Cancer in Minnesota, 1988 - 2008

Report to the Minnesota Legislature 2012

Minnesota Department of Health

March 2012

MINNESOTA MDH DEPARTMENT OF HEALTH

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Protecting, maintaining and improving the health of all Minnesotans

March 2012

Dear Colleague,

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

This report covers the 21-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 19 percent among males and by 10 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. The overall cancer incidence rate among males was increasing by 1.1 percent per year when trends were evaluated through the end of 2002; this has slowed down to an increase of 0.4 percent per year. Among females, the overall cancer incidence rate increased by 1.2 percent per year from 1995 to 2001, but then stabilized. Incidence rates for the four most common cancers (prostate, female breast, 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 26 percent more Minnesotans than heart disease in 2008. An estimated 211,070 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,

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Summary

This report describes the occurrence of cancer in Minnesota from 1988 through 2008 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 2008, 26,156 Minnesotans were diagnosed with cancer, and 9,439 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 2008, 26 percent more Minnesotans, or 1,988 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 19 percent among males and by ten percent among females. Liver and esophagus cancers are the only cancers that are significantly increasing.
- Progress in reversing the decades-long increase in the risk of developing cancer is more modest, but gains are being made. The overall cancer incidence rate among males was increasing by 1.1 percent per year when trends were evaluated through the end of 2002; this has slowed down to an increase of 0.4 percent per year. Among females, the overall cancer incidence rate increased by 1.2 percent per year from 1995 to 2001, but then stabilized.
- This deceleration in the rate of increase in the overall cancer incidence rate in Minnesota is being driven by encouraging trends in the four most common cancers: prostate (stable 1999-2008), female breast (stable since 2004), colon and rectum (declining significantly for both genders 1999-2008), and lung cancer (declining significantly for males since 1988, and stable among females since 2003).
- 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 (2,425 deaths) in 2008 than the next three leading cancers combined: colorectal (846), female breast (673) and prostate (546).
- Progress in reducing cancer rates is outstripped by growth and aging of the population. From 1988 to 2008, the number of Minnesotans diagnosed with cancer each year increased by 45 percent, and the number dying of cancer increased by seven 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 72 percent more likely to die of cancer. African Americans were three percent more likely to develop cancer than non-Hispanic whites and 33 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 seven percent comparing the region with the highest rate to the lowest. Considerably 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 (both genders), and uterine and prostate cancers, which were significantly elevated among non-Hispanic whites in Minnesota compared to those in the SEER 17 areas.
- Among American Indians, the overall cancer incidence and mortality rates in Minnesota were two times higher than nationally.
- On January 1, 2008, an estimated 211,070 Minnesotans, or 4.1 percent of the population, were living with a history of cancer.

The Minnesota Cancer Alliance and *Cancer Plan Minnesota*

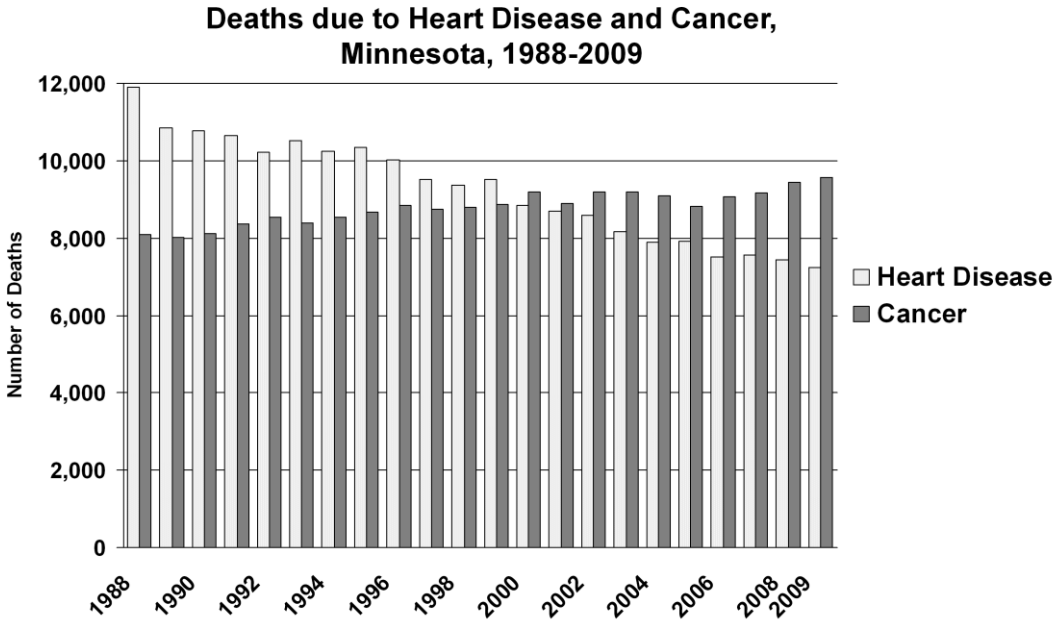
Established in 2005, the Minnesota Cancer Alliance (MCA) is a coalition of more than 100 organizations from diverse backgrounds and disciplines dedicated to reducing the burden of cancer across the continuum from prevention and detection to treatment, survivorship, and end of life care. The MCA supports 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 Elizabeth Moe, Project Coordinator, at 651-201-3608.



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

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.

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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 2008, 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 2012. 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.

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 538,581 cancers were registered with MCSS as of January 28, 2011. For the period covered by this report, January 1, 1988 to December 31, 2008, a total of 456,745 invasive cancers and nearly 34,000 *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, filed 21 years ago, 17,728 cancers were reported as diagnosed in 1988. The current database for 1988 contains information on 18,016 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 1988-2008 data included in this report was January 28, 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).

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 2008. 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, 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, 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 17 areas covering about 26 percent of the U.S. population, from the report *SEER Cancer Statistics Review, 1975-2008*. 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 3.9 percent of the Minnesota population during 2004-2008 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 17 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 2004-2008, 3.9 percent of invasive cancers in the SEER 17 registries were coded as clinical diagnoses. If all other factors were the same, one would therefore expect the overall cancer rate in Minnesota to be 3.9 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 clinical diagnoses, and Minnesota incidence rates may be artificially low for these sites. These include cancers of the liver (25% of cases reported as clinically diagnosed in SEER), pancreas (16%), brain (11%), 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 1988-2008, 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 2008 (the years for which death clearance has been performed), 5,365 (1.5%) were initially identified by death clearance and confirmed as reportable during follow-back, and another 4,875 (1.4%) remained DCO after follow-back was completed.

In December 2010, MCSS submitted a de-identified file of its provisional data through 2008 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.

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 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 1.3 percent of cases with unknown race for cases diagnosed 1995 forward.

Reporting the wrong race is a challenge as well as failure to report race. 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 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 1995-2008 increased by 49 percent because of the linkage; 79 percent of the cases reclassified as American Indian were originally reported to MCSS as white, 19 percent with unknown race,

and two 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 10 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 establish.

The ethnicity (Hispanic origin) of cancer patients is still more 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.naaccr.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 4.9 million, the 2000 census enumerated 168,813 African Americans, 142,797 Asian/Pacific Islanders, 52,009 American Indians, 143,382 Hispanics of any race, and 75,335 persons of mixed or "other" race, together representing 12 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 or may not match what the individual would report on the Census form. In order to match the Census definition of race, 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; thus the race as recorded in the medical record might be from the patient's self-report, or it 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, 2004-2008, 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 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 (2007-2008) 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 36 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 intended to be a framework for action to effectively 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 2008 data, Minnesota Cancer Surveillance System

Registry Element	Gold Standard	Silver Standard	MCSS Measure	Standard Achieved
1. Completeness of case ascertainment	95 %	90 %	105.3 %	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 %	0.0 %	Gold
5. Passing EDITS	100.0 %	97 %	100.0 %	Gold
6. Timeliness	Data submitted within 24 months of close of calendar year			Gold

Table I-2: Reports and Publications

Table I-2a: Publications co-authored by MCSS/MDH staff

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. 2011Summer;38(2):75-86.

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;60(36):1243-1247.

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

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

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

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

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Table I-3: Applications requesting data for research as of December 2011

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 deter mine 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 to assist in estimating response rates. (U of MN)
1997	Population-based pilot study of the quality of	Completed: MCSS identified and recruited a

* Year application submitted

Year*	Nature of Study	Status (Institution)
	life in cancer survivors	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 Indus try: 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 Regis tries	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

Year*	Nature of Study	Status (Institution)
		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 Endometrial Ablation in a Low Risk Population	Completed: The MCSS assisted in determining how many women who underwent endometrial ablation 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)

Year*	Nature of Study	Status (Institution)
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 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)

Year*	Nature of Study	Status (Institution)
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 will link 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)
2011	Adenoma Detection Rates and Missed Cancers	In process: This study is linking 60,000 records with MCSS to determine patient, procedure and physician reltated 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 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)

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 21-year period 1988-2008 are summarized in the third section, and geographical variation in cancer occurrence is discussed in the next section. The final section presents estimates of Minnesota cancer prevalence.

The total number of new cases and deaths due to cancer in Minnesota by gender and detailed cancer site over the five-year period 2004-2008 and the corresponding age-adjusted average annual incidence and mortality rates per 100,000 persons are presented in Table II-1. To calculate the average number of cases or deaths per year, divide the total number of cases or deaths over the five-year period by five. Annual counts and rates by year for the most common cancers are provided in Chapter III.

On average, 25,108 potentially serious cancers (13,336 in males and 11,772 in females) were diagnosed among Minnesotans each year over the five-year period 2004-2008 (Table II-1). These figures do not include common skin cancers or *in situ* cancers for sites other than the urinary bladder. The actual number of persons diagnosed with cancer was about 5.0 percent lower than the number of cancers diagnosed because some individuals were diagnosed with more than one cancer. The overall average annual age-adjusted incidence rate over the same five-year period was 475.6 new cases per 100,000 persons per year (561.1 and 413.9 for males and females, respectively).

Over the five-year period 2004-2008, an average of 9,117 Minnesotans died each year with cancer listed as the underlying cause of death on the death certificate (4,673 males and 4,444 females) (Table II-1). The age-adjusted mortality rate over the same five-year period was 171.3 deaths per 100,000 persons per year (208.7 for males and 147.5 for females). In 2000, cancer became the leading cause of death in Minnesota, surpassing heart disease. Cancer is now responsible for about one in every four (24.6%) deaths in Minnesota, while heart disease is responsible for one in five (19.4%).

Cancer is not a single disease, and does not have a single cause or a single cure. The more than 65 types of cancer listed in Table II-1 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 2004-2008, the overall cancer incidence rate was 36 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.

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

The fourth most commonly diagnosed cancer in Minnesota is urinary bladder cancer for men and uterine cancer in women. Urinary bladder cancer accounts for about seven percent of cancers diagnosed among males and uterine cancer accounts for about seven percent of the cancers among females. Non-Hodgkin lymphoma is the fifth most common cancer for each gender, accounting for nearly five percent of cancers diagnosed among Minnesotans. Melanoma of the skin is the sixth most commonly diagnosed cancer for each gender, accounting for roughly four percent of cancers.

Although prostate cancer and breast cancer are diagnosed much more frequently, lung and bronchus cancer is the leading cause of cancer mortality for each gender, accounting for 26 percent of cancer deaths in the state. In 2008, 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 2004-2008 in Minnesota. The overall cancer incidence rate increases by more than 100 fold with age, and the overall cancer mortality rate increases 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 are 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 80 percent of acute lymphocytic leukemias are 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 2004-2008, 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-7. Race- and sex-specific counts and rates are found in Table II-6 and in Chapter III.

American Indian/Alaska Native

Overall cancer rates for American Indians living in CHSDA counties are about 20 percent higher than for American Indians statewide, although the magnitude differs 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 2004-2008, an average of 208 American Indians in Minnesota were diagnosed with cancer each year, and on average, 132 were residents of CHSDA counties (Table III-1.4). During the same period, an average of 85 American Indians statewide died of cancer annually, and on average, 56 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-7 and Figure II-4). American Indians in CHSDA counties were 34 percent more likely to be diagnosed with cancer than non-Hispanic whites and 72 percent more likely to die of cancer.

During 2004-2008, the overall cancer incidence rate among American Indians was two times higher in Minnesota than in the SEER 17 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 the lowest overall cancer incidence rate 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 among American Indians in Minnesota compared to non-Hispanic whites was due to lung cancer. The lung cancer incidence rate was twice as high among American Indians as among non-Hispanic whites, and the lung cancer mortality rate was similarly elevated (Table II-7). Colorectal and kidney and renal pelvis cancers 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 these two cancers in Minnesota (Table II-7). American Indian women had the highest cervical cancer incidence rate in the state.

Asian/Pacific Islander

During the five-year period 2004-2008, an average of 256 Asian/Pacific Islanders in Minnesota were diagnosed with cancer each year and 98 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-7 and Figure II-4). Asian/Pacific Islanders were 44 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 16 percent lower in Minnesota than in the SEER Program, while mortality was 11 percent higher than in the U.S. as a whole (Figures II-4 and II-5).

Asian/Pacific Islanders in Minnesota and nationally 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, for which survival tends to be poor. Asian/Pacific Islanders in Minnesota were about four times more likely than non-Hispanic whites to be diagnosed with liver cancer and three times more likely to be diagnosed with stomach cancer (Table II-7). 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 2004-2008, an average of 533 blacks in Minnesota were diagnosed with cancer each year and 206 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-7 and Figure II-4), second only to American Indians. Blacks were three percent more likely to be diagnosed with cancer than non-Hispanic whites but 34 percent more likely to die of cancer.

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

Unlike nationally, where blacks had the highest incidence rate of many types of cancer compared to other race and ethnic groups, 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-7). Black males had the highest prostate cancer rates in Minnesota; incidence was 17 percent higher than among non-Hispanic whites, while mortality was 90 percent higher. Blacks also had the highest incidence rate in the state for liver cancer (five times higher than among non-Hispanic whites), pancreas cancer (two times higher than among non-Hispanic whites), Kaposi sarcoma (eight 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, 30 percent higher than among non-Hispanic white women.

Non-Hispanic White

During the five-year period 2004-2008, an average of 23,491 non-Hispanic white Minnesotans were diagnosed with cancer each year and 8,666 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-7 and Figure II-4).

Over the five-year period 2004-2008, the overall cancer incidence and mortality rates among non-Hispanic whites were five 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 cancer, non-Hodgkin lymphoma, urinary bladder cancer, 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 2004-2008, an average of 242 Hispanics in Minnesota were diagnosed with cancer each year and 57 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-7 and Figure II-4). Hispanics were 32 percent less likely to be diagnosed with cancer and 43 percent less likely to die of cancer than non-Hispanic whites.

The overall cancer incidence and mortality rates among Hispanics in Minnesota were very similar to those reported nationally.

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 and bladder cancers and non-Hodgkin lymphoma (Table II-7). 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 three times more likely than non-Hispanic whites to be diagnosed with liver cancer, and mortality was similarly elevated. Hispanic women in Minnesota had a significantly elevated incidence of cervical cancer; the rate was nearly three 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 2004 to 2008, 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-6). Prostate cancer is the most commonly diagnosed cancer among men, regardless of race and ethnicity (Table II-6). Lung and colorectal cancers are among the top three cancers, except for among Hispanic women, for women thyroid cancer ranks second and lung cancer sixth.

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 2008 were identified 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. It also calculates the linear trend during the interval between changes in trend, or over the entire time period if no changes in trend are identified. 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 drop significantly among both men and women since then (Figure II-6). Measured by the AAPC (1999-2008), the overall cancer mortality rate in Minnesota decreased significantly by 1.7 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 1.2 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 reduction in overall cancer mortality was, and 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. In their most recent report, the SEER program reported significant declines in the overall cancer incidence rate from 1999 to 2008 (AAPC) in some geographic areas and for some populations defined by race, ethnicity and gender.

Among the white population in the SEER 9 areas, the overall delay-adjusted cancer incidence rate from 1999 to 2008 (AAPC) declined significantly by 0.6 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 continued to increase significantly among males by 0.4 percent per year, but did not significantly change among females. 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 1999-2008 (Figures II-8 through II-11) and trends in Minnesota 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 in Minnesota declined significantly from 1999 to 2008 and have been dropping since cancer registration was initiated in 1988: male lung, colorectal (Figure II-12), brain and other nervous system, cervix, stomach, and ovary. 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 1999-2008.

For the two most common cancers, female breast (Figure II-13) and prostate, incidence rates did not change significantly from 1999 to 2008, while the mortality rates continued long standing, substantial and statistically significant declines. Hodgkin lymphoma and cancers of the oral cavity and pharynx 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), as well as urinary bladder in males, cancer of the uterus and leukemia. Three cancers showed statistically significant increases in incidence while mortality was significantly decreasing: non-Hodgkin lymphoma (Figure II-15) is the most common cancer in this group, along with testis cancer and myeloma among males.

Incidence and mortality rates both increased significantly for four cancers: esophagus, liver, female lung, and pancreas. Except for cancer of the pancreas, the major risk factors for these sites are well established, and for all four cancers, survival is relatively poor.

The ten-year trends for mesothelioma incidence and mortality were not statistically significant for either men or women, but the incidence of mesothelioma among males increased significantly from 1988 to 1999, and then stabilized. Among the cancers presented in Chapter III, no significant trends were found in either incidence or mortality for childhood cancers (all sites combined) or for myeloma and larynx cancer among females. Kaposi sarcoma declined among males, but the decline was not statistically significant; data were too sparse to calculate incidence trends for females or mortality trends for either gender.

In general, site-specific trends in Minnesota are very similar to national trends. There are two notable exceptions, lung (Figure II-16) and prostate cancer (Figure II-17). 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. In addition, the rate of decline in lung cancer mortality among males in Minnesota has consistently been about half that among white males in the SEER 9 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.

Another notable difference in cancer trends between Minnesota and the nation is in prostate cancer incidence, which is highly influenced by prostate specific antigen (PSA) testing. The prostate cancer incidence rate has been declining significantly among white males in the SEER 9 areas since about 2000; although the trend in Minnesota is also negative for that period, it is not statistically significant and is of smaller magnitude (Figure II-17). Whether this reflects changes in screening or changes in risk cannot be

determined from these data. But because prostate cancer accounts for one out of three cancers diagnosed among males, it has a large effect on the male overall cancer incidence trend. When SEER partitioned the decline in overall cancer incidence among males from 1999 to 2008, 47 percent of the decline was due to declines in prostate cancer incidence. This may partially explain the difference between SEER and Minnesota in overall cancer incidence trends among males noted at the beginning of this section, confounded perhaps by inherently less stable rates due to our smaller population.

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 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 6.6 percent over the 21-year period, from 1988 (445.6 new cases per 100,000 persons per year) to 2008 (474.9). At the same time, the number of Minnesotans diagnosed with a new cancer each year increased from 18,016 in 1988 to 26,156 in 2008, a 45.2 percent increase (Figure II-18). For overall cancer mortality, the age-adjusted rate decreased by 14.4 percent (from 199.5 in 1988 to 170.8 in 2008), but the number of Minnesotans dying from cancer each year still increased by seven percent (from 8,823 in 1988 to 9,439 in 2008)(Figure II-19). Both rates and counts are provided in the site-specific sections in Chapter III.

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 12.0 million Americans, or 3.9 percent of the U.S. population, were living with a history of cancer on January 1, 2008. This is eight times larger than the 1.4 million Americans estimated by the American Cancer Society to have been newly diagnosed with cancer during 2008.

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 approximate complete prevalence. 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 33-year) for the white population in the nine regions participating in the SEER Program since 1975 were calculated in SEER*Stat v. 7.0.4 for all sites combined and the most common cancers. Using the program ProjPrev v. 1.0.2 available from SEER, 33-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, 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. To calculate complete prevalence, 33-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 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 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, 2008, an estimated 211,070 Minnesotans were living with a history of cancer (Table II-8), or 4.1 percent of the Minnesota population. An estimated 73,000 of these survivors had been diagnosed in the previous five years (Table II-9), or 1.4 percent of Minnesotans. By comparison, a total of 26,156 Minnesotans were diagnosed with cancer in 2008.

The number of persons living with a history of cancer for up to five years is 11 percent higher for males (38,470) than females (34,530). However, the number of women ever diagnosed with cancer and alive on January 1, 2008 (111,230) is 11 percent higher than the number of men (99,840). This reflects the facts that men are more likely to be diagnosed with cancer, but life expectancy for women is five years longer than men.

The proportion of Minnesotans who were ever diagnosed with cancer and alive on January 1,

2008 increases with age (Table 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 (23.5%) have been diagnosed with cancer at some time during their lives.

Among female cancer survivors in Minnesota, two out of five (42% or 46,190 women) have a history of breast cancer; among male cancer survivors, two out of five (47% or 46,630 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 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 four most commonly diagnosed cancers (lung and bronchus, colon and rectum, female breast, and prostate). 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 2004-2008 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.

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

The Minnesota region with the highest overall cancer incidence rate (Central) was a modest seven percent higher than WC Minnesota, the region with the lowest rate (Figure II-21). 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 32 percent. Internationally, rates differ by as much as a factor of eight. Even within Minnesota, race-specific rates vary by two-fold (Figure II-4).

Although specific cancers may show more variation, the modest variation in the overall age-adjusted cancer incidence rate among non-Hispanic whites in Minnesota regions demonstrates a relatively high degree of homogeneity in cancer risk factors.

Lung cancer, which primarily reflects the smoking behaviors of the population two to three decades ago, varied considerably across regions. Lung cancer incidence rates varied by 28 percent between the highest (Central) and lowest (SW) regional rate (Figure II-22). For both sexes combined, lung cancer rates in SE, SC, SW, WC, and NW Minnesota were four to sixteen percent below the statewide rate. This was primarily due to lower female lung cancer rates in these regions (9% to 21% lower), although male rates (0% to 10% lower) also contributed to lower rates in these regions (Figures II-23 and II-24). In contrast, higher lung cancer rates for both males and females in Central Minnesota (over 9% higher than the statewide rate for each) gave that region the highest lung cancer rate of the eight regions. Although females in the Metro region had the highest regional rate (9% higher than the statewide rate for females), the Metro region male lung cancer rate differed very little from the state average. The regional differences in lung cancer incidence are very likely to be real (not an artifact of reporting or biopsy rates), since Minnesota lung cancer mortality rates closely parallel those of the incidence rates. Over time, it is likely that regional differences in lung cancer will become less pronounced as smoking rates around the state become more uniform.

Colon and rectum cancer incidence rates varied by 27 percent from the highest to lowest among Minnesota regions (Figure II-25). The Metro region had the lowest colorectal cancer incidence rate, five percent lower than the statewide rate. The SW and SC regions had significantly higher rates, 20 and 11 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.

Female breast cancer incidence rates showed smaller geographic differences within the state, varying by eleven percent comparing the highest (Metro) to the lowest (WC) regional rate (Figure II-26). Incidence rates ranged from four percent above the state average in the Metro region to nine and seven percent below the state average in the WC and Central regions, respectively. 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 will be discovered that would not have been identified had the cancer been allowed to take its natural course. 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 slightly 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 2004-2008, prostate cancer incidence rates varied by 16 percent from the highest to the lowest among Minnesota regions (Figure II-28). This is considerably less variation than seen from 1991 to 1995. The incidence rate in the Metro area was significantly lower than the state average (three percent lower), while the rate in the Central area was significantly higher by ten percent.

Prostate cancer incidence rates are influenced by the extent to which there are varying medical practices among the regions in the use of the PSA as a screening method for prostate cancer. It has been well documented that use (or lack of use) of the PSA test as a screening device is a significant factor in determining prostate cancer rates. 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 prostate cancer incidence in Minnesota.

Another notable and consistent regional pattern in cancer occurrence has been an increased incidence of mesothelioma, or 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 2004 and 2008, 45 men and 4 women in the NE region were diagnosed with mesothelioma, giving this region a significantly higher rate than statewide. The incidence rate for mesothelioma among men in NE Minnesota was just over twice that of the state incidence rate (Figure II-29), but no excess risk was found among women in NE Minnesota (Figure II-30). This significant difference between NE Minnesota and the state average only in males has been seen since the beginning of MCSS in 1988. This suggests an exposure unique to 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 certainly demonstrate a number of cautions that should be taken when examining regional variation.

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 two cancers that show the most striking geographic variation in Minnesota, lung cancer and mesothelioma, have well-known causes (smoking and asbestos exposure, respectively). It is likely that the observed geographic variation in these cancers can be explained by past geographic differences in smoking rates and work-related exposure to asbestos. Cancers of the colon and rectum, prostate, and, to a lesser extent, 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 average annual incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2004-2008

	Incidence						Mortality					
	New Cases 2004-2008			Average Annual Rate§			Deaths 2004-2008			Average Annual Rate§		
Cancer Site	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
All Sites Combined	66,681	58,858	125,539	561.1	413.9	475.6	23,365	22,219	45,584	208.7	147.5	171.3
Oral Cavity and Pharynx	1,986	1,028	3,014	15.9	7.1	11.2	351	206	557	2.9	1.3	2.0
Lip	232	81	313	2.1	0.6	1.2	4	0	4	0.0	0.0	0.0
Tongue	522	275	797	4.1	1.9	2.9	74	60	134	0.6	0.4	0.5
Salivary Gland	175	159	334	1.5	1.1	1.3	41	26	67	0.4	0.2	0.2
Floor of Mouth	140	72	212	1.1	0.5	0.8	8	3	11	0.1	0.0	0.0
Gum and Other Mouth	241	235	476	2.0	1.6	1.8	51	51	102	0.4	0.3	0.4
Nasopharynx	81	40	121	0.6	0.3	0.5	39	17	56	0.3	0.1	0.2
Tonsil	372	104	476	2.7	0.7	1.7	44	17	61	0.4	0.1	0.2
Oropharynx	63	16	79	0.5	0.1	0.3	22	13	35	0.2	0.1	0.1
Hypopharynx	142	38	180	1.2	0.3	0.7	19	3	22	0.2	0.0	0.1
Other Oral Cavity and Pharynx	18	8	26	0.1	0.1	0.1	49	16	65	0.4	0.1	0.2
Digestive System	11,287	9,782	21,069	95.5	66.4	79.5	5,837	4,962	10,799	51.0	32.0	40.3
Esophagus	1,077	305	1,382	8.9	2.1	5.2	922	250	1,172	7.8	1.7	4.4
Stomach	858	519	1,377	7.4	3.5	5.2	489	313	802	4.3	2.0	3.0
Small Intestine	340	307	647	2.8	2.1	2.4	73	51	124	0.6	0.3	0.5
Colon and Rectum	6,302	6,101	12,403	53.7	41.1	46.8	2,036	2,074	4,110	18.2	13.0	15.2
Colon excluding Rectum	4,326	4,754	9,080	37.6	31.8	34.3	1,646	1,802	3,448	14.8	11.2	12.7
Rectum and Rectosigmoid Junction	1,976	1,347	3,323	16.1	9.4	12.4	390	272	662	3.4	1.7	2.5
Anus, Anal Canal and Anorectum	117	194	311	0.9	1.3	1.1	10	31	41	0.1	0.2	0.1
Liver and Intrahepatic Bile Duct	813	336	1,149	6.5	2.3	4.3	785	440	1,225	6.6	3.0	4.6
Liver	714	267	981	5.7	1.9	3.6	590	234	824	4.9	1.6	3.1
Intrahepatic Bile Duct	99	69	168	0.8	0.5	0.6	195	206	401	1.7	1.4	1.5
Gallbladder	90	226	316	0.8	1.5	1.2	64	149	213	0.6	1.0	0.8
Other Biliary	193	160	353	1.7	1.1	1.4	61	74	135	0.6	0.5	0.5
Pancreas	1,379	1,294	2,673	11.7	8.8	10.1	1,341	1,433	2,774	11.8	9.3	10.4
Retroperitoneum	43	43	86	0.3	0.3	0.3	6	7	13	0.1	0.0	0.0
Peritoneum, Omentum and Mesentery	9	243	252	0.1	1.7	1.0	9	96	105	0.1	0.7	0.4
Other Digestive Organs	66	54	120	0.6	0.4	0.5	41	44	85	0.4	0.3	0.3

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Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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-1: Number of new cases and deaths and average annual incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2004-2008 (continued)

	Incidence						Mortality					
	New Cases 2004-2008			Average Annual Rate§			Deaths 2004-2008			Average Annual Rate§		
Cancer Site	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Respiratory System	8,660	7,273	15,933	74.5	51.7	61.4	6,682	5,468	12,150	59.0	37.8	46.6
Nose, Nasal Cavity and Middle Ear	92	80	172	0.8	0.6	0.6	22	23	45	0.2	0.2	0.2
Larynx	704	190	894	5.8	1.3	3.4	204	52	256	1.7	0.4	1.0
Lung and Bronchus	7,821	6,984	14,805	67.6	49.6	57.1	6,444	5,386	11,830	56.9	37.2	45.4
Pleura	4	1	5	0.0	0.0	0.0	3	1	4	0.0	0.0	0.0
Trachea, Mediastinum, and Other	39	18	57	0.3	0.1	0.2	9	6	15	0.1	0.0	0.1
Mesothelioma (all sites)†	244	81	325	2.2	0.5	1.3	211	61	272	2.0	0.4	1.0
Bones and Joints	163	113	276	1.3	0.9	1.1	75	64	139	0.6	0.5	0.5
Soft Tissue including Heart	457	409	866	3.8	2.9	3.3	173	162	335	1.5	1.1	1.2
Skin ††	3,434	2,906	6,340	28.5	21.3	24.0	518	302	820	4.5	2.0	3.0
Melanoma of the Skin	3,093	2,609	5,702	25.6	19.2	21.6	378	239	617	3.2	1.6	2.3
Other Non-Epithelial Skin	341	297	638	3.0	2.0	2.4	140	63	203	1.2	0.4	0.7
Kaposi Sarcoma (all sites)	53	8	61	0.4	0.1	0.2	2	2	4	0.0	0.0	0.0
Breast	161	17,913	18,074	1.4	126.4	67.4	24	3,229	3,253	0.2	21.5	12.0
Female Genital System	-	7,136	-	-	50.3	-	-	2,269	-	-	15.2	-
Cervix Uteri	-	807	-	-	6.1	-	-	222	-	-	1.6	-
Corpus and Uterus, NOS	-	3,963	-	-	27.7	-	-	631	-	-	4.2	-
Ovary ‡	-	1,773	-	-	12.5	-	-	1,243	-	-	8.4	-
Vagina	-	87	-	-	0.6	-	-	21	-	-	0.1	-
Vulva	-	383	-	-	2.6	-	-	103	-	-	0.6	-
Other Female Genital Organs	-	123	-	-	0.9	-	-	49	-	-	0.3	-
Male Genital System	23,143	-	-	192.4	-	-	2,628	-	-	25.5	-	-
Prostate	22,113	-	-	184.2	-	-	2,577	-	-	25.1	-	-
Testis	863	-	-	6.8	-	-	21	-	-	0.2	-	-
Penis	112	-	-	1.0	-	-	27	-	-	0.2	-	-
Other Male Genital Organs	55	-	-	0.5	-	-	3	-	-	0.0	-	-

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Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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-1: Number of new cases and deaths and average annual incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2004-2008 (continued)

	Incidence						Mortality					
	New Cases 2004-2008			Average Annual Rate§			Deaths 2004-2008			Average Annual Rate§		
Cancer Site	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urinary System	7,310	3,048	10,358	63.1	21.1	39.4	1,529	772	2,301	13.8	4.9	8.6
Urinary Bladder	4,562	1,432	5,994	40.7	9.7	22.9	771	303	1,074	7.3	1.9	4.0
Kidney and Renal Pelvis	2,610	1,529	4,139	21.1	10.8	15.6	721	427	1,148	6.2	2.8	4.3
Ureter	87	62	149	0.8	0.4	0.6	14	21	35	0.1	0.1	0.1
Other Urinary Organs	51	25	76	0.5	0.2	0.3	23	21	44	0.2	0.1	0.2
Eye and Orbit	100	71	171	0.8	0.5	0.6	13	8	21	0.1	0.0	0.1
Brain and Other Nervous System	938	696	1,634	7.5	5.2	6.3	632	514	1,146	5.2	3.6	4.3
Brain	889	658	1,547	7.2	4.9	5.9	-	-	-	-	-	-
Other Nervous System	49	38	87	0.4	0.3	0.3	-	-	-	-	-	-
Endocrine System	799	2,063	2,862	6.3	15.7	11.0	91	118	209	0.8	0.8	0.8
Thyroid	703	1,988	2,691	5.5	15.1	10.3	52	82	134	0.4	0.5	0.5
Other Endocrine including Thymus	96	75	171	0.8	0.6	0.7	39	36	75	0.3	0.3	0.3
Lymphoma	3,595	2,955	6,550	30.2	20.7	24.9	1,110	899	2,009	10.0	5.8	7.5
Hodgkin Lymphoma	422	342	764	3.4	2.6	3.0	59	51	110	0.5	0.4	0.4
Non-Hodgkin Lymphoma	3,173	2,613	5,786	26.9	18.1	21.9	1,051	848	1,899	9.5	5.4	7.1
Myeloma	874	616	1,490	7.5	4.3	5.7	518	461	979	4.6	3.0	3.7
Leukemia	2,435	1,652	4,087	20.7	11.4	15.5	1,185	862	2,047	10.8	5.7	7.7
Lymphocytic Leukemia	1,439	884	2,323	12.2	6.1	8.8	417	259	676	3.9	1.7	2.5
Acute Lymphocytic Leukemia	209	162	371	1.6	1.3	1.5	69	38	107	0.6	0.3	0.4
Chronic Lymphocytic Leukemia	1,136	691	1,827	9.7	4.6	6.9	328	208	536	3.1	1.3	2.0
Other Lymphocytic Leukemia	94	31	125	0.8	0.2	0.5	20	13	33	0.2	0.1	0.1
Myeloid and Monocytic Leukemia	925	712	1,637	8.0	4.9	6.2	592	462	1,054	5.3	3.1	4.0
Acute Myeloid Leukemia	537	436	973	4.6	3.1	3.7	477	383	860	4.2	2.6	3.3
Acute Monocytic Leukemia	34	40	74	0.3	0.3	0.3	7	4	11	0.1	0.0	0.0
Chronic Myeloid Leukemia	335	223	558	2.9	1.5	2.1	47	42	89	0.4	0.3	0.3
Other Myeloid/Monocytic Leukemia	19	13	32	0.2	0.1	0.1	61	33	94	0.6	0.2	0.3
Other Leukemia	71	56	127	0.6	0.4	0.5	176	141	317	1.6	0.9	1.2
Miscellaneous	1,042	1,108	2,150	9.0	7.4	8.1	1,785	1,860	3,645	16.1	11.9	13.6

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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-2: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2004-2008, all races combined, males

	Age at Diagnosis (Years)																	
Cancer Site	**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	23.9	13.4	14.8	24.1	35.5	51.9	71.5	93.4	152	273	556	987	1545	2312	2891	3223	3279	2969
Oral Cavity and Pharynx	0.0	0.2	0.1	0.2	1.4	1.6	2.7	4.1	8.6	18.1	28.8	39.1	40.3	53.3	58.6	63.9	78.6	69.7
Lip	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.3	1.2	1.1	1.5	1.6	3.6	7.2	10.5	12.0	15.2	21.2
Tongue	0.0	0.0	0.0	0.0	0.2	0.5	0.7	1.6	2.2	5.6	8.5	11.6	12.6	14.0	11.7	15.4	14.2	10.2
Salivary Gland	0.0	0.0	0.0	0.1	0.8	0.2	0.2	0.4	0.4	1.2	1.9	1.6	1.8	3.1	6.5	6.4	13.6	16.4
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6	1.3	2.9	2.9	2.5	4.8	4.3	3.0	4.7	3.4
Gum and Other Mouth	0.0	0.0	0.0	0.1	0.0	0.3	0.5	1.0	0.3	0.8	1.5	4.5	5.2	8.4	7.4	9.8	16.2	13.7
Nasopharynx	0.0	0.2	0.1	0.0	0.3	0.2	0.4	0.3	0.9	0.5	1.4	1.1	1.8	1.4	2.2	2.3	1.0	0.7
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	2.9	5.9	8.1	11.6	6.3	7.0	7.4	6.0	3.1	0.7
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.1	2.0	1.8	2.2	1.5	1.9	2.6	0.0
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	1.2	1.7	1.7	4.3	5.1	6.2	5.6	7.9	2.7
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	0.1	0.7	0.4	0.0	0.9	1.5	0.0	0.7
Digestive System	1.3	0.3	0.6	0.4	1.9	3.2	6.1	15.8	30.6	59.2	113	165	229	332	465	541	655	656
Esophagus	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.8	2.4	6.8	12.8	18.0	26.4	32.1	41.3	48.5	54.0	47.1
Stomach	0.0	0.0	0.0	0.0	0.2	0.0	0.4	1.1	2.6	3.7	5.8	10.1	17.4	24.6	35.4	47.3	57.1	66.9
Small Intestine	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.8	0.9	2.5	4.1	4.6	6.7	10.1	12.3	17.7	18.3	12.3
Colon and Rectum	0.0	0.1	0.2	0.1	1.0	1.8	3.2	10.6	17.7	31.8	63.2	85.5	119	181	258	310	380	414
Colon excluding Rectum	0.0	0.1	0.2	0.1	0.6	1.4	1.8	6.9	10.0	16.8	34.8	53.0	76.6	127	189	231	288	340
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.0	0.3	0.5	1.3	3.7	7.7	15.0	28.5	32.5	42.8	54.0	69.4	79.3	91.2	74.5
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.7	1.5	1.5	2.5	2.0	4.6	2.5	3.8	1.6	3.4
Liver and Intrahepatic Bile Duct	1.1	0.1	0.2	0.2	0.1	0.6	0.7	0.7	1.8	5.5	12.3	19.2	18.2	20.5	26.8	25.9	34.1	26.0
Liver	1.1	0.1	0.2	0.2	0.1	0.3	0.7	0.3	1.4	5.0	11.1	17.6	16.4	18.1	22.2	23.7	27.8	19.8
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.4	0.5	1.2	1.6	1.8	2.4	4.6	2.3	6.3	6.1
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.7	1.3	2.7	5.2	6.0	9.4	4.8
Other Biliary	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.7	1.0	1.0	2.2	2.5	6.3	8.6	12.4	13.6	13.0
Pancreas	0.0	0.0	0.0	0.0	0.3	0.2	0.6	1.1	3.6	5.1	10.7	20.4	34.3	46.5	68.4	62.7	79.1	62.8
Retroperitoneum	0.2	0.1	0.0	0.1	0.2	0.1	0.0	0.3	0.2	0.3	0.2	0.9	0.2	1.7	1.2	1.1	1.6	0.7
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	0.0	0.0	0.2	0.3	0.8	0.0	0.7
Other Digestive Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.7	0.9	1.7	4.3	4.1	6.3	4.8

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Source: MCSS January 2011. 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-2: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2004-2008, all races combined, males (continued)

	Age at Diagnosis (Years)																	
Cancer Site	**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	0.3	0.1	0.2	0.4	0.6	0.7	1.6	3.3	12.0	27.8	59.5	108	206	320	440	541	503	355
Nose, Nasal Cavity and Middle Ear	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.3	0.9	1.1	2.0	1.3	1.9	2.8	5.3	3.7	4.1
Larynx	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	2.2	3.6	7.4	11.7	19.4	26.5	32.4	29.7	26.2	21.2
Lung and Bronchus	0.2	0.0	0.1	0.3	0.3	0.2	0.7	2.6	9.1	23.3	50.5	93.4	185	290	404	506	471	329
Pleura	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	0.0	0.4	0.5	0.7
Trachea, Mediastinum, and Other	0.1	0.1	0.0	0.1	0.1	0.5	0.7	0.2	0.4	0.1	0.4	0.4	0.2	0.7	0.9	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	0.1	0.6	0.1	0.9	5.6	8.9	9.6	23.7	20.4	18.4
Bones and Joints	0.0	0.7	0.8	2.1	1.6	1.0	0.6	0.7	1.0	1.0	0.8	1.1	2.0	3.6	2.5	3.8	4.7	4.8
Soft Tissue including Heart	2.0	1.2	1.1	2.1	1.3	1.6	1.2	1.8	2.6	2.7	4.7	5.8	3.4	8.2	14.5	15.0	18.3	20.5
Skin ††	0.3	0.1	0.3	0.8	2.7	5.7	10.2	15.8	19.2	24.6	33.3	50.2	66.2	82.9	106	138	156	176
Melanoma of the Skin	0.3	0.1	0.3	0.7	2.6	4.9	8.6	14.4	17.6	22.5	32.2	46.2	60.8	76.9	95.6	123	133	140
Other Non-Epithelial Skin	0.0	0.0	0.0	0.1	0.1	0.8	1.6	1.5	1.6	2.1	1.2	4.1	5.4	6.0	10.2	15.4	23.1	36.2
Kaposi Sarcoma (all sites)	0.0	0.0	0.0	0.0	0.1	0.5	1.1	0.9	0.6	1.1	0.3	0.8	0.2	0.2	0.0	0.0	1.0	0.7
Breast	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.4	0.8	1.4	1.8	3.1	5.3	6.5	11.3	7.9	8.9
Female Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cervix Uteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corpus and Uterus, NOS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ovary ‡	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vagina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulva	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Female Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Male Genital System	0.3	0.1	0.1	5.7	11.8	16.6	20.0	13.5	21.0	49.7	177	396	675	1019	1145	1064	865	665
Prostate	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.9	8.5	41.6	173	393	671	1010	1137	1055	850	654
Testis	0.2	0.1	0.1	5.5	11.7	16.4	19.8	12.5	12.2	6.8	4.1	2.1	0.9	2.4	2.2	1.1	1.6	0.0
Penis	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	1.2	0.3	1.1	1.4	5.1	3.7	5.6	9.4	7.5
Other Male Genital Organs	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.5	0.5	1.3	1.7	2.5	2.6	4.2	3.4

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Source: MCSS January 2011. 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-2: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2004-2008, all races combined, males (continued)

	Age at Diagnosis (Years)																	
Cancer Site	**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	3.1	1.4	0.2	0.1	0.3	1.9	3.4	7.4	16.6	31.0	53.7	94.3	140	234	321	405	467	470
Urinary Bladder	0.0	0.0	0.0	0.1	0.2	0.5	1.1	1.7	4.7	10.8	22.4	47.0	76.8	142	224	296	361	400
Kidney and Renal Pelvis	3.1	1.4	0.2	0.0	0.1	1.5	2.3	5.6	11.8	19.9	30.6	46.4	61.5	87.5	90.3	99.2	91.7	58.7
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.5	1.3	3.9	4.0	5.3	10.0	5.5
Other Urinary Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.2	0.4	0.9	0.7	2.5	3.8	4.2	5.5
Eye and Orbit	0.7	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.7	1.0	1.3	2.7	3.1	1.8	2.6	4.7	5.5
Brain and Other Nervous System	3.3	2.4	3.5	2.0	3.1	3.4	5.2	6.5	4.9	7.7	9.4	12.5	14.4	18.1	27.1	23.3	17.8	17.8
Brain	3.3	2.3	3.0	1.8	2.5	3.3	5.0	6.0	4.9	7.0	9.0	11.8	13.5	17.8	25.9	22.5	17.3	17.8
Other Nervous System	0.0	0.1	0.6	0.2	0.5	0.1	0.2	0.4	0.0	0.7	0.4	0.7	0.9	0.2	1.2	0.8	0.5	0.0
Endocrine System	1.4	0.7	0.7	1.4	1.6	3.3	5.2	6.1	8.3	8.1	10.1	11.6	12.4	14.7	16.6	15.4	16.8	8.9
Thyroid	0.1	0.1	0.3	1.0	1.5	2.9	4.7	6.1	7.5	7.5	9.4	10.1	11.0	12.8	14.5	13.9	14.2	8.2
Other Endocrine including Thymus	1.3	0.6	0.3	0.3	0.1	0.3	0.5	0.0	0.8	0.6	0.8	1.4	1.4	1.9	2.2	1.5	2.6	0.7
Lymphoma	0.7	2.2	3.1	5.4	6.4	8.5	9.0	11.3	15.7	22.2	31.8	42.6	64.7	88.0	121	164	173	198
Hodgkin Lymphoma	0.1	0.5	1.5	3.3	4.4	5.4	4.4	3.1	4.0	2.7	2.4	3.7	3.2	4.8	5.9	9.4	4.7	5.5
Non-Hodgkin Lymphoma	0.6	1.7	1.5	2.1	2.0	3.1	4.6	8.1	11.7	19.5	29.5	38.9	61.5	83.1	115	154	168	193
Myeloma	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.8	2.1	3.7	6.5	12.6	17.3	29.6	42.2	49.6	49.8	41.0
Leukemia	9.7	3.4	4.0	3.2	2.5	3.3	3.5	3.7	5.3	10.3	17.1	28.4	45.8	64.6	80.4	110	148	167
Lymphocytic Leukemia	7.8	2.6	2.3	2.0	0.5	0.8	0.8	1.7	2.7	5.4	10.7	19.2	28.6	41.2	50.2	59.7	81.8	93.6
Acute Lymphocytic Leukemia	7.8	2.6	2.3	2.0	0.5	0.5	0.8	0.7	0.5	0.4	1.2	1.1	1.4	1.7	1.2	1.5	1.6	0.7
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	1.5	4.0	8.6	16.6	25.7	37.4	45.6	54.8	77.1	87.4
Other Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.7	1.0	0.9	1.6	1.4	2.2	3.4	3.4	3.1	5.5
Myeloid and Monocytic Leukemia	1.2	0.7	1.3	1.3	1.7	2.4	2.7	2.0	2.5	4.6	5.9	8.3	16.5	22.4	29.0	47.7	59.8	65.6
Acute Myeloid Leukemia	1.0	0.5	1.2	0.8	0.7	0.9	1.1	1.0	1.6	2.7	4.0	4.7	10.1	15.2	18.5	27.0	26.7	36.2
Acute Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.1	0.4	0.4	0.5	0.9	2.3	2.1	4.1
Chronic Myeloid Leukemia	0.2	0.1	0.1	0.4	1.0	1.4	1.5	0.9	0.6	1.4	1.7	3.2	6.1	6.5	9.6	17.3	29.9	20.5
Other Myeloid/Monocytic Leukemia	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.0	1.1	1.0	4.8
Other Leukemia	0.7	0.1	0.3	0.0	0.3	0.1	0.0	0.0	0.1	0.3	0.4	0.9	0.7	1.0	1.2	2.6	6.3	7.5
Miscellaneous	0.7	0.1	0.1	0.2	0.1	0.5	0.6	1.5	2.3	3.7	7.8	15.3	17.1	28.2	33.6	51.8	91.7	85.4

Source: MCSS January 2011. 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, 2004-2008, all races combined, females

	Age at Diagnosis (Years)																	
Cancer Site	**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	21.7	9.5	11.8	22.1	41.6	75.4	114	177	280	431	598	782	1065	1395	1619	1858	1940	1583
Oral Cavity and Pharynx	0.0	0.1	0.5	0.2	1.0	1.3	2.3	2.0	5.0	8.2	10.8	14.1	20.5	23.4	25.4	28.5	31.2	33.1
Lip	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.5	0.7	0.7	0.5	1.4	1.1	2.4	4.6	2.7	2.9
Tongue	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.5	1.8	2.3	2.8	4.6	6.2	6.2	6.4	5.8	6.8	8.6
Salivary Gland	0.0	0.1	0.1	0.2	0.3	0.4	0.8	0.5	0.9	1.7	1.1	2.2	2.4	3.3	4.2	3.8	4.1	4.6
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.0	1.2	1.2	2.4	1.3	1.7	3.1	2.3
Gum and Other Mouth	0.0	0.0	0.2	0.0	0.1	0.2	0.3	0.5	0.5	1.5	1.8	2.6	3.6	4.6	5.8	9.9	9.2	12.4
Nasopharynx	0.0	0.0	0.1	0.0	0.3	0.2	0.1	0.3	0.3	0.2	0.7	0.4	1.2	1.1	0.3	0.0	1.0	0.0
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.7	1.0	2.1	1.8	3.3	2.9	1.9	0.9	2.0	1.1
Oropharynx	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	0.4	0.8	0.3	1.0	0.3
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.5	0.5	1.0	1.1	1.3	0.9	1.4	0.9
Other Oral Cavity and Pharynx	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	0.2	1.1	0.6	0.0	0.0
Digestive System	0.6	0.0	0.4	0.8	1.4	3.0	8.0	12.4	21.5	40.5	71.9	100	147	226	324	407	476	461
Esophagus	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.4	0.9	1.1	5.0	5.5	9.7	10.3	15.1	10.2	12.6
Stomach	0.0	0.0	0.1	0.0	0.1	0.6	0.9	1.1	1.6	2.0	3.7	4.1	6.7	8.2	16.2	25.3	23.1	29.3
Small Intestine	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.7	0.9	2.5	3.2	6.0	4.7	6.8	10.1	9.3	10.5	7.5
Colon and Rectum	0.0	0.0	0.0	0.3	0.9	1.8	5.4	7.5	15.1	25.6	45.2	55.6	80.0	131	200	253	316	318
Colon excluding Rectum	0.0	0.0	0.0	0.2	0.7	1.2	3.3	4.6	9.7	15.8	26.0	37.4	59.0	102	159	212	273	274
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.1	0.2	0.6	2.2	2.9	5.4	9.8	19.2	18.2	21.0	29.1	41.1	40.9	43.8	43.4
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.5	2.2	3.9	4.2	3.6	4.0	2.9	3.5	5.1	5.2
Liver and Intrahepatic Bile Duct	0.6	0.0	0.1	0.2	0.3	0.0	0.3	0.5	0.7	1.8	3.3	3.0	6.6	9.3	11.9	12.2	12.6	10.6
Liver	0.6	0.0	0.1	0.2	0.3	0.0	0.3	0.5	0.5	1.5	2.7	2.4	5.2	7.7	9.3	9.3	9.5	7.8
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.5	0.7	1.4	1.5	2.6	2.9	3.1	2.9
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.7	0.5	2.9	4.1	6.4	8.2	9.6	13.9	8.9
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.4	0.7	1.2	1.9	3.8	6.4	6.4	11.9	8.0
Pancreas	0.0	0.0	0.1	0.1	0.1	0.1	0.5	1.6	1.1	3.6	7.0	13.6	26.6	34.9	46.6	57.5	61.4	54.3
Retroperitoneum	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.8	0.5	0.7	2.2	0.8	1.5	1.0	0.3
Peritoneum, Omentum and Mesentery	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.5	1.9	3.8	6.2	8.6	9.3	11.0	7.8	4.0
Other Digestive Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.7	0.4	0.9	0.9	1.3	3.2	2.7	2.3

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Source: MCSS January 2011. 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-3: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2004-2008, all races combined, females (continued)

	Age at Diagnosis (Years)																	
Cancer Site	**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	0.6	0.0	0.0	0.2	0.7	1.1	1.4	3.4	12.6	30.3	48.9	81.3	159	243	313	347	274	143
Nose, Nasal Cavity and Middle Ear	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.2	0.6	1.2	0.9	1.4	0.9	3.2	2.6	3.4	2.0
Larynx	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.5	1.3	1.6	2.5	7.2	7.1	5.0	6.7	4.1	2.0
Lung and Bronchus	0.0	0.0	0.0	0.1	0.4	1.0	1.3	3.1	11.7	28.2	45.9	77.6	151	235	304	337	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	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Trachea, Mediastinum, and Other	0.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.3	0.2	0.3	0.0	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	0.1	0.1	0.8	0.3	1.2	2.4	2.6	3.5	3.4	5.2
Bones and Joints	0.1	0.6	0.9	1.4	0.9	1.1	0.6	0.3	0.9	0.5	1.0	0.7	0.9	1.1	1.9	1.5	1.7	1.7
Soft Tissue including Heart	3.7	1.1	1.1	0.5	0.9	1.6	1.3	1.6	2.0	3.2	4.2	3.9	4.8	5.7	8.5	8.1	12.6	10.6
Skin ††	0.0	0.2	0.4	2.7	10.8	18.1	17.0	24.3	29.6	32.3	30.8	33.7	32.4	43.2	46.4	56.9	60.1	54.6
Melanoma of the Skin	0.0	0.2	0.1	2.4	10.3	17.5	15.7	23.0	28.8	30.1	29.3	30.8	29.8	39.7	38.7	45.6	45.5	38.8
Other Non-Epithelial Skin	0.0	0.0	0.2	0.3	0.4	0.6	1.3	1.3	0.8	2.1	1.4	2.9	2.6	3.5	7.7	11.3	14.6	15.8
Kaposi Sarcoma (all sites)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.6
Breast	0.0	0.0	0.0	0.3	1.2	7.0	25.4	62.1	115	189	232	284	362	418	420	450	462	363
Female Genital System	0.1	0.0	0.9	2.4	3.3	10.1	19.9	22.3	34.1	54.7	97.5	136	154	177	164	159	171	131
Cervix Uteri	0.0	0.0	0.0	0.4	1.4	5.8	10.2	8.9	10.6	10.9	9.5	10.8	8.8	8.2	9.8	8.7	6.1	7.2
Corpus and Uterus, NOS	0.0	0.0	0.0	0.1	0.2	1.6	4.3	6.6	12.2	27.0	58.0	87.4	102	114	98.0	85.4	94.7	60.4
Ovary ‡	0.0	0.0	0.9	1.7	1.5	1.9	4.2	5.2	8.8	13.8	24.2	30.1	33.8	39.5	41.1	47.3	49.2	35.9
Vagina	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	1.1	1.2	1.6	1.5	3.2	4.6	2.7	2.3
Vulva	0.0	0.0	0.0	0.0	0.1	0.4	0.8	1.1	2.1	2.0	3.3	3.9	5.0	8.8	8.7	9.6	16.6	22.4
Other Female Genital Organs	0.0	0.0	0.0	0.1	0.0	0.4	0.4	0.2	0.2	0.9	1.4	2.4	2.8	4.6	3.2	3.2	1.4	2.3
Male Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prostate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Testis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Penis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Male Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Source: MCSS January 2011. 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-3: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2004-2008, all races combined, females (continued)

	Age at Diagnosis (Years)																	
Cancer Site	**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	1.4	0.4	0.4	0.3	0.9	1.2	2.9	3.9	8.1	15.3	24.8	37.8	54.1	75.4	96.7	126	130	104
Urinary Bladder	0.0	0.0	0.0	0.2	0.2	0.2	0.4	1.4	1.7	5.2	9.5	13.5	21.0	35.3	46.6	67.1	74.6	69.6
Kidney and Renal Pelvis	1.4	0.4	0.4	0.1	0.7	1.0	2.5	2.5	6.3	9.9	14.8	23.8	31.7	37.9	47.7	53.4	50.6	29.9
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.2	2.0	2.1	4.6	3.7	2.3
Other Urinary Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.3	0.2	0.2	0.3	0.3	1.4	2.3
Eye and Orbit	1.5	0.1	0.0	0.0	0.1	0.0	0.4	0.0	0.1	0.5	0.7	0.9	0.3	1.3	2.6	1.2	1.0	2.6
Brain and Other Nervous System	3.2	2.4	2.3	2.3	1.6	3.9	2.3	3.3	4.2	5.6	6.0	8.1	11.4	15.7	13.2	13.4	15.3	5.7
Brain	2.9	2.2	2.2	2.0	1.5	3.8	1.9	3.1	3.7	5.3	5.7	8.0	11.4	14.8	12.7	12.8	14.9	5.2
Other Nervous System	0.3	0.2	0.1	0.2	0.1	0.1	0.4	0.2	0.5	0.3	0.3	0.1	0.0	0.9	0.5	0.6	0.3	0.6
Endocrine System	0.9	0.5	1.1	3.7	10.1	16.8	20.6	25.8	28.2	24.1	27.5	22.0	25.5	20.3	18.3	16.0	17.0	9.5
Thyroid	0.0	0.4	0.8	3.6	9.9	16.3	20.1	25.2	27.8	23.7	26.7	21.4	25.0	18.8	16.4	14.5	14.9	9.2
Other Endocrine including Thymus	0.9	0.1	0.2	0.1	0.2	0.5	0.5	0.6	0.4	0.4	0.8	0.5	0.5	1.5	1.9	1.5	2.0	0.3
Lymphoma	0.2	0.9	1.2	4.5	6.6	7.8	8.5	9.5	11.3	14.7	21.5	29.1	43.8	71.3	78.1	105	125	96.3
Hodgkin Lymphoma	0.0	0.4	0.7	3.2	5.0	6.0	4.4	2.9	2.0	1.0	2.0	1.7	2.4	4.9	3.2	5.2	4.8	2.0
Non-Hodgkin Lymphoma	0.2	0.5	0.5	1.3	1.6	1.8	4.0	6.7	9.3	13.8	19.5	27.4	41.4	66.4	75.0	99.9	121	94.3
Myeloma	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.8	2.4	4.2	7.3	10.7	15.0	25.2	29.9	28.2	20.7
Leukemia	8.5	3.2	2.6	2.6	2.1	2.1	2.8	3.3	4.4	6.5	10.4	14.2	20.7	33.1	45.3	58.7	68.5	75.0
Lymphocytic Leukemia	6.3	2.7	1.6	1.5	0.7	0.5	0.6	0.7	1.1	2.9	4.9	7.5	12.4	20.7	27.3	31.7	32.9	40.5
Acute Lymphocytic Leukemia	6.3	2.7	1.6	1.5	0.7	0.5	0.6	0.3	0.3	0.7	0.3	0.7	0.7	1.1	1.3	0.9	1.0	0.6
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	2.1	4.2	6.5	11.6	19.2	25.4	30.5	29.2	38.2
Other Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.4	0.3	0.2	0.4	0.5	0.3	2.7	1.7
Myeloid and Monocytic Leukemia	1.9	0.4	0.6	1.1	1.3	1.3	2.2	2.5	3.3	3.4	5.1	6.4	7.9	11.5	16.2	25.8	33.6	30.5
Acute Myeloid Leukemia	1.3	0.2	0.4	0.8	1.0	1.2	1.1	1.8	2.4	2.0	2.8	3.4	4.8	7.7	10.9	14.5	19.0	18.1
Acute Monocytic Leukemia	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.3	0.7	0.5	0.7	0.5	1.5	2.4	1.1
Chronic Myeloid Leukemia	0.3	0.1	0.1	0.3	0.3	0.0	1.0	0.6	0.8	1.1	1.9	2.1	2.2	3.1	4.8	9.3	10.9	10.9
Other Myeloid/Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.0	0.0	0.6	1.4	0.3
Other Leukemia	0.3	0.1	0.4	0.0	0.1	0.2	0.0	0.1	0.0	0.2	0.3	0.4	0.3	0.9	1.9	1.2	2.0	4.0
Miscellaneous	0.8	0.0	0.2	0.2	0.1	0.4	0.1	1.7	2.3	3.6	4.9	8.9	16.7	23.4	35.0	47.0	61.1	65.3

Source: MCSS January 2011. 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 cancer deaths by cancer site, Minnesota, 2004-2008, all races combined, males

	Age at Death (Years)																	
Cancer Site	**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	2.3	2.4	1.8	3.2	4.6	7.2	7.0	15.4	29.3	64.0	128	233	394	639	971	1359	1887	2629
Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.5	2.2	3.5	5.5	9.2	9.6	9.2	15.0	20.4	28.7
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	0.7
Tongue	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.3	0.6	1.2	0.8	1.8	2.2	1.8	1.9	3.1	6.1
Salivary Gland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.7	1.0	1.2	1.5	4.7	6.8
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	0.0	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	0.3	0.2	0.9	1.8	0.7	1.2	2.3	2.1	8.2
Nasopharynx	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.6	0.6	0.8	0.5	1.9	1.2	1.1	0.5	0.0
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.9	1.3	0.5	1.2	3.4	2.6	0.0
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.9	1.9	0.3	0.4	1.6	0.7
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.4	0.7	0.2	0.0	0.4	2.6	1.4
Other Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.1	0.9	1.0	1.8	3.8	3.1	4.1
Digestive System	0.2	0.1	0.2	0.1	0.4	1.5	2.1	4.1	9.7	20.5	42.5	72.9	113	160	241	308	409	566
Esophagus	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.4	1.5	4.4	8.0	13.4	22.3	28.9	37.6	50.0	48.7	58.1
Stomach	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.1	1.1	2.4	2.6	4.2	9.9	11.1	18.2	25.2	42.5	56.7
Small Intestine	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.9	0.9	2.7	2.8	3.8	4.7	8.9
Colon and Rectum	0.0	0.0	0.1	0.0	0.0	1.0	0.6	1.9	3.8	5.9	12.0	22.4	33.4	51.3	79.5	110	155	258
Colon excluding Rectum	0.0	0.0	0.1	0.0	0.0	1.0	0.6	1.6	3.0	4.0	8.5	16.8	27.7	41.9	65.0	89.0	125	221
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.8	3.5	5.5	5.8	9.4	14.5	21.4	29.9	36.9
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.5	0.2	0.0	0.4	0.0	0.7
Liver and Intrahepatic Bile Duct	0.1	0.1	0.1	0.1	0.0	0.2	0.5	0.6	1.3	4.3	9.2	14.7	14.7	21.2	29.0	36.8	43.5	47.8
Liver	0.1	0.1	0.1	0.1	0.0	0.1	0.4	0.4	1.0	3.2	7.8	11.6	12.2	16.1	18.8	25.5	28.8	38.3
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	1.2	1.4	3.2	2.5	5.1	10.2	11.3	14.7	9.6
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	1.4	2.2	3.7	4.1	7.3	3.4
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.7	0.5	1.0	2.5	4.1	4.2	10.9
Pancreas	0.0	0.0	0.0	0.0	0.1	0.2	0.2	1.0	1.7	2.8	9.3	15.8	28.4	39.0	66.0	69.9	99.6	113
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	1.0	0.0	0.0	1.0	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	0.1	0.2	0.2	0.3	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	0.1	0.0	0.4	0.1	0.5	1.4	1.2	2.6	2.6	6.8

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Source: Minnesota Center for Health Statistics. 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-4: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2004-2008, all races combined, males (continued)

	Age at Death (Years)																	
Cancer Site	**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	0.1	0.0	0.2	0.0	1.7	5.5	16.0	35.2	73.1	137	212	345	427	511	469
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	0.3	0.1	0.7	0.0	0.6	0.8	2.6	2.7
Larynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	1.7	3.7	4.9	5.1	8.3	12.0	11.0	13.0
Lung and Bronchus	0.0	0.0	0.0	0.1	0.0	0.2	0.0	1.7	5.2	14.9	33.1	69.2	131	207	336	413	496	451
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	0.4	0.0	1.4
Trachea, Mediastinum, and Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.3	0.4	1.0	1.4
Mesothelioma (all sites)†	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.4	0.3	3.4	7.5	8.9	18.0	20.4	23.9
Bones and Joints	0.0	0.0	0.2	0.6	0.8	0.5	0.2	0.7	0.2	0.1	0.3	0.5	0.9	2.2	0.6	2.3	5.2	3.4
Soft Tissue including Heart	0.0	0.5	0.0	0.4	0.3	0.3	0.2	0.6	0.3	1.4	1.6	1.8	2.2	2.9	5.5	8.6	11.5	12.3
Skin ††	0.1	0.0	0.0	0.1	0.1	0.5	0.5	0.6	1.9	2.7	5.0	7.1	8.3	11.6	16.6	19.2	36.2	59.4
Melanoma of the Skin	0.1	0.0	0.0	0.1	0.1	0.5	0.5	0.4	1.4	2.1	4.4	5.0	6.5	8.2	13.6	14.3	24.1	34.2
Other Non-Epithelial Skin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.6	0.5	2.1	1.8	3.4	3.1	4.9	12.1	25.3
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	0.1	0.0	0.1	0.7	0.5	0.9	1.5	2.1	3.4
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	0.1	0.0	0.6	0.1	0.1	0.3	0.6	2.2	8.5	17.1	47.2	77.7	174	289	662
Prostate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	1.9	7.9	16.9	45.3	75.5	172	286	659
Testis	0.0	0.0	0.0	0.1	0.0	0.6	0.1	0.0	0.1	0.2	0.2	0.3	0.0	1.0	0.6	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	0.4	0.2	0.7	1.5	1.5	3.1	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. 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-4: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2004-2008, all races combined, males (continued)

	Age at Death (Years)																	
Cancer Site	**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	0.0	0.0	0.1	0.0	0.0	0.7	1.4	3.2	6.8	13.9	24.4	45.8	61.6	87.9	126	206
Urinary Bladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.3	1.5	4.9	8.1	18.6	33.3	51.5	69.7	146
Kidney and Renal Pelvis	0.3	0.1	0.0	0.0	0.1	0.0	0.0	0.3	1.2	2.7	5.2	9.1	15.8	26.5	26.8	34.2	51.9	55.3
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.9	0.4	2.6	1.4
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	0.5	0.5	0.6	1.9	2.1	3.4
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	1.0	0.6	0.8	0.0	1.4
Brain and Other Nervous System	0.3	0.2	0.6	0.5	0.7	0.7	1.0	2.6	3.2	4.5	7.3	8.7	12.9	17.1	21.9	24.0	24.6	23.9
Endocrine System	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.1	0.3	0.9	0.9	0.7	1.6	3.1	3.7	3.0	6.3	2.7
Thyroid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.4	0.4	1.3	2.2	1.8	1.5	3.7	2.0
Other Endocrine including Thymus	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.1	0.1	0.2	0.4	0.3	0.4	1.0	1.8	1.5	2.6	0.7
Lymphoma	0.1	0.0	0.1	0.2	0.7	0.5	1.0	1.5	1.8	2.9	5.3	10.4	14.2	25.1	38.8	68.4	111	134
Hodgkin Lymphoma	0.0	0.0	0.0	0.0	0.4	0.1	0.2	0.2	0.3	0.6	0.4	0.4	0.7	0.7	1.8	3.4	3.1	4.1
Non-Hodgkin Lymphoma	0.1	0.0	0.1	0.2	0.3	0.3	0.7	1.2	1.5	2.3	4.9	10.0	13.5	24.3	37.0	65.0	108	130
Myeloma	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.8	3.2	5.8	9.2	13.3	23.1	36.1	44.6	47.8
Leukemia	0.8	1.3	0.6	0.8	0.8	1.8	0.5	1.3	1.7	2.6	4.4	7.1	15.6	30.4	46.2	65.7	103	164
Lymphocytic Leukemia	0.2	0.8	0.1	0.3	0.5	0.7	0.2	0.3	0.1	0.3	1.5	2.8	4.7	9.2	16.3	21.4	32.5	77.2
Acute Lymphocytic Leukemia	0.2	0.8	0.1	0.3	0.5	0.7	0.2	0.3	0.1	0.0	0.5	0.9	0.7	1.9	1.2	1.5	1.0	3.4
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	1.7	3.8	6.5	14.2	18.4	29.9	72.4
Other Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.2	0.7	0.9	1.5	1.6	1.4
Myeloid and Monocytic Leukemia	0.6	0.3	0.2	0.2	0.3	1.0	0.2	0.8	1.5	2.0	2.5	3.2	9.3	17.8	24.0	33.4	51.4	58.1
Acute Myeloid Leukemia	0.6	0.2	0.2	0.2	0.3	1.0	0.2	0.4	1.3	1.9	2.1	2.5	8.4	14.7	19.7	26.7	39.3	40.3
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	0.6	0.4	1.0	1.4
Chronic Myeloid Leukemia	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.1	0.1	0.3	0.5	1.2	2.2	2.6	3.1	6.1
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	0.4	0.4	1.9	1.5	3.8	7.9	10.2
Other Leukemia	0.0	0.1	0.2	0.3	0.0	0.1	0.0	0.2	0.1	0.3	0.4	1.2	1.6	3.4	5.9	10.9	19.4	28.7
Miscellaneous	0.1	0.1	0.1	0.2	0.3	0.3	1.1	1.2	2.0	5.3	8.8	16.8	23.9	49.4	69.4	99.5	167	221

Source: Minnesota Center for Health Statistics. 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, 2004-2008, all races combined, females

	Age at Death (Years)																	
Cancer Site	**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	2.1	1.3	2.3	2.7	3.2	5.1	10.0	19.4	38.3	70.8	125	207	333	501	702	905	1131	1349
Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.8	1.4	2.4	3.3	6.0	5.8	4.6	9.5	14.7
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	0.3	0.5	0.7	1.2	1.8	1.1	1.5	3.4	3.4
Salivary Gland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.7	1.6	0.6	1.4	2.3
Floor of Mouth	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	0.3
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	2.0	2.1	0.6	1.4	5.7
Nasopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.3	1.1	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	0.4	0.5	0.5	0.0	0.0	0.6	0.3	0.6
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.0	0.3	0.3	1.0	0.9
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	0.2	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	0.4	0.3	0.0	0.5	0.9	1.0	0.9
Digestive System	0.2	0.1	0.1	0.1	0.5	1.1	1.9	3.2	6.9	12.4	21.7	38.8	62.2	96.2	147	199	270	396
Esophagus	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6	1.5	2.1	5.0	6.0	8.2	14.2	8.5	14.9
Stomach	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.5	0.5	1.3	1.4	1.7	2.4	6.2	9.0	12.2	18.3	24.7
Small Intestine	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.7	0.7	0.3	0.7	1.6	2.3	1.7	3.2
Colon and Rectum	0.0	0.0	0.0	0.1	0.3	0.6	0.8	1.5	4.0	5.4	9.5	13.5	21.7	36.6	50.6	70.0	114	202
Colon excluding Rectum	0.0	0.0	0.0	0.1	0.2	0.5	0.6	1.3	3.5	4.3	7.4	10.7	18.3	32.9	42.6	60.7	103	179
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.5	1.1	2.1	2.7	3.4	3.8	7.9	9.3	11.5	22.4
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.7	0.5	0.7	0.4	0.5	0.0	0.7	1.1
Liver and Intrahepatic Bile Duct	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.3	0.5	1.8	2.6	4.1	4.5	9.3	16.2	20.0	25.1	23.0
Liver	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.2	0.3	0.7	1.4	2.0	2.6	4.2	6.9	11.9	12.6	14.7
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	1.1	1.2	2.1	1.9	5.1	9.3	8.1	12.6	8.3
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.9	1.7	2.6	5.6	7.8	10.9	8.9
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.7	1.0	1.3	1.9	2.6	4.1	7.8
Pancreas	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	1.3	2.2	4.3	12.9	22.8	29.3	46.9	64.5	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	0.2	0.3	0.3	0.3	0.6
Peritoneum, Omentum and Mesentery	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.4	1.2	1.7	2.9	4.5	4.4	4.4	3.7
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	0.7	0.3	0.7	1.6	0.9	1.7	4.6

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Source: Minnesota Center for Health Statistics. 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-5: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2004-2008, all races combined, females (continued)

	Age at Death (Years)																	
Cancer Site	**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	0.4	0.6	0.9	5.8	15.5	27.8	51.4	101	159	223	273	277	196
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	0.1	0.3	0.5	0.9	0.3	0.9	1.7	0.6
Larynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.7	1.0	2.0	2.6	1.7	1.0	1.4
Lung and Bronchus	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.9	5.6	15.1	27.3	50.5	99.6	156	220	270	274	193
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	0.1	0.1	0.4	0.4	0.5	1.8	2.1	2.6	2.4	4.9
Bones and Joints	0.0	0.1	0.2	0.4	0.5	0.4	0.4	0.0	0.2	0.1	0.7	0.5	1.2	0.7	1.1	2.0	1.7	2.0
Soft Tissue including Heart	0.1	0.0	0.0	0.3	0.1	0.1	0.3	0.0	0.8	0.6	1.2	2.0	2.9	4.4	2.9	3.5	4.8	11.5
Skin ††	0.0	0.0	0.0	0.1	0.0	0.2	0.8	1.0	0.6	1.3	1.9	4.3	5.0	5.5	7.7	9.6	15.9	14.9
Melanoma of the Skin	0.0	0.0	0.0	0.0	0.0	0.2	0.8	1.0	0.6	1.3	1.8	4.1	3.8	4.4	5.8	8.4	11.2	8.6
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	1.2	1.1	1.9	1.2	4.8	6.3
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	0.0	0.3	0.3
Breast	0.0	0.0	0.0	0.0	0.1	0.5	2.3	6.3	10.8	18.0	29.4	40.9	51.9	69.7	82.4	97.6	127	184
Female Genital System	0.0	0.0	0.0	0.0	0.2	0.7	1.4	2.9	4.9	7.8	17.2	29.7	41.7	50.1	67.5	84.2	102	115
Cervix Uteri	0.0	0.0	0.0	0.0	0.1	0.1	0.8	1.3	1.9	1.7	3.3	3.7	4.8	4.0	4.0	4.6	5.1	4.9
Corpus and Uterus, NOS	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.7	1.4	4.3	8.0	11.2	11.7	19.1	25.0	36.3	33.6
Ovary	0.0	0.0	0.0	0.0	0.1	0.4	0.3	1.0	1.8	4.5	8.5	16.6	23.8	31.3	40.8	45.9	53.6	60.1
Vagina	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.2	0.7	0.0	1.5	0.7	1.4
Vulva	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.5	0.5	0.5	1.1	2.4	4.6	4.4	12.4
Other Female Genital Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	1.2	1.3	1.3	2.6	1.7	2.3
Male Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prostate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Testis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Penis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Male Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(Continues on next page)

Source: Minnesota Center for Health Statistics. 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-5: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2004-2008, all races combined, females (continued)

	Age at Death (Years)																	
Cancer Site	**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	0.3	0.6	1.0	3.2	4.7	8.1	14.6	23.0	35.7	43.1	67.8
Urinary Bladder	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.6	0.9	0.9	2.9	3.5	9.3	12.8	15.6	34.5
Kidney and Renal Pelvis	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.5	0.4	2.1	3.4	5.2	9.9	13.2	20.0	23.1	31.3
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	1.7	1.7	1.4
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	0.3	0.0	0.7	0.3	1.2	2.7	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	0.1	0.0	0.0	0.3	0.3	0.0	1.1
Brain and Other Nervous System	0.2	0.7	0.7	0.8	0.2	0.5	0.5	1.4	2.4	3.1	6.3	6.5	9.3	11.7	13.8	14.8	18.0	12.6
Endocrine System	0.3	0.0	0.1	0.0	0.0	0.1	0.0	0.3	0.1	0.4	1.1	0.8	1.0	3.1	3.2	4.1	5.4	7.8
Thyroid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.5	0.5	0.5	2.2	2.1	3.8	4.8	6.6
Other Endocrine including Thymus	0.3	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.4	0.5	0.3	0.5	0.9	1.1	0.3	0.7	1.1
Lymphoma	0.0	0.0	0.1	0.1	0.4	0.2	0.6	0.8	0.9	2.2	2.1	3.7	9.0	15.9	25.4	40.4	63.5	73.0
Hodgkin Lymphoma	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.1	0.2	0.6	0.1	0.4	0.7	1.3	1.1	1.7	2.7	1.4
Non-Hodgkin Lymphoma	0.0	0.0	0.1	0.1	0.1	0.1	0.5	0.7	0.7	1.7	2.0	3.3	8.3	14.6	24.4	38.6	60.7	71.6
Myeloma	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.7	1.4	3.1	6.6	9.3	18.0	23.2	29.2	29.3
Leukemia	0.9	0.2	0.8	0.8	0.7	0.4	0.5	1.4	1.5	2.0	3.1	5.1	7.6	15.4	27.0	37.5	49.5	63.0
Lymphocytic Leukemia	0.2	0.1	0.4	0.2	0.1	0.0	0.1	0.2	0.3	0.3	0.5	1.0	1.4	5.5	9.3	11.0	12.6	24.4
Acute Lymphocytic Leukemia	0.2	0.1	0.4	0.2	0.1	0.0	0.1	0.2	0.3	0.1	0.2	0.3	0.2	1.1	1.1	1.5	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	0.3	0.5	1.2	4.2	7.9	9.6	11.5	22.1
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	0.6	0.1	0.5	0.4	0.4	0.4	0.3	1.1	1.1	1.5	2.1	3.4	5.3	7.3	13.8	18.6	28.8	26.7
Acute Myeloid Leukemia	0.5	0.1	0.5	0.4	0.3	0.4	0.1	0.9	1.1	1.2	2.0	3.1	5.2	6.2	12.2	16.0	22.7	18.4
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	0.1	0.1	0.0	0.3	0.0	0.0	0.2	0.7	1.1	1.7	3.7	3.2
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	0.3	0.0	0.4	0.5	0.6	2.0	4.6
Other Leukemia	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.3	0.4	0.7	0.9	2.6	4.0	7.8	8.1	11.8
Miscellaneous	0.2	0.1	0.1	0.1	0.3	0.4	0.6	0.7	2.1	4.8	6.2	12.4	21.9	37.9	52.4	72.9	112	155

Source: Minnesota Center for Health Statistics. 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: The five most commonly diagnosed cancers by race/ethnicity and gender, Minnesota, 2004-2008

	Males				Females			
Race/Ethnicity‡	**Cancer Site**	**Cases**	**Percent†**	**Rate§**	**Cancer Site**	**Cases**	**Percent†**	**Rate§**
American Indian Statewide	Prostate	126	23.9	160.4	Breast	114	22.1	96.0
	Lung and Bronchus	104	19.7	140.9	Lung and Bronchus	106	20.6	105.2
	Colon and Rectum	54	10.2	64.0	Colon and Rectum	46	8.9	53.4
	Kidney and Renal Pelvis	49	9.3	41.2	Corpus and Uterus, NOS	30	5.8	23.2
	Leukemia	25	4.7	26.7	Kidney and Renal Pelvis	30	5.8	26.3
	All Sites Combined	527	100.0	608.0	All Sites Combined	515	100.0	472.6
American Indian CHSDA††	Prostate	78	23.6	184.0	Lung and Bronchus	75	22.8	131.7
	Lung and Bronchus	68	20.6	165.7	Breast	67	20.4	108.9
	Colon and Rectum	37	11.2	81.4	Colon and Rectum	33	10.0	67.1
	Kidney and Renal Pelvis	27	8.2	42.0	Kidney and Renal Pelvis	22	6.7	36.4
	Leukemia	16	4.8	32.6	Corpus and Uterus, NOS	19	5.8	29.3
	All Sites Combined	330	100.0	711.8	All Sites Combined	329	100.0	565.3
Asian/Pacific Islander	Prostate	99	17.1	62.3	Breast	179	25.5	58.4
	Colon and Rectum	70	12.1	37.4	Colon and Rectum	67	9.6	28.4
	Lung and Bronchus	66	11.4	35.2	Lung and Bronchus	57	8.1	25.2
	Liver and Intrahepatic Bile Duct	45	7.8	21.0	Thyroid	56	8.0	14.7
	Leukemia	41	7.1	13.4	Corpus and Uterus, NOS	50	7.1	16.5
	All Sites Combined	580	100.0	293.6	All Sites Combined	701	100.0	250.2
Black	Prostate	491	31.9	212.8	Breast	337	29.8	109.0
	Lung and Bronchus	199	12.9	87.9	Lung and Bronchus	139	12.3	56.7
	Colon and Rectum	132	8.6	52.0	Colon and Rectum	94	8.3	35.8
	Liver and Intrahepatic Bile Duct	85	5.5	33.5	Corpus and Uterus, NOS	53	4.7	20.7
	Kidney and Renal Pelvis	82	5.3	27.6	Non-Hodgkin Lymphoma	46	4.1	13.2
	All Sites Combined	1,537	100.0	611.3	All Sites Combined	1,130	100.0	387.9

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Source: MCSS January 2011. 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-6: The five most commonly diagnosed cancers by race/ethnicity and gender, Minnesota, 2004-2008 (continued)

	Males				Females			
Race/Ethnicity‡	**Cancer Site**	**Cases**	**Percent†**	**Rate§**	**Cancer Site**	**Cases**	**Percent†**	**Rate§**
Non-Hispanic White	Prostate	20,699	33.2	181.3	Breast	16,922	30.7	127.3
	Lung and Bronchus	7,371	11.8	67.0	Lung and Bronchus	6,613	12.0	49.4
	Colon and Rectum	5,920	9.5	53.4	Colon and Rectum	5,754	10.4	40.7
	Urinary Bladder	4,397	7.1	41.1	Corpus and Uterus, NOS	3,734	6.8	27.7
	Melanoma of the Skin	3,000	4.8	26.6	Melanoma of the Skin	2,482	4.5	20.2
	All Sites Combined	62,363	100.0	556.8	All Sites Combined	55,090	100.0	412.5
Hispanic all races	Prostate	139	23.3	104.9	Breast	172	28.0	87.7
	Colon and Rectum	50	8.4	32.9	Thyroid	49	8.0	15.8
	Lung and Bronchus	46	7.7	32.2	Colon and Rectum	47	7.7	31.1
	Non-Hodgkin Lymphoma	37	6.2	19.2	Corpus and Uterus, NOS	44	7.2	24.1
	Kidney and Renal Pelvis	35	5.9	15.5	Cervix Uteri	38	6.2	13.6
	All Sites Combined	597	100.0	341.6	All Sites Combined	614	100.0	307.0

Source: MCSS January 2011. 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-7: Cancer incidence and mortality rates by race/ethnicity†, both genders combined, Minnesota, 2004-2008

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	473.0	531.5 *	631.5 *	264.8 *	487.3	320.7 *	171.0	244.2 *	294.9 *	121.3 *	228.5 *	96.8 *
Childhood (0-14)	15.4	15.6	19.0	16.2	10.9 *	16.8	1.7	~	~	4.5 *	2.5	3.0
Brain††	6.5	5.2	7.8	1.8 *	3.6 *	4.4	4.5	~	~	1.9 *	2.4 *	2.2 *
Breast, Female ‡	127.3	96.0 *	108.9	58.3 *	109.0 *	87.7 *	21.6	8.2 *	~	12.5 *	28.3 *	7.7 *
Cervix Uteri ‡	5.5	12.7 *	17.8 *	14.2 *	10.0 *	13.6 *	1.4	~	~	6.9 *	3.4 *	~
Colon and Rectum	46.4	59.2 *	74.7 *	32.3 *	42.9	32.4 *	15.2	24.1 *	30.9 *	10.7 *	17.5	6.6 *
Corpus Uteri†† ‡	27.7	23.2	29.3	16.5 *	20.7 *	24.1	4.2	~	~	~	6.9	~
Esophagus	5.2	~	~	3.5	7.1	~	4.5	~	~	~	4.3	~
Hodgkin Lymphoma	3.1	~	~	~	1.9 *	2.8	0.4	~	~	~	~	~
Kaposi Sarcoma††	0.2	~	~	~	1.7 *	~	~	~	~	~	~	~
Kidney††	15.4	33.7 *	39.7 *	3.3 *	20.6 *	14.5	4.3	9.5 *	12.5 *	~	5.5	5.4
Larynx	3.3	8.1 *	10.6 *	~	5.7 *	~	0.9	~	~	~	2.3 *	~
Leukemia	15.3	16.8	22.1	8.5 *	12.3	7.4 *	7.8	5.6	~	5.5	4.9 *	3.7 *
Liver††	3.6	11.5 *	13.6 *	13.6 *	20.2 *	7.6 *	4.0	12.0 *	~	17.0 *	21.2 *	5.8
Lung and Bronchus	56.7	120.1 *	146.3 *	29.6 *	70.7 *	28.1 *	45.5	99.1 *	127.6 *	22.2 *	59.5 *	19.8 *
Melanoma††	22.6	~	~	4.2 *	~	4.0 *	2.4	~	~	~	~	~
Mesothelioma††	1.3	~	~	~	~	~	1.1	~	~	~	~	~
Myeloma	5.5	7.0	~	3.0 *	11.4 *	6.8	3.7	~	~	~	7.2 *	~
NHL††	21.9	15.6	13.4	12.1 *	15.1 *	15.6 *	7.2	6.8	~	4.8	3.8 *	3.4 *
Oral Cavity††	10.9	14.9	15.5	10.8	13.8	6.8 *	2.0	~	~	4.3 *	2.1	~
Ovary †† ‡	12.6	13.7	~	6.2 *	8.4	6.4 *	8.5	~	~	3.6 *	8.9	~
Pancreas	10.0	7.8	10.1	8.9	19.2 *	9.6	10.4	9.0	10.7	6.9 *	17.6 *	5.8 *
Prostate ‡	181.3	160.4	184.0	62.3 *	212.7 *	104.9 *	24.8	22.1	~	~	47.2 *	5.8 *
Soft Tissues	3.3	~	~	2.6	3.5	1.7	1.2	~	~	~	1.9	~
Stomach	4.8	13.3 *	17.1 *	14.1 *	7.3 *	12.6 *	2.8	6.0	~	7.8 *	6.0 *	6.0 *
Testis ‡	7.5	~	~	~	~	2.8 *	0.2	~	~	~	~	~
Thyroid	10.4	8.4	8.6	10.2	4.4 *	9.1	0.5	~	~	~	~	~
Urinary Bladder	23.1	17.1	22.3	8.1 *	16.8 *	12.8 *	4.1	~	~	~	2.4	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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.
† 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-8: Estimated complete cancer prevalence† by cancer site and gender, all races combined, Minnesota, January 1, 2008

	Males		Females		Total	
Cancer Site	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
All Sites Combined	99,840	100.0	111,230	100.0	211,070	100.0
Brain and Other Nervous System	1,240	1.2	1,030	0.9	2,270	1.1
Breast	270	0.3	46,190	41.5	46,460	22.0
Cervix Uteri	0	0.0	3,910	3.5	3,910	1.9
Colon and Rectum	9,680	9.7	9,910	8.9	19,590	9.3
Corpus and Uterus, NOS	0	0.0	11,080	10.0	11,080	5.2
Esophagus	450	0.5	130	0.1	580	0.3
Hodgkin Lymphoma	1,540	1.5	1,340	1.2	2,880	1.4
Kidney and Renal Pelvis	3,350	3.4	2,170	2.0	5,520	2.6
Larynx	1,230	1.2	310	0.3	1,540	0.7
Leukemia	3,100	3.1	2,170	2.0	5,270	2.5
Liver and Intrahepatic Bile Duct	260	0.3	110	0.1	370	0.2
Lung and Bronchus	2,830	2.8	3,150	2.8	5,980	2.8
Melanoma of the Skin	6,270	6.3	6,980	6.3	13,250	6.3
Myeloma	640	0.6	430	0.4	1,070	0.5
Non-Hodgkin Lymphoma	4,440	4.4	3,980	3.6	8,420	4.0
Oral Cavity and Pharynx	2,960	3.0	1,720	1.5	4,680	2.2
Ovary	0	0.0	2,960	2.7	2,960	1.4
Pancreas	260	0.3	260	0.2	520	0.2
Prostate	46,630	46.7	0	0.0	46,630	22.1
Soft Tissues	930	0.9	870	0.8	1,800	0.9
Stomach	480	0.5	360	0.3	840	0.4
Testis	3,960	4.0	0	0.0	3,960	1.9
Thyroid	1,670	1.7	5,320	4.8	6,990	3.3
Urinary Bladder	7,430	7.4	2,490	2.2	9,920	4.7

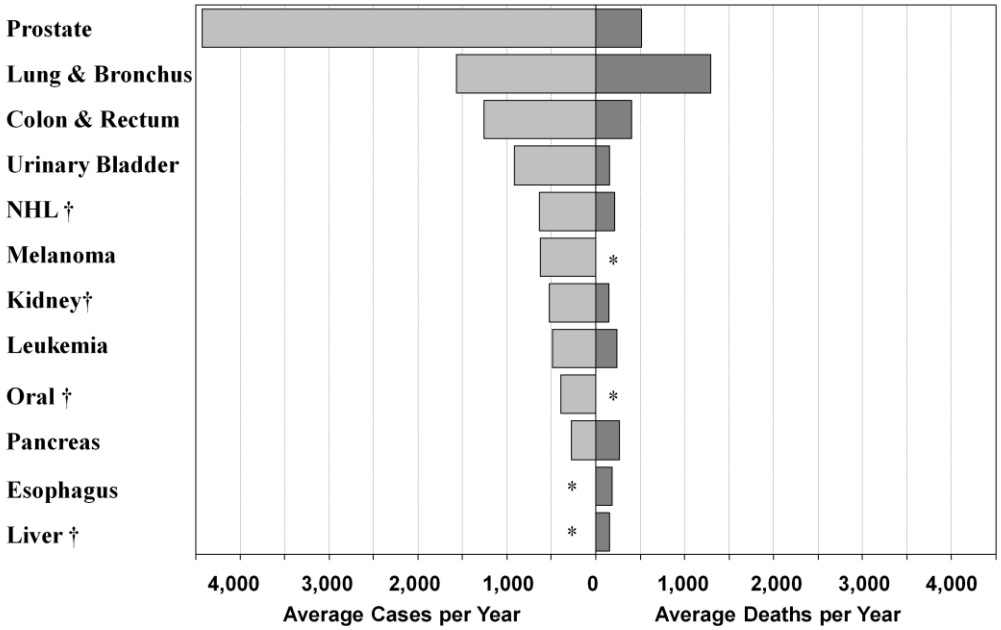
† Estimated number of Minnesotans ever diagnosed with an invasive cancer and alive on January 1, 2008, using the first malignant primary for a person and rounding to the nearest ten persons. Estimates are based on 33-year prevalence percentages for the white population in the SEER 9 areas and completeness 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-9: Estimated five-year cancer prevalence† by cancer site and gender, all races combined, Minnesota, January 1, 2008

	Males		Females		Total	
Cancer Site	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
All Sites Combined	38,470	100.0	34,530	100.0	73,000	100.0
Brain and Other Nervous System	400	1.0	300	0.9	700	1.0
Breast	110	0.3	13,570	39.3	13,680	18.7
Cervix Uteri	0	0.0	590	1.7	590	0.8
Colon and Rectum	3,610	9.4	3,360	9.7	6,970	9.5
Corpus and Uterus, NOS	0	0.0	2,890	8.4	2,890	4.0
Esophagus	300	0.8	80	0.2	380	0.5
Hodgkin Lymphoma	340	0.9	280	0.8	620	0.8
Kidney and Renal Pelvis	1,480	3.8	900	2.6	2,380	3.3
Larynx	410	1.1	110	0.3	520	0.7
Leukemia	1,260	3.3	840	2.4	2,100	2.9
Liver and Intrahepatic Bile Duct	200	0.5	80	0.2	280	0.4
Lung and Bronchus	1,660	4.3	1,810	5.2	3,470	4.8
Melanoma of the Skin	2,080	5.4	2,010	5.8	4,090	5.6
Myeloma	420	1.1	290	0.8	710	1.0
Non-Hodgkin Lymphoma	1,830	4.8	1,600	4.6	3,430	4.7
Oral Cavity and Pharynx	1,130	2.9	560	1.6	1,690	2.3
Ovary	0	0.0	920	2.7	920	1.3
Pancreas	200	0.5	190	0.6	390	0.5
Prostate	18,460	48.0	0	0.0	18,460	25.3
Soft Tissues	290	0.8	240	0.7	530	0.7
Stomach	250	0.6	160	0.5	410	0.6
Testis	770	2.0	0	0.0	770	1.1
Thyroid	510	1.3	1,630	4.7	2,140	2.9
Urinary Bladder	2,660	6.9	820	2.4	3,480	4.8

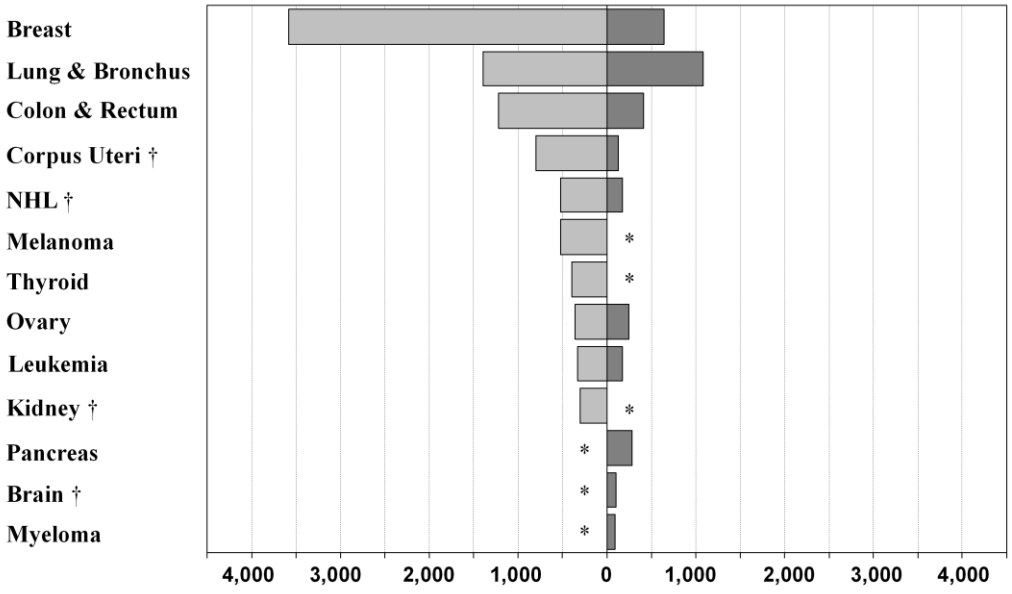
† Estimated number of Minnesotans diagnosed with an invasive cancer between 2003-2007 and alive on January 1, 2008, using the first malignant primary for a person and rounded to the nearest ten persons. Estimates are based on prevalence percentages for the white population in the SEER 9 areas and are 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, 2004-2008



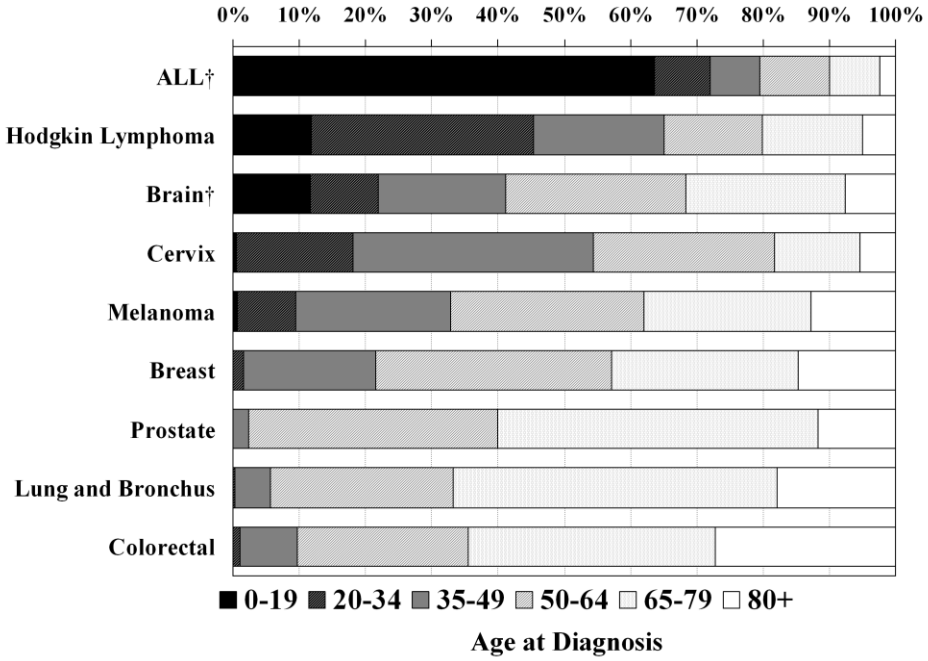
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.
† NHL is non-Hodgkin 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, 2004-2008



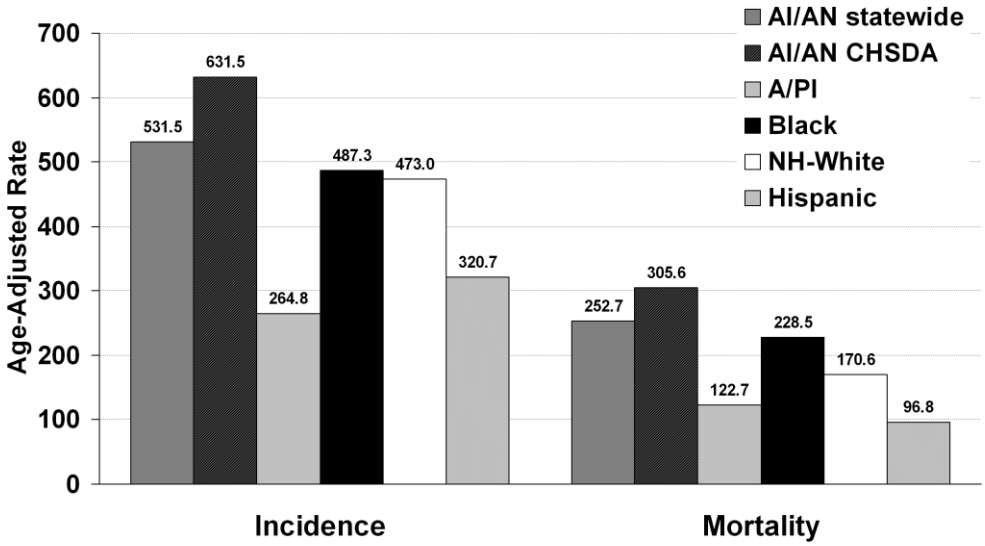
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.
† Corpus uteri includes 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 among Selected Cancers, Minnesota, 2004-2008



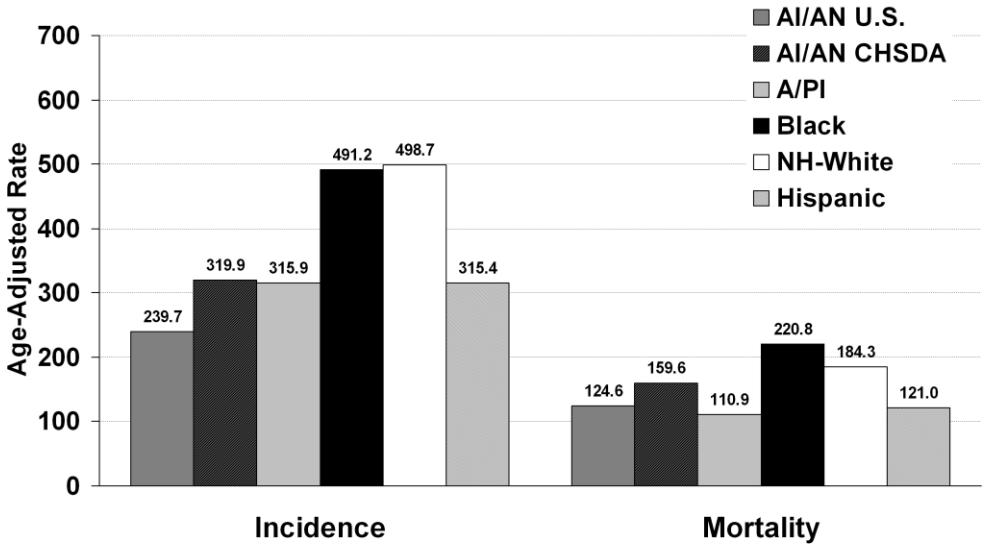
Source: MCSS January 2011. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.
† ALL is acute lymphocytic leukemia; brain includes other nervous system.
* Not among the ten leading causes.

Figure II-4: Cancer Incidence and Mortality Rates by Race and Ethnicity,† Minnesota, 2004-2008, All Cancer Sites Combined



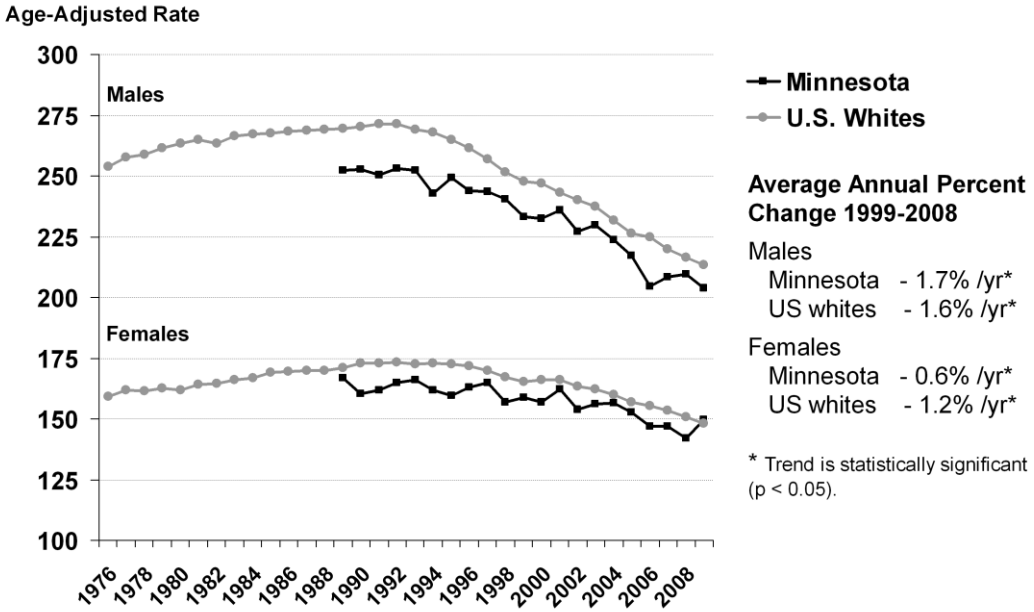
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 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., 2004-2008, All Cancer Sites Combined



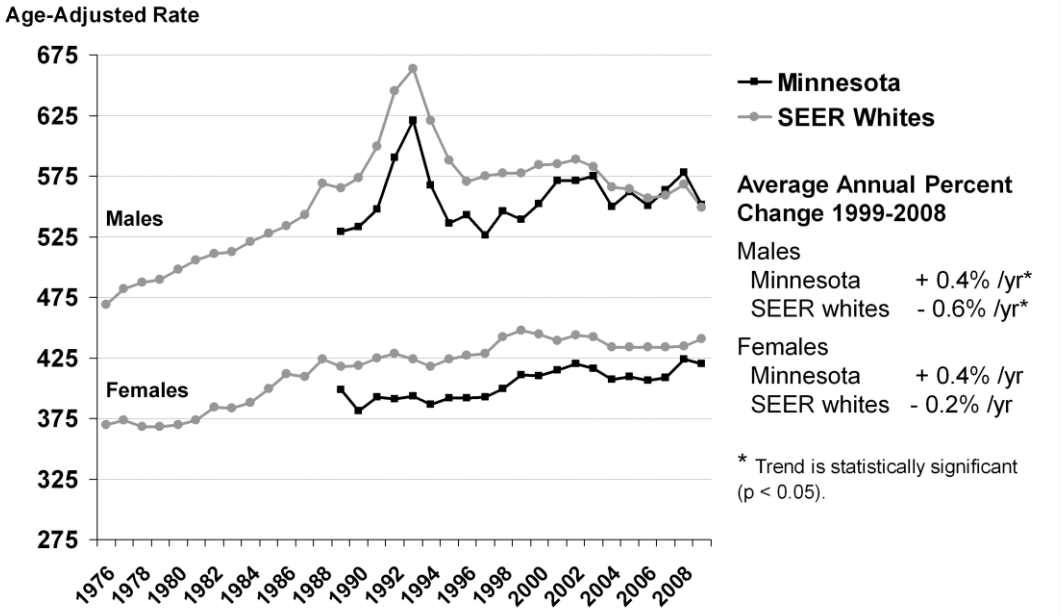
Source: *SEER Cancer Statistics Review, 1975-2008.* Incidence data are from the SEER 17 areas. Mortality data are for the entire US. *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.
† AI/AN is American Indian/Alaska 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., 1975-2008



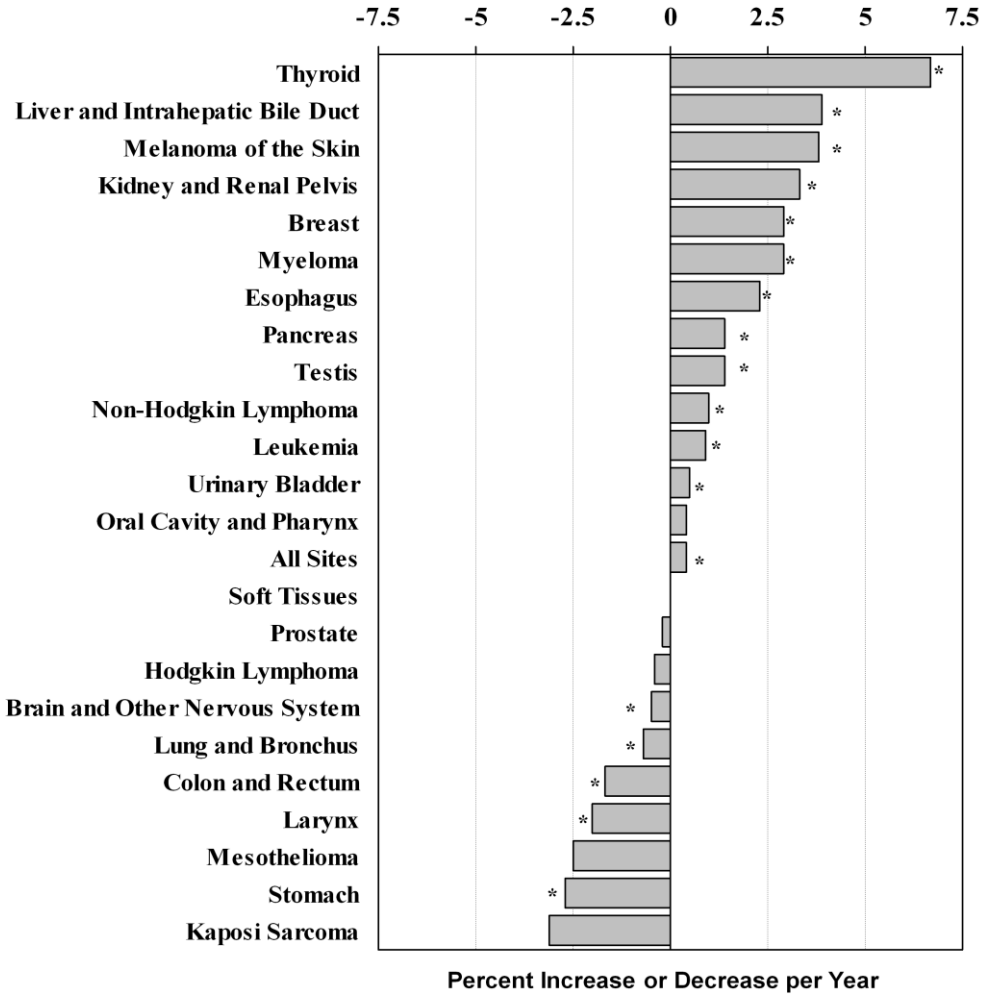
Source: Minnesota Center for Health Statistics and *SEER Cancer Statistics Review, 1975-2008.* Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates for Minnesota are for all races combined. Rates for the US are for white persons, including Hispanics. 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, 1975-2008



Source: MCSS January 2011 and *SEER Cancer Statistics Review, 1975-2008*. Rates for Minnesota do not include cancers only clinically diagnosed and are for all races combined. Delay-adjusted 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, 1999-2008

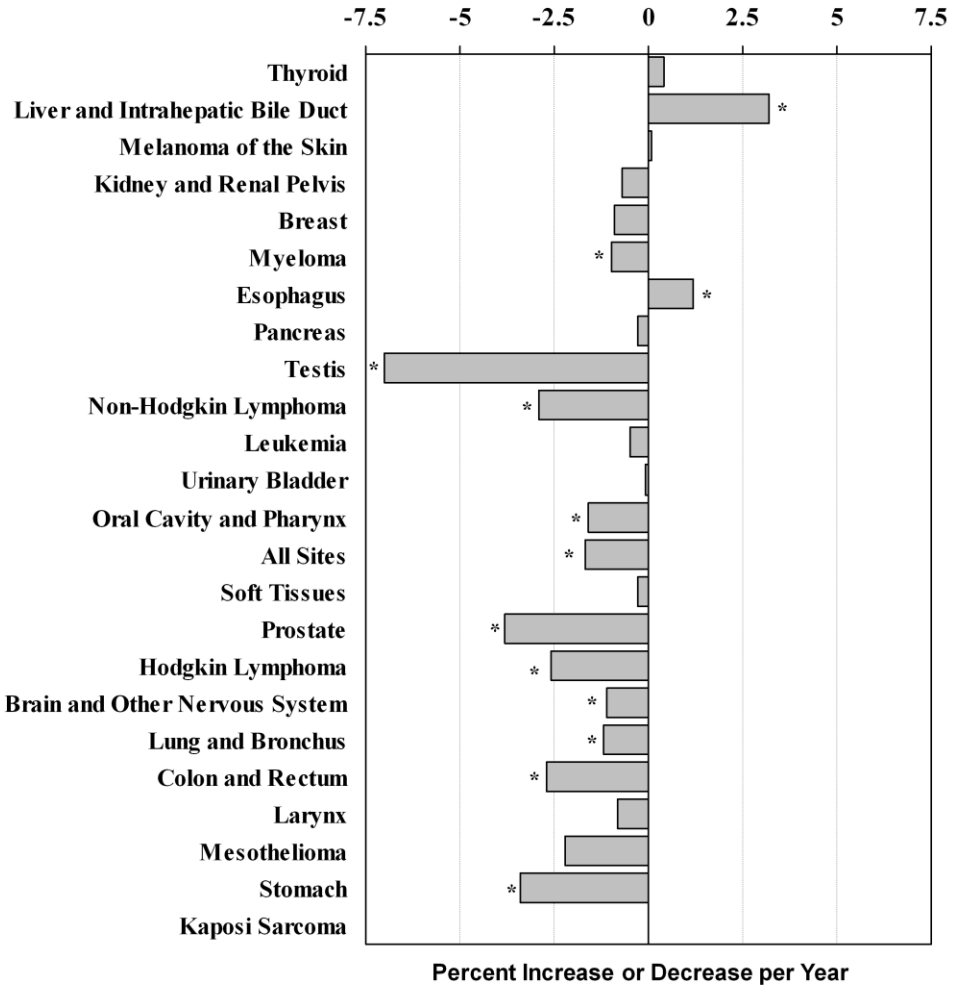


Source: MCSS January 2011. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2008, 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, 1999-2008

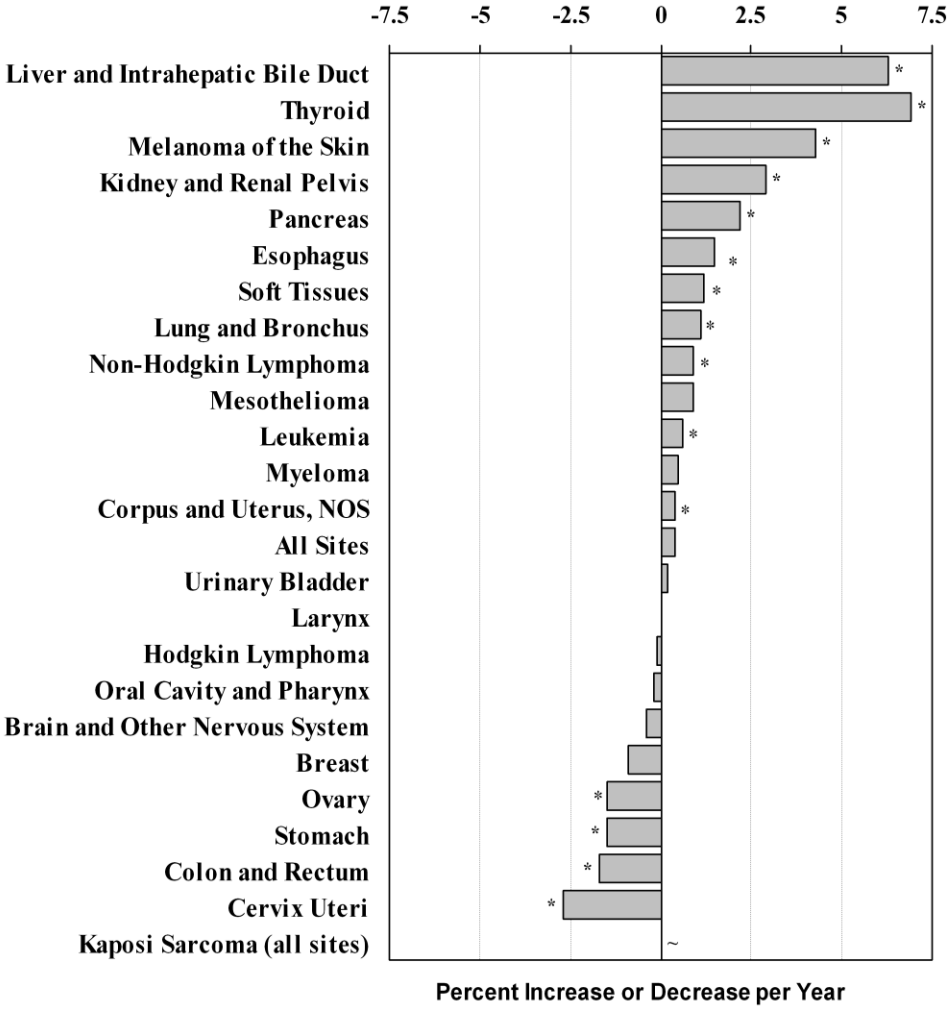


Source: Minnesota Center for Health Statistics. All analyses were conducted by MCSS.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2008, 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, 1999-2008

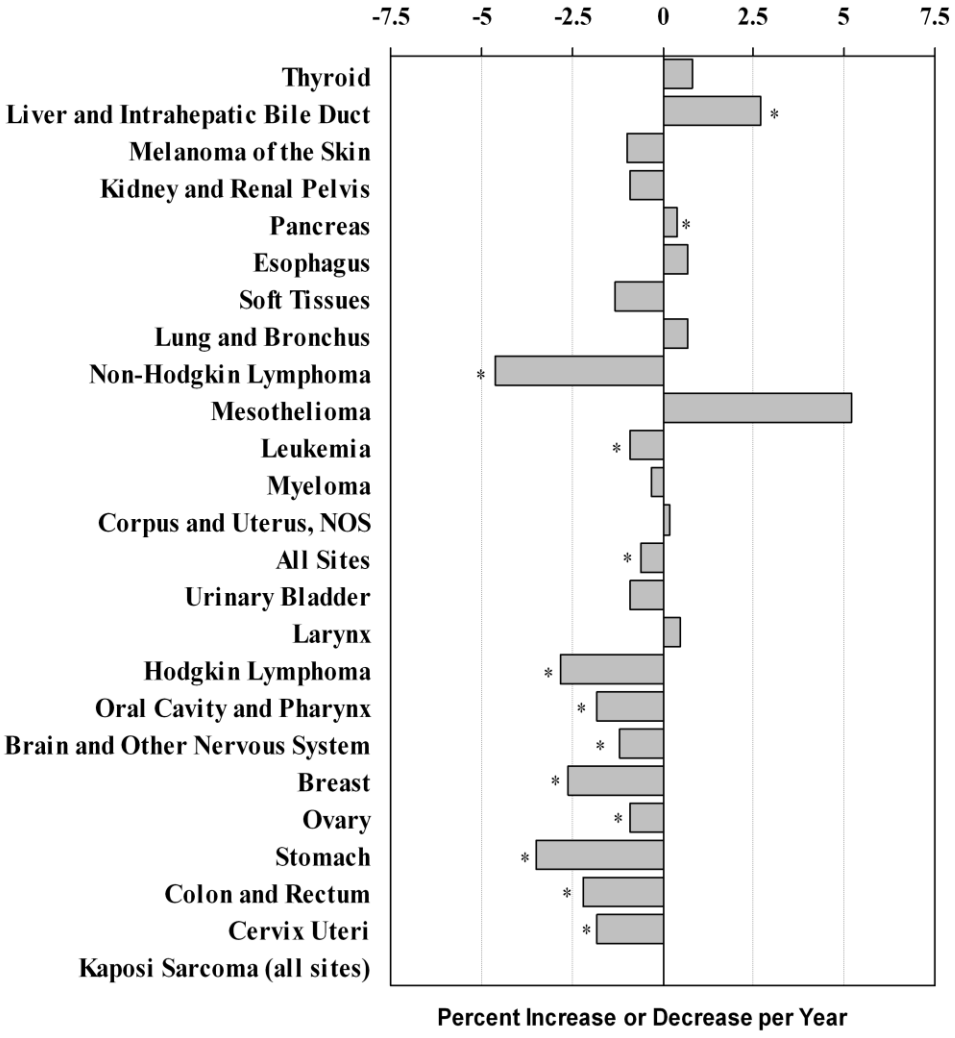


Source: MCSS January 2011. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2008, 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, 1999-2008

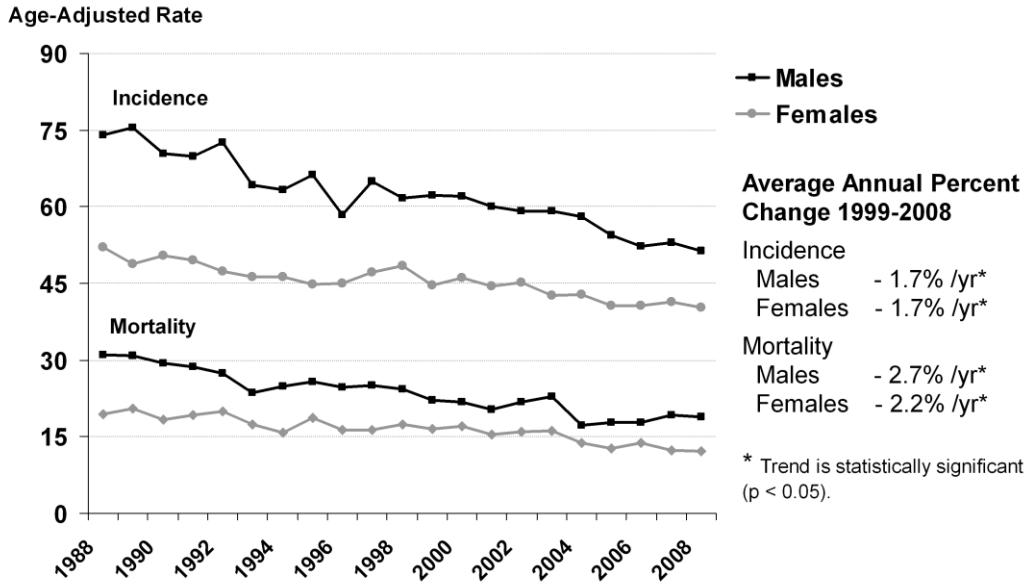


Source: Minnesota Center for Health Statistics. All analyses were conducted by MCSS.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2008, and represents a weighted average of the trends during the most recent ten-year period. Please see the text for more details.

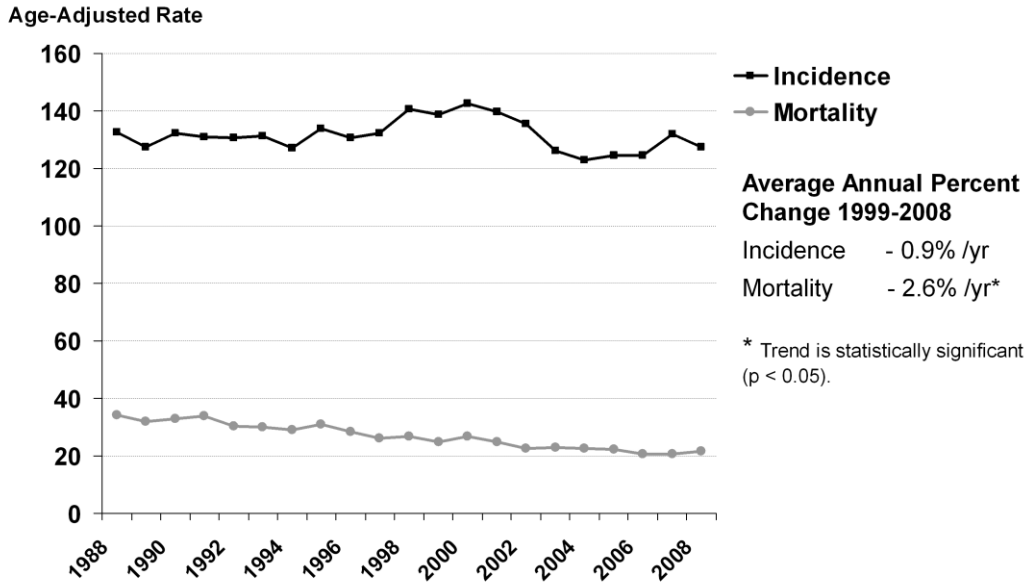
* The AAPC is statistically significant.

Figure II-12: Trends in Colorectal Cancer Incidence and Mortality by Gender, Minnesota, 1988-2008



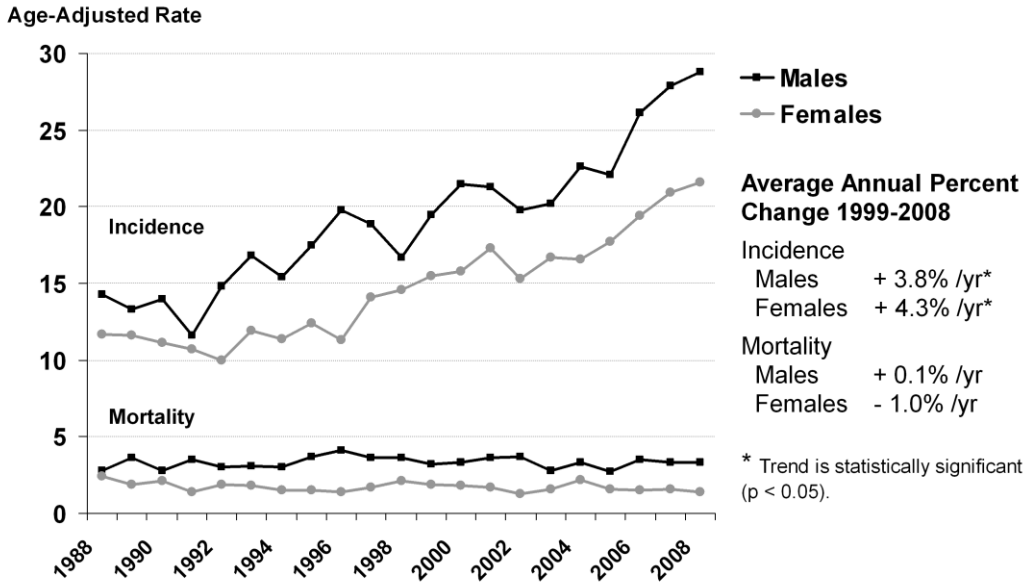
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths 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, 1988-2008



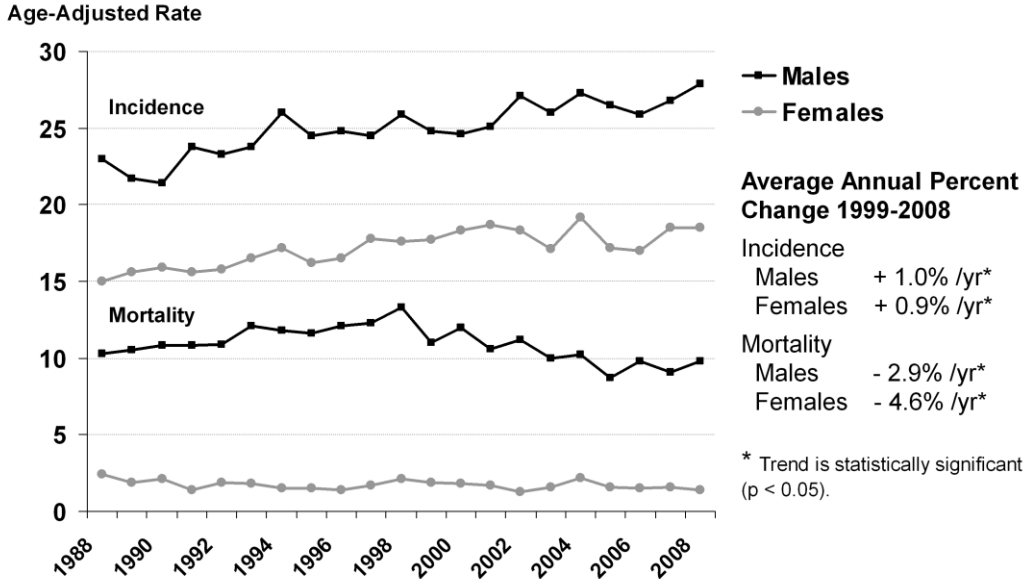
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths 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, 1988-2008



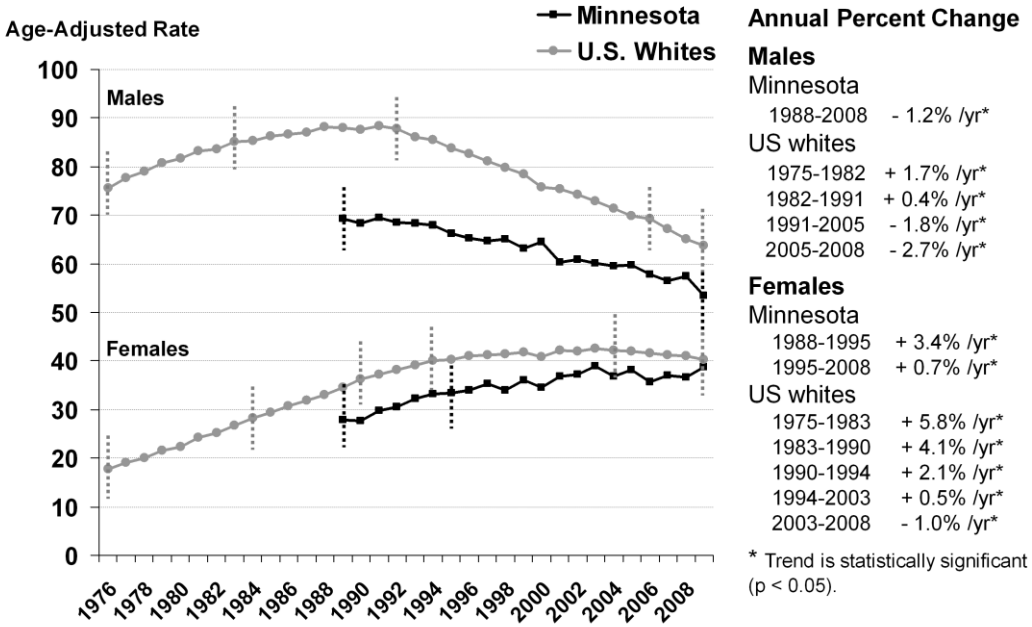
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths 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, 1988-2008



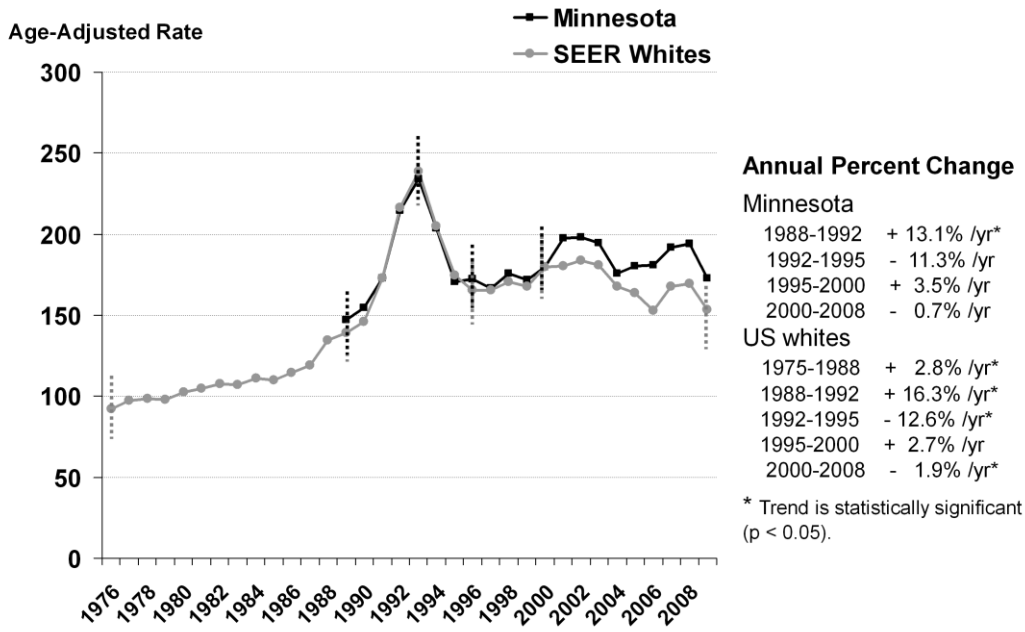
Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths 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., 1975-2008



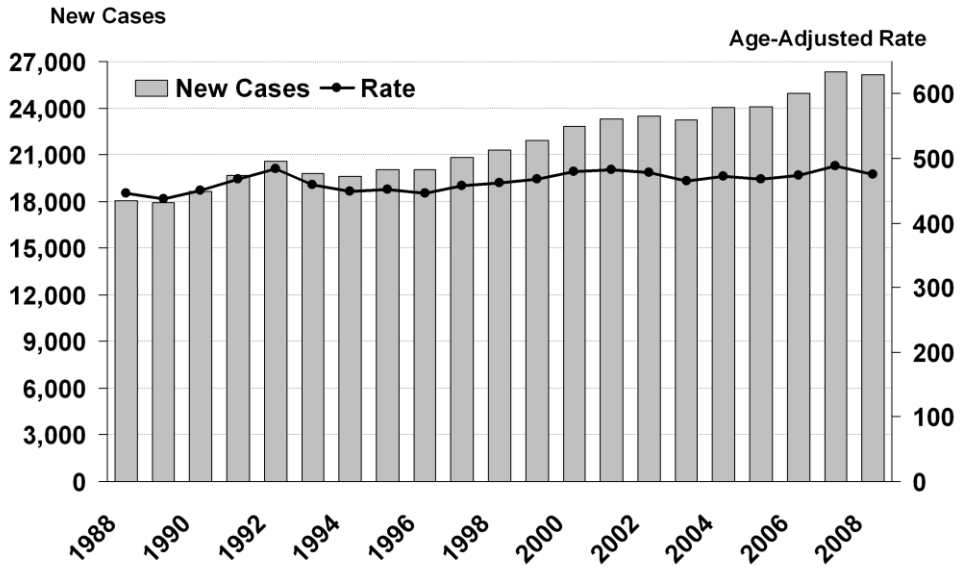
Source: Minnesota Center for Health Statistics and *SEER Cancer Statistics Review, 1975-2008.* Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates for Minnesota are for all races combined. Rates for the US are for white persons, including Hispanics. 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, 1988-2008



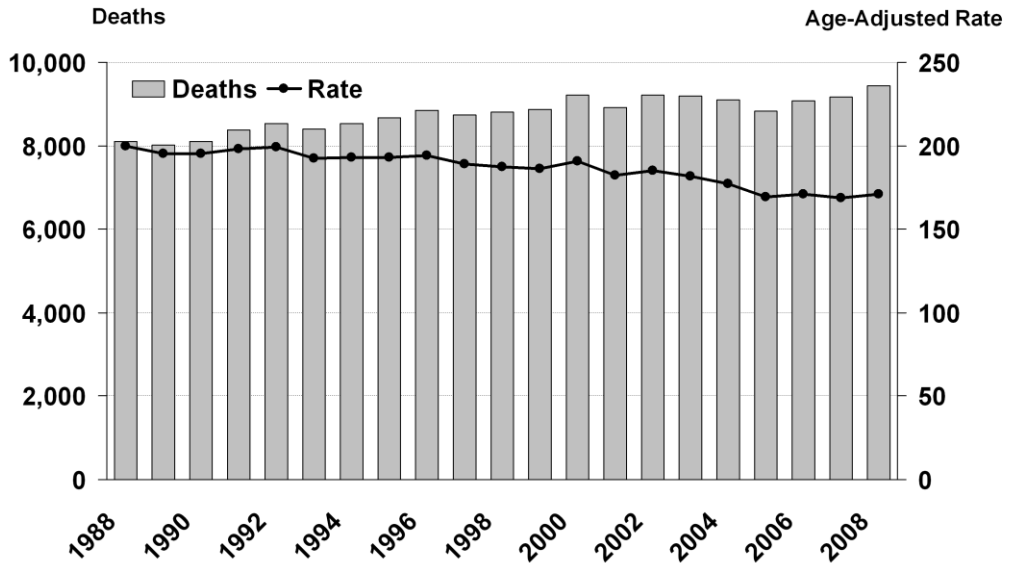
Source: MCSS January 2011 and *SEER Cancer Statistics Review, 1975-2008.* Rates for Minnesota do not include cancers only clinically diagnosed and are for all races combined. Delay-adjusted rates for the SEER 9 areas include clinically diagnosed cancers and are for white persons, including Hispanics. *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, 1988-2008



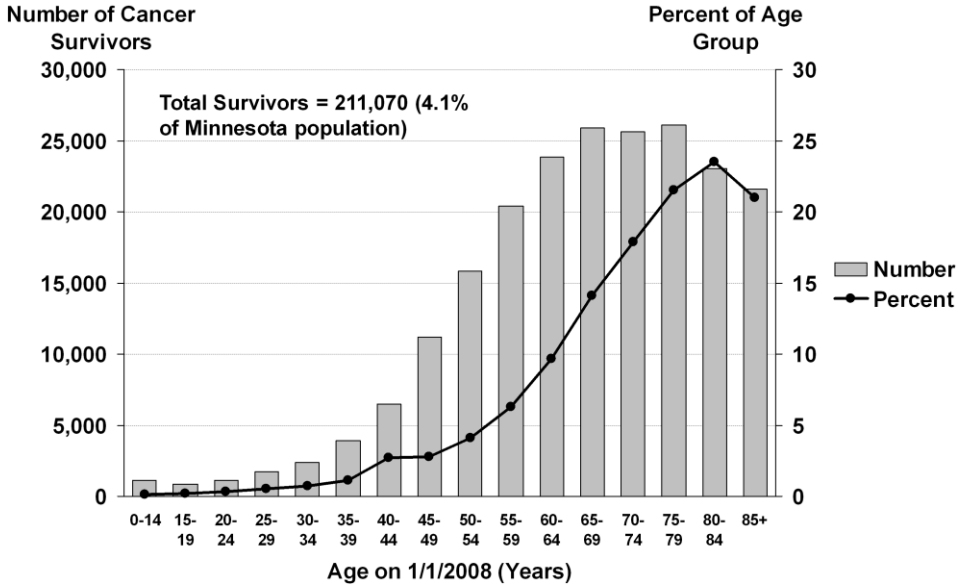
Source: MCSS January 2011. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-19: Cancer Mortality in Minnesota by Year, 1988-2008



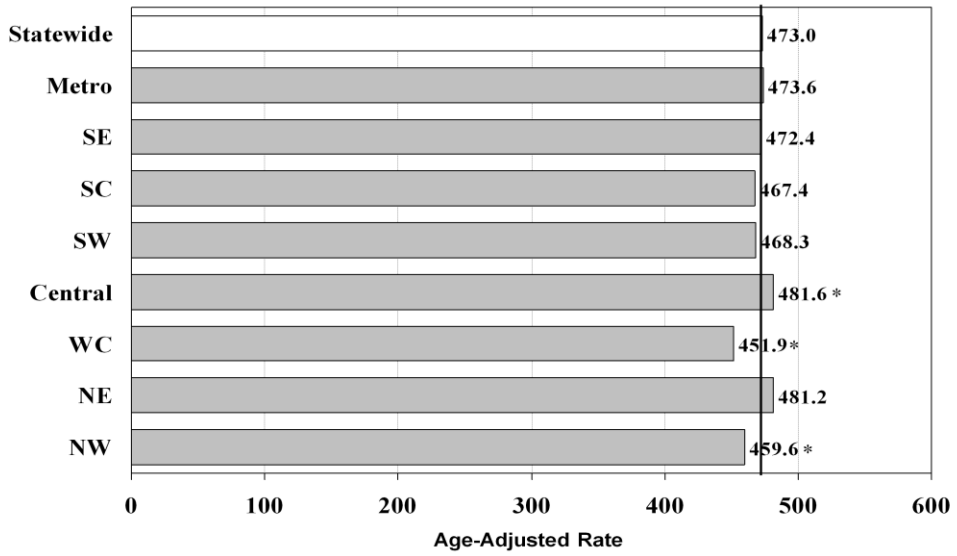
Source: Minnesota Center for Health Statistics. All analyses were conducted by MCSS. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-20: Number of Minnesotans Living with a History of Cancer by Age, Minnesota, January 1, 2008



Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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.

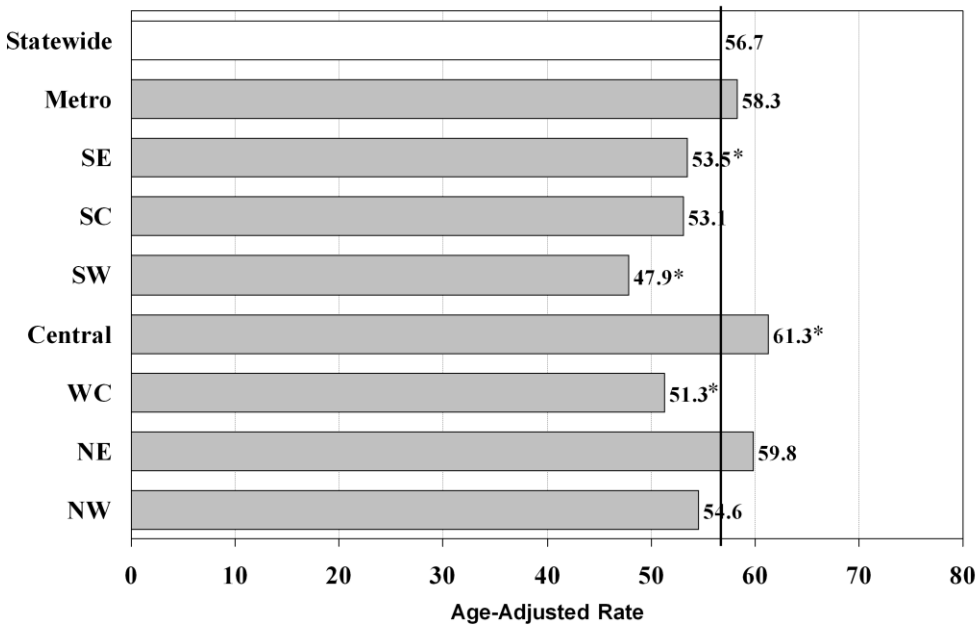
Figure II-21: Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2004-2008, All Cancer Sites Combined



Source: MCSS January 2011. 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.

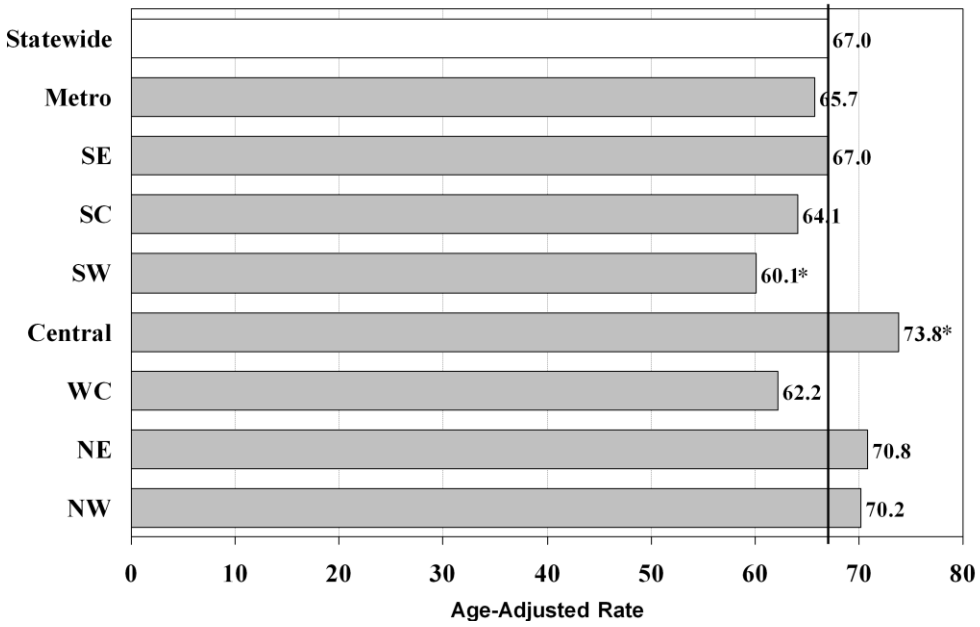
Figure II-22: Lung and Bronchus Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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.

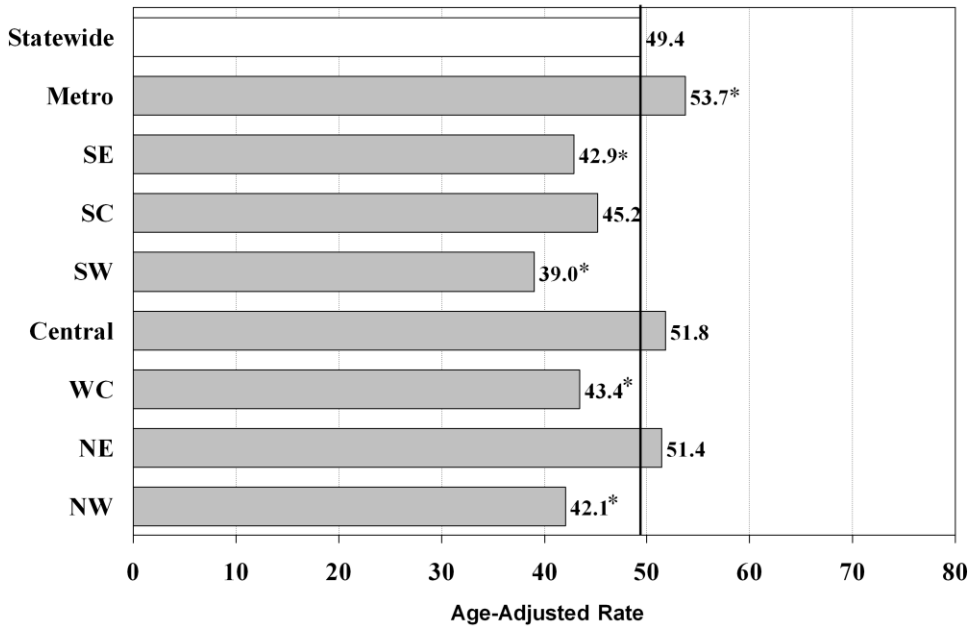
Figure II-23: Lung and Bronchus Cancer Incidence among Non-Hispanic White Males by Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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.

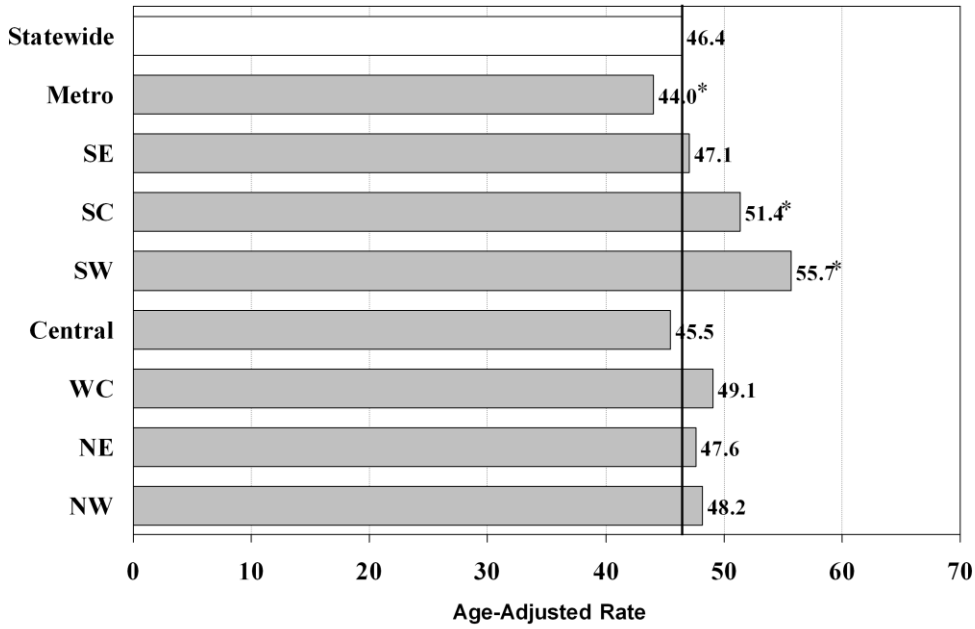
Figure II-24: Lung and Bronchus Cancer Incidence among Non-Hispanic White Females by Gender and Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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.

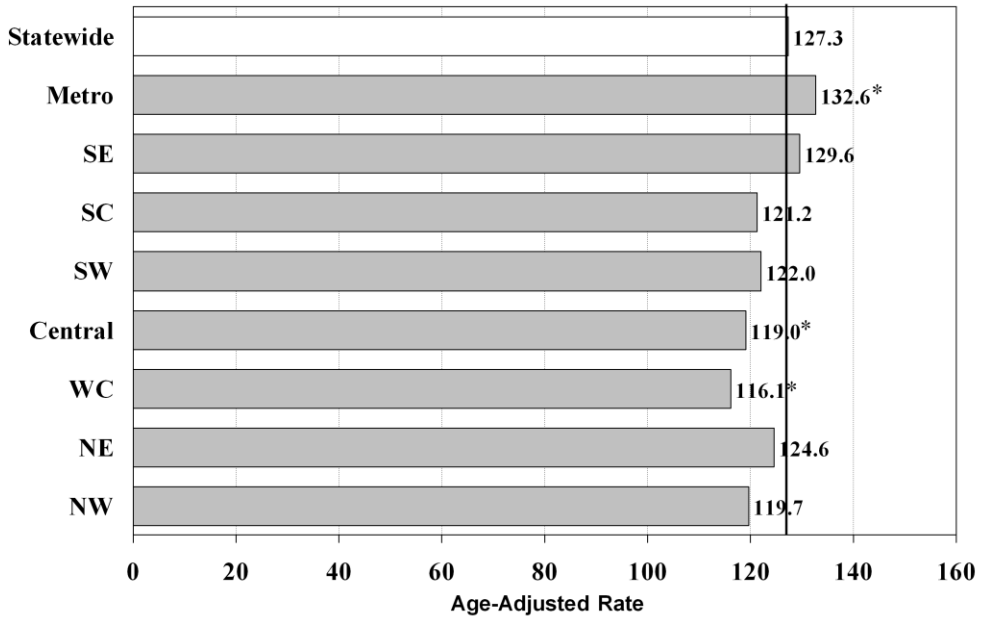
Figure II-25: Colon and Rectum Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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.

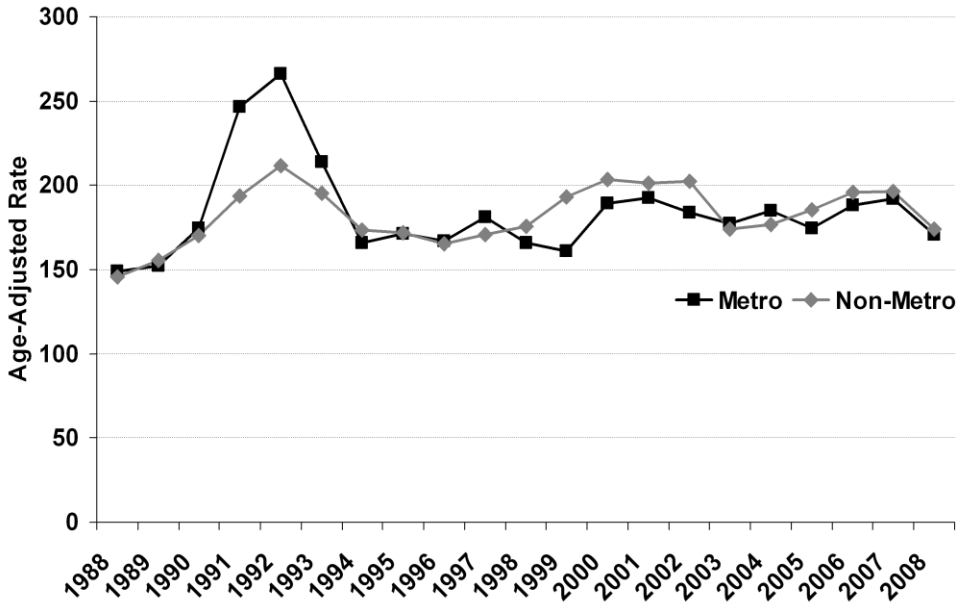
Figure II-26: Female Breast Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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.

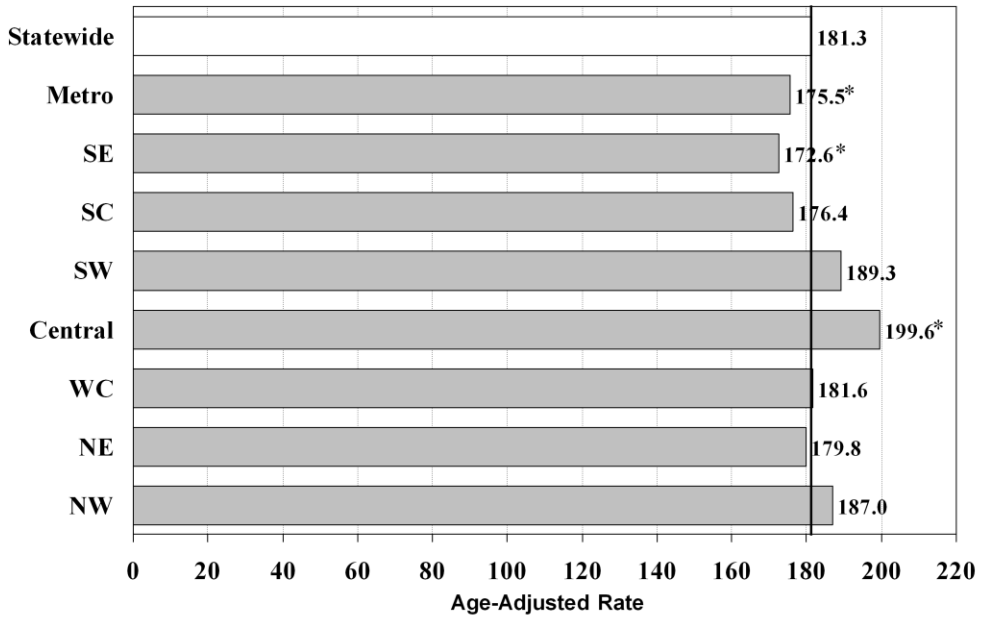
Figure II-27: Prostate Cancer Incidence Trends by Region, All Races Combined, Minnesota, 1988-2008



Source: MCSS January 2011. 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.

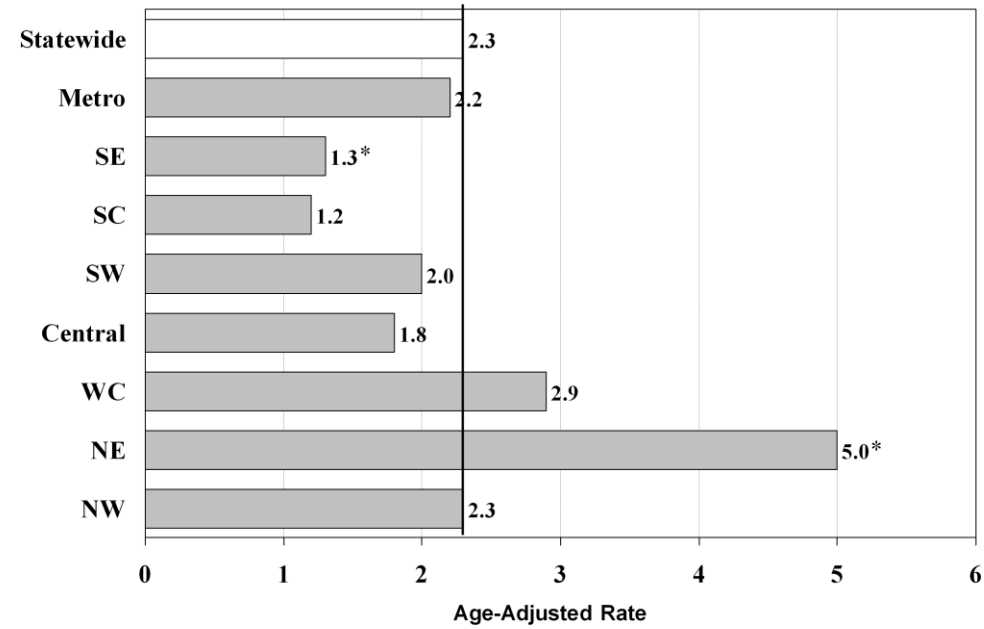
Figure II-28: Prostate Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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.

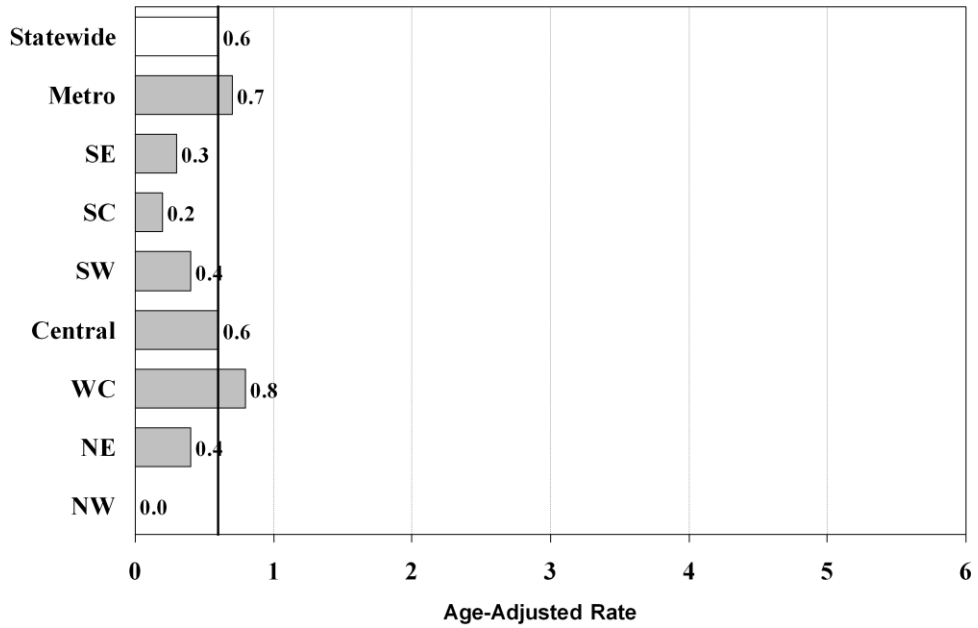
Figure II-29: Mesothelioma Incidence among Non-Hispanic White Males by Region, Minnesota, 2004-2008



Source: MCSS January 2011. 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, 2004-2008



Source: MCSS January 2011. 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.

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, 1988-2008, All Cancer Sites Combined

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	Males	Females	Males	Females	Males	Females	Males	Females
1988	9,148	8,868	528.9	398.4	4,205	3,895	252.3	166.8
1989	9,335	8,583	533.2	381.4	4,220	3,789	252.5	160.4
1990	9,722	8,928	547.2	392.9	4,256	3,857	250.3	161.8
1991	10,694	8,983	590.3	391.0	4,362	4,014	253.1	164.8
1992	11,387	9,185	620.8	393.2	4,422	4,116	252.3	166.0
1993	10,648	9,150	567.7	386.8	4,317	4,088	242.7	161.7
1994	10,225	9,405	536.1	391.8	4,487	4,055	249.3	159.6
1995	10,481	9,545	543.0	392.0	4,463	4,209	243.9	162.8
1996	10,336	9,688	526.5	392.6	4,541	4,309	243.4	164.8
1997	10,836	10,003	546.1	399.3	4,556	4,178	240.5	156.7
1998	10,888	10,448	539.2	411.2	4,480	4,314	233.2	158.7
1999	11,364	10,547	552.1	410.1	4,575	4,301	232.5	156.9
2000	11,987	10,809	571.2	414.9	4,696	4,503	235.7	162.4
2001	12,196	11,084	571.3	420.2	4,610	4,296	227.0	153.7
2002	12,310	11,154	564.7	415.9	4,745	4,455	229.9	156.0
2003	12,212	11,057	549.7	407.3	4,700	4,482	223.6	156.5
2004	12,713	11,299	561.8	409.5	4,644	4,445	217.3	152.5
2005	12,750	11,373	550.5	406.5	4,464	4,359	204.7	147.0
2006	13,334	11,585	563.4	408.6	4,661	4,404	208.3	147.1
2007	14,048	12,281	577.8	424.2	4,813	4,355	209.7	141.9
2008	13,836	12,320	551.6	420.0	4,783	4,656	203.8	149.5

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 three joinpoints, Minnesota, 1988-2008, 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	1988-2000	-0.7*	1988-2008	-0.6*
Interval 2	1992-1995	-3.7	1995-2001	1.2*	2000-2008	-1.8*		
Interval 3	1995-2008	0.4*	2001-2005	-0.9				
Interval 4			2005-2008	1.5				
AAPC(%)†	2004-2008	0.4*	2004-2008	0.9	2004-2008	-1.8*	2004-2008	-0.6*
	1999-2008	0.4*	1999-2008	0.4	1999-2008	-1.7*	1999-2008	-0.6*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 cases 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, All Cancer Sites Combined

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	695	571	19.2	16.5	89	74	2.5	2.1
20-34	1,385	1,905	52.2	75.2	166	150	6.3	5.9
35-49	5,194	8,706	176.8	302.6	1,097	1,271	37.3	44.2
50-64	21,253	17,621	947.4	780.1	5,147	4,659	229.5	206.3
65-74	18,973	12,434	2566.0	1496.5	5,800	4,923	784.4	592.5
75-84	14,835	12,115	3246.2	1895.7	7,217	6,450	1579.2	1009.3
85+	4,346	5,506	2968.5	1582.8	3,849	4,692	2629.0	1348.8

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, 2004-2008, All Cancer Sites Combined

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	66,681	58,858	561.1	413.9	23,365	22,219	208.7	147.5
American Indian								
Statewide	527	515	608.0	472.6	223	200	297.7	220.6
CHSDA**	330	329	711.8	565.3	143	138	343.5	276.6
Asian/PI	580	701	293.6	250.2	250	240	144.4	107.6
Black	1,537	1,130	611.3	387.9	578	450	298.1	180.3
Non-Hispanic White	62,363	55,090	556.8	412.5	22,140	21,189	207.7	147.1
Hispanic all races	597	614	341.6	307.0	162	124	121.6	76.2

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 cases 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, 2006-2008, All Cancer Sites Combined

	Males	Females
Median Age at Diagnosis (Yr)	67.0	65.0
Median Age at Death (Yr)	73.0	75.0
Lifetime Risk of Diagnosis (%)	51.5	42.1
Lifetime Risk of Death (%)	25.0	21.2
Complete prevalence†	99,840	111,230
Five-year prevalence‡	38,470	34,530

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, rounded to the nearest 10.
- Not applicable; sex-specific site.

Table III-1.6: Causes of death, Minnesota, 2008

Rank and Cause of Death	Deaths	Percent
1 Cancer	9,439	24.6
2 Heart Disease	7,451	19.4
3 Cerebrovascular Disease	2,087	5.4
4 Chronic Lung Disease	2,071	5.4
5 Accidents	2,002	5.2
6 Alzheimer's Disease	1,344	3.5
7 Diabetes	1,086	2.8
8 Pneumonia and Influenza	745	1.9
9 Nephritis	814	2.1
10 Suicide	593	1.5
All Other Causes of Death	10,797	28.1
Total Deaths	38,429	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, 2004-2008, All Cancer Sites Combined**

		Males	Females
Incidence	All Races Combined	541.0	411.6
	American Indian		
	Total	255.7	229.9
	CHSDA**	338.0	309.0
	Asian/PI	347.7	297.0
	Black	626.1	400.9
	Non-Hispanic White	565.3	439.4
	Hispanic all races	407.3	324.4
Mortality	All Races Combined	223.0	153.2
	American Indian		
	Total	148.4	107.7
	CHSDA**	190.0	138.4
	Asian/PI	134.7	94.1
	Black	295.3	177.7
	Non-Hispanic White	225.1	156.6
	Hispanic all races	149.2	101.5

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 (51%) 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 2008, 1,988 (26%) more Minnesotans died from cancer than from heart disease.

Over the most recent five-year period for which complete data are available (2004-2008), an average of 25,108 Minnesotans were diagnosed with a potentially serious cancer each year and 9,117 died from one of these diseases annually.

When differences in the racial composition of the populations are not taken into consideration, the overall cancer incidence rate in Minnesota is somewhat higher for males and about the same for females as in the 17 geographic areas participating in the SEER Program. However, when the comparison is limited to the non-Hispanic white populations, Minnesota cancer incidence is three percent lower among males and eight percent lower among females. The cancer mortality rate in Minnesota is six and four percent lower for males and females, respectively, than the sex-specific national rate for all races combined, but eight and six percent lower when comparing non-Hispanic white males and females, respectively.

Trends: The overall cancer incidence rate among males in Minnesota increased significantly by an average of 0.4 percent per year over the ten-year period 1999-2008. Among females, the overall cancer incidence rate did not show a statistically significant trend over the same ten-year period. On the other hand, the overall cancer mortality rate among males in Minnesota has been declining significantly since 1988 and since 2000 has been declining more rapidly by an average of 1.7 percent per year over the ten-year period 1999-2008. Among women statewide, the overall cancer mortality rate has been declining at a somewhat slower rate than among males, by 0.6 percent per year since 1988, but the decrease has been steady and statistically significant. Much of the difference in trends between men and women is due to the fact that lung cancer incidence and mortality rates are declining sharply among males but not females.

Overall cancer trends in Minnesota are similar to those seen nationally except for cancer incidence among males. Among non-Hispanic white men living in the SEER 13 areas, the overall cancer incidence rate declined significantly by an average of 0.7 percent per year over the ten-year period 1999-2008 while it was increasing by 0.4 percent per year among males in Minnesota. This difference is largely due to more rapidly decreasing lung cancer rates among males in the SEER 13 areas, and recent significant declines in prostate cancer incidence which are not seen in Minnesota.

Age: The likelihood of being diagnosed with cancer increases with age. Approximately 54 percent of cancers in Minnesota occur among persons age 65 years and older and about 72 percent of cancer deaths occur 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: The overall cancer incidence rate in Minnesota is 36 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 is about 41 percent

All Cancer Sites Combined

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 the ranking of risk by race/ethnicity is quite different: in Minnesota, American Indians have the highest overall risk of developing and dying from cancer, while nationally they have the lowest. The overall cancer incidence and mortality rates among American Indians living in CHSDA counties are about two times higher in Minnesota than nationally. Cancer rates among the other race/ethnic groups in Minnesota are similar to or lower than those reported nationally.

In Minnesota, the overall cancer incidence rate among males is highest among American Indians living in CHSDA counties (about 30% higher than among non-Hispanic whites), followed by blacks (10% higher than among non-Hispanic whites) and then non-Hispanic whites. Among females in Minnesota, the overall cancer incidence rate is highest among American Indians living in CHSDA counties (more than 35% higher than among non-Hispanic whites), followed by non-Hispanic whites, and then blacks (6% lower than among non-Hispanic whites). Overall cancer incidence in Minnesota is 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 physician. 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, 1988-2008, Childhood (0-14 Years of Age) Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	71	16.9	14.0	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	85	68	15.9	13.2	17	9	3.2	1.7
2007	98	68	18.3	13.1	10	13	1.9	2.6
2008	97	80	17.9	15.3	9	10	1.7	1.9

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 three joinpoints, Minnesota, 1988-2008, Childhood (0-14 Years of Age) Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	0.0	1988-2008	0.0	1988-2008	-1.7	1988-2008	-0.8
AAPC(%)†	2004-2008	0.0	2004-2008	0.0	2004-2008	-1.7	2004-2008	-0.8
	1999-2008	0.0	1999-2008	0.0	1999-2008	-1.7	1999-2008	-0.8

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Childhood (0-14 Years of Age) Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-4	215	187	23.9	21.7	21	18	2.4	2.1
5-9	115	78	13.4	9.5	21	11	2.5	1.4
10-14	134	101	14.8	11.8	16	20	1.8	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, 2004-2008, Childhood (0-14 Years of Age) Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	464	366	17.3	14.2	58	49	2.2	1.9
American Indian								
Statewide	10	7	17.8	~	1	1	~	~
CHSDA**	7	4	~	~	1	0	~	~
Asian/PI	24	24	15.8	16.7	8	4	~	~
Black	26	22	11.6	10.2	6	4	~	~
Non-Hispanic White	351	279	16.7	13.9	39	32	1.9	1.6
Hispanic all races	34	31	17.0	16.6	3	8	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2004-2008, Childhood (0-14 Years of Age) Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Cancer Site	Males	Females	Males	Females	Males	Females	Males	Females
Bones and Joints	13	14	0.5	0.6	2	3	0.1	0.1
Brain†	83	68	3.1	2.7	10	14	0.4	0.6
Hodgkin Lymphoma	19	9	0.7	0.4	0	0	0.0	0.0
Kidney and Renal Pelvis	42	18	1.5	0.7	4	1	0.1	0.0
Leukemia	152	121	5.6	4.7	23	17	0.9	0.7
ALL†	113	90	4.2	3.5	10	6	0.4	0.2
NHL†	34	10	1.3	0.4	2	1	0.1	0.0
Soft Tissue†	38	50	1.4	1.9	4	1	0.2	0.0

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 years of age) 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, 2006-2008, Childhood (0-14 Years of Age) Cancer

	Males	Females
Median Age at Diagnosis (Yr)	6.0	4.0
Median Age at Death (Yr)	7.5	5.0
Lifetime Risk of Diagnosis (%)	0.3	0.2
Lifetime Risk of Death (%)	0.0	0.0

Source: MCSS January 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	3.0	71.1
Brain & Other Nervous System	19.6	71.2
Hodgkin Lymphoma	3.2	95.4
Leukemia	31.7	83.1
ALL††	23.8	87.9
Non-Hodgkin Lymphoma	5.6	85.7
All Childhood Cancers	100.0	80.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*
†† ALL is acute lymphocytic leukemia.

Table III-2.8: Average annual incidence and mortality rates§ in the U.S. by cancer site and gender, 2004-2008, Childhood (0-14 Years of Age) Cancer

		Males	Females
Incidence	All Childhood Cancers		
	All Races Combined	16.4	14.3
	Non-Hispanic White	17.4	15.1
	Bones and Joints	0.8	0.7
	Brain†	3.3	3.0
	Hodgkin Lymphoma	0.7	0.5
	Kidney and Renal Pelvis	0.7	0.9
	Leukemia	5.6	4.5
	ALL†	4.5	3.6
	NHL†	1.2	0.6
	Soft Tissue†	1.0	1.0
Mortality	All Childhood Cancers		
	All Races Combined	2.5	2.2
	Non-Hispanic White	2.5	2.1

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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, 166 children under 15 years of age were diagnosed with and 21 children died of cancer in Minnesota each year from 2004 to 2008. Of all cancers diagnosed in the state, 0.7 percent, or seven out of every 1,000, are 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 is the leading cause of death from disease among children. Comparing non-Hispanic whites, the overall childhood cancer incidence rate is about five percent lower in Minnesota than in the SEER 17 areas, and overall childhood cancer mortality is more than 20 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 (32% of childhood cancers), brain cancer (20%), or lymphomas (9%). 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 80 percent. Survival varies by cancer type, but is more than 70 percent for the most common childhood cancers.

Trends: Overall childhood cancer incidence and mortality rates in Minnesota have been fairly stable or slightly decreasing since cancer reporting was implemented in 1988. Nationally, the overall cancer incidence rate in children ages 0-14 years increased significantly by 0.5 percent per year from 1975 to 2008. 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 2008.

Age: The overall cancer incidence rate is nearly twice as high among children under five years of age compared to those five to 14 years old. However, the age distribution varies by cancer type.

Gender: Boys are 22 percent more likely to develop childhood cancer than girls.

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.

Childhood (0-14 Years of Age) Cancer

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 on 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/magnetic-fields). 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, 1988-2008, Brain and Other Nervous System Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	Males	Females	Males	Females	Males	Females	Males	Females
1988	161	132	8.4	6.1	129	103	7.0	4.7
1989	147	115	7.4	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	114	8.6	5.0	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	188	134	8.5	5.4	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	198	154	8.0	5.7	128	84	5.3	2.9
2007	184	139	7.2	5.1	141	120	5.6	4.2
2008	190	152	7.3	5.5	122	122	4.8	4.1

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 three joinpoints, Minnesota, 1988-2008, Brain and Other Nervous System Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	-0.5	1988-2008	-0.4	1988-2008	-1.1*	1988-2008	-1.2*
AAPC(%)†	2004-2008	-0.5*	2004-2008	-0.4	2004-2008	-1.1*	2004-2008	-1.2*
	1999-2008	-0.5*	1999-2008	-0.4	1999-2008	-1.1*	1999-2008	-1.2*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Brain and Other Nervous System Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	102	89	2.8	2.6	15	21	0.4	0.6
20-34	102	65	3.8	2.6	21	10	0.8	0.4
35-49	187	127	6.4	4.4	102	68	3.5	2.4
50-64	262	183	11.7	8.1	206	162	9.2	7.2
65-74	163	121	22.0	14.6	142	105	19.2	12.6
75-84	96	91	21.0	14.2	111	104	24.3	16.3
85+	26	20	17.8	5.8	35	44	23.9	12.7

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, 2004-2008, Brain and Other Nervous System Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	938	696	7.5	5.2	632	514	5.2	3.6
American Indian								
Statewide	4	9	~	~	3	6	~	~
CHSDA**	3	7	~	~	2	5	~	~
Asian/PI	9	9	~	~	7	6	~	~
Black	24	8	4.6	~	9	5	~	~
Non-Hispanic White	875	650	7.8	5.3	608	490	5.4	3.7
Hispanic all races	14	16	5.3	3.7	4	7	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Brain and Other Nervous System Cancer

	Males	Females
Median Age at Diagnosis (Yr)	54.0	55.0
Median Age at Death (Yr)	61.0	63.0
Lifetime Risk of Diagnosis (%)	0.7	0.5
Lifetime Risk of Death (%)	0.5	0.4
Complete prevalence†	1,240	1,030
Five-year prevalence‡	400	300

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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, 2006-2008

Cell Type (Histologic Code)†	Cases	Percent
Glioblastoma (9440-9442)	446	43.9
Astrocytoma ††	327	32.2
Oligodendroglioma (9450,9451,9460)	57	5.6
Ependymoma (9391-9394)	41	4.0
Mixed glioma (9382)	59	5.8
Medulloblastoma (9470-9472)	19	1.9
Other glioma (9380,9381)	5	0.5
All others	63	6.2
Total	1,017	100.0

Source: MCSS January 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, 2004-2008, Brain and Other Nervous System Cancer**

		Males	Females
Incidence	All Races Combined	7.7	5.4
	American Indian		
	Total	3.3	2.6
	CHSDA**	3.8	3.6
	Asian/PI	4.0	3.2
	Black	4.6	3.5
	Non-Hispanic White	9.0	6.2
	Hispanic all races	6.0	4.6
Mortality	All Races Combined	5.2	3.5
	American Indian		
	Total	2.3	1.5
	CHSDA**	2.9	1.9
	Asian/PI	2.4	1.6
	Black	3.1	2.0
	Non-Hispanic White	5.8	3.9
	Hispanic all races	3.2	2.4

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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, 327 cases of invasive brain and other nervous system cancer were diagnosed and 229 deaths were caused by these cancers each year in Minnesota from 2004 to 2008. They account 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 are similar to those for the U.S. for all races combined, but are about 15 percent lower among non-Hispanic whites.
Survival: Based on SEER data, the five-year relative survival rate for brain cancers diagnosed between 2001-2007 was 34.8 percent, but was considerably higher among children ages 0-14 (82.5%).
Trends: Over the ten-year period 1999-2008, the incidence of invasive brain and other nervous system cancer in Minnesota was stable or declining. 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. The majority (68%) of brain and nervous system cancers are diagnosed before the age of 65, and 53 percent of brain cancer deaths occur in this age group.
Gender: Brain and nervous system cancers are about 44 percent more common 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/cellphones). 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, 1988-2008, Breast Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	Males	Females	Males	Females	Males	Females	Males	Females
1988	16	2.861	0.9	132.7	6	765	0.4	34.3
1989	13	2,773	0.7	127.3	5	716	0.3	32.0
1990	14	2,906	0.8	132.3	2	746	0.1	32.8
1991	18	2,924	1.0	130.9	6	786	0.4	33.8
1992	12	2,950	0.6	130.7	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	3,168	1.3	133.8	4	773	0.2	31.0
1996	18	3,154	0.9	130.6	7	725	0.4	28.5
1997	16	3,238	0.9	132.2	11	678	0.6	26.1
1998	23	3,510	1.2	140.6	5	720	0.2	27.0
1999	21	3,494	1.0	138.7	4	670	0.2	24.9
2000	30	3,655	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	3,603	1.2	135.5	2	640	0.1	22.6
2003	22	3,399	1.0	126.0	8	639	0.4	22.8
2004	25	3,376	1.2	123.0	1	655	0.1	22.5
2005	36	3,477	1.6	124.6	6	656	0.3	22.4
2006	30	3,530	1.4	124.6	5	609	0.2	20.5
2007	33	3,795	1.4	131.8	6	636	0.2	20.7
2008	37	3,735	1.4	127.3	6	673	0.3	21.5

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 three joinpoints, Minnesota, 1988-2008, Breast Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	2.9*	1988-1996	0.0	1988-2008	-0.9	1988-2008	-2.6*
Interval 2			1996-2000	2.4				
Interval 3			2000-2004	-3.8*				
Interval 4			2004-2008	1.3				
AAPC(%)†	2004-2008	2.9*	2004-2008	1.3	2004-2008	-0.9	2004-2008	-2.6*
	1999-2008	2.9*	1999-2008	-0.9	1999-2008	-0.9	1999-2008	-2.6*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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 ($p < 0.05$).

Breast Cancer

Table III-4.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2004-2008, Breast Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	3	0.0	0.1	0	0	0.0	0.0
20-34	3	270	0.1	10.7	0	23	0.0	0.9
35-49	13	3,600	0.4	125.1	1	346	0.0	12.0
50-64	44	6,387	2.0	282.8	5	883	0.2	39.1
65-74	43	3,478	5.8	418.6	5	627	0.7	75.5
75-84	45	2,911	9.9	455.5	8	709	1.8	110.9
85+	13	1,264	8.9	363.4	5	641	3.4	184.3

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, 2004-2008, Breast Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	161	17,913	1.4	126.4	24	3,229	0.2	21.5
American Indian								
Statewide	0	114	~	96.0	0	10	~	8.2
CHSDA**	0	67	~	108.9	0	5	~	~
Asian/PI	2	179	~	58.4	0	28	~	12.5
Black	2	337	~	109.0	0	85	~	28.7
Non-Hispanic White	155	16,922	1.4	127.3	24	3,084	0.2	21.6
Hispanic all races	1	172	~	87.7	0	23	~	15.1

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Breast Cancer

	Males	Females
Median Age at Diagnosis (Yr)	69.0	61.0
Median Age at Death (Yr)	77.0	71.0
Lifetime Risk of Diagnosis (%)	0.2	13.2
Lifetime Risk of Death (%)	0.0	2.9
Complete prevalence†	270	46,190
Five-year prevalence‡	110	13,570

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	89.1
In situ	19.5	100.0
Localized	50.4	98.6
Regional	24.4	83.8
Distant	3.8	23.4
Unstaged	2.0	52.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* Survival for All Stages excludes *in situ* tumors.
- There were not enough intervals to produce the statistic.

Breast Cancer

Table III-4.7: Number of new cases and average annual incidence rates of late-stage disease by MMSA†, Minnesota, 2004-2008, Female Breast Cancer

Area	MMSA†	Late-Stage‡ Cases	Late-Stage‡ Rate§
Statewide		6,338	45.1
Micropolitan	Albert Lea	52	46.5
	Alexandria	51	41.8
	Austin	56	47.5
	Bemidji	35	31.6*
	Brainerd	125	42.3
	Faribault-Northfield	67	44.2
	Fairmont	33	50.3
	Fergus Falls	70	36.3
	Hutchinson	47	45.7
	Marshall	33	47.8
	New Ulm	42	49.1
	Owatonna	37	36.9
	Red Wing	66	47.5
	Willmar	40	31.8*
	Winona	64	49.5
	Worthington	22	35.5
Metropolitan	Duluth	314	44.3
	Mankato-North Mankato	88	40.0
	Minneapolis-StPaul-Bloomington	3,635	46.7
	Rochester	222	46.4
	St Cloud	199	44.5

Source: MCSS January 2011.
§ 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 Office of Management and Budget. 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, 2004-2008, Breast Cancer**

		Males	Females
Incidence	All Races Combined	1.2	124.0
	American Indian		
	Total	~	57.7
	CHSDA**	~	77.9
	Asian/PI	0.6	93.7
	Black	1.6	119.9
	Non-Hispanic White	1.3	133.2
	Hispanic all races	0.7	92.1
Mortality	All Races Combined	0.3	23.5
	American Indian		
	Total	~	13.8
	CHSDA**	~	17.2
	Asian/PI	0.1	12.2
	Black	0.5	32.0
	Non-Hispanic White	0.3	23.4
	Hispanic all races	0.1	15.1

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 8 women 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 14 percent of cancer deaths among women in 2008 compared to 20 percent in 1988. Breast cancer incidence among women began declining sharply around 2000, and accounted for 30 percent of cancer diagnoses among women in 2008 compared to 34 percent in 2000. The incidence rate among non-Hispanic white women over the most recent five-year period was four percent lower in Minnesota than in the SEER Program, and the mortality rate was eight percent lower in Minnesota than in the U.S.

Survival: About 20 percent of breast cancers in Minnesota are 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 are diagnosed when still confined to the breast, when SEER data indicate that five-year relative survival is still very high, 98.6 percent.

Trends: Incidence rates for invasive breast cancer among Minnesota women decreased significantly by 3.8 percent per year from 2000-2004 and then stabilized, while the mortality rate decreased signifi-

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cantly by 2.6 percent per year from 1988 to 2008. 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 of the other common cancers. Almost 55 percent of cases are diagnosed before 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 this cancer. From 2004 to 2008, female breast cancer incidence rates in Minnesota were 14 percent lower among black compared to non-Hispanic white women, but mortality rates were 37 percent higher among black women. This indicates disparities in survival from breast cancer among populations of color. Female breast cancer incidence rates are somewhat lower in Minnesota than in the SEER Program for each race/ethnic group except American Indians. Among American Indian women, breast cancer incidence is 40 percent higher in Minnesota.

Geography: As breast cancer screening becomes more widely adopted, the rate of late-stage disease should decline as tumors are discovered at an earlier stage. Over the five-year period 2004-2008, the rate of late-stage breast cancer was significantly lower in the Bemidji and Willmar Micropolitan Areas than in the state as a whole.

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 account for only 30 to 50 percent of breast cancers.

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, and follow-up studies indicate that this increase in risk does not appear to decline after MHT is discontinued. However, the average duration of exposure to MHT in the WHI was 5.6 years, and the optimal duration of therapy to minimize risks and maximize benefits needs further research. 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/uspsbrca.htm.

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

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Table III-5.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Cervix Uteri Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	-	155	-	5.8	-	28	-	1.0
2008	-	165	-	6.3	-	49	-	1.7

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 three joinpoints, Minnesota, 1988-2008, Cervix Uteri Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	-	-	1988-2008	-2.7*	-	-	1988-2008	-1.8*
AAPC(%)†	-	-	2004-2008	-2.7*	-	-	2004-2008	-1.8*
	-	-	1999-2008	-2.7*	-	-	1999-2008	-1.8*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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 ($p < 0.05$).

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Table III-5.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2004-2008, Cervix Uteri Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	-	4	-	0.1	-	0	-	0.0
20-34	-	142	-	5.6	-	8	-	0.3
35-49	-	293	-	10.2	-	47	-	1.6
50-64	-	221	-	9.8	-	86	-	3.8
65-74	-	74	-	8.9	-	33	-	4.0
75-84	-	48	-	7.5	-	31	-	4.9
85+	-	25	-	7.2	-	17	-	4.9

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, 2004-2008, Cervix Uteri Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	-	807	-	6.1	-	222	-	1.6
American Indian								
Statewide	-	19	-	12.7	-	7	-	~
CHSDA**	-	13	-	17.8	-	6	-	~
Asian/PI	-	36	-	14.2	-	14	-	6.9
Black	-	40	-	10.1	-	10	-	3.4
Non-Hispanic White	-	653	-	5.5	-	185	-	1.4
Hispanic all races	-	38	-	13.6	-	6	-	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Cervix Uteri Cancer

	Males	Females
Median Age at Diagnosis (Yr)	-	46.0
Median Age at Death (Yr)	-	60.5
Lifetime Risk of Diagnosis (%)	-	0.5
Lifetime Risk of Death (%)	-	0.2
Complete prevalence†	-	3,910
Five-year prevalence‡	-	590

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	68.6
In situ	-	-
Localized	48.7	90.9
Regional	33.4	57.0
Distant	10.7	18.7
Unstaged	7.1	53.7

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* Survival for All Stages excludes *in situ* tumors.
- *In situ* tumors of the cervix are not registered.

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Table III-5.7: Number of new cases and average annual incidence rates of invasive disease by MMSA†, Minnesota, 2004-2008, Cervix Uteri Cancer

Area	MMSA†	Invasive‡ Disease Cases	Rate§
Statewide		807	6.1
Micropolitan	Albert Lea	3	3.7
	Alexandria	6	7.4
	Austin	5	5.4
	Bemidji	14	13.7*
	Brainerd	14	6.7
	Faribault-Northfield	6	4.3
	Fairmont	8	15.2
	Fergus Falls	13	9.5
	Hutchinson	5	4.3
	Marshall	6	9.4
	New Ulm	10	14.5*
	Owatonna	6	6.7
	Red Wing	5	4.4
	Willmar	12	12.2*
	Winona	6	5.6
	Worthington	5	8.5
Metropolitan	Duluth	35	6.2
	Mankato-North Mankato	12	6.1
	Minneapolis-StPaul-Bloomington	454	5.8
	Rochester	28	6.1
	St Cloud	21	5.1

Source: MCSS January 2011.
§ 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 Office of Management and Budget. 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, 2004-2008, Cervix Uteri Cancer**

		Males	Females
Incidence	All Races Combined	-	8.1
	American Indian		
	Total	-	5.7
	CHSDA**	-	7.8
	Asian/PI	-	7.3
	Black	-	10.0
	Non-Hispanic White	-	7.0
	Hispanic all races	-	12.2
Mortality	All Races Combined	-	2.4
	American Indian		
	Total	-	2.5
	CHSDA**	-	3.4
	Asian/PI	-	2.1
	Black	-	4.3
	Non-Hispanic White	-	2.1
	Hispanic all races	-	3.1

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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, 161 women were diagnosed with invasive cervical cancer in Minnesota each year from 2004 to 2008. 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, 44 Minnesota women died from cervical cancer annually. Incidence rates in Minnesota were 25 percent lower than those reported by SEER. Minnesota has one of the lowest cervical cancer mortality rates in the U.S., nearly one 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 2001 to 2007 had a five-year relative survival rate of 90 percent. However, survival decreased sharply when the cancer was diagnosed at later stages.

Trends: The invasive cervical cancer incidence rate decreased significantly by 2.7 percent per year in Minnesota from 1988 to 2008, while the mortality rate decreased significantly by 1.8 percent per year. Similar trends are seen nationally. These declines are attributed

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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 increases with age beginning at age 20, and starts to decrease after age 50. Approximately 80 percent of women diagnosed with cervical cancer are 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 are two to three times higher among women from each race/ethnic group in Minnesota. In contrast, non-Hispanic white, American Indian, and Asian/Pacific Islander women in the SEER Program have very similar cervical cancer rates, and only black and Hispanic women have elevated rates.

Geography: During the five-year period 2004-2008, cervical cancer incidence rates were two or more times higher in the Bemidji, New Ulm, and Willmar Micropolitan Areas than in the state as a whole.

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, 1988-2008, Colon and Rectum Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	1,276	1,275	62.0	46.1	429	497	21.7	17.1
2001	1,263	1,236	60.0	44.4	410	458	20.4	15.4
2002	1,268	1,271	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	1,301	1,234	58.1	42.9	371	425	17.3	13.7
2005	1,250	1,193	54.5	40.6	383	408	17.8	12.7
2006	1,212	1,190	52.2	40.6	393	429	17.7	13.8
2007	1,278	1,262	53.0	41.4	444	411	19.2	12.4
2008	1,261	1,222	51.3	40.2	445	401	18.8	12.2

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 three joinpoints, Minnesota, 1988-2008, Colon and Rectum Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	-1.7*	1988-1995	-1.9*	1988-2008	-2.7*	1988-2008	-2.2*
Interval 2			1995-1998	1.7				
Interval 3			1998-2008	-1.7*				
AAPC(%)†	2004-2008	-1.7*	2004-2008	-1.7*	2004-2008	-2.7*	2004-2008	-2.2*
	1999-2008	-1.7*	1999-2008	-1.7*	1999-2008	-2.7*	1999-2008	-2.2*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Colon and Rectum Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	4	3	0.1	0.1	1	1	0.0	0.0
20-34	51	66	1.9	2.6	14	14	0.5	0.6
35-49	603	475	20.5	16.5	116	107	4.0	3.7
50-64	1,900	1,302	84.7	57.6	467	316	20.8	14.0
65-74	1,588	1,348	214.8	162.2	471	357	63.7	43.0
75-84	1,550	1,802	339.2	282.0	589	577	128.9	90.3
85+	606	1,105	413.9	317.7	378	702	258.2	201.8

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, 2004-2008, Colon and Rectum Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	6,302	6,101	53.7	41.1	2,036	2,074	18.2	13.0
American Indian								
Statewide	54	46	64.0	53.4	25	13	37.3	17.2
CHSDA**	37	33	81.4	67.1	19	8	49.4	~
Asian/PI	70	67	37.4	28.4	15	27	9.9	11.7
Black	132	94	52.0	35.8	50	33	25.4	12.6
Non-Hispanic White	5,920	5,754	53.4	40.7	1,932	1,991	18.1	12.9
Hispanic all races	50	47	32.9	31.1	14	9	9.0	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Colon and Rectum Cancer

	Males	Females
Median Age at Diagnosis (Yr)	68.0	73.0
Median Age at Death (Yr)	73.0	79.0
Lifetime Risk of Diagnosis (%)	5.5	5.3
Lifetime Risk of Death (%)	2.2	2.0
Complete prevalence†	9,680	9,910
Five-year prevalence‡	3,610	3,360

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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
In situ	3.5	95.6
Localized	41.4	90.1
Regional	31.6	69.2
Distant	16.6	11.7
Unstaged	6.9	33.3

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Colon and Rectum Cancer

Area	MMSA†	Late-Stage‡ Cases	Late-Stage‡ Rate§
Statewide		6,169	23.3
Micropolitan	Albert Lea	51	21.9
	Alexandria	64	25.2
	Austin	49	18.9
	Bemidji	53	25.3
	Brainerd	155	25.9
	Faribault-Northfield	66	22.4
	Fairmont	48	31.4
	Fergus Falls	126	29.8*
	Hutchinson	39	18.5
	Marshall	44	30.7
	New Ulm	46	25.9
	Owatonna	59	30.8*
	Red Wing	65	23.5
	Willmar	57	22.9
	Winona	69	26.6
	Worthington	40	29.5
Metropolitan	Duluth	353	24.7
	Mankato-North Mankato	116	26.7
	Minneapolis-StPaul-Bloomington	3,051	22.3
	Rochester	220	24.3
	St Cloud	179	20.6

Source: MCSS January 2011.
§ 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 Management and Budget. 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, 2004-2008, Colon and Rectum Cancer**

		Males	Females
Incidence	All Races Combined	55.0	41.0
	American Indian		
	Total	31.1	28.3
	CHSDA**	42.7	40.0
	Asian/PI	45.4	34.6
	Black	67.7	51.2
	Non-Hispanic White	55.5	41.2
	Hispanic all races	46.0	32.3
Mortality	All Races Combined	20.7	14.5
	American Indian		
	Total	14.9	10.6
	CHSDA**	19.8	14.0
	Asian/PI	13.3	9.9
	Black	30.5	20.4
	Non-Hispanic White	20.4	14.2
	Hispanic all races	15.5	10.3

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004 to 2008, an average of approximately 2,500 cases of invasive colon and rectum cancer were diagnosed and 820 deaths occurred each year in Minnesota. Minnesota rates are slightly lower than national rates. Colorectal cancer is the second leading cause of cancer-related death in Minnesota; only lung cancer kills more Minnesotans.
Survival: About 40 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 2001 to 2007 had a five-year relative survival rate of 90 percent.
Trends: Colon and rectum cancer rates have declined sharply over the last decade 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 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: About 65 percent of diagnoses and 75 percent of deaths occur among persons 65 years and older.

Colon and Rectum Cancer

Gender: Colorectal cancer rates are about 30 percent higher among men than women.
Race: In Minnesota, American Indians have the highest incidence and mortality rates of colorectal cancer. Among American Indians, colorectal cancer rates in Minnesota are two times higher than in the U.S. as a whole.
Geography: As colorectal cancer screening becomes more widely adopted, the rate of late-stage disease should decline as tumors are discovered at an earlier stage. Over the five-year period 2004-2008, the rate of late-stage colorectal cancer was significantly higher in the Fergus Falls and Owatonna Micropolitan Areas compared the state as a whole.

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, 1988-2008, Corpus and Uterus, NOS Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	-	632	-	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	-	628	-	24.7	-	99	-	3.5
2001	-	706	-	27.2	-	111	-	4.0
2002	-	759	-	28.7	-	114	-	3.9
2003	-	670	-	25.0	-	138	-	4.9
2004	-	768	-	28.0	-	135	-	4.7
2005	-	783	-	28.1	-	120	-	4.2
2006	-	758	-	26.3	-	140	-	4.7
2007	-	822	-	28.1	-	109	-	3.5
2008	-	832	-	27.7	-	127	-	4.0

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 three joinpoints, Minnesota, 1988-2008, Corpus and Uterus, NOS Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	-	-	1988-2008	0.4*	-	-	1988-2008	0.2
AAPC(%)†	-	-	2004-2008	0.4*	-	-	2004-2008	0.2
	-	-	1999-2008	0.4*	-	-	1999-2008	0.2

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Corpus and Uterus, NOS Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	-	1	-	0.0	-	0	-	0.0
20-34	-	49	-	1.9	-	5	-	0.2
35-49	-	454	-	15.8	-	26	-	0.9
50-64	-	1,790	-	79.3	-	165	-	7.3
65-74	-	886	-	106.6	-	125	-	15.0
75-84	-	573	-	89.7	-	193	-	30.2
85+	-	210	-	60.4	-	117	-	33.6

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, 2004-2008, Corpus and Uterus, NOS Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	-	3,963	-	27.7	-	631	-	4.2
American Indian								
Statewide	-	30	-	23.2	-	2	-	~
CHSDA**	-	19	-	29.3	-	1	-	~
Asian/PI	-	50	-	16.5	-	8	-	~
Black	-	53	-	20.7	-	15	-	7.2
Non-Hispanic White	-	3,734	-	27.7	-	601	-	4.2
Hispanic all races	-	44	-	24.1	-	4	-	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Corpus and Uterus, NOS Cancer

	Males	Females
Median Age at Diagnosis (Yr)	-	61.0
Median Age at Death (Yr)	-	76.0
Lifetime Risk of Diagnosis (%)	-	3.1
Lifetime Risk of Death (%)	-	0.6
Complete prevalence†	-	11,080
Five-year prevalence‡	-	2,890

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	81.8
In situ	1.2	99.1
Localized	71.4	95.8
Regional	17.0	67.1
Distant	6.8	16.2
Unstaged	3.6	50.1

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Corpus and Uterus, NOS Cancer**

		Males	Females
Incidence	All Races Combined	-	23.9
	American Indian		
	Total	-	13.1
	CHSDA**	-	16.7
	Asian/PI	-	18.2
	Black	-	20.9
	Non-Hispanic White	-	25.6
	Hispanic all races	-	18.9
Mortality	All Races Combined	-	4.2
	American Indian		
	Total	-	2.5
	CHSDA**	-	3.1
	Asian/PI	-	2.5
	Black	-	7.2
	Non-Hispanic White	-	3.9
	Hispanic all races	-	3.2

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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.

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 2004-2008, an average of nearly 800 cases of uterine cancer were diagnosed among women in Minnesota each year and about 125 women died from the disease annually. Rates in Minnesota are somewhat higher than what is reported nationally.

Survival: The majority (70%) of uterine cancers in Minnesota are diagnosed when still confined to the uterus. SEER cases diagnosed at the localized stage from 2001 to 2007 had a five-year relative survival rate of over 95 percent. Similar to the disparity seen for breast cancer, the five-year relative survival rate for uterine cancer is 85 percent for white women, and only 61 percent for black women.

Trends: The uterine cancer incidence rate in Minnesota increased significantly by 0.4 percent per year from 1988 to 2008, while the mortality rate remained stable.

Age: Over 40 percent of diagnoses and nearly 70 percent of deaths occur among women 65 years of age or older.

Race: Nationally, uterine cancer risk is highest among non-Hispanic white women. In Minnesota, the uterine cancer incidence rate is highest among American Indian women living in CHSDA counties; their rate is 75 percent higher than among American Indian women in CHSDA counties in the SEER 17 areas. Uterine cancer incidence is 50 percent higher among Hispanic women in Minnesota compared to those in the SEER 17 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.

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

Corpus and Uterus, NOS 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, 1988-2008, Esophagus Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	202	47	9.4	1.7	174	56	8.2	1.9
2003	202	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	217	52	8.8	1.8	184	50	7.8	1.7
2007	220	67	9.0	2.2	180	51	7.4	1.7
2008	205	66	8.1	2.3	180	66	7.4	2.2

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 three joinpoints, Minnesota, 1988-2008, Esophagus Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	2.3*	1988-2008	1.5*	1988-2008	1.2*	1988-2008	0.7
AAPC(%)†	2004-2008	2.3*	2004-2008	1.5*	2004-2008	1.2*	2004-2008	0.7
	1999-2008	2.3*	1999-2008	1.5*	1999-2008	1.2*	1999-2008	0.7

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Esophagus Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	1	0	0.0	0.0
20-34	4	1	0.2	0.0	3	1	0.1	0.0
35-49	102	15	3.5	0.5	65	6	2.2	0.2
50-64	403	80	18.0	3.5	300	59	13.4	2.6
65-74	267	83	36.1	10.0	242	58	32.7	7.0
75-84	232	82	50.8	12.8	226	74	49.5	11.6
85+	69	44	47.1	12.7	85	52	58.1	15.0

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, 2004-2008, Esophagus Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	1,077	305	8.9	2.1	922	250	7.8	1.7
American Indian								
Statewide	4	2	~	~	4	1	~	~
CHSDA**	4	2	~	~	2	1	~	~
Asian/PI	10	2	6.7	~	6	2	~	~
Black	28	11	11.0	3.5	19	5	6.8	~
Non-Hispanic White	1,022	287	8.9	2.1	891	239	8.0	1.7
Hispanic all races	7	1	~	~	2	2	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Esophagus Cancer

	Males	Females
Median Age at Diagnosis (Yr)	65.5	70.0
Median Age at Death (Yr)	68.0	74.0
Lifetime Risk of Diagnosis (%)	0.9	0.3
Lifetime Risk of Death (%)	0.9	0.3
Complete prevalence†	450	130
Five-year prevalence‡	300	80

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	16.8
In situ	1.0	72.9
Localized	18.0	37.3
Regional	35.2	18.4
Distant	34.6	3.1
Unstaged	11.3	11.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Esophagus Cancer**

		Males	Females
Incidence	All Races Combined	7.8	1.9
	American Indian		
	Total	4.9	2.1
	CHSDA**	5.9	3.2
	Asian/PI	4.2	1.2
	Black	8.6	2.7
	Non-Hispanic White	8.5	1.9
	Hispanic all races	5.2	1.2
Mortality	All Races Combined	7.8	1.6
	American Indian		
	Total	5.1	1.2
	CHSDA**	6.7	1.5
	Asian/PI	3.2	0.9
	Black	8.5	2.4
	Non-Hispanic White	8.2	1.6
	Hispanic all races	4.1	0.8

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004 to 2008, an average of 275 cases of esophageal cancer were diagnosed in Minnesota each year and about 230 deaths resulted from this disease annually. Rates are similar to those reported by SEER.

Survival: Based on SEER data, the five-year relative survival rate for esophageal cancer is 17 percent overall, and 37 percent when diagnosed at the localized stage. Most esophageal cancers are diagnosed when the tumor has already spread to adjacent tissues (35%) or distant (35%) organs.

Trends: Incidence rates among Minnesota males and females have significantly increased by an average of 2.3 and 1.5 percent per year, respectively, since cancer reporting was initiated in 1988. The mortality rate has increased significantly among males by 1.2 percent per year. The mortality rate among Minnesota females has also increased somewhat during this same period, but the increase is not statistically significant. However, trends in squamous cell carcinomas of the esophagus, primarily caused by smoking and alcohol, are not increasing; all the increase is in adenocarcinomas, principally occurring in the lower portion of the esophagus and linked to other risk factors.

Age: In Minnesota, 55 percent of esophageal cancer diagnoses and 63 percent of deaths occur among persons 65 years of age and older.

Gender: Esophageal cancer rates are 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 have the highest, and very similar, incidence and mortality rates; among women, American Indians living in CHSDA counties have the highest incidence rate, while black women have 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 examination.

Hodgkin Lymphoma

Table III-9.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Hodgkin Lymphoma

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	74	73	3.4	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	94	80	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	66	3.1	2.6	8	11	0.4	0.4
2006	72	54	2.9	2.1	12	13	0.6	0.5
2007	90	65	3.6	2.4	22	10	0.9	0.3
2008	99	87	3.8	3.3	8	8	0.3	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 three joinpoints, Minnesota, 1988-2008, Hodgkin Lymphoma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	-0.4	1988-2008	-0.1	1988-2008	-2.6	1988-2008	-2.8*
AAPC(%)†	2004-2008	-0.4	2004-2008	-0.1	2004-2008	-2.6*	2004-2008	-2.8*
	1999-2008	-0.4	1999-2008	-0.1	1999-2008	-2.6*	1999-2008	-2.8*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Hodgkin Lymphoma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	51	39	1.4	1.1	0	0	0.0	0.0
20-34	126	130	4.7	5.1	7	5	0.3	0.2
35-49	96	55	3.3	1.9	11	9	0.4	0.3
50-64	68	45	3.0	2.0	11	8	0.5	0.4
65-74	39	34	5.3	4.1	9	10	1.2	1.2
75-84	34	32	7.4	5.0	15	14	3.3	2.2
85+	8	7	5.5	2.0	6	5	4.1	1.4

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, 2004-2008, Hodgkin Lymphoma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	422	342	3.4	2.6	59	51	0.5	0.4
American Indian								
Statewide	2	2	~	~	0	1	~	~
CHSDA**	1	2	~	~	0	0	~	~
Asian/PI	2	4	~	~	1	0	~	~
Black	12	11	1.7	2.0	1	0	~	~
Non-Hispanic White	385	309	3.5	2.7	54	49	0.5	0.4
Hispanic all races	15	8	4.0	~	3	1	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Hodgkin Lymphoma

	Males	Females
Median Age at Diagnosis (Yr)	41.0	36.5
Median Age at Death (Yr)	64.5	67.0
Lifetime Risk of Diagnosis (%)	0.3	0.2
Lifetime Risk of Death (%)	0.1	0.0
Complete prevalence†	1,540	1,340
Five-year prevalence‡	340	280

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	83.9
< 45	58.2	92.8
45-54	9.6	83.0
55-64	10.9	73.5
65-74	10.5	57.6
75+	10.7	37.9

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*

Hodgkin Lymphoma

Table III-9.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Hodgkin Lymphoma**

		Males	Females
Incidence	All Races Combined	3.1	2.6
	American Indian		
	Total	0.8	0.8
	CHSDA**	1.0	0.8
	Asian/PI	1.5	1.1
	Black	3.2	2.4
	Non-Hispanic White	3.6	3.0
	Hispanic all races	2.7	2.2
Mortality	All Races Combined	0.5	0.3
	American Indian		
	Total	0.3	~
	CHSDA**	~	~
	Asian/PI	0.2	0.2
	Black	0.5	0.3
	Non-Hispanic White	0.5	0.3
	Hispanic all races	0.5	0.3

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 only 12 percent of lymphomas and 0.6 percent of all cancer diagnoses. Approximately 150 cases are diagnosed each year in Minnesota and 22 people die from the disease annually. Rates are similar to those reported nationally.

Survival: The SEER five-year relative survival rate for Hodgkin lymphoma is about 85 percent, and decreases with 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 is declining significantly and to the same extent among men and women. This is similar to national trends.

Age: Approximately 80 percent of newly diagnosed cases of Hodgkin lymphoma occur 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: As with many cancers, the incidence of Hodgkin lymphoma is about 30 percent higher among males than females.

Race: Based on cases reported to SEER, the incidence rate of Hodgkin lymphoma is 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, 1988-2008, Kaposi Sarcoma

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	11	2	0.5	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

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 three joinpoints, Minnesota, 1988-2008, Kaposi Sarcoma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1992	14.0						
Interval 2	1992-1999	-18.8*						
Interval 3	1999-2008	-3.1						
AAPC(%)†	2004-2008	-3.1						
	1999-2008	-3.1						

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Kaposi Sarcoma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	0	0	0.0	0.0
20-34	14	2	0.5	0.1	0	0	0.0	0.0
35-49	25	0	0.9	0.0	1	0	0.0	0.0
50-64	10	0	0.5	0.0	0	0	0.0	0.0
65-74	1	0	0.1	0.0	0	0	0.0	0.0
75-84	2	4	0.4	0.6	0	1	0.0	0.2
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, 2004-2008, Kaposi Sarcoma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	53	8	0.4	~	2	2	~	~
American Indian								
Statewide	1	0	~	~	0	0	~	~
CHSDA**	0	0	~	~	0	0	~	~
Asian/PI	0	0	~	~	0	0	~	~
Black	13	0	3.9	~	0	0	~	~
Non-Hispanic White	34	6	0.3	~	2	2	~	~
Hispanic all races	3	1	~	~	.	.	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Kaposi Sarcoma

	Males	Females
Median Age at Diagnosis (Yr)	46.0	88.0
Median Age at Death (Yr)	88.0	89.0
Lifetime Risk of Diagnosis (%)	0.0	0.0
Lifetime Risk of Death (%)	0.0	0.0

Source: MCSS January 2011.

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	67.6
< 45	41.7	61.7
45-54	25.0	63.4
55-64	13.9	76.0
65-74	2.8	83.9
75+	16.7	90.1

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*

Kaposi Sarcoma

Table III-10.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Kaposi Sarcoma**

		Males	Females
Incidence	All Races Combined	1.2	0.1
	American Indian		
	Total	0.6	~
	CHSDA**	0.7	~
	Asian/PI	0.4	~
	Black	2.4	0.2
	Non-Hispanic White	0.9	0.1
	Hispanic all races	1.5	0.2

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission. SEER 17 covers 26% of the US population.
§ 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, 2004-2008, an average of 11 cases of KS were diagnosed in Minnesota each year. Deaths from KS cannot be readily 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 are two-thirds lower than reported by SEER.
Survival: Persons diagnosed with KS in the SEER Program from 2001 to 2007 had a five-year relative survival of 68 percent. Survival increased with 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 2006-2008. 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 18.8 percent per year from 1992 to 1999, and then stabilizing at around 0.4 per 100,000 males.
Age: About 85 percent of men diagnosed with KS in Minnesota are less than 65 years of age.
Gender: In Minnesota, nearly seven times more cases of KS are diagnosed among males than among females.
Race: Based on a fairly limited number of cases, it appears that KS incidence rates in Minnesota are considerably higher among black males than non-Hispanic white males. This is consistent with what is reported by the SEER 17 areas.

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, 1988-2008, Kidney and Renal Pelvis Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	304	160	15.2	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	466	295	19.5	10.6	135	81	5.9	2.7
2006	534	300	21.7	10.7	158	88	6.8	2.9
2007	533	345	21.0	11.9	153	96	6.4	3.1
2008	599	320	23.1	11.0	146	71	6.1	2.2

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 three joinpoints, Minnesota, 1988-2008, Kidney and Renal Pelvis Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1997	-0.2	1988-2008	2.9*	1988-2008	-0.7	1988-2008	-0.9
Interval 2	1997-2008	3.3*						
AAPC(%)†	2004-2008	3.3*	2004-2008	2.9*	2004-2008	-0.7	2004-2008	-0.9
	1999-2008	3.3*	1999-2008	2.9*	1999-2008	-0.7	1999-2008	-0.9

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Kidney and Renal Pelvis Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	42	19	1.2	0.6	4	1	0.1	0.0
20-34	33	34	1.2	1.3	1	0	0.0	0.0
35-49	375	186	12.8	6.5	43	10	1.5	0.4
50-64	979	501	43.6	22.2	205	75	9.1	3.3
65-74	656	352	88.7	42.4	197	95	26.6	11.4
75-84	439	333	96.1	52.1	190	137	41.6	21.4
85+	86	104	58.7	29.9	81	109	55.3	31.3

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, 2004-2008, Kidney and Renal Pelvis Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	2,610	1,529	21.1	10.8	721	427	6.2	2.8
American Indian								
Statewide	49	30	41.2	26.3	9	9	~	~
CHSDA**	27	22	42.0	36.4	7	6	~	~
Asian/PI	12	5	4.1	~	3	2	~	~
Black	82	44	27.6	14.3	17	7	7.4	~
Non-Hispanic White	2,407	1,406	20.9	10.6	685	404	6.2	2.7
Hispanic all races	35	25	15.5	13.3	7	5	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Kidney and Renal Pelvis Cancer

	Males	Females
Median Age at Diagnosis (Yr)	63.0	65.0
Median Age at Death (Yr)	70.0	77.0
Lifetime Risk of Diagnosis (%)	2.2	1.3
Lifetime Risk of Death (%)	0.8	0.4
Complete prevalence†	3,350	2,170
Five-year prevalence‡	1,480	900

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	69.5
In situ	2.3	91.0
Localized	61.7	90.8
Regional	18.3	63.3
Distant	13.1	11.1
Unstaged	4.6	34.8

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Kidney and Renal Pelvis Cancer**

		Males	Females
Incidence	All Races Combined	20.0	10.2
	American Indian		
	Total	16.0	9.7
	CHSDA**	22.1	13.9
	Asian/PI	10.6	5.4
	Black	23.3	11.6
	Non-Hispanic White	20.7	10.5
	Hispanic all races	19.2	10.7
Mortality	All Races Combined	5.9	2.7
	American Indian		
	Total	6.7	2.8
	CHSDA**	8.9	4.1
	Asian/PI	2.6	1.2
	Black	6.0	2.6
	Non-Hispanic White	6.0	2.7
	Hispanic all races	5.2	2.3

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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: Kidney and renal pelvis cancers are the seventh most commonly diagnosed cancer among males, and the tenth most commonly diagnosed cancer among females. From 2004 to 2008, and average of 828 cases of kidney and renal pelvis cancer were diagnosed each year in Minnesota, and 230 deaths resulted from this disease annually. Minnesota rates are very similar to those reported nationally.

Survival: The SEER five-year relative survival rate for kidney and renal pelvis cancers is 90.8 percent for localized tumors. Survival drops to 63.3 percent for tumors diagnosed at the regional stage. About 60 percent of kidney and renal pelvis cancers are diagnosed while in the localized stage in Minnesota.

Trends: Incidence rates in Minnesota increased significantly by about three percent per year from 1999 to 2008 among both males and females. 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 are diagnosed and 70 percent of deaths occur among persons 65 years of age or older.

Gender: Rates of kidney and renal pelvis cancer are two times higher in men than in women.

Race: The incidence rate of kidney and renal pelvis cancer in Minnesota is highest among American Indians, and is two times higher in this population than among non-Hispanic whites in Minnesota, and two times higher than among American Indians in the SEER Program. 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, 1988-2008, Larynx Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	145	40	5.9	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	144	40	5.6	1.4	35	17	1.5	0.6

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 three joinpoints, Minnesota, 1988-2008, Larynx Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	-2.0*	1988-2008	0.0	1988-2008	-0.8	1988-2008	0.5
AAPC(%)†	2004-2008	-2.0*	2004-2008	0.0	2004-2008	-0.8	2004-2008	0.5
	1999-2008	-2.0*	1999-2008	0.0	1999-2008	-0.8	1999-2008	0.5

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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 ($p < 0.05$).

Larynx Cancer

Table III-12.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2004-2008, Larynx Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	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	62	19	2.1	0.7	13	4	0.4	0.1
50-64	266	76	11.9	3.4	71	15	3.2	0.7
65-74	215	51	29.1	6.1	48	19	6.5	2.3
75-84	129	35	28.2	5.5	53	9	11.6	1.4
85+	31	7	21.2	2.0	19	5	13.0	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, 2004-2008, Larynx Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	704	190	5.8	1.4	204	52	1.7	0.4
American Indian								
Statewide	14	2	16.2	~	6	1	~	~
CHSDA**	9	2	~	~	3	1	~	~
Asian/PI	4	0	~	~	0	0	~	~
Black	20	12	7.5	4.2	10	0	4.9	~
Non-Hispanic White	654	175	5.7	1.3	185	51	1.7	0.4
Hispanic all races	7	1	~	~	2	0	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Larynx Cancer

	Males	Females
Median Age at Diagnosis (Yr)	66.0	65.0
Median Age at Death (Yr)	68.5	66.5
Lifetime Risk of Diagnosis (%)	0.6	0.2
Lifetime Risk of Death (%)	0.2	0.0
Complete prevalence†	1,230	310
Five-year prevalence‡	410	110

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	60.8
In situ	10.1	95.1
Localized	54.1	76.7
Regional	17.6	41.6
Distant	12.2	32.8
Unstaged	6.0	50.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Larynx Cancer**

		Males	Females
Incidence	All Races Combined	6.0	1.3
	American Indian		
	Total	2.6	0.5
	CHSDA**	2.8	0.8
	Asian/PI	2.2	0.3
	Black	9.8	1.9
	Non-Hispanic White	6.3	1.4
	Hispanic all races	4.6	0.6
Mortality	All Races Combined	2.2	0.5
	American Indian		
	Total	1.6	0.3
	CHSDA**	2.0	~
	Asian/PI	0.8	0.1
	Black	4.4	0.7
	Non-Hispanic White	2.0	0.5
	Hispanic all races	1.8	0.2

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004 to 2008, an average of 179 cases of laryngeal cancer were diagnosed among Minnesota residents each year, and 51 deaths were caused by this cancer annually. Incidence and mortality rates in Minnesota are somewhat lower than nationally.

Survival: Based on SEER data, the five-year relative survival rate for laryngeal cancer is 77 percent if diagnosed while still confined to the larynx. Survival decreases significantly when the cancer has progressed to involve nearby tissues, lymph nodes, or distant organs.

Trends: The laryngeal cancer incidence rate in Minnesota decreased significantly by 2.0 percent each year among males, but did not decrease among women. Nationally, incidence of this cancer is decreasing significantly among both men and women, by 2.7 percent and 2.5 percent each year, respectively. The laryngeal cancer mortality rate in Minnesota has not changed significantly for either men or women since 1988, while in the U.S. it is decreasing significantly by 2.5 percent each year among males and by 1.8 percent among females.

Age: The risk of laryngeal cancer increases with age, with 50 percent of cases and 60 percent of deaths occurring among those age 65 and older.

Gender: Incidence and mortality rates for laryngeal cancer are more than four times higher among males than females in Minnesota.

Race: The laryngeal cancer incidence rate in American Indian men in Minnesota is more than twice as high as among non-Hispanic white men in our state and six times higher than among American Indians in the SEER Program. In general, there are too few cases among people of color in the state to assess racial disparities. Nationally, black males have the highest incidence rate, about 50 percent higher than among non-Hispanic whites, and American Indians have 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.

Leukemia

Table III-13.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Leukemia

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	Males	Females	Males	Females	Males	Females	Males	Females
1988	303	259	17.2	11.2	167	154	10.2	6.4
1989	314	208	17.7	8.8	191	174	11.0	7.2
1990	336	252	18.3	10.7	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	391	277	20.2	11.3	211	155	11.6	6.0
1995	367	256	18.7	10.1	260	170	14.2	6.2
1996	361	267	18.4	10.4	226	191	12.1	7.2
1997	390	261	19.7	9.7	211	166	11.1	6.0
1998	366	300	17.9	11.5	192	163	10.0	5.7
1999	381	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	459	290	21.7	10.7	229	156	11.5	5.5
2002	416	281	19.2	10.1	227	196	11.0	6.6
2003	427	305	19.4	11.2	236	182	11.4	6.1
2004	489	331	21.8	11.9	232	168	10.9	5.8
2005	435	336	18.9	11.8	203	186	9.6	6.2
2006	486	307	20.6	10.5	236	152	10.8	5.0
2007	513	353	21.5	12.1	255	182	11.5	6.0
2008	512	325	20.8	10.9	259	174	11.2	5.4

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 three joinpoints, Minnesota, 1988-2008, Leukemia

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	0.9*	1988-2008	0.6*	1988-2008	-0.5	1988-2008	-0.9*
AAPC(%)†	2004-2008	0.9*	2004-2008	0.6*	2004-2008	-0.5	2004-2008	-0.9*
	1999-2008	0.9*	1999-2008	0.6*	1999-2008	-0.5	1999-2008	-0.9*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Leukemia

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	183	145	5.1	4.2	31	24	0.9	0.7
20-34	82	58	3.1	2.3	28	13	1.1	0.5
35-49	193	139	6.6	4.8	56	48	1.9	1.7
50-64	629	324	28.0	14.3	182	111	8.1	4.9
65-74	529	321	71.5	38.6	276	172	37.3	20.7
75-84	575	404	125.8	63.2	372	275	81.4	43.0
85+	244	261	166.7	75.0	240	219	163.9	63.0

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, 2004-2008, Leukemia

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	2,435	1,652	20.7	11.5	1,185	862	10.8	5.7
American Indian								
Statewide	25	11	26.7	8.7	6	7	~	~
CHSDA**	16	8	32.6	~	4	4	~	~
Asian/PI	41	21	13.4	4.8	18	8	10.0	~
Black	51	33	13.9	10.1	19	12	6.2	3.5
Non-Hispanic White	2,238	1,533	20.5	11.4	1,128	828	10.8	5.7
Hispanic all races	34	22	9.4	5.3	12	6	5.5	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Leukemia

	Males	Females
Median Age at Diagnosis (Yr)	67.0	69.0
Median Age at Death (Yr)	75.0	78.0
Lifetime Risk of Diagnosis (%)	2.3	1.4
Lifetime Risk of Death (%)	1.4	0.8
Complete prevalence†	3,100	2,170
Five-year prevalence‡	1,260	840

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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 Survival(%)‡
Acute Lymphocytic Leukemia	216	64.4
Chronic Lymphocytic Leukemia	1,108	78.0
Acute Myeloid Leukemia	608	22.6
Chronic Myeloid Leukemia	351	57.2
All Other Leukemias	213	42.1
Total Leukemias	2,496	53.9

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*

Leukemia

Table III-13.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Leukemia**

		Males	Females
Incidence	All Races Combined	16.1	9.7
	American Indian		
	Total	6.6	5.2
	CHSDA**	9.1	6.5
	Asian/PI	8.9	6.1
	Black	12.9	7.8
	Non-Hispanic White	17.3	10.2
	Hispanic all races	11.7	8.4
Mortality	All Races Combined	9.7	5.4
	American Indian		
	Total	4.5	2.9
	CHSDA**	6.4	3.6
	Asian/PI	5.0	2.9
	Black	8.6	4.9
	Non-Hispanic White	10.2	5.6
	Hispanic all races	6.0	3.9

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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: Leukemia is the eighth most common cancer diagnosed among males and the fifth most common cause of cancer-related death; among females it is the tenth most commonly diagnosed cancer and the sixth leading cause of cancer-related death. On average, 817 cases of leukemia were diagnosed each year in Minnesota and 409 deaths occurred annually from 2004 to 2008.

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 (24%).

Between 2004 and 2008, the leukemia incidence rate among non-Hispanic whites was 18 percent higher among males and 12 percent higher among females in Minnesota than in the SEER 17 areas. It is one of the few cancers for which incidence rates are significantly higher in Minnesota than nationally. Much of the excess risk in leukemia in Minnesota is in CLL, for which the incidence rate among non-Hispanic whites is 40 percent higher in Minnesota. Geographic variation in CLL is very hard to interpret, since rates are strongly affected by medical practices. About 20 percent of CLL is discovered while the person is being evaluated for another illness. The leukemia mortality rate among non-Hispanic whites was somewhat higher in Minnesota than nationally for both males and females, but the excess was much less than for incidence, and was not statistically significant.

Survival: The overall five-year relative survival rate in the SEER program is 54.0 percent, but survival varies considerably by subtype.

Trends: Since 1988, the incidence rate of leukemia in Minnesota has increased significantly by 0.9 percent per year among males and by 0.6 percent per year among females. During the same period, leukemia mortality rates declined among both males and females, although the decline was statistically significant only among females. This is similar to national trends. 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 is higher among children ages 19 and younger than among persons age 20-34 years, and then increases steadily with age.

Gender: Overall leukemia incidence and mortality rates are 80 percent higher among males than females, but this varies by subtype.

Race: Although based on relatively small numbers, American Indian males have the highest incidence of leukemia in Minnesota, considerably higher than among non-Hispanic whites. In the SEER 17 areas non-Hispanic whites have 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).

Early Detection / Prevention

Symptoms of leukemia often resemble those of less serious health conditions, making early detection difficult.

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, 1988-2008, Liver and Intrahepatic Bile Duct Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	43	4.2	1.7	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	187	54	7.5	1.9	152	77	6.3	2.6
2007	168	76	6.5	2.6	183	91	7.5	3.0
2008	184	91	7.0	3.1	174	93	6.9	3.1

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 three joinpoints, Minnesota, 1988-2008, Liver and Intrahepatic Bile Duct Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	3.9*	1988-2006	1.7*	1988-2008	3.2*	1988-2008	2.7*
Interval 2			2006-2008	24.0				
AAPC(%)†	2004-2008	3.9*	2004-2008	12.3*	2004-2008	3.2*	2004-2008	2.7*
	1999-2008	3.9*	1999-2008	6.3*	1999-2008	3.2*	1999-2008	2.7*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Liver and Intrahepatic Bile Duct Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	15	8	0.4	0.2	4	3	0.1	0.1
20-34	12	5	0.5	0.2	6	4	0.2	0.2
35-49	81	29	2.8	1.0	63	26	2.1	0.9
50-64	361	91	16.1	4.0	279	81	12.4	3.6
65-74	172	87	23.3	10.5	182	103	24.6	12.4
75-84	134	79	29.3	12.4	181	143	39.6	22.4
85+	38	37	26.0	10.6	70	80	47.8	23.0

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, 2004-2008, Liver and Intrahepatic Bile Duct Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	813	336	6.5	2.4	785	440	6.6	3.0
American Indian								
Statewide	13	10	11.3	11.3	12	8	12.7	~
CHSDA**	9	6	~	~	4	4	~	~
Asian/PI	45	17	21.0	7.6	47	27	22.6	12.5
Black	85	24	33.5	8.8	76	25	34.6	9.8
Non-Hispanic White	629	273	5.4	2.0	636	371	5.7	2.6
Hispanic all races	32	5	13.1	~	13	9	6.9	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Liver and Intrahepatic Bile Duct Cancer

	Males	Females
Median Age at Diagnosis (Yr)	61.0	68.0
Median Age at Death (Yr)	66.0	74.0
Lifetime Risk of Diagnosis (%)	0.7	0.3
Lifetime Risk of Death (%)	0.8	0.4
Complete prevalence†	260	110
Five-year prevalence‡	200	80

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	14.4
In situ	0.0	-
Localized	41.2	27.0
Regional	26.8	8.7
Distant	17.2	4.1
Unstaged	14.7	5.8

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Liver and Intrahepatic Bile Duct Cancer**

		Males	Females
Incidence	All Races Combined	11.2	3.9
	American Indian		
	Total	13.0	5.7
	CHSDA**	17.4	7.8
	Asian/PI	22.1	8.4
	Black	15.1	4.6
	Non-Hispanic White	8.4	2.8
	Hispanic all races	16.5	6.4
Mortality	All Races Combined	7.9	3.2
	American Indian		
	Total	8.6	4.9
	CHSDA**	11.9	6.7
	Asian/PI	14.7	6.3
	Black	11.5	3.9
	Non-Hispanic White	6.7	2.8
	Hispanic all races	11.6	5.2

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 30 percent of liver cancers are not microscopically confirmed, indicating that MCSS 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, about 245 Minnesotans died of liver cancer each year from 2004 to 2008. Liver cancer mortality rates for non-Hispanic whites are significantly lower in Minnesota than in the U.S. as a whole among males, but not among females.

Survival: Survival from liver cancer is quite poor. Based on cases diagnosed in the SEER Program from 2001 to 2007, five-year relative survival is fourteen percent overall, and 27 percent if diagnosed before the cancer has spread to adjacent or distant tissues.

Trends: Liver cancer is one of the few cancers with significantly increasing incidence and mortality rates for each gender. Since 1988, the liver cancer mortality rate in Minnesota significantly increased by 3.2 percent per year for males and 2.7 percent per year for females, similar to national trends.

Age: Over 60 percent of liver cancer deaths occur among persons 65 years of age or older.

Gender: Rates of liver and bile duct cancer are roughly three times higher among males than females.

Race: Both in Minnesota and nationally, non-Hispanic whites have the lowest liver cancer mortality rates. There are too few deaths in Minnesota among American Indians and Hispanics to assess their risk. 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, 1988-2008, Lung and Bronchus Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	1,474	1,093	73.3	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	1,300	71.4	49.4	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	1,557	1,354	70.7	49.7	1,296	1,060	59.8	38.1
2005	1,598	1,326	70.5	48.5	1,272	1,009	57.8	35.7
2006	1,506	1,382	64.9	49.2	1,277	1,076	56.5	37.1
2007	1,615	1,447	68.9	50.3	1,327	1,088	57.5	36.6
2008	1,545	1,475	63.1	50.7	1,272	1,153	53.4	38.7

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 three joinpoints, Minnesota, 1988-2008, Lung and Bronchus Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	-0.7*	1988-2003	2.3*	1988-2008	-1.2*	1988-1995	3.4*
Interval 2			2003-2008	0.1			1995-2008	0.7*
AAPC(%)†	2004-2008	-0.7*	2004-2008	0.1	2004-2008	-1.2*	2004-2008	0.7*
	1999-2008	-0.7*	1999-2008	1.1*	1999-2008	-1.2*	1999-2008	0.7*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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 ($p < 0.05$).

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, 2004-2008, Lung and Bronchus Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	6	1	0.2	0.0	1	0	0.0	0.0
20-34	11	22	0.4	0.9	2	8	0.1	0.3
35-49	356	431	12.1	15.0	222	218	7.6	7.6
50-64	2,208	1,886	98.4	83.5	1,564	1,213	69.7	53.7
65-74	2,514	2,215	340.0	266.6	1,948	1,538	263.5	185.1
75-84	2,245	1,945	491.3	304.4	2,047	1,737	447.9	271.8
85+	481	484	328.6	139.1	660	672	450.8	193.2

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, 2004-2008, Lung and Bronchus Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	7,821	6,984	67.6	49.6	6,444	5,386	57.0	37.2
American Indian								
Statewide	104	106	140.9	105.2	84	81	122.0	89.5
CHSDA**	68	75	165.7	131.7	56	62	147.3	122.2
Asian/PI	66	57	35.2	25.2	55	30	33.2	14.4
Black	199	139	87.9	56.7	144	109	75.7	46.7
Non-Hispanic White	7,371	6,613	67.0	49.4	6,123	5,148	56.7	37.2
Hispanic all races	46	35	32.2	23.9	35	15	27.2	12.4

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, 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 (%)	7.2	6.2
Lifetime Risk of Death (%)	6.6	5.2
Complete prevalence†	2,830	3,150
Five-year prevalence‡	1,660	1,810

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	15.6
In situ	0.0	41.5
Localized	18.4	52.0
Regional	23.5	24.2
Distant	52.3	3.6
Unstaged	5.8	8.1

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Lung and Bronchus Cancer**

		Males	Females
Incidence	All Races Combined	75.2	52.3
	American Indian		
	Total	40.5	30.7
	CHSDA**	51.2	39.5
	Asian/PI	53.2	28.5
	Black	99.8	54.7
	Non-Hispanic White	80.1	58.9
	Hispanic all races	41.5	26.1
Mortality	All Races Combined	67.4	40.1
	American Indian		
	Total	42.4	28.2
	CHSDA**	50.5	33.9
	Asian/PI	36.7	18.5
	Black	85.4	38.8
	Non-Hispanic White	69.7	43.5
	Hispanic all races	31.9	14.3

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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: Lung and bronchus cancer is the second most commonly diagnosed cancer among men and among women, and is the leading cause of cancer death for each gender. It accounts for 12 percent of cancers and 26 percent of cancer deaths in Minnesota. In 2008, more Minnesotans died of lung and bronchus cancer than breast, prostate, and colorectal cancer combined.

Over the five-year period 2004-2008, an average of 2,691 Minnesotans were diagnosed with lung and bronchus cancer each year, and 2,366 deaths occurred annually. Mortality rates among non-Hispanic whites in Minnesota are about 20 percent lower than national rates for men, and about 15 percent lower for women.

Survival: Based on SEER data, the five-year relative survival rate for lung and bronchus cancer is 52 percent for localized tumors, 24 percent for regional tumors, and four percent for distant tumors. Most cases (52% in Minnesota) are 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 1999 to 2008, the lung cancer mortality rate among males decreased significantly by 1.2 percent per year in Minnesota, and by 2.2 percent per year in the U.S. Among women, 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 is still significantly increasing, 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 0.4 percent per year from 2003 to 2008.

Age: Mortality from lung and bronchus cancer increases with age. About 75 percent of deaths occur among persons 65 years of age or older.

Gender: Lung and bronchus cancer mortality rates in Minnesota are about 50 percent higher among men than women.

Race: In Minnesota, American Indians have the highest mortality rates of lung and bronchus cancer, two to three times higher than among non-Hispanic whites in Minnesota, and 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

Smoking cessation is the best way to prevent lung and bronchus cancer. An estimated 35 percent of homes in Minnesota have elevated levels of radon. Homeowners are encouraged to test their homes for 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 for lung and bronchus cancer has not yet been proven to improve survival, even among smokers.

Melanoma of the Skin

Table III-16.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Melanoma of the Skin

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	225	237	11.6	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	345	18.9	14.1	69	43	3.6	1.7
1998	355	361	16.7	14.6	72	56	3.6	2.1
1999	427	388	19.5	15.5	67	52	3.2	1.9
2000	474	402	21.5	15.8	71	48	3.3	1.8
2001	477	447	21.3	17.3	75	45	3.6	1.7
2002	450	396	19.8	15.3	79	34	3.7	1.3
2003	465	440	20.2	16.7	62	45	2.8	1.6
2004	528	441	22.6	16.6	72	60	3.3	2.2
2005	528	475	22.1	17.7	62	44	2.7	1.6
2006	630	520	26.1	19.4	83	44	3.5	1.5
2007	692	574	27.9	20.9	79	49	3.3	1.6
2008	715	599	28.8	21.6	82	42	3.3	1.4

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 three joinpoints, Minnesota, 1988-2008, Melanoma of the Skin

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	3.8*	1988-1992	-1.9	1988-2008	0.1	1988-2008	-1.0
Interval 2			1992-2008	4.3*				
AAPC(%)†	2004-2008	3.8*	2004-2008	4.3*	2004-2008	0.1	2004-2008	-1.0
	1999-2008	3.8*	1999-2008	4.3*	1999-2008	0.1	1999-2008	-1.0

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Melanoma of the Skin

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	14	25	0.4	0.7	2	0	0.1	0.0
20-34	139	363	5.2	14.3	9	8	0.3	0.3
35-49	539	792	18.4	27.5	40	28	1.4	1.0
50-64	987	677	44.0	30.0	115	69	5.1	3.1
65-74	629	326	85.1	39.2	78	42	10.6	5.1
75-84	580	291	126.9	45.5	84	62	18.4	9.7
85+	205	135	140.0	38.8	50	30	34.2	8.6

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, 2004-2008, Melanoma of the Skin

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	3,093	2,609	25.6	19.2	378	239	3.2	1.7
American Indian								
Statewide	5	3	~	~	1	1	~	~
CHSDA**	4	1	~	~	1	1	~	~
Asian/PI	9	8	~	~	1	0	~	~
Black	2	3	~	~	3	0	~	~
Non-Hispanic White	3,000	2,482	26.6	20.2	372	236	3.4	1.7
Hispanic all races	3	13	~	7.4	0	2	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Melanoma of the Skin

	Males	Females
Median Age at Diagnosis (Yr)	63.0	52.0
Median Age at Death (Yr)	66.5	71.0
Lifetime Risk of Diagnosis (%)	2.7	1.9
Lifetime Risk of Death (%)	0.4	0.2
Complete prevalence†	6,270	6,980
Five-year prevalence‡	2,080	2,010

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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
In situ	41.6	100.0
Localized	49.2	98.1
Regional	4.9	61.4
Distant	1.3	15.3
Unstaged	3.0	74.6

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* Survival for All Stages excludes *in situ* tumors.
- There were not enough intervals to produce the statistic.

Melanoma of the Skin

Table III-16.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Melanoma of the Skin**

		Males	Females
Incidence	All Races Combined	26.7	16.7
	American Indian		
	Total	3.8	3.0
	CHSDA**	3.9	3.7
	Asian/PI	1.6	1.3
	Black	1.2	0.9
	Non-Hispanic White	35.8	23.3
	Hispanic all races	4.8	4.8
Mortality	All Races Combined	4.0	1.7
	American Indian		
	Total	1.0	0.6
	CHSDA**	1.4	0.8
	Asian/PI	0.4	0.3
	Black	0.5	0.4
	Non-Hispanic White	4.9	2.1
	Hispanic all races	1.0	0.6

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 is the sixth most commonly diagnosed cancer among men and among women. Over the five-year period 2004-2008, an average of 1,140 new cases of invasive melanoma of the skin were diagnosed each year in Minnesota, and 123 deaths were caused by the disease annually. Incidence and mortality rates among non-Hispanic whites are about 25 percent lower in Minnesota than nationally for males, and about 15 percent lower among females.

Survival: About 40 percent of melanomas in Minnesota are diagnosed at the pre-invasive (*in situ*) stage, where five-year relative survival is 100 percent. Survival remains very high until the lesion has invaded the nearby or distant tissues.

Trends: Over the ten-year period 1999-2008, the incidence of invasive melanoma of the skin in Minnesota increased significantly by about four percent per year among both men and women, making it one of the most rapidly increasing cancers. This is similar to incidence trends reported by SEER. 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 are diagnosed among persons 65 years of age or younger, and about 45 percent of deaths occur in this age group.

Gender: The incidence rate of melanoma of the skin is about 35 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.

Mesothelioma

Table III-17.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Mesothelioma

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	50	16	2.3	0.5	41	15	1.9	0.5
2006	41	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	58	13	2.5	0.4	42	14	1.9	0.5

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 three joinpoints, Minnesota, 1988-2008, Mesothelioma

	Incidence				Mortality‡			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1999	4.2*	1988-2008	0.9	1999-2008	-2.2	1999-2008	5.2
Interval 2	1999-2008	-2.5						
AAPC(%)†	2004-2008	-2.5	2004-2008	0.9	2004-2008	-2.2	2004-2008	5.2
	1999-2008	-2.5	1999-2008	0.9	1999-2008	-2.2	1999-2008	5.2

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

‡ Mortality trend based on 1999-2008, when unique cause of death code available.

- 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, 2004-2008, Mesothelioma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	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	7	4	0.2	0.1	3	2	0.1	0.1
50-64	39	16	1.7	0.7	25	10	1.1	0.4
65-74	68	21	9.2	2.5	60	16	8.1	1.9
75-84	102	22	22.3	3.4	87	16	19.0	2.5
85+	27	18	18.4	5.2	35	17	23.9	4.9

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, 2004-2008, Mesothelioma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	244	81	2.2	0.5	211	61	2.0	0.4
American Indian								
Statewide	2	0	~	~	1	0	~	~
CHSDA**	0	0	~	~	0	0	~	~
Asian/PI	1	0	~	~	0	0	~	~
Black	2	1	~	~	1	0	~	~
Non-Hispanic White	238	80	2.3	0.6	208	61	2.0	0.4
Hispanic all races	1	0	~	~	0	0	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Mesothelioma

	Males	Females
Median Age at Diagnosis (Yr)	74.0	74.0
Median Age at Death (Yr)	76.0	77.0
Lifetime Risk of Diagnosis (%)	0.3	0.1
Lifetime Risk of Death (%)	0.2	0.1

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	7.7
< 45	0.5	38.9
45-54	4.7	16.6
55-64	15.0	8.5
65-74	30.6	6.5
75+	49.2	3.2

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*

Mesothelioma

Table III-17.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Mesothelioma**

		Males	Females
Incidence	All Races Combined	1.9	0.4
	American Indian		
	Total	1.0	~
	CHSDA**	1.7	~
	Asian/PI	0.6	0.2
	Black	1.2	0.3
	Non-Hispanic White	2.2	0.5
	Hispanic all races	1.6	0.5

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission. SEER 17 covers 26% of the US population.
§ 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 2004 to 2008, an average of 65 Minnesotans were diagnosed with mesothelioma each year, and 54 deaths occurred annually. Mesothelioma incidence rates in Minnesota are marginally higher than those reported by SEER, but are higher among males in the Northeast Region of the state (see Chapter II).
Survival: SEER data indicate that five-year relative survival from mesothelioma is less than ten percent, but is higher among those diagnosed at a younger age.
Trends: The incidence of mesothelioma among males increased significantly in Minnesota by an average of 4.2 percent per year from 1988 to 1999, and then began to stabilize or decrease slightly. Although the decline is not statistically significant, it appears that rates for this cancer may have peaked. Because the delay between exposure to asbestos and 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 have been stable. Joinpoint analysis of mesothelioma incidence in the SEER Program was not reported.
Age: About 80 percent of mesotheliomas diagnosed in Minnesota and 85 percent of the deaths are 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 is about four times more common among men than women, reflecting that most exposures 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 whites.

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, 1988-2008, Myeloma

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	133	114	6.2	4.2	110	85	5.4	2.9
2003	176	111	8.0	4.1	104	89	5.0	3.1
2004	158	119	7.1	4.4	102	85	4.8	2.8
2005	163	122	7.1	4.3	108	88	4.9	3.0
2006	179	127	7.6	4.3	112	100	5.0	3.3
2007	172	113	7.3	3.9	107	80	4.8	2.6
2008	202	135	8.2	4.6	89	108	3.8	3.4

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 three joinpoints, Minnesota, 1988-2008, Myeloma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1999	-1.3	1988-2008	0.5	1988-2008	-1.0	1988-2008	-0.3
Interval 2	1999-2008	2.9*						
AAPC(%)†	2004-2008	2.9*	2004-2008	0.5	2004-2008	-1.0*	2004-2008	-0.3
	1999-2008	2.9*	1999-2008	0.5	1999-2008	-1.0*	1999-2008	-0.3

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Myeloma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	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	35	2.3	1.2	11	8	0.4	0.3
50-64	252	156	11.2	6.9	125	75	5.6	3.3
65-74	260	163	35.2	19.6	130	110	17.6	13.2
75-84	227	186	49.7	29.1	181	166	39.6	26.0
85+	60	72	41.0	20.7	70	102	47.8	29.3

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, 2004-2008, Myeloma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	874	616	7.5	4.3	518	461	4.6	3.1
American Indian								
Statewide	5	10	~	8.9	5	4	~	~
CHSDA**	2	4	~	~	3	3	~	~
Asian/PI	6	7	~	~	3	4	~	~
Black	27	22	14.7	9.3	18	10	8.9	5.3
Non-Hispanic White	812	559	7.3	4.1	489	439	4.6	3.0
Hispanic all races	10	9	6.4	~	3	2	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Myeloma

	Males	Females
Median Age at Diagnosis (Yr)	68.0	72.0
Median Age at Death (Yr)	73.0	77.0
Lifetime Risk of Diagnosis (%)	0.9	0.6
Lifetime Risk of Death (%)	0.5	0.5
Complete prevalence†	640	430
Five-year prevalence‡	420	290

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	39.7
< 45	3.3	63.3
45-54	10.3	56.8
55-64	21.6	49.1
65-74	28.3	36.7
75+	36.4	23.7

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*

Myeloma

Table III-18.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Myeloma**

		Males	Females
Incidence	All Races Combined	7.2	4.6
	American Indian		
	Total	3.5	3.3
	CHSDA**	4.9	4.3
	Asian/PI	4.1	2.9
	Black	14.5	10.2
	Non-Hispanic White	6.9	4.0
	Hispanic all races	6.4	4.7
Mortality	All Races Combined	4.4	2.8
	American Indian		
	Total	3.3	1.9
	CHSDA**	4.0	2.4
	Asian/PI	2.1	1.4
	Black	8.2	5.6
	Non-Hispanic White	4.2	2.6
	Hispanic all races	3.3	2.4

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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: Multiple myeloma is a malignancy of the plasma cells, a component of the immune system, which can lead to the formation of multiple tumors in the bone marrow. Over the five-year period 2004-2008, an average of 298 cases of multiple myeloma were diagnosed in Minnesota residents each year, and 196 deaths occurred annually. Comparing non-Hispanic whites, both incidence and mortality rates in Minnesota are somewhat higher than in the SEER 17 areas.
Survival: Based on SEER cases of multiple myeloma diagnosed between 2001 and 2007, the overall five-year relative survival rate is 40 percent, but is higher among those diagnosed at younger ages.
Trends: Over the ten-year period 1999-2008, the incidence of myeloma among males in Minnesota significantly increased by 2.9 percent per year, while the mortality rate significantly decreased by one percent per year. Among females, trends were in the same direction, but were of a lesser magnitude and were not statistically significant. Nationally, incidence is significantly increasing and mortality is significantly decreasing among both males and females.
Age: Multiple myeloma incidence rates increase with age, with 65 percent of diagnoses and 78 percent of deaths occurring among those 65 years of age or older.
Gender: Rates of multiple myeloma are about 75 percent higher among males than females.
Race: Both in Minnesota and nationally, blacks are at the greatest risk for multiple myeloma, with rates that are roughly twice those of 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, 1988-2008, Non-Hodgkin Lymphoma

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	Males	Females	Males	Females	Males	Females	Males	Females
1988	401	346	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	461	401	23.8	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	454	24.5	17.8	234	218	12.3	8.0
1998	525	458	25.9	17.6	259	204	13.3	7.3
1999	517	465	24.8	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	596	494	27.1	18.3	231	198	11.2	6.5
2003	583	476	26.0	17.1	209	182	10.0	6.1
2004	618	531	27.3	19.2	218	185	10.2	6.2
2005	616	486	26.5	17.2	193	173	8.7	5.6
2006	605	494	25.9	17.0	215	154	9.8	4.9
2007	645	542	26.8	18.5	201	153	9.1	4.9
2008	689	560	27.9	18.5	224	183	9.8	5.5

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 three joinpoints, Minnesota, 1988-2008, Non-Hodgkin Lymphoma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	1.0*	1988-2008	0.9*	1988-1997	2.2*	1988-1996	2.9*
Interval 2					1997-2008	-2.9*	1996-2008	-4.6*
AAPC(%)†	2004-2008	1.0*	2004-2008	0.9*	2004-2008	-2.9*	2004-2008	-4.6*
	1999-2008	1.0*	1999-2008	0.9*	1999-2008	-2.9*	1999-2008	-4.6*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Non-Hodgkin Lymphoma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	54	22	1.5	0.6	4	2	0.1	0.1
20-34	84	62	3.2	2.5	12	6	0.5	0.2
35-49	393	290	13.4	10.1	50	30	1.7	1.0
50-64	911	628	40.6	27.8	196	91	8.7	4.0
65-74	717	584	97.0	70.3	221	158	29.9	19.0
75-84	732	699	160.2	109.4	378	312	82.7	48.8
85+	282	328	192.6	94.3	190	249	129.8	71.6

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, 2004-2008, Non-Hodgkin Lymphoma

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	3,173	2,613	26.9	18.1	1,051	848	9.5	5.4
American Indian								
Statewide	16	12	19.6	12.4	7	4	~	~
CHSDA**	9	5	~	~	4	1	~	~
Asian/PI	23	39	7.4	15.3	6	10	~	5.8
Black	58	46	18.0	13.2	16	4	8.5	~
Non-Hispanic White	2,998	2,449	27.0	17.9	1,013	825	9.6	5.5
Hispanic all races	37	20	19.2	12.5	9	4	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, 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 (%)	2.9	2.3
Lifetime Risk of Death (%)	1.2	0.8
Complete prevalence†	4,440	3,980
Five-year prevalence‡	1,830	1,600

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	67.3
< 45	9.1	76.4
45-54	13.4	76.6
55-64	19.2	73.6
65-74	22.2	67.4
75+	36.2	51.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.*

Non-Hodgkin Lymphoma

Table III-19.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Non-Hodgkin Lymphoma**

		Males	Females
Incidence	All Races Combined	24.0	16.5
	American Indian		
	Total	9.6	7.9
	CHSDA**	13.0	10.3
	Asian/PI	16.3	10.9
	Black	17.9	12.3
	Non-Hispanic White	25.8	17.6
	Hispanic all races	19.5	15.3
Mortality	All Races Combined	8.6	5.4
	American Indian		
	Total	4.3	3.3
	CHSDA**	5.1	4.4
	Asian/PI	5.4	3.4
	Black	6.1	3.8
	Non-Hispanic White	9.0	5.6
	Hispanic all races	6.3	4.3

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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, and are of two 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 2004-2008, an average of 1,157 Minnesotans were diagnosed with NHL each year, and 380 deaths occurred annually. It was the fifth most commonly diagnosed cancer among men and among women. Incidence and mortality rates in Minnesota are about ten percent higher in Minnesota than nationally.

Survival: Based on SEER cases diagnosed between 2001 and 2007, the overall five-year relative survival rate from NHL is 67 percent, and is somewhat higher among those diagnosed at younger ages.

Trends: From 1999 to 2008, the incidence rate for NHL in Minnesota increased significantly by about one percent per year for each gender, while mortality decreased significantly by 2.9 percent each year among males and by 4.6 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: About 60 percent of cases and 80 percent of deaths from NHL occur among persons ages 65 years or older. However, it is one of the most common forms of childhood cancer.

Gender: NHL rates are about 50 percent higher among men than women.

Race: Non-Hispanic white males are at greatest risk for NHL, both in Minnesota and nationally. Although based on relatively few cases, the rate of NHL among American Indians appears to be about two times higher in Minnesota than in the SEER 17 areas.

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, 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, 1988-2008, Oral Cavity and Pharynx Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	347	172	15.8	6.6	66	36	3.1	1.2
2001	349	175	15.8	6.5	72	45	3.4	1.6
2002	342	208	15.1	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	388	214	15.7	7.3	75	44	3.1	1.5
2007	453	214	17.8	7.3	72	47	3.1	1.5
2008	412	188	15.5	6.3	57	38	2.2	1.2

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 three joinpoints, Minnesota, 1988-2008, 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*	1988-2008	-0.2	1988-2008	-1.6*	1988-2008	-1.8*
Interval 2	2003-2008	2.6						
AAPC(%)†	2004-2008	2.6	2004-2008	-0.2	2004-2008	-1.6*	2004-2008	-1.8*
	1999-2008	0.4	1999-2008	-0.2	1999-2008	-1.6*	1999-2008	-1.8*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Oral Cavity and Pharynx Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	5	7	0.1	0.2	0	0	0.0	0.0
20-34	49	38	1.9	1.5	4	1	0.2	0.0
35-49	311	150	10.6	5.2	31	11	1.1	0.4
50-64	788	326	35.1	14.4	125	50	5.6	2.2
65-74	411	202	55.6	24.3	70	49	9.5	5.9
75-84	320	190	70.0	29.7	79	44	17.3	6.9
85+	102	115	69.7	33.1	42	51	28.7	14.7

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, 2004-2008, Oral Cavity and Pharynx Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	1,986	1,028	15.9	7.1	351	206	2.9	1.3
American Indian								
Statewide	19	14	19.4	12.0	5	2	~	~
CHSDA**	11	7	23.4	~	2	2	~	~
Asian/PI	40	24	14.6	7.6	18	5	7.8	~
Black	62	30	20.8	7.9	9	3	~	~
Non-Hispanic White	1,834	921	15.7	6.8	318	194	2.8	1.3
Hispanic all races	17	15	5.9	7.4	1	2	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Oral Cavity and Pharynx Cancer

	Males	Females
Median Age at Diagnosis (Yr)	61.0	64.0
Median Age at Death (Yr)	66.0	73.0
Lifetime Risk of Diagnosis (%)	1.6	0.8
Lifetime Risk of Death (%)	0.3	0.2
Complete prevalence†	2,960	1,720
Five-year prevalence‡	1,130	560

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	60.8
In situ	4.7	-
Localized	36.6	82.4
Regional	39.0	55.5
Distant	12.0	33.2
Unstaged	7.7	50.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* Survival for All Stages excludes *in situ* tumors.
- Not available.

Oral Cavity and Pharynx Cancer

Table III-20.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2004-2008, Oral Cavity and Pharynx Cancer**

		Males	Females
Incidence	All Races Combined	15.7	6.2
	American Indian		
	Total	7.4	3.6
	CHSDA**	9.1	5.1
	Asian/PI	10.9	5.3
	Black	15.6	5.6
	Non-Hispanic White	17.3	6.6
	Hispanic all races	9.0	3.9
Mortality	All Races Combined	3.9	1.4
	American Indian		
	Total	3.2	1.1
	CHSDA**	3.8	1.2
	Asian/PI	3.0	1.3
	Black	6.0	1.5
	Non-Hispanic White	3.8	1.5
	Hispanic all races	2.4	0.8

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2004-2008, an average of 603 cases of oral cavity and pharynx cancer were diagnosed each year in Minnesota, and 111 residents died from this cancer annually. Comparing non-Hispanic whites, incidence and mortality rates are considerably lower in Minnesota than nationally among males, but not females.

Survival: Based on SEER data, five-year relative survival for oral cavity and pharynx cancer is 82 percent for localized tumors. In Minnesota, about 35 percent of these cancers are diagnosed when still localized.

Trends: From 1999 to 2008, the incidence rate of oral cavity and pharynx cancer in Minnesota was stable among both men and women, while the mortality rate decreased significantly for each gender. Similar trends are reported nationally. SEER data indicate that trends vary significantly among the subsites within this group of cancers. From 2004 to 2008, 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 occur among those 65 years of age or older.

Gender: Incidence and mortality rates of oral cavity and pharynx cancer are two times higher among males than females.

Race: Among Minnesota males, American Indians living in CHSDA counties have the highest incidence rates of cancer of the oral cavity and pharynx, followed by blacks, non-Hispanic whites and Asian/Pacific Islanders. Rates among American Indians living in CHSDA counties in Minnesota are nearly three times higher than among 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 are located.

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.

Ovary Cancer

Table III-21.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Ovary Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	-	344	-	12.1	-	247	-	8.3
2007	-	348	-	12.0	-	218	-	7.2
2008	-	364	-	12.5	-	265	-	8.7

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 three joinpoints, Minnesota, 1988-2008, Ovary Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	-	-	1988-2008	-1.5*	-	-	1988-2008	-0.9*
AAPC(%)†	-	-	2004-2008	-1.5*	-	-	2004-2008	-0.9*
	-	-	1999-2008	-1.5*	-	-	1999-2008	-0.9*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 cases 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Ovary Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	-	24	-	0.7	-	0	-	0.0
20-34	-	63	-	2.5	-	6	-	0.2
35-49	-	272	-	9.5	-	73	-	2.5
50-64	-	647	-	28.6	-	343	-	15.2
65-74	-	334	-	40.2	-	296	-	35.6
75-84	-	308	-	48.2	-	316	-	49.5
85+	-	125	-	35.9	-	209	-	60.1

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, 2004-2008, Ovary Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	-	1,773	-	12.5	-	1,243	-	8.4
American Indian								
Statewide	-	15	-	13.7	-	6	-	~
CHSDA**	-	8	-	~	-	4	-	~
Asian/PI	-	21	-	6.2	-	10	-	3.7
Black	-	26	-	8.4	-	20	-	9.2
Non-Hispanic White	-	1,671	-	12.6	-	1,199	-	8.5
Hispanic all races	-	13	-	6.4	-	6	-	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 cases 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, 2006-2008, Ovary Cancer

	Males	Females
Median Age at Diagnosis (Yr)	-	62.0
Median Age at Death (Yr)	-	72.0
Lifetime Risk of Diagnosis (%)	-	1.4
Lifetime Risk of Death (%)	-	1.1
Complete prevalence†	-	2,960
Five-year prevalence‡	-	920

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	43.8
In situ	0.5	-
Localized	15.5	92.4
Regional	23.9	71.7
Distant	53.4	27.2
Unstaged	6.8	22.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Ovary Cancer**

		Males	Females
Incidence	All Races Combined	-	12.8
	American Indian		
	Total	-	8.0
	CHSDA**	-	10.6
	Asian/PI	-	9.9
	Black	-	10.0
	Non-Hispanic White	-	13.7
	Hispanic all races	-	11.6
Mortality	All Races Combined	-	8.4
	American Indian		
	Total	-	5.1
	CHSDA**	-	6.7
	Asian/PI	-	5.0
	Black	-	7.0
	Non-Hispanic White	-	9.0
	Hispanic all races	-	5.9

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, 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 eight percent lower in Minnesota than in the SEER 17 areas, and mortality was five percent lower in Minnesota than in the U.S.

Survival: Based on SEER cases diagnosed in 2001-2007, the five-year relative survival rate is 92.4 percent for localized tumors and 71.8 percent for regional tumors. However, more than half (53.4%) of ovarian cancers in Minnesota are diagnosed when the tumor has already spread to other organs, when five-year survival is lower (27.2%).

Trends: Since cancer reporting was initiated in Minnesota in 1988, ovarian cancer incidence and mortality rates have declined significantly by 1.5 percent per year and 0.9 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 is highest among American Indian women statewide. The next highest rate is among 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, 1988-2008, Pancreas Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	207	208	9.8	7.8	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	265	260	11.3	9.1	265	297	11.9	9.8
2006	268	262	11.5	9.0	263	301	11.4	9.8
2007	278	256	11.4	8.7	274	272	11.7	8.9
2008	313	297	12.8	9.8	268	324	11.3	10.3

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 three joinpoints, Minnesota, 1988-2008, Pancreas Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	1.4*	1988-2008	2.2*	1988-2008	-0.3	1988-2008	0.4
AAPC(%)†	2004-2008	1.4*	2004-2008	2.2*	2004-2008	-0.3	2004-2008	0.4*
	1999-2008	1.4*	1999-2008	2.2*	1999-2008	-0.3	1999-2008	0.4*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Pancreas Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	2	0.0	0.1	0	0	0.0	0.0
20-34	10	6	0.4	0.2	5	1	0.2	0.0
35-49	99	62	3.4	2.2	55	40	1.9	1.4
50-64	445	322	19.8	14.3	364	270	16.2	12.0
65-74	415	334	56.1	40.2	376	310	50.9	37.3
75-84	318	379	69.6	59.3	376	459	82.3	71.8
85+	92	189	62.8	54.3	165	353	112.7	101.5

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, 2004-2008, Pancreas Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	1,379	1,294	11.7	8.8	1,341	1,433	11.8	9.3
American Indian								
Statewide	9	9	~	~	8	10	~	9.7
CHSDA**	5	7	~	~	5	7	~	~
Asian/PI	19	15	12.5	6.5	13	11	9.2	5.5
Black	46	39	22.3	16.5	36	30	21.3	15.6
Non-Hispanic White	1,277	1,216	11.4	8.7	1,272	1,377	11.7	9.4
Hispanic all races	20	8	12.8	~	12	3	9.3	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, 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 (%)	1.3	1.3
Lifetime Risk of Death (%)	1.4	1.5
Complete prevalence†	260	260
Five-year prevalence‡	200	190

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	5.5
In situ	0.4	85.7
Localized	7.3	21.5
Regional	35.2	8.6
Distant	47.9	1.8
Unstaged	9.3	4.2

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Pancreas Cancer**

		Males	Females
Incidence	All Races Combined	13.6	10.7
	American Indian		
	Total	8.0	7.8
	CHSDA**	11.4	10.0
	Asian/PI	10.6	8.6
	Black	17.1	14.8
	Non-Hispanic White	13.8	10.5
	Hispanic all races	11.4	10.4
Mortality	All Races Combined	12.5	9.4
	American Indian		
	Total	7.6	6.4
	CHSDA**	10.5	8.3
	Asian/PI	8.4	7.0
	Black	15.6	12.5
	Non-Hispanic White	12.6	9.3
	Hispanic all races	9.2	7.5

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, an average of 535 Minnesotans were diagnosed with a microscopically confirmed pancreas cancer each year, and about 555 Minnesotans died from this disease annually. MCSS does not register cancers that are not microscopically confirmed (see Chapter I). In the SEER Program, about 22 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. Mortality rates for this cancer are 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 2001-2007, the five-year relative survival rate is five percent.

Trends: On average, the incidence rate of pancreatic cancer in Minnesota increased significantly in both males (1.4% per year) and females (2.2%) from 1988 to 2008. Over the same period, mortality was stable among males, but increased by an average of 0.4 percent per year among women. These are similar to national trends, except that nationally, liver cancer mortality is increasing significantly among males as well as among 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 65 percent of cases and 74 percent of deaths due to pancreas cancer in Minnesota occur among persons age 65 year or older.

Gender: Rates are about 30 percent higher among males than females.

Race: In Minnesota, black men and women have the highest pancreas cancer incidence and mortality rates, about two times higher than among non-Hispanic white men and women. Blacks also have the highest rates of pancreas cancer nationally, but their risk is only about 30 percent higher than among non-Hispanic whites.

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.

Prostate Cancer

Table III-23.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Prostate Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	3,778	-	204.0	-	604	-	37.2	-
1994	3,211	-	170.8	-	673	-	40.9	-
1995	3,279	-	172.2	-	653	-	39.4	-
1996	3,229	-	166.7	-	681	-	39.5	-
1997	3,454	-	175.7	-	596	-	34.3	-
1998	3,424	-	172.0	-	598	-	33.9	-
1999	3,641	-	179.5	-	565	-	31.2	-
2000	4,084	-	197.8	-	598	-	32.6	-
2001	4,172	-	198.1	-	598	-	32.2	-
2002	4,210	-	194.6	-	601	-	31.7	-
2003	3,893	-	175.9	-	545	-	28.3	-
2004	4,082	-	180.4	-	558	-	28.4	-
2005	4,204	-	181.1	-	491	-	24.7	-
2006	4,575	-	192.0	-	484	-	23.6	-
2007	4,803	-	194.1	-	498	-	23.7	-
2008	4,449	-	173.0	-	546	-	25.3	-

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 three joinpoints, Minnesota, 1988-2008, Prostate Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1992	13.1*	-	-	1988-1995	-0.2	-	-
Interval 2	1992-1995	-11.3	-	-	1995-2008	-3.8*	-	-
Interval 3	1995-2000	3.5	-	-			-	-
Interval 4	2000-2008	-0.7	-	-			-	-
AAPC(%)†	2004-2008	-0.7	-	-	2004-2008	-3.8*	-	-
	1999-2008	-0.2	-	-	1999-2008	-3.8*	-	-

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Prostate Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	2	-	0.1	-	0	-	0.0	-
20-34	3	-	0.1	-	0	-	0.0	-
35-49	526	-	17.9	-	5	-	0.2	-
50-64	8,316	-	370.7	-	172	-	7.7	-
65-74	7,878	-	1065.5	-	433	-	58.6	-
75-84	4,430	-	969.4	-	1,003	-	219.5	-
85+	958	-	654.4	-	964	-	658.5	-

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, 2004-2008, Prostate Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	22,113	-	184.2	-	2,577	-	25.1	-
American Indian								
Statewide	126	-	160.4	-	13	-	23.5	-
CHSDA**	78	-	184.0	-	7	-	~	-
Asian/PI	99	-	62.3	-	9	-	~	-
Black	491	-	212.8	-	56	-	48.2	-
Non-Hispanic White	20,699	-	181.3	-	2,488	-	25.1	-
Hispanic all races	139	-	104.9	-	11	-	13.1	-

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Prostate Cancer

	Males	Females
Median Age at Diagnosis (Yr)	67.0	-
Median Age at Death (Yr)	82.0	-
Lifetime Risk of Diagnosis (%)	21.0	-
Lifetime Risk of Death (%)	3.3	-
Complete prevalence†	46,630	-
Five-year prevalence‡	18,460	-

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	99.4
In situ	0.0	95.4
Localized	80.8	100.0
Regional	12.6	100.0
Distant	3.4	28.8
Unstaged	3.2	69.9

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Prostate Cancer**

		Males	Females
Incidence	All Races Combined	156.0	-
	American Indian		
	Total	58.3	-
	CHSDA**	75.3	-
	Asian/PI	88.3	-
	Black	233.8	-
	Non-Hispanic White	153.1	-
	Hispanic all races	129.0	-
Mortality	All Races Combined	24.4	-
	American Indian		
	Total	16.9	-
	CHSDA**	20.7	-
	Asian/PI	10.5	-
	Black	54.9	-
	Non-Hispanic White	22.6	-
	Hispanic all races	18.5	-

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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, 4,423 men were diagnosed with and 515 men died of prostate cancer in Minnesota each year from 2004 to 2008. Prostate cancer is by far 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.

Prostate cancer incidence and mortality rates among non-Hispanic whites and American Indians are considerably higher in Minnesota than reported nationally, but are 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 2001-2007, 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. From 2000 to 2008, prostate cancer incidence in Minnesota declined by 0.7 percent a year, but the trend was not statistically significant; nationally, the rate decreased by 1.7 percent per year.

Age: About 60 percent of all newly diagnosed prostate cancers and over 90 percent of deaths occur among men age 65 years and older.

Race: Black men are at highest risk for prostate cancer. Compared to non-Hispanic whites, the prostate cancer incidence rate among blacks in Minnesota is 17 percent higher, while their mortality rate is two times higher. Prostate cancer incidence among American Indians is 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; the question is whether treating these cancers prolongs life. The most recent epidemiologic studies did not find a reduction in mortality among screened men. The American Cancer Society recommends that men should not be tested without learning about what we know and don't know about the risks and possible benefits of testing and treatment. At the time this publication is being prepared, the United States Preventive Services Task Force is considering new recommendations that would advise against PSA screening.

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).

Soft Tissue Cancer

Table III-24.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Soft Tissue Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	84	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	46	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	78	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	81	83	3.5	3.0	36	31	1.6	1.0
2006	90	94	3.7	3.5	36	35	1.6	1.2
2007	92	84	3.7	3.0	37	30	1.5	0.9
2008	106	75	4.2	2.6	34	36	1.3	1.1

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 three joinpoints, Minnesota, 1988-2008, Soft Tissue Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	0.0	1988-2008	1.2*	1988-2008	-0.3	1988-2008	-1.3
AAPC(%)†	2004-2008	0.0	2004-2008	1.2*	2004-2008	-0.3	2004-2008	-1.3
	1999-2008	0.0	1999-2008	1.2*	1999-2008	-0.3	1999-2008	-1.3

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Soft Tissue Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	58	55	1.6	1.6	8	4	0.2	0.1
20-34	36	31	1.4	1.2	8	4	0.3	0.2
35-49	70	67	2.4	2.3	23	14	0.8	0.5
50-64	107	96	4.8	4.3	41	43	1.8	1.9
65-74	81	58	11.0	7.0	30	31	4.1	3.7
75-84	75	65	16.4	10.2	45	26	9.9	4.1
85+	30	37	20.5	10.6	18	40	12.3	11.5

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, 2004-2008, Soft Tissue Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	457	409	3.8	2.9	173	162	1.5	1.1
American Indian								
Statewide	5	2	~	~	4	0	~	~
CHSDA**	2	0	~	~	4	0	~	~
Asian/PI	8	12	~	3.1	1	1	~	~
Black	16	13	3.1	3.6	3	9	~	~
Non-Hispanic White	418	366	3.8	2.9	164	150	1.5	1.0
Hispanic all races	3	7	~	~	1	2	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Soft Tissue Cancer

	Males	Females
Median Age at Diagnosis (Yr)	56.5	57.0
Median Age at Death (Yr)	65.0	67.0
Lifetime Risk of Diagnosis (%)	0.4	0.3
Lifetime Risk of Death (%)	0.2	0.1
Complete prevalence†	930	870
Five-year prevalence‡	290	240

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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
In situ	0.0	-
Localized	56.6	83.6
Regional	20.7	61.7
Distant	13.5	16.9
Unstaged	9.2	51.3

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Soft Tissue Cancer**

		Males	Females
Incidence	All Races Combined	3.9	2.8
	American Indian		
	Total	2.4	1.6
	CHSDA**	3.2	2.1
	Asian/PI	2.7	2.2
	Black	3.6	3.1
	Non-Hispanic White	4.1	2.8
	Hispanic all races	3.3	2.7
Mortality	All Races Combined	1.5	1.1
	American Indian		
	Total	0.7	0.8
	CHSDA**	1.0	1.1
	Asian/PI	1.0	0.8
	Black	1.4	1.4
	Non-Hispanic White	1.5	1.1
	Hispanic all races	1.0	0.9

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, an average of 173 cancers of the soft tissues were diagnosed in Minnesota each year, and 67 deaths were caused by these cancers annually. The incidence and mortality rates of soft tissue sarcoma in Minnesota are similar to national rates.

Survival: In Minnesota, the majority (56.6%) of soft tissue cancers are diagnosed while the tumors are localized. Among persons diagnosed with soft tissue cancers between 2001 and 2007 in the SEER 17 areas, five-year relative survival was 84 percent for localized disease.

Trends: Incidence and mortality rates of soft issue sarcomas have been fairly stable since cancer reporting was implemented in Minnesota in 1988. The exception is incidence among females, which increased significantly by 1.2 percent per year over the 21 year period. National trends for this cancer were not reported by SEER.

Age: Incidence rates for soft tissue sarcomas increase only moderately with age. Unlike many cancers, 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 47 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 are similar between males and females until age 65 years of age, when rates become considerably 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, 1988-2008, Stomach Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	94	6.8	3.1	78	64	3.6	2.1
2006	171	96	7.3	3.3	85	51	3.8	1.7
2007	190	118	8.2	4.0	107	66	4.6	2.2
2008	167	104	7.0	3.4	105	51	4.4	1.6

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 three joinpoints, Minnesota, 1988-2008, Stomach Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	-2.7*	1988-2008	-1.5*	1988-2008	-3.4*	1988-2008	-3.5*
AAPC(%)†	2004-2008	-2.7*	2004-2008	-1.5*	2004-2008	-3.4*	2004-2008	-3.5*
	1999-2008	-2.7*	1999-2008	-1.5*	1999-2008	-3.4*	1999-2008	-3.5*

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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 ($p < 0.05$).

Stomach Cancer

Table III-25.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2004-2008, Stomach Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	1	0.0	0.0	0	0	0.0	0.0
20-34	5	13	0.2	0.5	5	7	0.2	0.3
35-49	75	46	2.6	1.6	37	22	1.3	0.8
50-64	228	104	10.2	4.6	111	40	5.0	1.8
65-74	217	98	29.4	11.8	105	62	14.2	7.5
75-84	235	155	51.4	24.3	148	96	32.4	15.0
85+	98	102	66.9	29.3	83	86	56.7	24.7

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, 2004-2008, Stomach Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	858	519	7.5	3.5	489	313	4.3	2.0
American Indian								
Statewide	13	12	13.9	11.8	7	3	~	~
CHSDA**	9	8	~	~	5	3	~	~
Asian/PI	36	18	22.6	8.2	17	12	10.9	5.9
Black	25	15	10.1	4.9	22	8	10.9	~
Non-Hispanic White	750	453	6.9	3.2	432	286	4.0	1.9
Hispanic all races	24	16	17.3	9.0	11	4	10.2	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Stomach Cancer

	Males	Females
Median Age at Diagnosis (Yr)	70.0	73.0
Median Age at Death (Yr)	74.0	77.0
Lifetime Risk of Diagnosis (%)	0.9	0.5
Lifetime Risk of Death (%)	0.5	0.3
Complete prevalence†	480	360
Five-year prevalence‡	250	160

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	26.3
In situ	0.8	71.2
Localized	23.1	61.5
Regional	30.0	27.8
Distant	32.2	3.7
Unstaged	13.8	16.4

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Stomach Cancer**

		Males	Females
Incidence	All Races Combined	10.8	5.4
	American Indian		
	Total	9.9	5.0
	CHSDA**	14.7	7.4
	Asian/PI	17.2	9.9
	Black	17.2	8.5
	Non-Hispanic White	8.7	3.8
	Hispanic all races	14.9	9.0
Mortality	All Races Combined	5.2	2.7
	American Indian		
	Total	5.7	2.7
	CHSDA**	8.5	3.9
	Asian/PI	9.2	5.4
	Black	10.7	5.0
	Non-Hispanic White	4.2	2.1
	Hispanic all races	7.7	4.5

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, an average of 275 Minnesotans were diagnosed with stomach cancer each year, and 160 residents died of this disease annually. Among non-Hispanic whites, incidence and mortality rates for this cancer are somewhat lower in Minnesota than nationally.

Survival: Based on SEER data, the five-year relative survival rate for stomach cancer is 61.5 percent for localized tumors, 27.8 percent for regional tumors, and 3.7 percent for distant tumors. Most cases in Minnesota are diagnosed at the regional (30.0%) or distant (32.2%) 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 it 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 72 percent of deaths occur among Minnesotans age 65 years or older.

Gender: Stomach cancer rates are about two times higher among males than females.

Race: Both in Minnesota and nationally, non-Hispanic whites have the lowest rates of stomach cancer. Incidence rates are considerably higher in each of the other race/ethnic groups; rates are highest among Asian/Pacific Islanders, whose risk is nearly three times higher than among non-Hispanic whites. Too few deaths from stomach cancer occur 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.

Testis Cancer

Table III-26.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2008, Testis Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	164	-	6.3	-	2	-	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 three joinpoints, Minnesota, 1988-2008, Testis Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	1.4*	-	-	1988-1994	-18.1*	-	-
Interval 2			-	-	1994-1997	35.5	-	-
Interval 3			-	-	1997-2008	-7.0*	-	-
AAPC(%)†	2004-2008	1.4*	-	-	2004-2008	-7.0*	-	-
	1999-2008	1.4*	-	-	1999-2008	-7.0*	-	-

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Testis Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	57	-	1.6	-	1	-	0.0	-
20-34	419	-	15.8	-	6	-	0.2	-
35-49	305	-	10.4	-	3	-	0.1	-
50-64	59	-	2.6	-	4	-	0.2	-
65-74	17	-	2.3	-	6	-	0.8	-
75-84	6	-	1.3	-	0	-	0.0	-
85+	0	-	0.0	-	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, 2004-2008, Testis Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	863	-	6.8	-	21	-	0.2	-
American Indian								
Statewide	9	-	~	-	0	-	~	-
CHSDA**	5	-	~	-	0	-	~	-
Asian/PI	5	-	~	-	2	-	~	-
Black	5	-	~	-	0	-	~	-
Non-Hispanic White	804	-	7.5	-	19	-	0.2	-
Hispanic all races	21	-	2.8	-	0	-	~	-

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Testis Cancer

	Males	Females
Median Age at Diagnosis (Yr)	32.0	-
Median Age at Death (Yr)	54.5	-
Lifetime Risk of Diagnosis (%)	0.4	-
Lifetime Risk of Death (%)	0.0	-
Complete prevalence†	3,960	-
Five-year prevalence‡	770	-

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	95.3
In situ	0.6	100.0
Localized	66.8	99.0
Regional	19.4	96.1
Distant	12.3	72.7
Unstaged	1.0	85.5

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Testis Cancer**

		Males	Females
Incidence	All Races Combined	5.5	-
	American Indian		
	Total	2.8	-
	CHSDA**	3.8	-
	Asian/PI	1.9	-
	Black	1.3	-
	Non-Hispanic White	7.2	-
	Hispanic all races	4.4	-
Mortality	All Races Combined	0.2	-
	American Indian		
	Total	0.1	-
	CHSDA**	~	-
	Asian/PI	0.1	-
	Black	0.1	-
	Non-Hispanic White	0.3	-
	Hispanic all races	0.3	-

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, an average of 173 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: Five-year relative survival for testicular cancer is quite high, even when it has already spread to other organs when diagnosed. The majority (66.8%) of testicular cancers in Minnesota are diagnosed when still confined to the testis, when five-year survival is 99 percent.

Trends: Over the ten-year period 1999-2008, 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. The large decrease in mortality may reflect random variation in the small number of deaths attributed to testicular cancer each year in Minnesota. Nationally, incidence is increasing significantly at about the same rate as in Minnesota, while the mortality rate is declining significantly by one percent a year.

Age: Testicular cancer is a disease of young men. About 50 percent of males diagnosed with this cancer are between the ages of 20 and 34 years, and 90 percent are younger than 50 years of age. About 50 percent of deaths occur among men over the age of 50.

Race: Too few cases of testicular cancer in Minnesota occur 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, 1988-2008, Thyroid Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	171	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	108	275	4.4	10.9	2	8	0.1	0.3
2003	103	316	4.2	12.3	7	20	0.3	0.7
2004	114	361	4.5	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	137	426	5.3	16.0	14	11	0.5	0.4
2008	188	460	7.3	17.3	12	18	0.5	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 three joinpoints, Minnesota, 1988-2008, Thyroid Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2003	2.4*	1988-2000	3.9*	1988-2008	0.4	1988-2008	0.8
Interval 2	2003-2008	10.3*	2000-2008	7.3*				
AAPC(%)†	2004-2008	10.3*	2004-2008	7.3*	2004-2008	0.4	2004-2008	0.8
	1999-2008	6.7*	1999-2008	6.9*	1999-2008	0.4	1999-2008	0.8

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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 ($p < 0.05$).

Thyroid Cancer

Table III-27.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2004-2008, Thyroid Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	15	43	0.4	1.2	0	0	0.0	0.0
20-34	79	384	3.0	15.2	0	0	0.0	0.0
35-49	208	735	7.1	25.6	9	2	0.3	0.1
50-64	225	553	10.0	24.5	14	12	0.6	0.5
65-74	100	147	13.5	17.7	15	18	2.0	2.2
75-84	64	94	14.0	14.7	11	27	2.4	4.2
85+	12	32	8.2	9.2	3	23	2.1	6.6

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, 2004-2008, Thyroid Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	703	1,988	5.6	15.2	52	82	0.4	0.5
American Indian								
Statewide	2	20	~	14.5	1	1	~	~
CHSDA**	1	10	~	14.8	0	1	~	~
Asian/PI	15	56	5.4	14.7	1	3	~	~
Black	15	27	2.6	6.1	0	2	~	~
Non-Hispanic White	641	1,786	5.6	15.2	49	76	0.4	0.5
Hispanic all races	11	49	3.1	15.8	1	0	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Thyroid Cancer

	Males	Females
Median Age at Diagnosis (Yr)	52.0	47.0
Median Age at Death (Yr)	67.0	78.0
Lifetime Risk of Diagnosis (%)	0.5	1.3
Lifetime Risk of Death (%)	0.1	0.1
Complete prevalence†	1,670	5,320
Five-year prevalence‡	510	1,630

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	97.2
In situ	0.0	100.0
Localized	65.7	99.8
Regional	28.2	96.9
Distant	3.3	56.4
Unstaged	2.8	87.6

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Thyroid Cancer**

		Males	Females
Incidence	All Races Combined	5.6	16.3
	American Indian		
	Total	2.3	6.7
	CHSDA**	3.2	9.4
	Asian/PI	4.9	16.4
	Black	3.2	9.3
	Non-Hispanic White	6.4	18.0
	Hispanic all races	4.0	15.0
Mortality	All Races Combined	0.5	0.5
	American Indian		
	Total	0.3	0.3
	CHSDA**	~	0.5
	Asian/PI	0.5	0.8
	Black	0.4	0.6
	Non-Hispanic White	0.5	0.5
	Hispanic all races	0.6	0.6

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, an average of 538 Minnesotans were diagnosed with thyroid cancer each year, while 27 deaths from this cancer occurred annually. Incidence rates among non-Hispanic whites are about 15 percent lower in Minnesota than in the SEER 17 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. Nearly 94 percent of thyroid cancers in Minnesota are diagnosed at the localized or regional stage, when survival is 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 1999 to 2008, the thyroid cancer incidence rate in Minnesota increased by almost seven 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 has been increasing among males by 1.2 percent per year since 1983, and by 0.4 percent per year among females.

Age: Thyroid cancer incidence is highest among women 35-64 years of age. From 2004 to 2008, 83 percent of cases in Minnesota were diagnosed among persons less than 65 years of age, while nearly 75 percent of deaths occurred among persons 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 appears to be very similar among all race/ethnic groups except blacks, whose risk is about half that of other women. There are 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, 1988-2008, Urinary Bladder Cancer

	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
Year	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	685	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	752	268	38.4	10.0	133	63	7.3	2.0
1999	759	262	38.3	9.7	129	70	6.9	2.2
2000	753	256	37.3	9.5	146	63	7.8	2.0
2001	815	271	39.5	10.0	146	51	7.4	1.6
2002	841	295	39.9	10.3	164	77	8.5	2.6
2003	828	311	38.7	11.2	149	79	7.3	2.6
2004	926	304	43.1	10.8	155	61	7.7	2.0
2005	885	296	40.5	10.1	137	59	6.7	1.8
2006	907	272	40.4	9.2	148	62	7.0	1.9
2007	908	282	40.1	9.3	159	55	7.4	1.7
2008	936	278	39.7	9.1	172	66	7.8	1.9

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 three joinpoints, Minnesota, 1988-2008, Urinary Bladder Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2008	0.5*	1988-2008	0.2	1988-2008	-0.1	1988-2008	-0.9
AAPC(%)†	2004-2008	0.5*	2004-2008	0.2	2004-2008	-0.1	2004-2008	-0.9
	1999-2008	0.5*	1999-2008	0.2	1999-2008	-0.1	1999-2008	-0.9

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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 Program version 2.7, National Cancer Institute (http://sraab.cancer.gov/joinpoint). The APC is the Annual Percent Change during the specified interval based on rates age-adjusted to the 2000 US standard population. The AAPC is the Average Annual Percent Change and is based on the APCs calculated in Joinpoint. 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, 2004-2008, Urinary Bladder Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Age (Yr)	Males	Females	Males	Females	Males	Females	Males	Females
0-19	1	2	0.0	0.1	0	0	0.0	0.0
20-34	15	7	0.6	0.3	0	1	0.0	0.0
35-49	174	82	5.9	2.9	7	9	0.2	0.3
50-64	992	312	44.2	13.8	96	32	4.3	1.4
65-74	1,316	336	178.0	40.4	185	51	25.0	6.1
75-84	1,478	451	323.4	70.6	270	90	59.1	14.1
85+	586	242	400.3	69.6	213	120	145.5	34.5

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, 2004-2008, Urinary Bladder Cancer

	Incidence 2004-2008				Mortality 2004-2008			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
Race/Ethnicity**	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	4,562	1,432	40.7	9.7	771	303	7.3	1.9
American Indian								
Statewide	19	8	28.6	~	2	2	~	~
CHSDA**	14	6	36.4	~	1	2	~	~
Asian/PI	22	8	16.5	~	4	2	~	~
Black	56	14	29.5	6.6	6	4	~	~
Non-Hispanic White	4,397	1,379	41.1	9.8	755	294	7.4	1.9
Hispanic all races	23	6	20.7	~	4	1	~	~

Source: MCSS January 2011 (incidence) and Minnesota Center for Health Statistics (mortality). 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, 2006-2008, Urinary Bladder Cancer

	Males	Females
Median Age at Diagnosis (Yr)	73.0	74.0
Median Age at Death (Yr)	78.0	81.0
Lifetime Risk of Diagnosis (%)	4.6	1.3
Lifetime Risk of Death (%)	0.9	0.3
Complete prevalence†	7,430	2,490
Five-year prevalence‡	2,660	820

Source: MCSS January 2011. See Appendix E for information on prevalence calculations.
† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2008, rounded to the nearest 10.
‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2008, 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	78.1
In situ	56.3	96.6
Localized	29.3	70.7
Regional	8.0	34.6
Distant	3.4	5.4
Unstaged	3.0	49.1

† Among Minnesota cases diagnosed 2006-2008.
‡ Among SEER17 cases diagnosed 2001-2007 followed into 2008 from *SEER Cancer Statistics Review, 1975-2008.* 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, 2004-2008, Urinary Bladder Cancer**

		Males	Females
Incidence	All Races Combined	37.5	9.2
	American Indian		
	Total	10.8	2.7
	CHSDA**	14.0	3.6
	Asian/PI	16.3	4.0
	Black	21.6	7.6
	Non-Hispanic White	43.4	10.4
	Hispanic all races	20.0	5.4
Mortality	All Races Combined	7.7	2.2
	American Indian		
	Total	2.9	1.1
	CHSDA**	3.6	1.1
	Asian/PI	2.7	0.9
	Black	5.5	2.7
	Non-Hispanic White	8.3	2.3
	Hispanic all races	3.8	1.2

Source: SEER*Stat Database: SEER 17 Regs Research Data released April 2011 (updated 10/28/2011), based on the November 2010 submission (incidence), and *SEER Cancer Statistics Review 1975-2008* (mortality). Incidence covers 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 2004-2008, an average of 1,199 cases of bladder cancer were diagnosed in Minnesotans each year, and 215 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 are diagnosed before they have become invasive, and are included in the above rates. Based on SEER data, five-year relative survival for *in situ* bladder cancer is 97 percent. Another 30 percent of bladder cancers in Minnesota are diagnosed when still confined to the bladder (localized stage), when survival is 71 percent.

Trends: The incidence rate of bladder cancer among males in Minnesota has increased significantly by 0.5 percent a year since 1988, while the mortality rate has been stable. The increase in incidence is not seen among males in the SEER Program for all races combined or for whites, but mortality among males is stable nationally as well. The bladder cancer incidence rate among women is stable both in Minnesota and the SEER Program; female mortality is stable in Minnesota but decreasing significantly by 0.4 percent per year among women in the U.S.

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 those 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; although based on relatively few cases, incidence among American Indian males living in CHSDA counties is only somewhat lower, while the rate among American Indian males statewide and black males is about 25 percent lower. 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 17 areas have the highest incidence rate, but rates are similar among the other race/ethnic groups. Among American Indians, bladder cancer incidence is more than 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.

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Chapter IV:
Cancer in Minnesota Counties and Regions, 2004-2008

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Chapter IV: Cancer in Minnesota Counties and Regions, 2004-2008

Introduction

This chapter contains a profile of cancer incidence for 2004-2008 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, 2004-2008. The "expected" number of cancers was calculated by applying the 2004-2008 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	396	388.2	278	278.9	576.8	444.0
Brain††	3	4.1	0	2.9	~	~
Breast	1	1.0	90	83.6	~	133.2
Cervix Uteri	-	-	4	2.8	-	~
Colon and Rectum	36	36.3	28	30.1	53.6	40.1
Corpus and Uterus, NOS	-	-	16	19.7	-	25.5
Esophagus	8	6.1	0	1.6	~	~
Hodgkin Lymphoma	1	1.5	1	1.1	~	~
Kaposi Sarcoma	0	0.2	1	0.0	~	~
Kidney and Renal Pelvis	13	14.2	2	7.5	24.9	~
Larynx	6	4.1	2	1.0	~	~
Leukemia	9	13.4	10	7.6	~	26.1
Liver††	3	4.3	0	1.7	~	~
Lung and Bronchus	53	48.7	46	37.6	73.6	64.8
Melanoma of the Skin	14	16.1	6	9.9	19.5	~
Mesothelioma	4	1.6	0	0.4	~	~
Myeloma	6	5.2	4	3.2	~	~
Non-Hodgkin Lymphoma	17	17.5	19	12.8	31.2	35.1
Oral Cavity and Pharynx	20	10.3	2	4.8	34.5	~
Ovary	-	-	11	8.2	-	17.4
Pancreas	10	8.2	5	6.8	14.7	~
Prostate	142	137.8	-	-	190.5	-
Soft Tissues	6	2.1	1	1.6	~	~
Stomach	1	5.1	2	2.5	~	~
Testis	2	2.0	-	-	~	-
Thyroid	3	3.0	6	6.6	~	~
Urinary Bladder	26	28.5	8	7.3	37.4	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	3,682	3,479.7	3,204	3,073.3	608.4	433.4
Brain††	52	55.6	35	40.1	6.8	4.4
Breast	6	8.2	956	978.2	~	122.0
Cervix Uteri	-	-	48	50.0	-	6.1
Colon and Rectum	357	321.1	300	282.3	63.2	43.1
Corpus and Uterus, NOS	-	-	202	216.0	-	26.1
Esophagus	69	56.8	10	14.5	11.1	1.5
Hodgkin Lymphoma	29	25.9	25	20.3	4.1	3.4
Kaposi Sarcoma	2	3.5	0	0.4	~	~
Kidney and Renal Pelvis	161	145.0	86	80.0	24.2	11.5
Larynx	51	37.7	12	10.1	7.6	1.7
Leukemia	126	125.6	82	81.1	22.8	11.9
Liver††	65	44.7	17	16.8	9.7	2.6
Lung and Bronchus	451	391.8	438	343.7	78.3	65.2
Melanoma of the Skin	170	169.6	150	152.7	26.3	18.8
Mesothelioma	14	11.2	8	3.7	2.7	~
Myeloma	56	44.6	33	29.3	10.1	5.1
Non-Hodgkin Lymphoma	181	165.9	153	128.5	31.6	21.4
Oral Cavity and Pharynx	106	110.2	61	53.7	16.5	8.3
Ovary	-	-	94	96.0	-	11.7
Pancreas	73	71.0	61	60.5	11.6	8.9
Prostate	1,167	1,152.7	-	-	186.6	-
Soft Tissues	24	25.6	23	22.4	3.9	3.0
Stomach	58	42.5	18	24.0	10.8	2.7
Testis	68	57.2	-	-	8.1	-
Thyroid	51	42.7	146	124.8	6.7	17.7
Urinary Bladder	222	215.1	76	65.6	43.4	11.4

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	550	531.8	370	435.6	586.5	355.8
Brain††	8	6.6	5	4.8	~	~
Breast	0	1.3	108	131.6	~	104.1
Cervix Uteri	-	-	6	5.1	-	~
Colon and Rectum	62	49.8	36	46.4	64.5	33.2
Corpus and Uterus, NOS	-	-	20	30.1	-	19.6
Esophagus	11	8.5	2	2.4	11.5	~
Hodgkin Lymphoma	2	2.6	2	2.0	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	18	20.3	10	11.5	19.1	9.1
Larynx	8	5.7	2	1.5	~	~
Leukemia	18	18.8	16	12.2	19.9	17.2
Liver††	3	6.3	1	2.6	~	~
Lung and Bronchus	68	64.4	44	55.0	69.6	39.2
Melanoma of the Skin	17	23.3	13	17.2	18.4	14.5
Mesothelioma	1	2.0	0	0.6	~	~
Myeloma	4	7.0	3	4.8	~	~
Non-Hodgkin Lymphoma	31	24.5	18	19.7	35.2	16.8
Oral Cavity and Pharynx	27	15.1	5	7.6	29.8	~
Ovary	-	-	15	13.0	-	13.8
Pancreas	10	11.1	14	10.1	10.7	12.4
Prostate	174	183.9	-	-	176.3	-
Soft Tissues	1	3.3	2	2.8	~	~
Stomach	9	6.8	4	3.9	~	~
Testis	4	4.6	-	-	~	-
Thyroid	4	4.8	9	12.3	~	~
Urinary Bladder	45	37.2	9	11.0	50.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	562	544.0	474	470.6	582.7	421.0
Brain††	7	7.6	6	5.7	~	~
Breast	3	1.3	132	141.9	~	116.7
Cervix Uteri	-	-	14	6.4	-	13.7
Colon and Rectum	46	50.7	59	48.4	49.0	51.3
Corpus and Uterus, NOS	-	-	41	31.9	-	36.8
Esophagus	10	8.7	3	2.5	10.6	~
Hodgkin Lymphoma	4	3.5	1	3.0	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	20	21.0	13	12.3	19.8	10.8
Larynx	9	5.7	1	1.5	~	~
Leukemia	19	19.8	9	13.3	20.9	~
Liver††	6	6.6	1	2.7	~	~
Lung and Bronchus	78	64.3	62	56.6	81.3	55.4
Melanoma of the Skin	14	24.5	13	20.9	14.0	12.6
Mesothelioma	2	2.0	0	0.6	~	~
Myeloma	5	7.1	8	4.9	~	~
Non-Hodgkin Lymphoma	20	25.5	11	20.9	21.2	9.3
Oral Cavity and Pharynx	24	15.8	13	8.2	23.6	12.2
Ovary	-	-	15	14.2	-	13.1
Pancreas	12	11.2	11	10.4	13.2	9.2
Prostate	208	183.6	-	-	211.5	-
Soft Tissues	3	3.7	1	3.3	~	~
Stomach	10	6.9	7	4.1	10.0	~
Testis	5	6.9	-	-	~	-
Thyroid	5	5.5	15	15.9	~	14.3
Urinary Bladder	26	37.1	7	11.4	29.9	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	472	428.5	412	385.8	611.5	444.9
Brain††	5	6.6	6	4.8	~	~
Breast	1	1.0	118	115.5	~	131.5
Cervix Uteri	-	-	6	5.9	-	~
Colon and Rectum	45	40.6	39	40.2	58.6	39.1
Corpus and Uterus, NOS	-	-	23	25.0	-	26.4
Esophagus	5	6.9	4	1.9	~	~
Hodgkin Lymphoma	2	3.2	5	2.8	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	28	16.9	13	9.8	35.8	12.9
Larynx	4	4.4	3	1.2	~	~
Leukemia	21	16.1	11	11.2	27.0	10.7
Liver††	2	5.3	3	2.2	~	~
Lung and Bronchus	53	49.1	50	43.8	73.2	56.1
Melanoma of the Skin	20	20.5	32	18.6	24.6	34.6
Mesothelioma	0	1.5	1	0.5	~	~
Myeloma	7	5.6	2	3.9	~	~
Non-Hodgkin Lymphoma	23	20.8	16	17.1	30.4	17.2
Oral Cavity and Pharynx	18	13.0	7	6.8	20.5	~
Ovary	-	-	7	11.5	-	~
Pancreas	11	8.8	9	8.3	13.7	~
Prostate	160	138.1	-	-	209.2	-
Soft Tissues	0	3.2	3	2.9	~	~
Stomach	3	5.5	9	3.5	~	~
Testis	8	7.2	-	-	~	-
Thyroid	5	4.9	17	14.7	~	18.9
Urinary Bladder	31	29.1	6	9.3	44.2	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	113	113.6	94	95.9	557.2	420.6
Brain††	1	1.2	0	0.9	~	~
Breast	0	0.3	28	27.8	~	114.4
Cervix Uteri	-	-	0	0.9	-	~
Colon and Rectum	17	11.1	13	11.3	81.9	43.6
Corpus and Uterus, NOS	-	-	10	6.2	-	38.2
Esophagus	2	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	5	2.8	~	~
Liver††	0	1.3	0	0.6	~	~
Lung and Bronchus	13	14.2	11	12.6	63.5	49.3
Melanoma of the Skin	7	4.8	0	3.4	~	~
Mesothelioma	1	0.5	0	0.2	~	~
Myeloma	1	1.5	0	1.1	~	~
Non-Hodgkin Lymphoma	6	5.4	4	4.6	~	~
Oral Cavity and Pharynx	6	3.1	1	1.7	~	~
Ovary	-	-	2	2.8	-	~
Pancreas	1	2.4	5	2.4	~	~
Prostate	40	38.2	-	-	188.9	-
Soft Tissues	2	0.7	1	0.6	~	~
Stomach	0	1.6	0	1.0	~	~
Testis	0	0.7	-	-	~	-
Thyroid	0	0.9	3	2.2	~	~
Urinary Bladder	5	8.9	1	2.7	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	681	686.8	605	617.7	560.7	414.5
Brain††	8	10.0	9	7.3	~	~
Breast	3	1.7	184	181.8	~	127.4
Cervix Uteri	-	-	9	7.9	-	~
Colon and Rectum	71	64.9	78	66.9	58.4	48.3
Corpus and Uterus, NOS	-	-	44	40.1	-	31.2
Esophagus	8	10.9	7	3.3	~	~
Hodgkin Lymphoma	5	5.2	2	4.4	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	33	26.2	12	15.9	27.5	8.1
Larynx	6	7.1	4	1.9	~	~
Leukemia	21	25.7	16	18.2	16.2	12.2
Liver††	3	8.3	3	3.6	~	~
Lung and Bronchus	80	80.2	68	73.6	68.7	48.4
Melanoma of the Skin	48	31.8	31	27.5	40.1	20.0
Mesothelioma	2	2.6	0	0.9	~	~
Myeloma	14	8.9	9	6.6	11.8	~
Non-Hodgkin Lymphoma	28	32.9	27	28.1	22.3	16.5
Oral Cavity and Pharynx	15	20.3	8	10.8	11.7	~
Ovary	-	-	16	18.5	-	11.4
Pancreas	7	14.1	13	14.0	~	8.2
Prostate	212	224.0	-	-	174.9	-
Soft Tissues	3	5.0	6	4.4	~	~
Stomach	11	8.9	4	5.7	9.0	~
Testis	11	10.9	-	-	7.9	-
Thyroid	8	7.2	18	20.7	~	14.1
Urinary Bladder	50	47.8	8	15.7	41.8	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	418	446.0	391	370.5	528.6	428.2
Brain††	5	5.4	5	3.9	~	~
Breast	1	1.1	108	109.6	~	123.7
Cervix Uteri	-	-	10	4.1	-	14.5
Colon and Rectum	45	43.0	50	41.8	56.6	47.2
Corpus and Uterus, NOS	-	-	26	24.2	-	28.3
Esophagus	8	7.2	1	2.1	~	~
Hodgkin Lymphoma	3	2.2	2	1.7	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	21	16.5	8	9.7	27.2	~
Larynx	7	4.6	0	1.2	~	~
Leukemia	15	16.2	13	10.7	19.3	12.3
Liver††	2	5.2	1	2.2	~	~
Lung and Bronchus	41	54.5	39	46.8	51.2	42.1
Melanoma of the Skin	24	19.7	17	14.3	31.8	23.3
Mesothelioma	0	1.8	0	0.6	~	~
Myeloma	4	6.0	3	4.2	~	~
Non-Hodgkin Lymphoma	23	21.1	17	17.2	30.0	16.1
Oral Cavity and Pharynx	6	12.5	5	6.5	~	~
Ovary	-	-	10	10.9	-	9.8
Pancreas	13	9.4	8	8.8	15.9	~
Prostate	130	149.0	-	-	160.5	-
Soft Tissues	2	2.8	2	2.4	~	~
Stomach	7	6.0	3	3.5	~	~
Testis	5	3.9	-	-	~	-
Thyroid	3	3.9	16	10.0	~	22.4
Urinary Bladder	31	33.1	22	9.9	37.9	23.1

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	544	503.8	398	431.7	598.9	379.4
Brain††	3	6.7	6	4.8	~	~
Breast	0	1.2	109	130.0	~	103.9
Cervix Uteri	-	-	2	5.3	-	~
Colon and Rectum	44	47.7	33	46.6	47.8	31.9
Corpus and Uterus, NOS	-	-	28	28.9	-	24.6
Esophagus	9	8.1	6	2.3	~	~
Hodgkin Lymphoma	3	2.9	1	2.1	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	16	19.5	9	11.3	17.6	~
Larynx	4	5.3	3	1.4	~	~
Leukemia	21	18.1	10	12.2	23.2	10.1
Liver††	4	6.1	3	2.5	~	~
Lung and Bronchus	75	60.0	53	53.2	81.4	48.5
Melanoma of the Skin	29	22.9	20	17.7	31.4	24.3
Mesothelioma	7	1.9	0	0.6	~	~
Myeloma	5	6.7	4	4.7	~	~
Non-Hodgkin Lymphoma	24	23.7	29	19.6	26.2	26.3
Oral Cavity and Pharynx	12	14.8	4	7.5	12.1	~
Ovary	-	-	9	12.8	-	~
Pancreas	9	10.5	16	9.9	~	14.8
Prostate	191	169.4	-	-	208.6	-
Soft Tissues	2	3.3	2	2.9	~	~
Stomach	7	6.5	3	3.9	~	~
Testis	8	5.5	-	-	~	-
Thyroid	8	5.0	9	12.9	~	~
Urinary Bladder	39	35.0	7	11.0	45.9	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	821	846.0	747	766.2	549.1	399.2
Brain††	18	14.2	17	10.2	9.3	7.6
Breast	0	2.0	236	243.7	~	121.1
Cervix Uteri	-	-	13	12.9	-	6.3
Colon and Rectum	63	79.8	63	72.1	45.7	36.0
Corpus and Uterus, NOS	-	-	46	51.5	-	25.6
Esophagus	7	13.9	0	3.5	~	~
Hodgkin Lymphoma	3	6.6	4	5.1	~	~
Kaposi Sarcoma	1	0.9	0	0.1	~	~
Kidney and Renal Pelvis	37	35.6	14	19.6	20.6	6.8
Larynx	9	9.1	0	2.4	~	~
Leukemia	28	31.7	28	21.0	18.5	15.2
Liver††	7	11.0	4	4.2	~	~
Lung and Bronchus	80	94.2	71	82.2	60.5	42.9
Melanoma of the Skin	46	42.5	54	39.2	27.6	24.9
Mesothelioma	0	2.7	0	0.9	~	~
Myeloma	12	10.9	8	7.2	6.8	~
Non-Hodgkin Lymphoma	34	41.5	22	32.3	20.2	11.4
Oral Cavity and Pharynx	23	27.4	17	13.4	12.4	9.6
Ovary	-	-	31	23.7	-	17.1
Pancreas	20	17.2	19	14.9	13.2	11.4
Prostate	308	270.0	-	-	209.4	-
Soft Tissues	5	6.6	5	5.8	~	~
Stomach	14	10.6	6	6.2	8.8	~
Testis	15	14.7	-	-	7.2	-
Thyroid	11	10.9	30	32.3	5.6	14.6
Urinary Bladder	39	53.2	18	16.5	32.4	10.2

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	600	567.6	430	413.6	591.0	437.7
Brain††	8	6.6	10	4.6	~	13.0
Breast	0	1.4	106	126.8	~	104.0
Cervix Uteri	-	-	6	4.7	-	~
Colon and Rectum	46	52.3	62	42.1	45.1	63.0
Corpus and Uterus, NOS	-	-	25	29.8	-	20.6
Esophagus	13	9.0	1	2.3	13.2	~
Hodgkin Lymphoma	1	2.5	4	1.8	~	~
Kaposi Sarcoma	0	0.3	0	0.0	~	~
Kidney and Renal Pelvis	31	21.4	19	11.1	31.0	18.9
Larynx	9	6.1	0	1.5	~	~
Leukemia	22	19.4	6	11.0	22.2	~
Liver††	8	6.6	3	2.4	~	~
Lung and Bronchus	84	69.6	67	53.7	83.9	62.4
Melanoma of the Skin	24	24.0	17	16.0	24.5	19.1
Mesothelioma	3	2.2	1	0.6	~	~
Myeloma	6	7.5	4	4.5	~	~
Non-Hodgkin Lymphoma	23	25.5	20	18.3	26.2	19.6
Oral Cavity and Pharynx	10	15.7	7	7.2	9.9	~
Ovary	-	-	11	12.5	-	11.9
Pancreas	15	12.0	9	9.5	16.4	~
Prostate	225	202.7	-	-	203.7	-
Soft Tissues	3	3.2	2	2.6	~	~
Stomach	6	7.2	5	3.5	~	~
Testis	4	3.9	-	-	~	-
Thyroid	2	4.8	12	11.5	~	15.6
Urinary Bladder	38	39.4	7	10.1	40.6	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	232	215.4	196	194.1	613.5	425.9
Brain††	3	2.6	2	2.0	~	~
Breast	1	0.5	54	56.7	~	124.5
Cervix Uteri	-	-	4	2.1	-	~
Colon and Rectum	33	20.9	30	22.7	84.9	53.8
Corpus and Uterus, NOS	-	-	17	12.5	-	35.2
Esophagus	2	3.5	2	1.1	~	~
Hodgkin Lymphoma	1	1.0	1	0.8	~	~
Kaposi Sarcoma	1	0.1	0	0.0	~	~
Kidney and Renal Pelvis	5	8.0	2	5.0	~	~
Larynx	7	2.2	0	0.6	~	~
Leukemia	8	7.9	9	5.8	~	~
Liver††	2	2.5	0	1.2	~	~
Lung and Bronchus	23	26.3	18	24.5	60.1	40.0
Melanoma of the Skin	6	9.5	2	7.3	~	~
Mesothelioma	1	0.9	0	0.3	~	~
Myeloma	3	2.9	2	2.2	~	~
Non-Hodgkin Lymphoma	13	10.3	11	9.2	33.7	17.7
Oral Cavity and Pharynx	5	6.1	1	3.4	~	~
Ovary	-	-	6	5.6	-	~
Pancreas	1	4.5	2	4.8	~	~
Prostate	83	71.6	-	-	218.0	-
Soft Tissues	2	1.4	1	1.2	~	~
Stomach	1	2.9	4	1.9	~	~
Testis	1	1.7	-	-	~	-
Thyroid	2	1.9	6	4.9	~	~
Urinary Bladder	19	16.1	4	5.4	46.9	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	627	583.1	514	476.6	599.2	447.2
Brain††	6	8.9	7	6.0	~	~
Breast	0	1.4	161	149.2	~	135.4
Cervix Uteri	-	-	7	7.3	-	~
Colon and Rectum	52	54.7	57	46.0	50.5	50.2
Corpus and Uterus, NOS	-	-	23	32.5	-	20.0
Esophagus	13	9.4	1	2.3	10.9	~
Hodgkin Lymphoma	1	4.0	1	2.9	~	~
Kaposi Sarcoma	0	0.5	1	0.1	~	~
Kidney and Renal Pelvis	30	23.5	12	12.4	27.0	10.9
Larynx	8	6.2	1	1.5	~	~
Leukemia	19	21.4	9	13.0	18.9	~
Liver††	3	7.2	3	2.7	~	~
Lung and Bronchus	85	67.0	76	54.8	88.0	68.7
Melanoma of the Skin	18	27.9	20	22.7	15.9	16.6
Mesothelioma	2	2.0	1	0.6	~	~
Myeloma	8	7.6	6	4.7	~	~
Non-Hodgkin Lymphoma	24	28.0	29	20.5	23.5	25.6
Oral Cavity and Pharynx	19	17.8	11	8.3	16.5	9.6
Ovary	-	-	13	14.6	-	12.0
Pancreas	16	12.0	9	9.8	14.9	~
Prostate	236	191.6	-	-	220.0	-
Soft Tissues	5	4.2	4	3.4	~	~
Stomach	9	7.4	4	3.9	~	~
Testis	10	8.6	-	-	7.8	-
Thyroid	4	6.7	17	18.2	~	14.2
Urinary Bladder	39	38.4	9	10.7	41.1	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	587	671.7	576	597.9	489.7	404.7
Brain††	7	9.3	3	7.0	~	~
Breast	2	1.6	161	177.3	~	117.4
Cervix Uteri	-	-	7	7.7	-	~
Colon and Rectum	53	64.2	71	64.6	43.0	45.1
Corpus and Uterus, NOS	-	-	38	38.8	-	27.7
Esophagus	13	10.8	2	3.2	11.0	~
Hodgkin Lymphoma	4	4.4	3	3.9	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	21	25.5	19	15.4	17.9	12.9
Larynx	4	7.0	2	1.9	~	~
Leukemia	35	25.0	23	17.5	29.3	15.8
Liver††	8	8.0	0	3.5	~	~
Lung and Bronchus	72	79.6	62	71.6	61.4	42.5
Melanoma of the Skin	24	30.7	26	26.2	17.9	18.8
Mesothelioma	3	2.6	3	0.9	~	~
Myeloma	10	8.8	10	6.4	8.4	6.7
Non-Hodgkin Lymphoma	20	32.2	26	27.2	16.3	17.5
Oral Cavity and Pharynx	22	19.6	6	10.5	18.5	~
Ovary	-	-	16	17.8	-	13.1
Pancreas	17	13.9	9	13.6	14.5	~
Prostate	170	220.0	-	-	143.1	-
Soft Tissues	3	4.7	2	4.2	~	~
Stomach	4	8.8	5	5.5	~	~
Testis	15	8.7	-	-	13.3	-
Thyroid	3	6.8	24	19.6	~	20.0
Urinary Bladder	49	47.7	18	15.2	41.5	11.1

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	146	147.6	100	114.3	547.0	353.7
Brain††	2	1.8	0	1.2	~	~
Breast	0	0.4	38	34.0	~	130.7
Cervix Uteri	-	-	3	1.3	-	~
Colon and Rectum	16	14.1	15	12.6	59.7	50.2
Corpus and Uterus, NOS	-	-	4	7.7	-	~
Esophagus	4	2.4	1	0.6	~	~
Hodgkin Lymphoma	0	0.7	0	0.5	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	8	5.5	2	3.0	~	~
Larynx	3	1.5	0	0.4	~	~
Leukemia	5	5.3	2	3.3	~	~
Liver††	2	1.7	2	0.7	~	~
Lung and Bronchus	23	18.0	8	14.4	88.1	~
Melanoma of the Skin	2	6.4	4	4.4	~	~
Mesothelioma	1	0.6	0	0.2	~	~
Myeloma	3	2.0	0	1.3	~	~
Non-Hodgkin Lymphoma	8	6.9	7	5.2	~	~
Oral Cavity and Pharynx	5	4.1	1	2.0	~	~
Ovary	-	-	2	3.4	-	~
Pancreas	2	3.1	5	2.7	~	~
Prostate	43	50.2	-	-	154.9	-
Soft Tissues	2	0.9	0	0.7	~	~
Stomach	2	2.0	1	1.1	~	~
Testis	1	1.2	-	-	~	-
Thyroid	1	1.3	1	3.1	~	~
Urinary Bladder	10	10.9	1	3.0	33.5	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	92	109.2	84	83.4	497.6	420.7
Brain††	2	1.3	1	0.9	~	~
Breast	0	0.3	27	25.9	~	121.8
Cervix Uteri	-	-	2	1.0	-	~
Colon and Rectum	10	10.2	6	8.6	53.9	~
Corpus and Uterus, NOS	-	-	6	6.0	-	~
Esophagus	2	1.8	0	0.5	~	~
Hodgkin Lymphoma	0	0.5	1	0.3	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	3	4.2	3	2.2	~	~
Larynx	2	1.2	0	0.3	~	~
Leukemia	3	3.7	2	2.2	~	~
Liver††	0	1.3	2	0.5	~	~
Lung and Bronchus	6	13.2	11	10.5	~	50.5
Melanoma of the Skin	3	4.7	4	3.3	~	~
Mesothelioma	0	0.4	0	0.1	~	~
Myeloma	2	1.4	1	0.9	~	~
Non-Hodgkin Lymphoma	6	5.0	4	3.7	~	~
Oral Cavity and Pharynx	0	3.1	0	1.5	~	~
Ovary	-	-	1	2.5	-	~
Pancreas	5	2.3	4	1.9	~	~
Prostate	36	38.6	-	-	179.5	-
Soft Tissues	0	0.6	0	0.5	~	~
Stomach	0	1.4	0	0.7	~	~
Testis	1	0.8	-	-	~	-
Thyroid	1	0.9	2	2.3	~	~
Urinary Bladder	7	7.6	1	2.0	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	203	213.5	162	183.7	525.6	377.5
Brain††	4	2.5	1	1.8	~	~
Breast	0	0.5	54	53.3	~	131.1
Cervix Uteri	-	-	0	1.9	-	~
Colon and Rectum	29	20.9	23	21.8	71.8	42.8
Corpus and Uterus, NOS	-	-	12	11.8	-	30.2
Esophagus	3	3.4	1	1.1	~	~
Hodgkin Lymphoma	0	1.0	0	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	9	7.7	4	4.8	~	~
Larynx	1	2.2	0	0.6	~	~
Leukemia	8	8.0	8	5.5	~	~
Liver††	4	2.4	1	1.1	~	~
Lung and Bronchus	24	26.2	18	23.3	64.7	44.0
Melanoma of the Skin	10	9.3	3	6.7	30.8	~
Mesothelioma	0	0.9	0	0.3	~	~
Myeloma	1	2.9	0	2.1	~	~
Non-Hodgkin Lymphoma	3	10.2	5	8.7	~	~
Oral Cavity and Pharynx	4	5.9	3	3.2	~	~
Ovary	-	-	4	5.3	-	~
Pancreas	3	4.5	2	4.6	~	~
Prostate	65	70.8	-	-	164.9	-
Soft Tissues	0	1.3	2	1.2	~	~
Stomach	5	2.9	2	1.9	~	~
Testis	1	1.5	-	-	~	-
Thyroid	1	1.8	1	4.4	~	~
Urinary Bladder	17	16.5	4	5.1	41.7	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	1,148	1,044.3	826	842.6	612.1	407.3
Brain††	13	12.6	10	9.4	7.8	4.7
Breast	5	2.6	232	252.8	~	114.0
Cervix Uteri	-	-	8	9.9	-	~
Colon and Rectum	97	98.3	83	89.8	50.9	37.8
Corpus and Uterus, NOS	-	-	56	57.5	-	26.7
Esophagus	20	16.6	4	4.6	10.8	~
Hodgkin Lymphoma	2	5.1	1	4.1	~	~
Kaposi Sarcoma	0	0.6	0	0.1	~	~
Kidney and Renal Pelvis	44	39.1	25	22.3	24.5	12.3
Larynx	15	11.0	4	2.9	7.9	~
Leukemia	29	37.1	20	23.5	15.9	10.6
Liver††	12	12.1	5	5.0	6.6	~
Lung and Bronchus	149	127.9	118	107.4	79.1	53.2
Melanoma of the Skin	40	45.4	42	33.6	22.7	26.1
Mesothelioma	3	4.1	2	1.2	~	~
Myeloma	7	13.9	8	9.3	~	~
Non-Hodgkin Lymphoma	48	48.3	33	38.2	26.6	15.1
Oral Cavity and Pharynx	40	29.1	17	14.6	21.4	9.9
Ovary	-	-	17	25.0	-	8.8
Pancreas	21	21.9	27	19.6	11.4	12.0
Prostate	427	358.8	-	-	218.3	-
Soft Tissues	5	6.4	9	5.5	~	~
Stomach	14	13.6	3	7.5	7.8	~
Testis	8	9.0	-	-	~	-
Thyroid	8	9.2	32	24.1	~	19.6
Urinary Bladder	83	74.9	26	21.4	43.9	11.5

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	4,004	4,037.8	3,872	3,687.3	571.3	435.5
Brain††	58	64.6	44	48.1	6.8	4.7
Breast	9	9.6	1,259	1,173.5	~	134.4
Cervix Uteri	-	-	53	60.4	-	5.2
Colon and Rectum	360	375.5	374	341.1	51.4	45.8
Corpus and Uterus, NOS	-	-	291	257.5	-	31.5
Esophagus	52	66.1	22	17.3	7.8	2.9
Hodgkin Lymphoma	35	30.0	23	24.7	4.0	2.4
Kaposi Sarcoma	3	4.1	0	0.5	~	~
Kidney and Renal Pelvis	181	168.0	80	95.5	23.5	9.3
Larynx	45	43.5	10	11.9	6.8	1.2
Leukemia	160	147.6	113	98.0	23.6	12.6
Liver††	58	52.1	21	20.1	7.5	2.2
Lung and Bronchus	468	453.8	433	406.5	72.1	53.9
Melanoma of the Skin	179	197.3	191	184.6	24.3	20.3
Mesothelioma	13	13.1	13	4.4	2.4	1.6
Myeloma	44	51.7	37	35.0	6.8	4.6
Non-Hodgkin Lymphoma	198	193.7	170	154.4	29.4	19.3
Oral Cavity and Pharynx	133	128.4	69	64.5	16.7	7.4
Ovary	-	-	116	115.2	-	13.1
Pancreas	67	82.3	74	72.3	10.0	9.2
Prostate	1,315	1,326.4	-	-	185.1	-
Soft Tissues	29	30.0	30	27.2	3.8	3.1
Stomach	47	49.7	28	29.2	7.2	3.6
Testis	66	65.9	-	-	6.7	-
Thyroid	52	49.4	152	151.1	5.6	15.2
Urinary Bladder	248	252.4	62	79.1	40.3	7.7

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	248	243.7	230	205.9	563.4	465.8
Brain††	4	3.5	0	2.5	~	~
Breast	0	0.6	70	62.8	~	141.1
Cervix Uteri	-	-	4	2.9	-	~
Colon and Rectum	21	23.3	20	21.3	47.2	40.1
Corpus and Uterus, NOS	-	-	10	13.7	-	21.1
Esophagus	5	3.9	0	1.0	~	~
Hodgkin Lymphoma	3	1.5	2	1.2	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	12	9.5	6	5.3	26.4	~
Larynx	3	2.6	0	0.7	~	~
Leukemia	9	9.1	6	5.9	~	~
Liver††	4	2.9	4	1.2	~	~
Lung and Bronchus	42	28.6	20	24.2	97.1	42.3
Melanoma of the Skin	19	11.4	21	9.3	43.8	45.3
Mesothelioma	1	0.9	0	0.3	~	~
Myeloma	2	3.2	1	2.1	~	~
Non-Hodgkin Lymphoma	11	11.7	13	9.1	23.4	24.7
Oral Cavity and Pharynx	12	7.2	4	3.6	25.6	~
Ovary	-	-	6	6.2	-	~
Pancreas	4	5.0	5	4.5	~	~
Prostate	69	79.7	-	-	160.3	-
Soft Tissues	0	1.7	3	1.5	~	~
Stomach	0	3.2	1	1.8	~	~
Testis	3	3.1	-	-	~	-
Thyroid	6	2.6	10	7.1	~	21.4
Urinary Bladder	12	17.0	13	5.0	26.6	24.7

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	649	623.2	479	513.5	590.2	379.6
Brain††	12	7.5	7	5.5	12.0	~
Breast	4	1.5	145	152.0	~	120.0
Cervix Uteri	-	-	6	5.8	-	~
Colon and Rectum	72	59.3	49	56.9	65.7	35.1
Corpus and Uterus, NOS	-	-	37	34.3	-	28.0
Esophagus	5	9.9	3	2.9	~	~
Hodgkin Lymphoma	3	3.1	2	2.4	~	~
Kaposi Sarcoma	0	0.4	1	0.1	~	~
Kidney and Renal Pelvis	22	23.1	7	13.5	20.3	~
Larynx	4	6.5	0	1.7	~	~
Leukemia	16	22.4	20	14.6	16.2	14.0
Liver††	5	7.2	3	3.1	~	~
Lung and Bronchus	73	76.0	59	65.5	65.5	43.1
Melanoma of the Skin	28	27.2	18	20.0	29.0	16.3
Mesothelioma	3	2.5	0	0.8	~	~
Myeloma	16	8.3	8	5.8	14.0	~
Non-Hodgkin Lymphoma	31	29.1	23	23.7	30.1	16.9
Oral Cavity and Pharynx	14	17.4	6	8.9	12.3	~
Ovary	-	-	22	15.1	-	19.0
Pancreas	13	13.1	5	12.2	11.4	~
Prostate	225	212.3	-	-	196.4	-
Soft Tissues	3	3.8	1	3.3	~	~
Stomach	7	8.2	5	4.8	~	~
Testis	5	5.5	-	-	~	-
Thyroid	2	5.5	5	13.9	~	~
Urinary Bladder	63	45.4	13	13.5	55.9	9.3

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	275	289.2	251	248.5	537.0	423.3
Brain††	3	3.3	3	2.5	~	~
Breast	0	0.7	76	72.1	~	123.1
Cervix Uteri	-	-	2	2.5	-	~
Colon and Rectum	28	28.1	42	29.4	52.7	57.6
Corpus and Uterus, NOS	-	-	11	16.0	-	20.0
Esophagus	4	4.6	0	1.4	~	~
Hodgkin Lymphoma	1	1.3	2	1.0	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	7	10.5	7	6.5	~	~
Larynx	3	3.0	1	0.8	~	~
Leukemia	14	10.6	3	7.4	30.1	~
Liver††	3	3.3	0	1.5	~	~
Lung and Bronchus	34	35.8	28	32.1	64.2	39.5
Melanoma of the Skin	15	12.6	12	9.0	36.8	35.0
Mesothelioma	0	1.2	1	0.4	~	~
Myeloma	2	3.9	2	2.9	~	~
Non-Hodgkin Lymphoma	13	13.7	7	11.8	26.2	~
Oral Cavity and Pharynx	7	8.0	3	4.3	~	~
Ovary	-	-	8	7.1	-	~
Pancreas	7	6.1	7	6.2	~	~
Prostate	99	96.7	-	-	189.0	-
Soft Tissues	2	1.8	5	1.6	~	~
Stomach	2	3.9	2	2.5	~	~
Testis	1	2.0	-	-	~	-
Thyroid	3	2.4	6	5.9	~	~
Urinary Bladder	13	22.0	10	7.0	25.8	12.4

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	371	366.9	296	305.7	567.8	389.3
Brain††	3	4.4	1	3.2	~	~
Breast	0	0.9	102	90.0	~	137.9
Cervix Uteri	-	-	5	3.4	-	~
Colon and Rectum	48	35.4	33	34.9	71.6	36.8
Corpus and Uterus, NOS	-	-	16	20.0	-	22.3
Esophagus	3	5.9	1	1.7	~	~
Hodgkin Lymphoma	3	1.8	2	1.4	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	12	13.6	13	8.0	20.2	17.7
Larynx	3	3.8	0	1.0	~	~
Leukemia	16	13.4	13	9.0	23.5	17.0
Liver††	5	4.2	2	1.8	~	~
Lung and Bronchus	47	44.9	23	38.4	71.0	31.9
Melanoma of the Skin	15	16.1	8	11.7	22.9	~
Mesothelioma	0	1.5	1	0.5	~	~
Myeloma	7	4.9	5	3.5	~	~
Non-Hodgkin Lymphoma	23	17.4	12	14.3	35.5	15.7
Oral Cavity and Pharynx	11	10.3	3	5.3	16.8	~
Ovary	-	-	8	8.9	-	~
Pancreas	6	7.7	7	7.4	~	~
Prostate	117	122.9	-	-	175.2	-
Soft Tissues	1	2.3	3	2.0	~	~
Stomach	5	4.9	6	2.9	~	~
Testis	3	3.0	-	-	~	-
Thyroid	6	3.2	8	8.1	~	~
Urinary Bladder	21	27.3	6	8.2	31.8	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	562	562.5	437	476.7	559.0	380.1
Brain††	6	6.7	3	5.0	~	~
Breast	1	1.4	133	140.1	~	115.3
Cervix Uteri	-	-	3	5.2	-	~
Colon and Rectum	55	54.0	55	54.0	54.6	41.2
Corpus and Uterus, NOS	-	-	26	31.3	-	24.2
Esophagus	12	9.0	7	2.7	11.7	~
Hodgkin Lymphoma	3	2.7	3	2.1	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	14	20.9	15	12.5	13.5	13.6
Larynx	9	5.9	2	1.6	~	~
Leukemia	26	20.3	4	13.8	26.1	~
Liver††	5	6.5	4	2.9	~	~
Lung and Bronchus	71	69.0	47	61.2	70.7	40.8
Melanoma of the Skin	31	24.7	24	18.1	31.6	23.0
Mesothelioma	1	2.3	1	0.7	~	~
Myeloma	4	7.5	5	5.4	~	~
Non-Hodgkin Lymphoma	24	26.4	13	22.2	24.0	9.4
Oral Cavity and Pharynx	19	15.7	5	8.3	19.6	~
Ovary	-	-	9	13.9	-	~
Pancreas	11	11.8	10	11.5	10.4	8.3
Prostate	177	189.9	-	-	171.6	-
Soft Tissues	3	3.4	4	3.0	~	~
Stomach	7	7.5	4	4.6	~	~
Testis	4	4.6	-	-	~	-
Thyroid	3	4.9	11	12.4	~	18.7
Urinary Bladder	44	41.5	11	12.8	42.4	7.6

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	681	696.6	594	595.7	545.8	419.9
Brain††	11	9.0	8	6.6	8.4	~
Breast	0	1.7	193	179.4	~	137.7
Cervix Uteri	-	-	5	7.3	-	~
Colon and Rectum	66	66.3	72	64.7	53.0	47.0
Corpus and Uterus, NOS	-	-	42	39.7	-	29.6
Esophagus	6	11.3	1	3.2	~	~
Hodgkin Lymphoma	7	3.8	5	2.9	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	16	26.7	14	15.5	13.1	10.6
Larynx	5	7.4	3	1.9	~	~
Leukemia	26	25.1	10	17.0	21.7	6.7
Liver††	5	8.3	5	3.5	~	~
Lung and Bronchus	81	83.5	53	72.7	65.1	37.0
Melanoma of the Skin	36	31.4	28	24.5	28.4	23.6
Mesothelioma	4	2.7	0	0.9	~	~
Myeloma	13	9.2	6	6.5	10.3	~
Non-Hodgkin Lymphoma	31	32.9	37	27.1	26.2	24.5
Oral Cavity and Pharynx	23	20.3	5	10.4	17.9	~
Ovary	-	-	17	17.7	-	13.0
Pancreas	12	14.5	7	13.7	9.7	~
Prostate	223	233.8	-	-	172.7	-
Soft Tissues	9	4.5	6	4.0	~	~
Stomach	10	9.1	5	5.5	8.2	~
Testis	10	7.0	-	-	9.6	-
Thyroid	7	6.7	14	17.8	~	11.2
Urinary Bladder	53	49.3	15	15.2	44.4	9.6

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	125	123.5	107	99.5	579.7	447.5
Brain††	1	1.4	1	1.0	~	~
Breast	0	0.3	35	28.8	~	149.6
Cervix Uteri	-	-	1	1.0	-	~
Colon and Rectum	18	12.1	9	11.7	94.1	~
Corpus and Uterus, NOS	-	-	9	6.4	-	~
Esophagus	3	2.0	0	0.6	~	~
Hodgkin Lymphoma	0	0.5	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	2	4.4	2	2.6	~	~
Larynx	1	1.3	0	0.3	~	~
Leukemia	5	4.5	4	2.9	~	~
Liver††	1	1.4	0	0.6	~	~
Lung and Bronchus	16	15.4	15	12.9	68.5	59.0
Melanoma of the Skin	4	5.3	3	3.6	~	~
Mesothelioma	0	0.5	0	0.2	~	~
Myeloma	1	1.7	2	1.2	~	~
Non-Hodgkin Lymphoma	4	5.8	5	4.7	~	~
Oral Cavity and Pharynx	3	3.3	0	1.7	~	~
Ovary	-	-	3	2.9	-	~
Pancreas	4	2.6	1	2.5	~	~
Prostate	45	41.3	-	-	196.0	-
Soft Tissues	1	0.7	3	0.6	~	~
Stomach	1	1.7	1	1.0	~	~
Testis	1	0.8	-	-	~	-
Thyroid	0	1.0	2	2.4	~	~
Urinary Bladder	7	9.6	2	2.8	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	12,957	13,292.2	12,596	12,412.7	545.4	420.4
Brain††	199	197.4	133	150.1	7.4	4.6
Breast	36	32.1	3,977	3,789.7	1.5	133.1
Cervix Uteri	-	-	179	181.4	-	6.1
Colon and Rectum	1,159	1,257.7	1,172	1,267.5	49.3	37.7
Corpus and Uterus, NOS	-	-	840	836.3	-	27.9
Esophagus	193	215.4	65	62.9	7.7	2.1
Hodgkin Lymphoma	89	92.8	76	78.1	3.3	2.5
Kaposi Sarcoma	33	12.4	3	1.9	1.1	~
Kidney and Renal Pelvis	504	528.4	288	320.9	20.1	9.6
Larynx	133	139.7	44	39.3	5.6	1.5
Leukemia	478	490.4	392	346.4	19.9	12.9
Liver††	199	165.6	84	70.0	7.8	2.9
Lung and Bronchus	1,456	1,531.8	1,514	1,435.0	63.9	52.4
Melanoma of the Skin	673	634.5	547	574.6	27.3	18.4
Mesothelioma	43	47.2	13	16.7	2.0	0.4
Myeloma	163	173.0	142	127.2	6.9	4.7
Non-Hodgkin Lymphoma	655	639.2	519	545.9	27.8	17.2
Oral Cavity and Pharynx	429	406.1	230	217.2	16.8	7.5
Ovary	-	-	391	376.3	-	13.1
Pancreas	286	272.9	280	266.7	12.2	9.2
Prostate	4,119	4,331.3	-	-	175.1	-
Soft Tissues	106	94.8	97	88.3	4.2	3.3
Stomach	151	169.7	107	108.5	6.6	3.4
Testis	180	203.9	-	-	6.0	-
Thyroid	170	150.3	416	447.8	6.3	14.1
Urinary Bladder	853	893.2	313	296.0	39.0	10.5

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	317	323.4	254	270.5	546.0	402.3
Brain††	2	4.0	6	2.9	~	~
Breast	0	0.8	92	81.0	~	147.4
Cervix Uteri	-	-	2	3.2	-	~
Colon and Rectum	31	31.1	17	29.9	52.7	23.2
Corpus and Uterus, NOS	-	-	17	17.9	-	25.2
Esophagus	6	5.2	2	1.5	~	~
Hodgkin Lymphoma	2	1.6	2	1.3	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	11	12.2	7	7.1	18.5	~
Larynx	6	3.4	0	0.9	~	~
Leukemia	12	11.7	1	7.7	20.7	~
Liver††	1	3.8	2	1.6	~	~
Lung and Bronchus	31	39.1	29	33.4	54.3	44.4
Melanoma of the Skin	24	14.4	11	10.8	41.2	20.1
Mesothelioma	0	1.3	0	0.4	~	~
Myeloma	5	4.3	4	3.0	~	~
Non-Hodgkin Lymphoma	16	15.3	11	12.4	27.7	17.4
Oral Cavity and Pharynx	5	9.3	3	4.7	~	~
Ovary	-	-	9	8.0	-	~
Pancreas	5	6.8	6	6.3	~	~
Prostate	116	108.4	-	-	196.7	-
Soft Tissues	0	2.0	1	1.8	~	~
Stomach	3	4.3	6	2.5	~	~
Testis	2	2.8	-	-	~	-
Thyroid	1	3.0	10	7.7	~	23.3
Urinary Bladder	27	23.4	3	7.1	47.4	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	364	377.6	299	281.3	536.7	446.0
Brain††	6	4.3	6	3.0	~	~
Breast	1	0.9	87	85.1	~	129.6
Cervix Uteri	-	-	1	3.1	-	~
Colon and Rectum	24	35.4	26	29.7	36.9	34.8
Corpus and Uterus, NOS	-	-	24	19.7	-	36.4
Esophagus	7	6.0	2	1.6	~	~
Hodgkin Lymphoma	2	1.6	2	1.2	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	6	14.0	13	7.5	~	20.9
Larynx	3	4.0	1	1.0	~	~
Leukemia	12	13.1	8	7.7	18.8	~
Liver††	4	4.3	2	1.7	~	~
Lung and Bronchus	48	46.7	45	36.6	67.7	61.6
Melanoma of the Skin	17	16.0	9	10.7	26.7	~
Mesothelioma	2	1.5	0	0.4	~	~
Myeloma	9	5.0	5	3.1	~	~
Non-Hodgkin Lymphoma	22	17.2	10	12.7	34.7	14.2
Oral Cavity and Pharynx	14	10.4	7	4.9	19.7	~
Ovary	-	-	11	8.4	-	15.5
Pancreas	6	8.0	6	6.6	~	~
Prostate	126	132.4	-	-	171.6	-
Soft Tissues	5	2.2	0	1.7	~	~
Stomach	7	4.9	2	2.5	~	~
Testis	3	2.5	-	-	~	-
Thyroid	3	3.1	9	7.6	~	~
Urinary Bladder	17	27.1	3	7.1	24.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	434	452.0	362	389.6	541.7	383.6
Brain††	3	6.7	4	4.9	~	~
Breast	3	1.1	122	120.8	~	129.2
Cervix Uteri	-	-	7	5.8	-	~
Colon and Rectum	24	42.4	27	38.5	29.5	29.3
Corpus and Uterus, NOS	-	-	30	26.6	-	29.4
Esophagus	4	7.3	4	1.9	~	~
Hodgkin Lymphoma	3	3.1	4	2.4	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	21	18.1	8	10.1	22.7	~
Larynx	8	4.8	1	1.3	~	~
Leukemia	18	16.5	8	10.7	22.6	~
Liver††	9	5.6	4	2.2	~	~
Lung and Bronchus	56	51.8	41	44.8	79.8	45.6
Melanoma of the Skin	19	21.4	12	18.3	26.1	12.0
Mesothelioma	0	1.6	0	0.5	~	~
Myeloma	8	5.8	3	3.9	~	~
Non-Hodgkin Lymphoma	22	21.6	11	16.9	24.7	13.4
Oral Cavity and Pharynx	15	13.8	9	6.8	16.8	~
Ovary	-	-	11	11.9	-	10.9
Pancreas	11	9.3	5	8.2	14.3	~
Prostate	140	149.8	-	-	172.8	-
Soft Tissues	1	3.2	4	2.8	~	~
Stomach	8	5.7	2	3.3	~	~
Testis	9	6.5	-	-	~	-
Thyroid	6	5.1	16	14.4	~	16.6
Urinary Bladder	27	29.8	10	9.0	36.7	10.3

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	780	805.5	596	629.2	537.5	387.4
Brain††	9	9.7	6	6.9	~	~
Breast	3	2.0	180	191.2	~	115.6
Cervix Uteri	-	-	7	7.3	-	~
Colon and Rectum	87	75.6	76	66.4	59.8	48.5
Corpus and Uterus, NOS	-	-	45	43.8	-	28.4
Esophagus	13	13.0	5	3.4	8.7	~
Hodgkin Lymphoma	3	3.8	4	2.9	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	28	30.5	14	16.7	18.5	9.0
Larynx	10	8.6	2	2.2	6.6	~
Leukemia	33	28.2	17	17.2	23.6	10.5
Liver††	8	9.5	4	3.7	~	~
Lung and Bronchus	98	98.2	61	79.7	65.4	38.4
Melanoma of the Skin	27	35.0	19	24.8	18.1	14.4
Mesothelioma	4	3.1	0	0.9	~	~
Myeloma	13	10.7	3	6.9	8.7	~
Non-Hodgkin Lymphoma	45	37.1	34	28.3	31.3	20.9
Oral Cavity and Pharynx	21	22.8	8	11.0	15.1	~
Ovary	-	-	18	18.9	-	13.2
Pancreas	22	16.9	15	14.5	16.3	9.1
Prostate	240	279.3	-	-	159.6	-
Soft Tissues	3	4.8	3	4.0	~	~
Stomach	10	10.4	4	5.6	7.3	~
Testis	4	6.4	-	-	~	-
Thyroid	7	7.1	15	17.8	~	10.6
Urinary Bladder	55	56.9	14	15.8	39.9	8.6

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	189	204.7	137	166.7	530.4	332.2
Brain††	4	2.4	2	1.7	~	~
Breast	0	0.5	36	48.7	~	95.5
Cervix Uteri	-	-	2	1.8	-	~
Colon and Rectum	26	20.2	18	19.4	67.7	35.6
Corpus and Uterus, NOS	-	-	14	10.7	-	34.4
Esophagus	1	3.3	2	1.0	~	~
Hodgkin Lymphoma	2	1.0	1	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	8	7.4	3	4.3	~	~
Larynx	0	2.1	0	0.5	~	~
Leukemia	4	7.6	2	4.9	~	~
Liver††	1	2.4	0	1.0	~	~
Lung and Bronchus	22	25.1	15	21.3	62.2	36.0
Melanoma of the Skin	7	9.0	9	6.2	~	~
Mesothelioma	1	0.9	0	0.3	~	~
Myeloma	2	2.8	1	1.9	~	~
Non-Hodgkin Lymphoma	10	9.8	6	7.9	28.9	~
Oral Cavity and Pharynx	3	5.7	0	2.9	~	~
Ovary	-	-	6	4.8	-	~
Pancreas	5	4.3	4	4.1	~	~
Prostate	55	67.3	-	-	154.5	-
Soft Tissues	5	1.3	1	1.1	~	~
Stomach	4	2.8	1	1.6	~	~
Testis	2	1.6	-	-	~	-
Thyroid	2	1.7	3	4.2	~	~
Urinary Bladder	20	15.8	1	4.6	50.6	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	281	258.9	175	200.7	612.0	353.5
Brain††	3	3.3	2	2.3	~	~
Breast	1	0.6	54	61.8	~	105.5
Cervix Uteri	-	-	4	2.6	-	~
Colon and Rectum	28	24.1	10	20.4	62.1	19.2
Corpus and Uterus, NOS	-	-	14	14.0	-	26.9
Esophagus	9	4.2	0	1.1	~	~
Hodgkin Lymphoma	2	1.3	0	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	11	10.0	10	5.3	22.6	24.7
Larynx	4	2.8	2	0.7	~	~
Leukemia	8	9.1	4	5.4	~	~
Liver††	4	3.1	0	1.2	~	~
Lung and Bronchus	38	31.1	27	24.9	81.5	53.1
Melanoma of the Skin	6	11.5	7	8.4	~	~
Mesothelioma	2	1.0	0	0.3	~	~
Myeloma	6	3.4	2	2.1	~	~
Non-Hodgkin Lymphoma	10	11.9	2	8.9	20.8	~
Oral Cavity and Pharynx	8	7.5	2	3.5	~	~
Ovary	-	-	4	6.1	-	~
Pancreas	5	5.4	1	4.5	~	~
Prostate	91	89.4	-	-	187.1	-
Soft Tissues	0	1.6	2	1.3	~	~
Stomach	4	3.3	0	1.7	~	~
Testis	3	2.4	-	-	~	-
Thyroid	6	2.5	7	6.3	~	~
Urinary Bladder	21	17.7	2	4.8	48.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	556	630.9	527	532.6	498.8	413.2
Brain††	8	8.0	6	6.0	~	~
Breast	2	1.6	140	159.7	~	106.8
Cervix Uteri	-	-	12	6.4	-	12.2
Colon and Rectum	51	60.4	67	57.7	46.5	47.7
Corpus and Uterus, NOS	-	-	48	35.7	-	37.6
Esophagus	5	10.2	1	2.9	~	~
Hodgkin Lymphoma	3	3.4	4	2.7	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	26	23.8	8	13.9	22.8	~
Larynx	9	6.6	2	1.7	~	~
Leukemia	21	23.0	10	15.2	18.5	8.8
Liver††	3	7.5	3	3.1	~	~
Lung and Bronchus	65	75.9	44	65.7	58.1	32.6
Melanoma of the Skin	34	28.2	27	21.7	32.2	23.2
Mesothelioma	4	2.5	1	0.8	~	~
Myeloma	5	8.4	6	5.8	~	~
Non-Hodgkin Lymphoma	20	29.9	28	24.2	17.9	21.2
Oral Cavity and Pharynx	11	18.1	15	9.3	9.6	11.9
Ovary	-	-	17	15.8	-	12.5
Pancreas	7	13.2	9	12.3	~	~
Prostate	189	211.3	-	-	164.5	-
Soft Tissues	3	4.1	2	3.6	~	~
Stomach	6	8.3	5	4.9	~	~
Testis	8	6.2	-	-	~	-
Thyroid	7	5.9	22	15.7	~	21.0
Urinary Bladder	48	45.5	12	13.6	43.5	9.5

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	79	93.7	80	78.1	482.7	472.8
Brain††	2	1.0	0	0.8	~	~
Breast	0	0.2	35	22.5	~	207.5
Cervix Uteri	-	-	0	0.8	-	~
Colon and Rectum	13	9.2	6	9.4	70.4	~
Corpus and Uterus, NOS	-	-	8	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	1	3.4	2	2.0	~	~
Larynx	0	1.0	1	0.2	~	~
Leukemia	1	3.4	2	2.3	~	~
Liver††	1	1.1	0	0.5	~	~
Lung and Bronchus	16	11.5	7	10.1	96.4	~
Melanoma of the Skin	1	4.1	3	2.8	~	~
Mesothelioma	0	0.4	0	0.1	~	~
Myeloma	1	1.3	0	0.9	~	~
Non-Hodgkin Lymphoma	4	4.5	2	3.7	~	~
Oral Cavity and Pharynx	3	2.6	0	1.4	~	~
Ovary	-	-	0	2.2	-	~
Pancreas	3	2.0	1	2.0	~	~
Prostate	27	31.4	-	-	160.7	-
Soft Tissues	1	0.6	1	0.5	~	~
Stomach	0	1.3	1	0.8	~	~
Testis	0	0.6	-	-	~	-
Thyroid	0	0.8	2	1.8	~	~
Urinary Bladder	3	7.2	3	2.2	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	266	253.7	213	210.5	599.9	433.0
Brain††	0	3.0	2	2.2	~	~
Breast	1	0.6	50	62.9	~	111.2
Cervix Uteri	-	-	10	2.3	-	29.1
Colon and Rectum	29	24.2	31	23.3	67.2	50.8
Corpus and Uterus, NOS	-	-	17	14.1	-	35.4
Esophagus	3	4.1	1	1.2	~	~
Hodgkin Lymphoma	0	1.1	1	0.9	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	12	9.5	8	5.5	32.6	~
Larynx	1	2.7	1	0.7	~	~
Leukemia	11	9.0	6	5.9	29.1	~
Liver††	1	3.0	1	1.3	~	~
Lung and Bronchus	47	31.0	38	26.9	101.4	71.2
Melanoma of the Skin	9	11.1	4	8.0	~	~
Mesothelioma	4	1.0	0	0.3	~	~
Myeloma	3	3.4	4	2.4	~	~
Non-Hodgkin Lymphoma	15	11.8	7	9.7	32.3	~
Oral Cavity and Pharynx	5	7.2	2	3.7	~	~
Ovary	-	-	3	6.2	-	~
Pancreas	4	5.3	4	5.0	~	~
Prostate	84	86.9	-	-	178.4	-
Soft Tissues	0	1.5	0	1.3	~	~
Stomach	8	3.3	2	2.0	~	~
Testis	0	1.9	-	-	~	-
Thyroid	0	2.2	4	5.5	~	~
Urinary Bladder	16	18.4	7	5.5	39.2	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	153	152.8	121	125.3	562.7	386.8
Brain††	0	1.7	0	1.2	~	~
Breast	0	0.4	40	36.5	~	126.2
Cervix Uteri	-	-	1	1.2	-	~
Colon and Rectum	18	15.1	16	15.0	58.6	40.6
Corpus and Uterus, NOS	-	-	7	8.1	-	~
Esophagus	3	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	6	5.5	1	3.3	~	~
Larynx	0	1.6	0	0.4	~	~
Leukemia	4	5.6	5	3.7	~	~
Liver††	0	1.7	1	0.8	~	~
Lung and Bronchus	20	18.9	7	16.0	70.9	~
Melanoma of the Skin	4	6.6	3	4.5	~	~
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	4	2.1	2	1.5	~	~
Non-Hodgkin Lymphoma	8	7.3	7	6.0	~	~
Oral Cavity and Pharynx	1	4.2	2	2.2	~	~
Ovary	-	-	4	3.6	-	~
Pancreas	3	3.2	4	3.1	~	~
Prostate	69	50.6	-	-	260.3	-
Soft Tissues	0	0.9	0	0.8	~	~
Stomach	1	2.1	2	1.3	~	~
Testis	0	0.9	-	-	~	-
Thyroid	1	1.2	5	2.9	~	~
Urinary Bladder	6	11.9	3	3.5	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	204	225.0	176	168.9	500.4	424.3
Brain††	1	2.5	5	1.8	~	~
Breast	0	0.6	49	50.5	~	110.9
Cervix Uteri	-	-	2	1.9	-	~
Colon and Rectum	13	21.5	21	18.5	30.9	44.5
Corpus and Uterus, NOS	-	-	14	11.4	-	35.6
Esophagus	1	3.6	0	0.9	~	~
Hodgkin Lymphoma	0	1.0	2	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	9	8.3	3	4.5	~	~
Larynx	3	2.4	0	0.6	~	~
Leukemia	3	7.9	2	4.7	~	~
Liver††	3	2.6	2	1.0	~	~
Lung and Bronchus	26	28.1	20	21.9	63.4	46.4
Melanoma of the Skin	5	9.7	10	6.4	~	26.4
Mesothelioma	0	0.9	0	0.3	~	~
Myeloma	1	3.0	1	1.9	~	~
Non-Hodgkin Lymphoma	11	10.4	8	7.7	27.9	~
Oral Cavity and Pharynx	3	6.2	2	2.9	~	~
Ovary	-	-	5	5.0	-	~
Pancreas	7	4.7	5	4.0	~	~
Prostate	94	77.1	-	-	224.4	-
Soft Tissues	0	1.3	1	1.0	~	~
Stomach	3	3.0	3	1.6	~	~
Testis	1	1.5	-	-	~	-
Thyroid	1	1.9	5	4.5	~	~
Urinary Bladder	12	16.6	5	4.4	28.8	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	106	84.5	60	64.3	716.5	371.0
Brain††	1	1.0	0	0.7	~	~
Breast	0	0.2	21	19.3	~	126.8
Cervix Uteri	-	-	2	0.7	-	~
Colon and Rectum	10	8.1	7	7.0	71.5	~
Corpus and Uterus, NOS	-	-	0	4.4	-	~
Esophagus	4	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	3	3.2	2	1.7	~	~
Larynx	2	0.9	0	0.2	~	~
Leukemia	0	3.0	0	1.8	~	~
Liver††	0	1.0	0	0.4	~	~
Lung and Bronchus	9	10.3	13	8.3	~	73.7
Melanoma of the Skin	2	3.7	5	2.4	~	~
Mesothelioma	0	0.3	0	0.1	~	~
Myeloma	1	1.1	1	0.7	~	~
Non-Hodgkin Lymphoma	6	3.9	2	2.9	~	~
Oral Cavity and Pharynx	4	2.4	0	1.1	~	~
Ovary	-	-	1	1.9	-	~
Pancreas	3	1.8	1	1.5	~	~
Prostate	41	29.2	-	-	264.4	-
Soft Tissues	0	0.5	0	0.4	~	~
Stomach	2	1.1	0	0.6	~	~
Testis	1	0.6	-	-	~	-
Thyroid	2	0.7	0	1.7	~	~
Urinary Bladder	10	6.1	2	1.7	60.9	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	407	405.8	307	336.1	562.3	376.3
Brain††	8	5.4	1	3.8	~	~
Breast	0	1.0	94	101.9	~	117.8
Cervix Uteri	-	-	1	4.3	-	~
Colon and Rectum	38	38.5	43	35.5	52.6	50.6
Corpus and Uterus, NOS	-	-	13	22.7	-	15.9
Esophagus	9	6.6	2	1.8	~	~
Hodgkin Lymphoma	2	2.3	1	1.7	~	~
Kaposi Sarcoma	0	0.3	0	0.0	~	~
Kidney and Renal Pelvis	20	15.7	7	8.8	26.8	~
Larynx	1	4.3	0	1.1	~	~
Leukemia	17	14.7	9	9.5	24.7	~
Liver††	2	4.9	2	2.0	~	~
Lung and Bronchus	49	48.2	37	40.9	69.6	42.9
Melanoma of the Skin	19	18.5	15	14.1	27.9	19.8
Mesothelioma	1	1.5	0	0.5	~	~
Myeloma	6	5.3	3	3.6	~	~
Non-Hodgkin Lymphoma	23	19.2	8	15.1	31.1	~
Oral Cavity and Pharynx	8	11.9	7	5.9	~	~
Ovary	-	-	10	10.1	-	12.7
Pancreas	13	8.4	8	7.6	17.8	~
Prostate	137	136.4	-	-	185.2	-
Soft Tissues	1	2.7	3	2.3	~	~
Stomach	6	5.3	1	3.0	~	~
Testis	4	4.3	-	-	~	-
Thyroid	1	4.0	9	10.5	~	~
Urinary Bladder	25	28.2	8	8.4	35.5	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	115	122.7	94	102.2	537.0	367.2
Brain††	1	1.3	1	1.0	~	~
Breast	0	0.3	24	29.1	~	101.3
Cervix Uteri	-	-	1	1.0	-	~
Colon and Rectum	6	12.0	16	12.5	~	50.7
Corpus and Uterus, NOS	-	-	6	6.4	-	~
Esophagus	1	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	5	4.4	1	2.6	~	~
Larynx	1	1.3	0	0.3	~	~
Leukemia	4	4.5	3	3.1	~	~
Liver††	0	1.4	1	0.6	~	~
Lung and Bronchus	15	15.4	9	13.3	64.6	~
Melanoma of the Skin	7	5.3	2	3.6	~	~
Mesothelioma	0	0.5	0	0.2	~	~
Myeloma	0	1.7	3	1.2	~	~
Non-Hodgkin Lymphoma	2	5.8	10	5.0	~	40.5
Oral Cavity and Pharynx	1	3.3	1	1.8	~	~
Ovary	-	-	3	2.9	-	~
Pancreas	1	2.6	4	2.6	~	~
Prostate	55	40.9	-	-	238.5	-
Soft Tissues	0	0.7	1	0.6	~	~
Stomach	2	1.7	0	1.1	~	~
Testis	2	0.8	-	-	~	-
Thyroid	0	1.0	3	2.3	~	~
Urinary Bladder	8	9.6	1	3.0	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	349	341.8	313	302.9	568.0	425.0
Brain††	4	4.5	6	3.4	~	~
Breast	0	0.8	85	89.2	~	119.7
Cervix Uteri	-	-	6	3.7	-	~
Colon and Rectum	37	33.0	39	34.0	59.1	46.4
Corpus and Uterus, NOS	-	-	20	19.4	-	30.0
Esophagus	3	5.5	2	1.6	~	~
Hodgkin Lymphoma	1	2.1	1	1.7	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	12	12.8	9	7.8	18.9	~
Larynx	4	3.5	1	0.9	~	~
Leukemia	12	12.8	9	9.0	18.4	~
Liver††	4	4.0	1	1.8	~	~
Lung and Bronchus	40	40.7	41	36.5	64.7	58.1
Melanoma of the Skin	12	15.5	10	12.7	19.0	15.0
Mesothelioma	1	1.3	1	0.5	~	~
Myeloma	2	4.5	1	3.3	~	~
Non-Hodgkin Lymphoma	22	16.4	14	14.0	35.1	14.8
Oral Cavity and Pharynx	8	9.8	8	5.3	~	~
Ovary	-	-	8	8.9	-	~
Pancreas	6	7.1	7	7.1	~	~
Prostate	131	111.7	-	-	217.8	-
Soft Tissues	2	2.3	1	2.1	~	~
Stomach	3	4.6	3	2.9	~	~
Testis	6	4.0	-	-	~	-
Thyroid	2	3.3	13	9.2	~	20.2
Urinary Bladder	26	25.0	5	8.0	42.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	505	506.5	418	448.5	556.2	387.9
Brain††	3	6.9	7	5.1	~	~
Breast	1	1.2	122	134.3	~	114.8
Cervix Uteri	-	-	5	5.7	-	~
Colon and Rectum	48	48.1	40	48.4	53.8	33.5
Corpus and Uterus, NOS	-	-	27	29.6	-	25.7
Esophagus	5	8.1	3	2.4	~	~
Hodgkin Lymphoma	3	3.0	0	2.4	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	12	19.5	12	11.7	13.0	11.1
Larynx	3	5.3	0	1.4	~	~
Leukemia	14	18.6	13	12.9	15.6	11.2
Liver††	5	6.1	1	2.6	~	~
Lung and Bronchus	61	60.1	44	54.7	70.3	41.5
Melanoma of the Skin	31	23.1	26	18.8	34.0	26.0
Mesothelioma	2	1.9	0	0.6	~	~
Myeloma	7	6.7	5	4.9	~	~
Non-Hodgkin Lymphoma	20	24.0	21	20.4	22.8	17.5
Oral Cavity and Pharynx	10	14.7	9	7.8	11.5	~
Ovary	-	-	14	13.3	-	14.0
Pancreas	10	10.5	4	10.3	10.9	~
Prostate	197	168.6	-	-	210.7	-
Soft Tissues	2	3.4	2	3.1	~	~
Stomach	5	6.6	4	4.1	~	~
Testis	6	5.9	-	-	~	-
Thyroid	9	5.1	23	13.9	~	26.1
Urinary Bladder	34	35.6	9	11.4	38.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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: Mahnomen County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	86	84.0	55	67.9	570.1	325.1
Brain††	1	1.0	1	0.7	~	~
Breast	0	0.2	16	20.0	~	90.3
Cervix Uteri	-	-	0	0.7	-	~
Colon and Rectum	12	8.0	5	7.6	76.2	~
Corpus and Uterus, NOS	-	-	2	4.5	-	~
Esophagus	0	1.3	0	0.4	~	~
Hodgkin Lymphoma	0	0.4	2	0.3	~	~
Kaposi Sarcoma	0	0.0	0	0.0	~	~
Kidney and Renal Pelvis	3	3.1	1	1.8	~	~
Larynx	3	0.9	1	0.2	~	~
Leukemia	7	3.0	3	2.0	~	~
Liver††	0	1.0	1	0.4	~	~
Lung and Bronchus	13	10.2	9	8.6	84.4	~
Melanoma of the Skin	4	3.6	1	2.6	~	~
Mesothelioma	0	0.3	0	0.1	~	~
Myeloma	0	1.1	2	0.8	~	~
Non-Hodgkin Lymphoma	5	3.9	2	3.1	~	~
Oral Cavity and Pharynx	3	2.3	1	1.2	~	~
Ovary	-	-	1	2.0	-	~
Pancreas	1	1.8	0	1.6	~	~
Prostate	26	28.7	-	-	165.2	-
Soft Tissues	0	0.5	0	0.5	~	~
Stomach	1	1.1	0	0.6	~	~
Testis	0	0.7	-	-	~	-
Thyroid	0	0.7	3	1.8	~	~
Urinary Bladder	4	6.1	1	1.8	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	170	177.7	121	141.2	545.0	353.0
Brain††	1	2.1	4	1.5	~	~
Breast	1	0.4	37	41.8	~	112.1
Cervix Uteri	-	-	1	1.5	-	~
Colon and Rectum	22	17.3	18	15.9	68.4	49.5
Corpus and Uterus, NOS	-	-	5	9.4	-	~
Esophagus	5	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	4	6.6	5	3.7	~	~
Larynx	1	1.8	0	0.5	~	~
Leukemia	6	6.5	5	4.1	~	~
Liver††	2	2.1	0	0.8	~	~
Lung and Bronchus	19	21.8	14	18.0	60.1	41.5
Melanoma of the Skin	4	7.9	5	5.3	~	~
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	2	2.4	0	1.6	~	~
Non-Hodgkin Lymphoma	5	8.5	2	6.6	~	~
Oral Cavity and Pharynx	11	5.0	5	2.5	35.8	~
Ovary	-	-	0	4.1	-	~
Pancreas	2	3.7	5	3.4	~	~
Prostate	64	59.2	-	-	197.1	-
Soft Tissues	4	1.1	1	0.9	~	~
Stomach	0	2.4	1	1.3	~	~
Testis	0	1.4	-	-	~	-
Thyroid	1	1.5	1	3.7	~	~
Urinary Bladder	5	13.3	2	3.8	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	359	379.7	364	332.7	534.4	462.2
Brain††	2	4.4	4	3.4	~	~
Breast	0	0.9	100	97.1	~	136.6
Cervix Uteri	-	-	8	3.5	-	~
Colon and Rectum	39	36.8	47	39.1	58.1	52.7
Corpus and Uterus, NOS	-	-	25	21.5	-	35.6
Esophagus	8	6.1	4	1.9	~	~
Hodgkin Lymphoma	0	1.7	2	1.3	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	17	14.0	13	8.7	25.4	17.3
Larynx	3	3.9	2	1.1	~	~
Leukemia	19	13.8	11	9.9	27.9	12.9
Liver††	2	4.4	2	2.0	~	~
Lung and Bronchus	44	46.6	35	42.3	64.0	41.5
Melanoma of the Skin	18	16.6	11	12.2	30.0	16.1
Mesothelioma	0	1.6	0	0.5	~	~
Myeloma	5	5.1	6	3.9	~	~
Non-Hodgkin Lymphoma	14	17.9	17	15.8	20.8	19.0
Oral Cavity and Pharynx	8	10.6	1	5.8	~	~
Ovary	-	-	14	9.6	-	18.7
Pancreas	8	8.0	11	8.2	~	10.1
Prostate	123	127.6	-	-	177.2	-
Soft Tissues	2	2.3	4	2.1	~	~
Stomach	5	5.1	5	3.3	~	~
Testis	2	2.8	-	-	~	-
Thyroid	2	3.2	9	8.1	~	~
Urinary Bladder	21	28.4	12	9.2	30.3	11.9

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	338	373.5	264	308.1	504.4	358.6
Brain††	2	4.7	1	3.4	~	~
Breast	0	0.9	64	92.0	~	84.1
Cervix Uteri	-	-	2	3.6	-	~
Colon and Rectum	42	35.8	32	34.1	61.7	37.3
Corpus and Uterus, NOS	-	-	17	20.4	-	22.9
Esophagus	7	6.0	3	1.7	~	~
Hodgkin Lymphoma	3	1.9	1	1.4	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	12	14.1	10	8.0	17.5	12.7
Larynx	2	3.9	0	1.0	~	~
Leukemia	11	13.6	10	8.9	17.1	11.9
Liver††	2	4.4	1	1.8	~	~
Lung and Bronchus	36	45.1	33	38.1	53.1	46.9
Melanoma of the Skin	13	16.7	6	12.2	20.7	~
Mesothelioma	1	1.5	0	0.5	~	~
Myeloma	6	5.0	3	3.4	~	~
Non-Hodgkin Lymphoma	19	17.7	17	14.1	28.9	23.3
Oral Cavity and Pharynx	7	10.7	5	5.4	~	~
Ovary	-	-	6	9.1	-	~
Pancreas	6	7.8	3	7.2	~	~
Prostate	122	125.3	-	-	178.8	-
Soft Tissues	0	2.4	2	2.0	~	~
Stomach	7	4.9	1	2.9	~	~
Testis	1	3.5	-	-	~	-
Thyroid	3	3.5	16	8.7	~	28.5
Urinary Bladder	21	26.9	9	8.0	31.2	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	420	387.3	338	332.7	606.0	420.4
Brain††	4	5.0	7	3.8	~	~
Breast	0	0.9	89	99.4	~	110.3
Cervix Uteri	-	-	6	4.1	-	~
Colon and Rectum	27	36.6	36	35.9	40.3	41.0
Corpus and Uterus, NOS	-	-	19	22.1	-	25.3
Esophagus	7	6.2	1	1.8	~	~
Hodgkin Lymphoma	0	2.1	3	1.7	~	~
Kaposi Sarcoma	0	0.3	0	0.0	~	~
Kidney and Renal Pelvis	30	14.7	15	8.7	44.0	17.9
Larynx	3	4.1	2	1.1	~	~
Leukemia	20	14.0	11	9.5	30.5	12.8
Liver††	1	4.5	3	2.0	~	~
Lung and Bronchus	77	46.7	48	41.6	110.6	58.3
Melanoma of the Skin	14	17.3	8	13.6	20.0	~
Mesothelioma	6	1.5	1	0.5	~	~
Myeloma	3	5.1	3	3.6	~	~
Non-Hodgkin Lymphoma	11	18.2	17	15.2	16.1	21.6
Oral Cavity and Pharynx	13	11.0	4	5.8	19.2	~
Ovary	-	-	13	9.8	-	17.3
Pancreas	6	8.1	8	7.7	~	~
Prostate	135	130.7	-	-	189.1	-
Soft Tissues	2	2.5	1	2.2	~	~
Stomach	5	5.0	1	3.0	~	~
Testis	2	4.0	-	-	~	-
Thyroid	3	3.7	9	9.9	~	~
Urinary Bladder	30	27.5	8	8.5	44.1	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	536	498.8	406	420.9	604.6	405.6
Brain††	6	6.5	5	4.7	~	~
Breast	2	1.2	122	126.0	~	122.6
Cervix Uteri	-	-	7	5.0	-	~
Colon and Rectum	57	47.3	29	45.7	64.8	23.8
Corpus and Uterus, NOS	-	-	28	28.0	-	27.3
Esophagus	6	8.0	2	2.3	~	~
Hodgkin Lymphoma	6	2.7	3	2.1	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	31	19.0	11	11.0	32.8	9.9
Larynx	7	5.3	5	1.4	~	~
Leukemia	18	18.0	10	12.0	20.8	9.4
Liver††	2	5.9	1	2.5	~	~
Lung and Bronchus	58	60.0	53	52.5	66.3	51.4
Melanoma of the Skin	12	22.3	20	17.0	13.0	24.8
Mesothelioma	1	1.9	0	0.6	~	~
Myeloma	10	6.6	4	4.6	11.5	~
Non-Hodgkin Lymphoma	25	23.5	9	19.2	28.2	~
Oral Cavity and Pharynx	15	14.4	14	7.3	17.6	13.0
Ovary	-	-	12	12.5	-	12.1
Pancreas	12	10.4	8	9.8	13.2	~
Prostate	178	168.1	-	-	194.5	-
Soft Tissues	3	3.2	3	2.8	~	~
Stomach	9	6.5	9	3.9	~	~
Testis	6	5.1	-	-	~	-
Thyroid	5	4.7	15	12.3	~	20.2
Urinary Bladder	45	35.3	15	10.8	52.1	13.5

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	649	628.7	492	552.9	578.9	374.4
Brain††	5	7.7	8	5.8	~	~
Breast	2	1.6	154	159.9	~	122.2
Cervix Uteri	-	-	5	6.0	-	~
Colon and Rectum	65	61.2	47	64.7	57.5	31.2
Corpus and Uterus, NOS	-	-	30	35.0	-	22.7
Esophagus	12	10.1	3	3.2	11.0	~
Hodgkin Lymphoma	0	3.2	3	2.5	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	20	23.1	9	14.4	17.6	~
Larynx	3	6.4	1	1.7	~	~
Leukemia	24	23.5	15	16.6	20.5	9.4
Liver††	5	7.3	4	3.3	~	~
Lung and Bronchus	72	77.1	64	70.1	66.4	46.2
Melanoma of the Skin	41	27.9	20	21.1	39.7	19.1
Mesothelioma	2	2.6	2	0.9	~	~
Myeloma	9	8.5	2	6.4	~	~
Non-Hodgkin Lymphoma	29	30.1	22	26.2	26.7	16.7
Oral Cavity and Pharynx	14	17.6	9	9.6	13.3	~
Ovary	-	-	10	15.9	-	9.3
Pancreas	9	13.2	13	13.6	~	7.8
Prostate	220	206.3	-	-	194.9	-
Soft Tissues	4	4.0	4	3.6	~	~
Stomach	12	8.6	3	5.5	10.0	~
Testis	4	5.8	-	-	~	-
Thyroid	6	5.6	15	14.4	~	15.0
Urinary Bladder	52	47.7	15	15.3	43.6	8.1

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	164	173.3	156	140.4	536.1	443.8
Brain††	1	2.0	1	1.4	~	~
Breast	1	0.4	37	41.1	~	108.5
Cervix Uteri	-	-	2	1.4	-	~
Colon and Rectum	26	16.7	33	16.2	90.1	85.7
Corpus and Uterus, NOS	-	-	12	9.2	-	36.1
Esophagus	0	2.8	0	0.8	~	~
Hodgkin Lymphoma	2	0.7	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	10	6.3	4	3.7	30.6	~
Larynx	2	1.8	0	0.5	~	~
Leukemia	4	6.2	3	4.1	~	~
Liver††	0	2.0	1	0.9	~	~
Lung and Bronchus	18	21.5	19	18.3	59.1	52.0
Melanoma of the Skin	5	7.5	3	5.1	~	~
Mesothelioma	1	0.7	0	0.2	~	~
Myeloma	3	2.3	2	1.6	~	~
Non-Hodgkin Lymphoma	5	8.1	6	6.6	~	~
Oral Cavity and Pharynx	1	4.8	1	2.4	~	~
Ovary	-	-	2	4.1	-	~
Pancreas	3	3.7	6	3.5	~	~
Prostate	49	58.8	-	-	152.8	-
Soft Tissues	3	1.0	0	0.9	~	~
Stomach	3	2.3	4	1.4	~	~
Testis	0	1.2	-	-	~	-
Thyroid	1	1.4	6	3.4	~	~
Urinary Bladder	20	13.1	4	3.9	61.9	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	374	398.1	319	336.2	522.6	395.2
Brain††	3	5.6	5	4.0	~	~
Breast	1	1.0	84	101.7	~	101.9
Cervix Uteri	-	-	3	4.5	-	~
Colon and Rectum	50	37.4	35	34.8	70.0	41.4
Corpus and Uterus, NOS	-	-	28	22.7	-	34.2
Esophagus	5	6.4	3	1.7	~	~
Hodgkin Lymphoma	2	2.6	2	2.2	~	~
Kaposi Sarcoma	0	0.3	0	0.0	~	~
Kidney and Renal Pelvis	16	15.5	6	8.7	21.5	~
Larynx	2	4.2	0	1.1	~	~
Leukemia	10	14.5	11	9.5	14.0	13.3
Liver††	3	4.9	0	1.9	~	~
Lung and Bronchus	48	46.5	36	40.2	71.2	44.5
Melanoma of the Skin	24	18.3	8	14.9	31.8	~
Mesothelioma	0	1.4	0	0.5	~	~
Myeloma	5	5.2	5	3.5	~	~
Non-Hodgkin Lymphoma	16	18.8	19	15.0	23.9	23.7
Oral Cavity and Pharynx	14	11.9	6	5.9	17.4	~
Ovary	-	-	15	10.2	-	18.1
Pancreas	6	8.2	12	7.4	~	13.5
Prostate	104	133.1	-	-	139.8	-
Soft Tissues	6	2.8	3	2.3	~	~
Stomach	6	5.1	2	2.9	~	~
Testis	7	5.3	-	-	~	-
Thyroid	2	4.1	9	11.4	~	~
Urinary Bladder	36	27.0	3	8.2	52.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	309	317.6	262	271.1	546.8	413.1
Brain††	5	4.0	5	2.9	~	~
Breast	0	0.8	77	79.7	~	125.9
Cervix Uteri	-	-	5	3.1	-	~
Colon and Rectum	43	30.6	38	30.9	75.6	53.2
Corpus and Uterus, NOS	-	-	20	17.6	-	35.1
Esophagus	3	5.1	4	1.5	~	~
Hodgkin Lymphoma	2	1.7	0	1.2	~	~
Kaposi Sarcoma	1	0.2	0	0.0	~	~
Kidney and Renal Pelvis	14	11.9	7	7.0	24.4	~
Larynx	2	3.3	1	0.9	~	~
Leukemia	10	11.8	7	8.1	18.1	~
Liver††	4	3.7	1	1.6	~	~
Lung and Bronchus	33	38.3	29	33.8	57.6	43.5
Melanoma of the Skin	14	14.2	11	10.5	23.7	20.1
Mesothelioma	0	1.3	0	0.4	~	~
Myeloma	7	4.2	2	3.1	~	~
Non-Hodgkin Lymphoma	13	15.1	15	12.6	23.1	20.2
Oral Cavity and Pharynx	10	9.1	1	4.7	17.4	~
Ovary	-	-	7	7.9	-	~
Pancreas	3	6.6	7	6.5	~	~
Prostate	98	105.5	-	-	169.0	-
Soft Tissues	2	2.1	0	1.8	~	~
Stomach	6	4.2	2	2.6	~	~
Testis	7	3.1	-	-	~	-
Thyroid	2	2.9	10	7.3	~	18.0
Urinary Bladder	15	23.2	3	7.3	26.2	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	133	127.4	104	107.1	591.1	394.1
Brain††	0	1.5	1	1.1	~	~
Breast	1	0.3	32	31.2	~	120.0
Cervix Uteri	-	-	1	1.1	-	~
Colon and Rectum	15	12.3	11	12.5	63.1	40.6
Corpus and Uterus, NOS	-	-	3	6.9	-	~
Esophagus	4	2.0	1	0.6	~	~
Hodgkin Lymphoma	1	0.6	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	2	4.7	3	2.8	~	~
Larynx	2	1.3	0	0.3	~	~
Leukemia	3	4.6	4	3.2	~	~
Liver††	0	1.5	1	0.6	~	~
Lung and Bronchus	17	15.8	16	13.8	72.9	58.6
Melanoma of the Skin	4	5.5	5	3.9	~	~
Mesothelioma	0	0.5	0	0.2	~	~
Myeloma	3	1.7	1	1.2	~	~
Non-Hodgkin Lymphoma	8	6.0	2	5.1	~	~
Oral Cavity and Pharynx	5	3.5	3	1.9	~	~
Ovary	-	-	4	3.1	-	~
Pancreas	3	2.7	2	2.6	~	~
Prostate	49	42.9	-	-	212.0	-
Soft Tissues	2	0.8	0	0.7	~	~
Stomach	1	1.7	1	1.1	~	~
Testis	0	0.9	-	-	~	-
Thyroid	2	1.1	4	2.6	~	~
Urinary Bladder	5	9.6	4	3.0	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	1,840	1,686.2	1,613	1,528.2	604.5	437.1
Brain††	29	24.3	24	18.4	9.3	7.2
Breast	4	4.1	487	466.6	~	133.0
Cervix Uteri	-	-	23	21.7	-	6.4
Colon and Rectum	153	159.3	125	156.7	51.1	33.2
Corpus and Uterus, NOS	-	-	111	102.8	-	28.4
Esophagus	29	27.2	9	7.8	8.9	~
Hodgkin Lymphoma	19	11.0	11	9.2	5.9	3.2
Kaposi Sarcoma	2	1.4	0	0.2	~	~
Kidney and Renal Pelvis	80	66.3	46	39.6	26.3	12.8
Larynx	15	17.8	0	4.9	5.0	~
Leukemia	64	62.2	44	43.0	21.6	11.9
Liver††	35	20.6	20	8.7	10.7	5.1
Lung and Bronchus	183	197.0	174	178.9	62.1	48.3
Melanoma of the Skin	141	78.7	137	69.4	45.0	38.6
Mesothelioma	4	6.1	2	2.1	~	~
Myeloma	26	22.0	14	15.8	8.8	3.9
Non-Hodgkin Lymphoma	79	80.5	65	67.4	25.1	17.2
Oral Cavity and Pharynx	58	50.4	21	26.7	17.8	5.3
Ovary	-	-	40	46.1	-	11.0
Pancreas	49	34.8	36	33.1	16.9	9.2
Prostate	540	555.8	-	-	175.7	-
Soft Tissues	12	11.8	9	10.9	3.6	~
Stomach	21	21.6	15	13.4	7.4	3.5
Testis	28	23.1	-	-	8.1	-
Thyroid	35	18.1	60	53.5	10.5	16.8
Urinary Bladder	144	115.0	42	36.6	51.0	11.2

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	1,071	1,081.5	792	870.5	555.8	379.5
Brain††	17	12.6	9	9.1	9.2	~
Breast	2	2.7	227	258.9	~	110.8
Cervix Uteri	-	-	13	9.4	-	9.5
Colon and Rectum	117	103.2	104	96.9	62.3	45.0
Corpus and Uterus, NOS	-	-	51	58.6	-	26.0
Esophagus	22	17.3	6	4.9	11.0	~
Hodgkin Lymphoma	6	4.9	2	3.7	~	~
Kaposi Sarcoma	0	0.6	0	0.1	~	~
Kidney and Renal Pelvis	33	40.1	23	22.9	17.0	9.9
Larynx	12	11.4	2	2.9	6.0	~
Leukemia	35	38.5	15	24.7	18.9	6.5
Liver††	6	12.5	1	5.2	~	~
Lung and Bronchus	130	132.8	95	111.7	65.3	43.7
Melanoma of the Skin	38	46.9	46	32.8	21.0	25.7
Mesothelioma	7	4.4	3	1.3	~	~
Myeloma	15	14.5	12	9.8	8.2	5.2
Non-Hodgkin Lymphoma	42	50.5	32	40.1	23.4	15.4
Oral Cavity and Pharynx	24	30.1	7	15.2	12.9	~
Ovary	-	-	25	25.5	-	12.7
Pancreas	26	22.7	19	20.9	13.8	7.5
Prostate	404	370.0	-	-	202.1	-
Soft Tissues	3	6.5	7	5.5	~	~
Stomach	11	14.3	12	8.1	5.9	5.4
Testis	5	8.0	-	-	~	-
Thyroid	2	9.2	14	22.5	~	8.8
Urinary Bladder	81	79.4	26	23.0	41.7	11.1

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	207	199.1	170	182.6	582.7	377.6
Brain††	4	2.6	3	2.0	~	~
Breast	0	0.5	43	54.0	~	102.6
Cervix Uteri	-	-	2	2.2	-	~
Colon and Rectum	27	19.0	19	20.4	79.1	34.5
Corpus and Uterus, NOS	-	-	16	12.0	-	32.1
Esophagus	5	3.2	1	1.0	~	~
Hodgkin Lymphoma	1	1.1	1	0.9	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	7	7.5	6	4.7	~	~
Larynx	1	2.1	0	0.6	~	~
Leukemia	2	7.3	4	5.3	~	~
Liver††	1	2.4	2	1.1	~	~
Lung and Bronchus	25	23.7	19	22.4	71.9	42.0
Melanoma of the Skin	9	9.0	5	7.4	~	~
Mesothelioma	1	0.8	0	0.3	~	~
Myeloma	2	2.6	0	2.0	~	~
Non-Hodgkin Lymphoma	3	9.5	12	8.4	~	23.6
Oral Cavity and Pharynx	13	5.7	4	3.2	34.3	~
Ovary	-	-	6	5.4	-	~
Pancreas	3	4.1	5	4.3	~	~
Prostate	74	66.2	-	-	202.0	-
Soft Tissues	2	1.3	0	1.2	~	~
Stomach	0	2.6	3	1.7	~	~
Testis	4	2.2	-	-	~	-
Thyroid	1	1.9	3	5.3	~	~
Urinary Bladder	17	14.3	3	4.8	52.1	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	468	463.0	375	359.3	565.8	434.7
Brain††	6	5.9	3	4.0	~	~
Breast	0	1.1	112	109.1	~	131.7
Cervix Uteri	-	-	6	4.4	-	~
Colon and Rectum	47	43.4	42	37.5	58.0	44.7
Corpus and Uterus, NOS	-	-	28	24.8	-	31.0
Esophagus	6	7.4	3	1.9	~	~
Hodgkin Lymphoma	4	2.5	3	1.8	~	~
Kaposi Sarcoma	0	0.3	1	0.0	~	~
Kidney and Renal Pelvis	18	17.7	12	9.5	20.9	12.9
Larynx	8	4.9	2	1.2	~	~
Leukemia	12	16.3	7	9.9	15.1	~
Liver††	8	5.5	0	2.1	~	~
Lung and Bronchus	71	55.8	48	45.4	84.4	55.3
Melanoma of the Skin	8	20.6	11	14.6	~	16.2
Mesothelioma	1	1.7	1	0.5	~	~
Myeloma	4	6.1	2	3.9	~	~
Non-Hodgkin Lymphoma	13	21.5	16	16.1	16.7	18.1
Oral Cavity and Pharynx	10	13.3	9	6.3	12.5	~
Ovary	-	-	11	10.7	-	12.9
Pancreas	6	9.7	13	8.2	~	14.5
Prostate	162	158.3	-	-	189.6	-
Soft Tissues	2	2.9	2	2.3	~	~
Stomach	8	5.9	2	3.1	~	~
Testis	7	4.8	-	-	~	-
Thyroid	4	4.4	8	10.6	~	~
Urinary Bladder	42	32.2	10	8.9	53.3	10.4

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	205	165.0	164	153.0	706.5	445.4
Brain††	4	1.9	5	1.5	~	~
Breast	0	0.4	59	43.9	~	184.1
Cervix Uteri	-	-	2	1.5	-	~
Colon and Rectum	29	16.2	27	18.4	94.7	55.4
Corpus and Uterus, NOS	-	-	12	9.6	-	25.6
Esophagus	2	2.6	2	0.9	~	~
Hodgkin Lymphoma	1	0.8	3	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	9	6.0	4	4.0	~	~
Larynx	2	1.7	0	0.5	~	~
Leukemia	14	6.1	4	4.6	48.6	~
Liver††	3	1.9	1	0.9	~	~
Lung and Bronchus	22	20.4	9	19.7	68.7	~
Melanoma of the Skin	9	7.2	4	5.5	~	~
Mesothelioma	0	0.7	0	0.3	~	~
Myeloma	1	2.2	2	1.8	~	~
Non-Hodgkin Lymphoma	7	7.9	5	7.4	~	~
Oral Cavity and Pharynx	4	4.5	1	2.7	~	~
Ovary	-	-	5	4.4	-	~
Pancreas	7	3.5	3	3.8	~	~
Prostate	58	54.6	-	-	196.1	-
Soft Tissues	3	1.0	0	1.0	~	~
Stomach	6	2.3	3	1.6	~	~
Testis	1	1.3	-	-	~	-
Thyroid	3	1.4	2	3.6	~	~
Urinary Bladder	14	12.7	1	4.3	46.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	462	481.4	414	426.0	539.7	409.9
Brain††	4	6.1	1	4.6	~	~
Breast	1	1.2	125	125.5	~	129.9
Cervix Uteri	-	-	5	4.9	-	~
Colon and Rectum	45	46.3	72	48.4	51.3	68.7
Corpus and Uterus, NOS	-	-	23	27.7	-	24.2
Esophagus	9	7.8	1	2.4	~	~
Hodgkin Lymphoma	0	2.6	3	2.0	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	18	18.1	13	11.0	21.1	13.0
Larynx	5	5.0	1	1.4	~	~
Leukemia	19	17.6	16	12.5	22.8	14.2
Liver††	4	5.7	0	2.5	~	~
Lung and Bronchus	69	58.0	38	52.7	79.5	34.6
Melanoma of the Skin	13	21.5	13	16.7	17.0	14.2
Mesothelioma	6	1.9	0	0.7	~	~
Myeloma	6	6.4	4	4.8	~	~
Non-Hodgkin Lymphoma	24	22.8	21	19.8	27.8	17.6
Oral Cavity and Pharynx	13	13.8	8	7.5	15.3	~
Ovary	-	-	7	12.5	-	~
Pancreas	15	10.1	6	10.2	18.0	~
Prostate	136	160.7	-	-	157.6	-
Soft Tissues	5	3.1	6	2.8	~	~
Stomach	5	6.4	4	4.1	~	~
Testis	5	4.6	-	-	~	-
Thyroid	1	4.4	8	11.7	~	~
Urinary Bladder	35	35.1	14	11.4	40.3	14.9

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	204	210.3	136	177.3	550.3	302.8
Brain††	2	2.4	2	1.8	~	~
Breast	0	0.5	39	52.0	~	96.1
Cervix Uteri	-	-	3	1.9	-	~
Colon and Rectum	18	20.4	20	20.5	50.0	34.7
Corpus and Uterus, NOS	-	-	12	11.6	-	27.8
Esophagus	4	3.4	0	1.0	~	~
Hodgkin Lymphoma	1	0.9	1	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	9	7.7	2	4.6	~	~
Larynx	4	2.2	0	0.6	~	~
Leukemia	6	7.6	2	5.2	~	~
Liver††	2	2.4	0	1.1	~	~
Lung and Bronchus	25	25.9	18	22.7	65.0	33.6
Melanoma of the Skin	8	9.1	3	6.6	~	~
Mesothelioma	1	0.9	0	0.3	~	~
Myeloma	2	2.8	1	2.0	~	~
Non-Hodgkin Lymphoma	6	9.9	1	8.3	~	~
Oral Cavity and Pharynx	7	5.8	3	3.1	~	~
Ovary	-	-	5	5.1	-	~
Pancreas	5	4.4	5	4.4	~	~
Prostate	63	70.8	-	-	162.9	-
Soft Tissues	0	1.3	0	1.1	~	~
Stomach	3	2.8	4	1.7	~	~
Testis	4	1.5	-	-	~	-
Thyroid	1	1.8	3	4.4	~	~
Urinary Bladder	17	15.8	6	4.9	42.9	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	6,159	6,095.9	5,721	5,923.3	562.0	401.8
Brain††	89	86.3	70	69.5	7.8	5.2
Breast	11	14.8	1,723	1,771.4	1.0	123.4
Cervix Uteri	-	-	74	79.8	-	5.6
Colon and Rectum	528	577.8	553	631.4	48.5	36.6
Corpus and Uterus, NOS	-	-	362	391.7	-	25.8
Esophagus	114	98.1	19	31.1	10.3	1.4
Hodgkin Lymphoma	47	40.0	31	36.1	3.8	2.2
Kaposi Sarcoma	8	5.0	1	1.0	~	~
Kidney and Renal Pelvis	234	236.5	160	153.4	20.7	11.3
Larynx	64	63.7	26	18.6	5.7	1.9
Leukemia	230	225.5	146	169.8	21.4	9.9
Liver††	106	74.2	36	34.1	9.2	2.6
Lung and Bronchus	699	715.5	701	706.1	65.8	49.3
Melanoma of the Skin	254	282.6	182	261.0	23.0	13.5
Mesothelioma	17	22.6	11	8.4	1.6	0.8
Myeloma	81	79.9	72	63.1	7.5	4.7
Non-Hodgkin Lymphoma	298	291.0	264	266.8	27.4	18.0
Oral Cavity and Pharynx	184	180.6	119	103.4	16.0	8.1
Ovary	-	-	197	176.9	-	14.2
Pancreas	132	125.8	121	132.9	12.2	8.1
Prostate	2,114	2,005.0	-	-	191.8	-
Soft Tissues	47	42.5	43	41.4	4.2	2.9
Stomach	79	78.7	52	53.9	7.4	3.5
Testis	72	83.2	-	-	5.8	-
Thyroid	53	63.9	196	196.8	4.7	15.2
Urinary Bladder	386	422.1	142	148.2	36.9	9.2

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	77	73.2	45	59.4	576.6	313.9
Brain††	0	0.9	0	0.6	~	~
Breast	0	0.2	11	17.6	~	82.3
Cervix Uteri	-	-	0	0.7	-	~
Colon and Rectum	11	7.0	3	6.7	79.8	~
Corpus and Uterus, NOS	-	-	2	3.9	-	~
Esophagus	1	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	1.5	~	~
Larynx	1	0.8	0	0.2	~	~
Leukemia	3	2.6	0	1.7	~	~
Liver††	0	0.9	0	0.4	~	~
Lung and Bronchus	7	8.9	6	7.5	~	~
Melanoma of the Skin	2	3.2	2	2.3	~	~
Mesothelioma	0	0.3	0	0.1	~	~
Myeloma	1	1.0	1	0.7	~	~
Non-Hodgkin Lymphoma	1	3.4	6	2.7	~	~
Oral Cavity and Pharynx	4	2.1	3	1.0	~	~
Ovary	-	-	1	1.7	-	~
Pancreas	0	1.5	1	1.4	~	~
Prostate	27	24.7	-	-	198.5	-
Soft Tissues	2	0.5	0	0.4	~	~
Stomach	2	1.0	0	0.6	~	~
Testis	0	0.6	-	-	~	-
Thyroid	1	0.7	1	1.6	~	~
Urinary Bladder	9	5.3	3	1.6	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	261	284.4	232	236.3	525.5	408.4
Brain††	3	3.4	7	2.4	~	~
Breast	0	0.7	80	69.0	~	141.4
Cervix Uteri	-	-	2	2.5	-	~
Colon and Rectum	32	27.6	26	27.6	68.6	38.8
Corpus and Uterus, NOS	-	-	21	15.3	-	39.7
Esophagus	6	4.5	1	1.3	~	~
Hodgkin Lymphoma	4	1.3	0	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	9	10.4	7	6.1	~	~
Larynx	3	2.9	0	0.8	~	~
Leukemia	8	10.5	7	7.0	~	~
Liver††	2	3.2	0	1.4	~	~
Lung and Bronchus	29	34.8	21	29.9	56.5	32.5
Melanoma of the Skin	6	12.4	8	8.8	~	~
Mesothelioma	0	1.2	0	0.4	~	~
Myeloma	7	3.8	3	2.7	~	~
Non-Hodgkin Lymphoma	8	13.5	8	11.2	~	~
Oral Cavity and Pharynx	4	7.9	4	4.1	~	~
Ovary	-	-	8	6.8	-	~
Pancreas	6	6.0	4	5.8	~	~
Prostate	92	95.0	-	-	177.8	-
Soft Tissues	0	1.8	0	1.5	~	~
Stomach	6	3.9	1	2.3	~	~
Testis	4	2.2	-	-	~	-
Thyroid	3	2.4	4	5.9	~	~
Urinary Bladder	22	21.6	5	6.5	43.0	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	297	283.8	261	235.0	594.3	468.5
Brain††	2	3.4	4	2.5	~	~
Breast	3	0.7	71	69.1	~	126.0
Cervix Uteri	-	-	3	2.6	-	~
Colon and Rectum	31	27.6	33	27.1	61.5	58.4
Corpus and Uterus, NOS	-	-	21	15.2	-	31.4
Esophagus	4	4.6	2	1.3	~	~
Hodgkin Lymphoma	1	1.4	0	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	12	10.5	8	6.1	25.8	~
Larynx	7	2.9	0	0.7	~	~
Leukemia	12	10.4	7	6.9	24.9	~
Liver††	2	3.3	0	1.4	~	~
Lung and Bronchus	30	34.6	17	29.6	59.1	33.7
Melanoma of the Skin	11	12.6	14	8.9	20.9	35.7
Mesothelioma	4	1.1	1	0.4	~	~
Myeloma	2	3.8	2	2.7	~	~
Non-Hodgkin Lymphoma	10	13.5	13	11.0	19.2	23.1
Oral Cavity and Pharynx	4	8.0	4	4.1	~	~
Ovary	-	-	9	6.8	-	~
Pancreas	7	6.0	10	5.7	~	16.7
Prostate	113	94.4	-	-	221.6	-
Soft Tissues	2	1.8	3	1.5	~	~
Stomach	3	3.8	4	2.3	~	~
Testis	4	2.4	-	-	~	-
Thyroid	3	2.5	7	6.1	~	~
Urinary Bladder	21	21.2	7	6.4	40.6	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	701	756.1	623	654.3	518.0	395.8
Brain††	9	10.9	16	7.8	~	11.1
Breast	3	1.8	184	197.8	~	119.4
Cervix Uteri	-	-	6	8.8	-	~
Colon and Rectum	67	71.0	73	68.3	49.8	43.4
Corpus and Uterus, NOS	-	-	45	43.8	-	28.4
Esophagus	20	12.1	2	3.4	14.7	~
Hodgkin Lymphoma	1	5.2	5	4.1	~	~
Kaposi Sarcoma	0	0.6	0	0.1	~	~
Kidney and Renal Pelvis	26	29.5	16	17.0	18.8	10.1
Larynx	3	8.0	0	2.1	~	~
Leukemia	42	27.7	25	18.7	31.2	15.9
Liver††	7	9.1	2	3.8	~	~
Lung and Bronchus	97	88.4	70	77.8	71.7	45.7
Melanoma of the Skin	29	35.2	17	28.9	21.7	11.1
Mesothelioma	1	2.7	0	0.9	~	~
Myeloma	9	9.9	9	6.9	~	~
Non-Hodgkin Lymphoma	35	36.0	24	29.2	26.4	14.4
Oral Cavity and Pharynx	26	22.5	8	11.4	17.5	~
Ovary	-	-	16	19.7	-	11.0
Pancreas	17	15.6	10	14.5	13.1	5.9
Prostate	197	250.4	-	-	144.3	-
Soft Tissues	1	5.3	2	4.6	~	~
Stomach	9	9.7	4	5.8	~	~
Testis	8	10.7	-	-	~	-
Thyroid	10	8.1	22	22.0	6.9	15.8
Urinary Bladder	54	51.3	18	16.0	44.3	10.0

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	140	162.0	112	142.1	499.0	318.4
Brain††	2	1.9	0	1.5	~	~
Breast	0	0.4	34	41.3	~	103.1
Cervix Uteri	-	-	1	1.5	-	~
Colon and Rectum	14	15.7	12	16.6	48.9	33.4
Corpus and Uterus, NOS	-	-	15	9.1	-	42.8
Esophagus	1	2.6	1	0.8	~	~
Hodgkin Lymphoma	3	0.8	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	4	6.0	2	3.7	~	~
Larynx	2	1.7	0	0.4	~	~
Leukemia	6	6.0	1	4.3	~	~
Liver††	1	1.9	0	0.9	~	~
Lung and Bronchus	13	19.9	10	18.0	42.1	28.4
Melanoma of the Skin	9	7.1	1	5.3	~	~
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	4	2.2	2	1.6	~	~
Non-Hodgkin Lymphoma	6	7.7	9	6.7	~	~
Oral Cavity and Pharynx	6	4.5	1	2.5	~	~
Ovary	-	-	4	4.1	-	~
Pancreas	1	3.4	2	3.5	~	~
Prostate	39	54.0	-	-	129.7	-
Soft Tissues	2	1.0	0	0.9	~	~
Stomach	2	2.2	0	1.4	~	~
Testis	2	1.3	-	-	~	-
Thyroid	2	1.4	5	3.6	~	~
Urinary Bladder	12	12.1	5	3.9	42.5	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	227	224.5	171	180.6	571.8	391.1
Brain††	1	3.1	1	2.1	~	~
Breast	1	0.5	54	55.2	~	126.6
Cervix Uteri	-	-	2	2.4	-	~
Colon and Rectum	21	21.4	14	19.0	53.8	29.1
Corpus and Uterus, NOS	-	-	14	12.1	-	34.1
Esophagus	3	3.6	2	0.9	~	~
Hodgkin Lymphoma	0	1.3	0	1.0	~	~
Kaposi Sarcoma	1	0.2	0	0.0	~	~
Kidney and Renal Pelvis	8	8.8	6	4.7	~	~
Larynx	0	2.4	1	0.6	~	~
Leukemia	7	8.2	3	5.1	~	~
Liver††	1	2.7	0	1.0	~	~
Lung and Bronchus	21	26.4	17	21.2	54.0	38.6
Melanoma of the Skin	12	10.4	8	7.8	30.8	~
Mesothelioma	0	0.8	0	0.3	~	~
Myeloma	2	2.9	3	1.9	~	~
Non-Hodgkin Lymphoma	7	10.7	12	8.1	~	24.2
Oral Cavity and Pharynx	9	6.7	0	3.2	~	~
Ovary	-	-	2	5.4	-	~
Pancreas	8	4.7	4	4.0	~	~
Prostate	81	74.3	-	-	202.4	-
Soft Tissues	3	1.5	2	1.3	~	~
Stomach	1	2.9	3	1.6	~	~
Testis	6	2.6	-	-	~	-
Thyroid	1	2.3	6	5.9	~	~
Urinary Bladder	19	15.6	8	4.4	48.1	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	3,105	3,043.8	2,744	2,666.9	573.8	429.9
Brain††	52	38.8	23	28.9	10.9	4.1
Breast	12	7.4	801	797.7	2.1	129.7
Cervix Uteri	-	-	33	31.2	-	7.1
Colon and Rectum	305	290.1	286	292.9	56.4	40.9
Corpus and Uterus, NOS	-	-	197	178.4	-	30.8
Esophagus	56	49.3	14	14.5	10.1	2.0
Hodgkin Lymphoma	18	16.7	10	13.5	3.6	1.7
Kaposi Sarcoma	0	1.9	0	0.4	~	~
Kidney and Renal Pelvis	99	115.7	61	69.5	17.7	9.3
Larynx	36	32.1	14	8.6	6.4	2.3
Leukemia	97	109.6	58	76.0	18.2	8.7
Liver††	31	36.6	16	15.7	5.6	2.5
Lung and Bronchus	392	364.6	357	329.0	71.7	54.1
Melanoma of the Skin	124	136.3	97	107.4	22.4	17.7
Mesothelioma	26	11.6	4	3.9	5.2	~
Myeloma	32	40.3	20	29.4	6.1	3.0
Non-Hodgkin Lymphoma	146	143.4	134	121.9	27.6	20.1
Oral Cavity and Pharynx	112	88.5	58	46.7	20.6	8.9
Ovary	-	-	90	79.4	-	14.0
Pancreas	64	63.5	76	62.0	11.9	10.9
Prostate	969	1,025.2	-	-	175.7	-
Soft Tissues	15	19.6	15	17.4	3.2	2.8
Stomach	50	39.8	32	24.7	9.2	4.4
Testis	36	30.4	-	-	8.8	-
Thyroid	26	28.6	56	76.9	4.6	11.3
Urinary Bladder	248	216.0	80	69.2	46.1	11.4

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	1,036	1,097.6	1,016	973.3	534.9	434.1
Brain††	20	19.6	6	13.8	8.7	~
Breast	5	2.6	334	311.9	~	134.0
Cervix Uteri	-	-	16	18.2	-	6.2
Colon and Rectum	99	101.5	102	85.5	54.3	50.1
Corpus and Uterus, NOS	-	-	55	66.5	-	22.3
Esophagus	15	17.8	4	4.3	9.1	~
Hodgkin Lymphoma	12	9.3	8	7.4	4.3	~
Kaposi Sarcoma	0	1.4	0	0.1	~	~
Kidney and Renal Pelvis	39	47.1	23	24.9	17.5	10.3
Larynx	8	11.8	3	3.0	~	~
Leukemia	35	41.2	24	26.3	20.3	10.6
Liver††	10	14.3	5	5.2	5.3	~
Lung and Bronchus	111	119.8	114	101.5	68.0	54.0
Melanoma of the Skin	63	56.2	71	53.3	29.3	27.0
Mesothelioma	3	3.4	2	1.1	~	~
Myeloma	8	13.9	6	8.7	~	~
Non-Hodgkin Lymphoma	63	53.6	26	39.9	28.6	13.3
Oral Cavity and Pharynx	31	35.8	19	17.0	13.3	7.2
Ovary	-	-	32	30.5	-	12.8
Pancreas	32	22.1	16	18.0	17.9	8.8
Prostate	292	350.8	-	-	153.2	-
Soft Tissues	16	8.8	6	7.8	7.8	~
Stomach	19	13.3	13	7.4	10.5	6.9
Testis	29	22.2	-	-	8.6	-
Thyroid	19	15.1	57	45.7	7.1	18.8
Urinary Bladder	49	65.8	22	19.5	28.8	10.5

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	782	772.8	681	675.1	592.9	423.0
Brain††	18	13.4	9	9.4	10.9	~
Breast	3	1.8	221	213.4	~	128.8
Cervix Uteri	-	-	5	12.0	-	~
Colon and Rectum	55	71.0	60	61.7	44.9	43.2
Corpus and Uterus, NOS	-	-	50	45.9	-	30.2
Esophagus	13	12.5	1	3.1	8.2	~
Hodgkin Lymphoma	4	6.6	5	5.1	~	~
Kaposi Sarcoma	1	0.9	0	0.1	~	~
Kidney and Renal Pelvis	23	32.5	23	17.3	14.0	16.2
Larynx	5	8.3	0	2.1	~	~
Leukemia	34	28.9	18	18.6	22.8	11.0
Liver††	7	9.9	4	3.6	~	~
Lung and Bronchus	86	85.2	81	71.6	74.0	57.8
Melanoma of the Skin	43	38.7	34	35.9	32.6	17.1
Mesothelioma	2	2.4	1	0.8	~	~
Myeloma	13	9.8	4	6.2	11.9	~
Non-Hodgkin Lymphoma	35	37.3	33	28.2	26.2	21.0
Oral Cavity and Pharynx	18	24.7	10	11.8	14.4	6.1
Ovary	-	-	17	21.0	-	11.1
Pancreas	11	15.6	14	12.9	7.8	9.7
Prostate	279	249.8	-	-	210.1	-
Soft Tissues	7	6.1	4	5.3	~	~
Stomach	10	9.4	4	5.3	8.2	~
Testis	18	15.5	-	-	8.0	-
Thyroid	9	10.2	33	30.2	~	16.9
Urinary Bladder	58	46.9	14	14.2	55.6	9.0

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	219	232.2	178	193.6	528.1	379.5
Brain††	3	3.0	2	2.1	~	~
Breast	0	0.6	41	57.5	~	91.0
Cervix Uteri	-	-	2	2.3	-	~
Colon and Rectum	18	22.2	22	21.4	42.9	41.3
Corpus and Uterus, NOS	-	-	11	12.6	-	22.9
Esophagus	2	3.7	1	1.1	~	~
Hodgkin Lymphoma	1	1.3	1	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	6	8.8	7	5.0	~	~
Larynx	0	2.4	1	0.6	~	~
Leukemia	6	8.5	4	5.6	~	~
Liver††	2	2.7	2	1.1	~	~
Lung and Bronchus	23	28.0	26	24.1	55.1	55.5
Melanoma of the Skin	12	10.4	6	7.8	29.3	~
Mesothelioma	1	0.9	1	0.3	~	~
Myeloma	3	3.1	4	2.1	~	~
Non-Hodgkin Lymphoma	13	11.0	12	8.9	32.6	27.1
Oral Cavity and Pharynx	6	6.6	1	3.4	~	~
Ovary	-	-	2	5.7	-	~
Pancreas	9	4.8	4	4.5	~	~
Prostate	85	77.5	-	-	202.4	-
Soft Tissues	3	1.5	0	1.3	~	~
Stomach	3	3.1	3	1.8	~	~
Testis	1	2.3	-	-	~	-
Thyroid	0	2.2	4	5.6	~	~
Urinary Bladder	11	16.7	5	5.0	26.2	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	1,826	1,818.3	1,537	1,511.0	569.8	423.6
Brain††	24	25.7	21	18.3	7.0	5.9
Breast	8	4.4	469	456.2	~	131.1
Cervix Uteri	-	-	15	20.2	-	4.7
Colon and Rectum	170	171.1	148	155.4	53.5	38.9
Corpus and Uterus, NOS	-	-	93	101.0	-	25.4
Esophagus	29	29.1	13	7.8	8.7	3.2
Hodgkin Lymphoma	14	12.2	9	9.9	4.2	~
Kaposi Sarcoma	0	1.4	0	0.2	~	~
Kidney and Renal Pelvis	68	70.1	54	39.4	21.0	14.7
Larynx	17	19.1	4	4.9	5.2	~
Leukemia	55	66.5	46	42.9	17.5	12.2
Liver††	17	21.8	7	8.8	5.3	~
Lung and Bronchus	206	215.0	173	181.9	65.6	47.6
Melanoma of the Skin	82	83.4	82	67.6	25.7	23.9
Mesothelioma	5	6.8	0	2.1	~	~
Myeloma	28	23.9	11	15.9	8.6	3.0
Non-Hodgkin Lymphoma	93	86.2	71	67.2	29.5	19.7
Oral Cavity and Pharynx	51	53.4	22	26.3	15.4	6.1
Ovary	-	-	46	45.6	-	12.6
Pancreas	32	37.6	25	33.2	10.0	7.0
Prostate	649	602.5	-	-	198.7	-
Soft Tissues	6	12.7	8	10.6	~	~
Stomach	17	23.4	13	13.2	5.3	3.6
Testis	20	24.9	-	-	5.8	-
Thyroid	15	18.8	67	51.7	4.7	19.6
Urinary Bladder	146	125.4	40	36.6	48.6	10.2

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	504	477.0	377	423.4	592.1	370.4
Brain††	6	6.6	7	4.9	~	~
Breast	0	1.2	117	127.8	~	115.2
Cervix Uteri	-	-	6	5.6	-	~
Colon and Rectum	39	45.4	60	44.8	46.0	57.4
Corpus and Uterus, NOS	-	-	26	28.1	-	25.6
Esophagus	12	7.7	3	2.2	15.2	~
Hodgkin Lymphoma	3	2.9	1	2.3	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	21	18.5	12	11.0	25.5	11.4
Larynx	3	5.0	1	1.4	~	~
Leukemia	17	17.6	17	12.1	20.2	15.7
Liver††	4	5.8	3	2.5	~	~
Lung and Bronchus	47	56.4	23	51.2	56.4	22.6
Melanoma of the Skin	22	22.0	15	18.2	26.0	15.6
Mesothelioma	0	1.8	0	0.6	~	~
Myeloma	5	6.3	3	4.5	~	~
Non-Hodgkin Lymphoma	30	22.7	17	19.0	35.4	15.4
Oral Cavity and Pharynx	11	14.1	5	7.4	12.4	~
Ovary	-	-	9	12.6	-	~
Pancreas	8	9.9	9	9.5	~	~
Prostate	186	157.8	-	-	216.0	-
Soft Tissues	2	3.3	3	2.9	~	~
Stomach	5	6.2	2	3.8	~	~
Testis	6	5.7	-	-	~	-
Thyroid	3	4.9	12	13.6	~	13.1
Urinary Bladder	38	33.3	13	10.5	46.0	13.3

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	130	147.7	109	125.4	511.3	386.7
Brain††	1	1.8	1	1.3	~	~
Breast	0	0.4	37	35.8	~	138.1
Cervix Uteri	-	-	0	1.3	-	~
Colon and Rectum	10	14.5	14	14.7	38.5	39.1
Corpus and Uterus, NOS	-	-	5	7.8	-	~
Esophagus	2	2.4	1	0.7	~	~
Hodgkin Lymphoma	2	0.8	1	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	6	5.3	5	3.2	~	~
Larynx	2	1.5	0	0.4	~	~
Leukemia	6	5.6	3	3.8	~	~
Liver††	2	1.7	0	0.8	~	~
Lung and Bronchus	12	18.0	10	15.8	47.4	29.1
Melanoma of the Skin	8	6.5	4	4.9	~	~
Mesothelioma	0	0.6	0	0.2	~	~
Myeloma	1	2.0	0	1.4	~	~
Non-Hodgkin Lymphoma	4	7.1	3	6.0	~	~
Oral Cavity and Pharynx	0	4.1	4	2.2	~	~
Ovary	-	-	2	3.6	-	~
Pancreas	3	3.1	1	3.1	~	~
Prostate	46	48.0	-	-	178.4	-
Soft Tissues	1	1.0	0	0.8	~	~
Stomach	2	2.0	1	1.3	~	~
Testis	2	1.5	-	-	~	-
Thyroid	1	1.3	4	3.4	~	~
Urinary Bladder	11	11.4	5	3.5	44.3	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	194	188.4	194	156.3	588.9	505.1
Brain††	4	2.4	2	1.6	~	~
Breast	0	0.5	62	44.9	~	170.5
Cervix Uteri	-	-	3	1.6	-	~
Colon and Rectum	18	18.5	29	18.8	51.1	64.6
Corpus and Uterus, NOS	-	-	8	9.9	-	~
Esophagus	3	3.0	2	0.9	~	~
Hodgkin Lymphoma	0	1.1	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	12	7.0	1	4.1	36.0	~
Larynx	1	1.9	0	0.5	~	~
Leukemia	1	7.0	6	4.7	~	~
Liver††	3	2.2	1	1.0	~	~
Lung and Bronchus	21	22.5	20	20.1	65.4	47.1
Melanoma of the Skin	6	8.7	5	5.6	~	~
Mesothelioma	0	0.8	0	0.3	~	~
Myeloma	5	2.5	1	1.8	~	~
Non-Hodgkin Lymphoma	14	9.2	11	7.5	43.5	26.4
Oral Cavity and Pharynx	2	5.4	4	2.7	~	~
Ovary	-	-	5	4.5	-	~
Pancreas	2	3.9	2	3.9	~	~
Prostate	66	60.8	-	-	202.2	-
Soft Tissues	1	1.2	3	1.0	~	~
Stomach	5	2.6	1	1.6	~	~
Testis	2	2.2	-	-	~	-
Thyroid	3	1.9	6	3.7	~	~
Urinary Bladder	16	14.0	6	4.4	47.8	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	398	404.4	287	319.0	555.0	368.1
Brain††	4	5.0	2	3.5	~	~
Breast	2	1.0	72	96.1	~	94.5
Cervix Uteri	-	-	4	3.7	-	~
Colon and Rectum	52	38.2	42	34.3	73.3	50.5
Corpus and Uterus, NOS	-	-	19	21.7	-	26.0
Esophagus	10	6.5	1	1.7	13.4	~
Hodgkin Lymphoma	3	2.0	2	1.5	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	17	15.4	11	8.4	24.5	13.1
Larynx	3	4.3	0	1.1	~	~
Leukemia	5	14.4	9	9.0	~	~
Liver††	2	4.8	2	1.9	~	~
Lung and Bronchus	50	49.0	37	40.1	69.2	44.7
Melanoma of the Skin	7	17.8	11	12.6	~	15.1
Mesothelioma	1	1.6	1	0.5	~	~
Myeloma	3	5.4	6	3.5	~	~
Non-Hodgkin Lymphoma	18	18.8	18	14.5	25.9	22.7
Oral Cavity and Pharynx	10	11.5	6	5.6	13.8	~
Ovary	-	-	8	9.5	-	~
Pancreas	6	8.5	8	7.4	~	~
Prostate	157	138.3	-	-	213.7	-
Soft Tissues	4	2.5	5	2.1	~	~
Stomach	7	5.2	0	2.9	~	~
Testis	4	3.6	-	-	~	-
Thyroid	3	3.7	3	9.0	~	~
Urinary Bladder	18	28.6	2	8.1	24.8	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	86	86.6	55	68.0	504.7	362.3
Brain††	0	0.9	1	0.6	~	~
Breast	1	0.2	11	19.2	~	59.5
Cervix Uteri	-	-	0	0.6	-	~
Colon and Rectum	12	8.7	11	8.5	71.7	53.8
Corpus and Uterus, NOS	-	-	5	4.2	-	~
Esophagus	3	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	2	3.0	0	1.8	~	~
Larynx	0	0.9	1	0.2	~	~
Leukemia	4	3.3	2	2.1	~	~
Liver††	0	0.9	2	0.4	~	~
Lung and Bronchus	10	11.0	8	8.9	58.1	~
Melanoma of the Skin	4	3.7	1	2.3	~	~
Mesothelioma	0	0.4	0	0.1	~	~
Myeloma	1	1.2	1	0.8	~	~
Non-Hodgkin Lymphoma	3	4.2	2	3.3	~	~
Oral Cavity and Pharynx	4	2.3	0	1.2	~	~
Ovary	-	-	1	1.9	-	~
Pancreas	3	1.8	2	1.8	~	~
Prostate	26	28.3	-	-	151.1	-
Soft Tissues	0	0.5	0	0.4	~	~
Stomach	1	1.2	0	0.7	~	~
Testis	0	0.5	-	-	~	-
Thyroid	1	0.6	2	1.4	~	~
Urinary Bladder	7	7.2	3	2.0	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	323	358.6	291	286.1	507.6	431.8
Brain††	5	4.5	2	3.2	~	~
Breast	0	0.9	86	86.8	~	125.1
Cervix Uteri	-	-	1	3.5	-	~
Colon and Rectum	45	34.2	34	30.5	70.2	45.1
Corpus and Uterus, NOS	-	-	17	19.4	-	23.5
Esophagus	4	5.8	4	1.5	~	~
Hodgkin Lymphoma	2	1.8	3	1.4	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	13	13.6	10	7.5	21.9	14.9
Larynx	4	3.8	0	1.0	~	~
Leukemia	12	12.9	10	8.0	19.3	16.6
Liver††	3	4.3	2	1.7	~	~
Lung and Bronchus	52	43.1	37	35.2	81.0	54.8
Melanoma of the Skin	19	16.0	12	11.7	29.5	22.3
Mesothelioma	0	1.4	0	0.4	~	~
Myeloma	4	4.8	0	3.1	~	~
Non-Hodgkin Lymphoma	15	16.9	13	12.9	22.9	19.0
Oral Cavity and Pharynx	7	10.3	5	5.0	~	~
Ovary	-	-	12	8.5	-	17.6
Pancreas	5	7.5	4	6.5	~	~
Prostate	79	121.1	-	-	121.3	-
Soft Tissues	2	2.3	5	1.9	~	~
Stomach	2	4.7	1	2.6	~	~
Testis	7	3.3	-	-	~	-
Thyroid	7	3.3	8	8.5	~	~
Urinary Bladder	26	25.7	10	7.2	40.1	15.7

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	256	245.9	220	208.4	598.4	439.1
Brain††	2	2.9	1	2.2	~	~
Breast	0	0.6	59	60.3	~	115.6
Cervix Uteri	-	-	3	2.1	-	~
Colon and Rectum	22	23.7	30	24.3	49.1	51.7
Corpus and Uterus, NOS	-	-	20	13.4	-	42.8
Esophagus	4	3.9	0	1.2	~	~
Hodgkin Lymphoma	0	1.1	2	0.9	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	18	8.9	7	5.5	42.6	~
Larynx	1	2.5	1	0.7	~	~
Leukemia	12	8.9	8	6.2	30.0	~
Liver††	1	2.8	1	1.3	~	~
Lung and Bronchus	36	30.5	22	27.2	78.8	41.3
Melanoma of the Skin	12	10.6	10	7.7	31.6	20.1
Mesothelioma	0	1.0	1	0.3	~	~
Myeloma	1	3.3	1	2.4	~	~
Non-Hodgkin Lymphoma	16	11.6	11	9.9	41.0	22.1
Oral Cavity and Pharynx	5	6.7	0	3.6	~	~
Ovary	-	-	11	6.0	-	23.0
Pancreas	4	5.2	6	5.2	~	~
Prostate	71	82.9	-	-	162.2	-
Soft Tissues	1	1.5	1	1.3	~	~
Stomach	5	3.3	0	2.0	~	~
Testis	2	1.9	-	-	~	-
Thyroid	2	2.0	4	5.1	~	~
Urinary Bladder	29	18.6	10	5.8	62.8	19.6

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	276	270.5	234	230.1	578.5	431.1
Brain††	10	3.8	1	2.6	19.6	~
Breast	1	0.7	69	68.7	~	131.0
Cervix Uteri	-	-	3	2.8	-	~
Colon and Rectum	22	26.0	27	25.1	46.7	44.3
Corpus and Uterus, NOS	-	-	18	15.2	-	33.1
Esophagus	4	4.4	2	1.2	~	~
Hodgkin Lymphoma	1	1.7	1	1.2	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	8	10.5	7	6.0	~	~
Larynx	3	2.8	2	0.7	~	~
Leukemia	4	10.0	7	6.7	~	~
Liver††	3	3.3	2	1.3	~	~
Lung and Bronchus	31	31.7	25	28.1	66.8	45.6
Melanoma of the Skin	17	12.7	6	9.5	36.4	~
Mesothelioma	3	1.0	0	0.3	~	~
Myeloma	3	3.6	1	2.5	~	~
Non-Hodgkin Lymphoma	16	13.0	18	10.5	32.6	35.3
Oral Cavity and Pharynx	5	8.1	2	4.0	~	~
Ovary	-	-	6	6.8	-	~
Pancreas	8	5.6	11	5.3	~	18.8
Prostate	87	88.0	-	-	183.5	-
Soft Tissues	5	1.9	2	1.6	~	~
Stomach	6	3.6	1	2.1	~	~
Testis	2	3.6	-	-	~	-
Thyroid	3	2.8	4	6.9	~	~
Urinary Bladder	23	19.1	5	5.9	49.7	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	2,532	2,491.9	2,319	2,196.2	584.0	441.4
Brain††	40	38.7	27	28.1	7.7	4.7
Breast	9	5.9	773	703.9	~	138.2
Cervix Uteri	-	-	38	34.7	-	7.0
Colon and Rectum	239	230.8	222	203.1	56.0	45.5
Corpus and Uterus, NOS	-	-	161	155.6	-	28.7
Esophagus	48	40.9	9	10.4	9.6	~
Hodgkin Lymphoma	11	17.3	15	13.4	2.1	3.1
Kaposi Sarcoma	0	2.3	0	0.2	~	~
Kidney and Renal Pelvis	112	103.7	59	57.2	22.4	11.2
Larynx	27	27.1	5	7.2	5.7	~
Leukemia	124	89.7	68	57.8	29.5	13.8
Liver††	38	32.2	12	12.0	7.9	2.6
Lung and Bronchus	226	281.5	256	244.8	58.1	54.5
Melanoma of the Skin	138	120.1	132	106.7	28.4	24.3
Mesothelioma	13	8.0	0	2.6	3.3	~
Myeloma	40	32.0	15	21.0	10.2	3.0
Non-Hodgkin Lymphoma	132	118.3	103	92.0	31.0	20.5
Oral Cavity and Pharynx	52	79.0	35	38.4	10.4	6.3
Ovary	-	-	76	68.8	-	13.9
Pancreas	34	51.0	47	43.4	8.1	9.8
Prostate	858	832.8	-	-	193.8	-
Soft Tissues	20	17.9	12	15.8	4.3	2.0
Stomach	26	30.6	15	17.2	5.5	3.1
Testis	35	36.3	-	-	6.8	-
Thyroid	26	29.6	88	86.5	5.2	15.4
Urinary Bladder	168	155.1	48	47.2	46.8	10.2

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	186	191.6	158	160.6	547.0	402.8
Brain††	3	2.3	0	1.7	~	~
Breast	0	0.5	49	46.6	~	133.6
Cervix Uteri	-	-	2	1.7	-	~
Colon and Rectum	18	18.5	19	18.7	49.8	37.7
Corpus and Uterus, NOS	-	-	10	10.2	-	23.1
Esophagus	2	3.1	0	0.9	~	~
Hodgkin Lymphoma	3	0.9	0	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	4	7.1	3	4.2	~	~
Larynx	0	2.0	0	0.5	~	~
Leukemia	5	7.0	3	4.8	~	~
Liver††	1	2.2	0	1.0	~	~
Lung and Bronchus	20	23.5	19	20.4	56.7	50.1
Melanoma of the Skin	7	8.4	10	6.1	~	26.6
Mesothelioma	0	0.8	0	0.3	~	~
Myeloma	2	2.6	2	1.8	~	~
Non-Hodgkin Lymphoma	12	9.1	8	7.6	39.9	~
Oral Cavity and Pharynx	8	5.3	4	2.8	~	~
Ovary	-	-	3	4.6	-	~
Pancreas	5	4.0	4	3.9	~	~
Prostate	64	64.2	-	-	181.6	-
Soft Tissues	0	1.2	1	1.1	~	~
Stomach	3	2.6	2	1.6	~	~
Testis	5	1.5	-	-	~	-
Thyroid	1	1.6	2	4.2	~	~
Urinary Bladder	12	14.3	2	4.4	33.7	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	90	106.7	84	89.1	474.2	368.2
Brain††	1	1.3	0	1.0	~	~
Breast	0	0.3	24	26.7	~	111.8
Cervix Uteri	-	-	1	1.0	-	~
Colon and Rectum	12	10.3	15	9.8	63.5	58.0
Corpus and Uterus, NOS	-	-	3	5.9	-	~
Esophagus	3	1.7	0	0.5	~	~
Hodgkin Lymphoma	0	0.5	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	2	4.0	4	2.3	~	~
Larynx	1	1.1	0	0.3	~	~
Leukemia	4	3.9	3	2.6	~	~
Liver††	0	1.3	0	0.5	~	~
Lung and Bronchus	7	13.0	13	11.0	~	61.0
Melanoma of the Skin	3	4.8	0	3.6	~	~
Mesothelioma	2	0.4	0	0.1	~	~
Myeloma	2	1.4	3	1.0	~	~
Non-Hodgkin Lymphoma	5	5.1	4	4.1	~	~
Oral Cavity and Pharynx	2	3.0	0	1.6	~	~
Ovary	-	-	2	2.6	-	~
Pancreas	3	2.2	1	2.1	~	~
Prostate	27	35.6	-	-	139.8	-
Soft Tissues	0	0.7	0	0.6	~	~
Stomach	4	1.4	2	0.8	~	~
Testis	0	1.0	-	-	~	-
Thyroid	1	1.0	1	2.5	~	~
Urinary Bladder	9	7.8	3	2.3	~	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	599	661.8	561	573.8	507.3	405.8
Brain††	7	8.9	6	6.6	~	~
Breast	0	1.6	187	169.9	~	139.9
Cervix Uteri	-	-	6	7.0	-	~
Colon and Rectum	76	62.8	69	62.6	65.2	46.4
Corpus and Uterus, NOS	-	-	42	37.7	-	30.9
Esophagus	7	10.6	3	3.1	~	~
Hodgkin Lymphoma	3	4.2	4	3.6	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	17	25.0	16	14.8	15.6	11.8
Larynx	10	6.9	5	1.8	8.3	~
Leukemia	23	24.2	11	16.7	18.9	5.9
Liver††	6	7.9	0	3.4	~	~
Lung and Bronchus	83	78.6	70	69.4	71.2	50.7
Melanoma of the Skin	26	29.8	17	24.4	23.1	13.4
Mesothelioma	2	2.5	0	0.8	~	~
Myeloma	7	8.7	7	6.2	~	~
Non-Hodgkin Lymphoma	23	31.3	18	26.2	18.6	12.7
Oral Cavity and Pharynx	18	19.2	11	10.1	14.9	8.8
Ovary	-	-	11	17.1	-	8.7
Pancreas	12	13.7	14	13.2	10.0	9.8
Prostate	191	220.8	-	-	158.5	-
Soft Tissues	8	4.5	1	3.9	~	~
Stomach	3	8.6	5	5.3	~	~
Testis	5	8.1	-	-	~	-
Thyroid	5	6.4	13	18.0	~	10.2
Urinary Bladder	44	46.7	12	14.7	37.9	7.1

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	1,153	1,190.7	998	1,019.3	547.4	406.1
Brain††	22	19.1	17	13.6	8.8	6.4
Breast	1	2.8	267	318.0	~	105.6
Cervix Uteri	-	-	14	16.6	-	5.0
Colon and Rectum	97	110.4	97	96.7	49.3	41.0
Corpus and Uterus, NOS	-	-	54	69.2	-	21.4
Esophagus	9	19.2	6	4.9	~	~
Hodgkin Lymphoma	10	8.9	7	7.0	3.7	~
Kaposi Sarcoma	0	1.2	0	0.1	~	~
Kidney and Renal Pelvis	48	48.8	37	26.4	20.6	15.1
Larynx	10	12.7	3	3.3	4.8	~
Leukemia	44	44.2	20	28.3	21.9	7.9
Liver††	14	14.9	3	5.6	5.8	~
Lung and Bronchus	145	135.1	143	113.9	76.3	62.7
Melanoma of the Skin	41	57.7	52	50.7	17.7	19.9
Mesothelioma	2	4.0	2	1.3	~	~
Myeloma	18	15.3	14	9.8	9.2	5.4
Non-Hodgkin Lymphoma	52	57.0	42	43.5	23.2	17.9
Oral Cavity and Pharynx	37	36.8	24	17.7	16.3	10.0
Ovary	-	-	29	31.3	-	11.1
Pancreas	27	24.3	26	20.5	12.3	10.8
Prostate	418	390.7	-	-	196.1	-
Soft Tissues	6	8.9	7	7.8	~	~
Stomach	12	14.8	11	8.3	5.9	4.6
Testis	18	19.7	-	-	6.4	-
Thyroid	13	14.3	46	41.5	5.9	16.7
Urinary Bladder	60	75.9	18	22.5	30.7	7.7

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	174	185.0	149	157.8	521.5	398.8
Brain††	4	2.2	2	1.6	~	~
Breast	1	0.5	36	45.7	~	90.3
Cervix Uteri	-	-	0	1.6	-	~
Colon and Rectum	15	18.0	21	18.8	43.4	54.2
Corpus and Uterus, NOS	-	-	12	10.0	-	35.3
Esophagus	2	3.0	1	0.9	~	~
Hodgkin Lymphoma	1	0.9	0	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	7	6.8	4	4.1	~	~
Larynx	1	1.9	1	0.5	~	~
Leukemia	6	6.8	6	4.8	~	~
Liver††	2	2.1	1	1.0	~	~
Lung and Bronchus	19	22.8	20	19.9	56.7	53.9
Melanoma of the Skin	4	8.1	2	5.8	~	~
Mesothelioma	1	0.8	1	0.3	~	~
Myeloma	1	2.5	2	1.8	~	~
Non-Hodgkin Lymphoma	8	8.8	16	7.5	~	41.1
Oral Cavity and Pharynx	2	5.2	3	2.8	~	~
Ovary	-	-	4	4.5	-	~
Pancreas	2	3.9	2	3.9	~	~
Prostate	74	61.3	-	-	221.6	-
Soft Tissues	1	1.2	2	1.0	~	~
Stomach	3	2.5	1	1.6	~	~
Testis	1	1.5	-	-	~	-
Thyroid	0	1.6	4	3.9	~	~
Urinary Bladder	12	14.1	2	4.4	35.7	~

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	5,387	5,329.2	4,489	4,469.6	566.5	417.9
Brain††	70	66.1	43	48.3	8.2	4.6
Breast	17	13.0	1,306	1,341.7	1.7	123.9
Cervix Uteri	-	-	60	51.8	-	7.6
Colon and Rectum	524	505.5	481	486.5	55.2	41.4
Corpus and Uterus, NOS	-	-	323	302.3	-	29.7
Esophagus	92	86.0	26	24.5	9.4	2.1
Hodgkin Lymphoma	25	27.4	20	21.6	3.1	2.8
Kaposi Sarcoma	0	3.2	1	0.6	~	~
Kidney and Renal Pelvis	180	201.9	100	117.2	18.9	9.0
Larynx	62	56.4	22	14.8	6.2	2.1
Leukemia	177	189.8	105	125.8	19.0	9.8
Liver††	50	63.3	28	26.4	5.0	2.5
Lung and Bronchus	697	643.8	586	558.9	72.2	52.1
Melanoma of the Skin	211	235.7	160	177.4	22.0	17.9
Mesothelioma	45	20.6	4	6.6	4.9	~
Myeloma	62	70.7	37	49.4	6.6	3.3
Non-Hodgkin Lymphoma	264	249.0	235	203.7	28.5	21.0
Oral Cavity and Pharynx	173	152.9	76	78.1	18.2	6.9
Ovary	-	-	137	133.0	-	12.9
Pancreas	121	111.5	125	104.1	12.6	10.7
Prostate	1,756	1,814.3	-	-	179.4	-
Soft Tissues	26	33.3	22	28.8	3.2	2.4
Stomach	79	69.5	46	40.9	8.4	3.7
Testis	52	48.5	-	-	7.7	-
Thyroid	46	48.7	97	126.4	5.0	12.0
Urinary Bladder	403	378.9	122	115.2	43.2	10.3

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	3,169	3,146.3	2,463	2,608.9	564.4	390.6
Brain††	37	39.5	28	28.9	6.9	5.1
Breast	8	7.7	739	780.0	~	118.7
Cervix Uteri	-	-	37	30.9	-	7.7
Colon and Rectum	324	298.5	291	284.0	57.7	43.2
Corpus and Uterus, NOS	-	-	162	175.2	-	26.4
Esophagus	63	50.5	15	14.3	11.2	2.2
Hodgkin Lymphoma	10	16.4	13	13.0	1.9	2.4
Kaposi Sarcoma	1	1.9	0	0.4	~	~
Kidney and Renal Pelvis	98	118.8	76	68.3	17.6	12.3
Larynx	38	33.1	8	8.6	6.8	~
Leukemia	102	113.4	72	74.5	19.0	10.9
Liver††	24	37.1	10	15.4	4.3	1.5
Lung and Bronchus	413	380.0	298	325.2	72.7	45.7
Melanoma of the Skin	101	139.1	86	104.6	19.0	15.7
Mesothelioma	13	12.2	0	3.8	2.4	~
Myeloma	39	41.7	28	28.7	6.7	4.3
Non-Hodgkin Lymphoma	144	147.4	107	119.0	26.2	15.8
Oral Cavity and Pharynx	135	89.5	50	45.6	24.2	8.1
Ovary	-	-	65	77.3	-	10.2
Pancreas	68	65.8	61	60.7	12.3	8.6
Prostate	1,076	1,067.4	-	-	185.6	-
Soft Tissues	30	19.9	13	17.2	5.8	2.3
Stomach	40	41.1	27	24.0	7.3	4.4
Testis	29	29.5	-	-	6.5	-
Thyroid	22	28.8	62	75.0	4.0	11.8
Urinary Bladder	205	225.0	60	67.2	37.0	9.0

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	10,244	9,995.7	8,243	8,311.3	576.1	410.2
Brain††	129	139.9	112	99.9	6.9	5.7
Breast	27	24.2	2,390	2,531.5	1.7	119.1
Cervix Uteri	-	-	105	113.7	-	5.7
Colon and Rectum	909	937.9	834	850.9	52.2	39.9
Corpus and Uterus, NOS	-	-	526	561.5	-	25.8
Esophagus	160	160.3	47	43.0	8.9	2.3
Hodgkin Lymphoma	58	62.5	50	48.9	3.1	2.7
Kaposi Sarcoma	1	7.8	2	1.1	~	~
Kidney and Renal Pelvis	442	389.9	279	216.8	24.0	13.9
Larynx	107	105.7	28	27.3	5.9	1.4
Leukemia	342	362.9	210	233.1	19.8	10.2
Liver††	97	120.3	41	47.8	5.4	2.0
Lung and Bronchus	1,291	1,179.0	1,061	996.6	74.8	53.1
Melanoma of the Skin	390	459.1	390	368.3	21.8	20.4
Mesothelioma	31	36.7	12	11.4	1.8	0.6
Myeloma	135	131.0	78	86.8	7.8	3.8
Non-Hodgkin Lymphoma	452	472.0	366	368.0	25.7	18.2
Oral Cavity and Pharynx	286	294.0	156	144.8	15.7	7.8
Ovary	-	-	230	250.4	-	11.5
Pancreas	199	206.9	175	182.2	11.2	8.6
Prostate	3,647	3,345.6	-	-	200.3	-
Soft Tissues	47	68.0	59	58.1	2.5	3.0
Stomach	129	127.7	68	72.2	7.5	3.3
Testis	126	126.6	-	-	6.8	-
Thyroid	97	103.7	325	281.9	5.3	17.5
Urinary Bladder	722	682.3	195	200.3	42.9	9.3

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	2,942	3,051.2	2,338	2,541.0	543.7	381.8
Brain††	41	37.3	24	27.4	8.1	4.8
Breast	9	7.5	679	750.8	~	115.0
Cervix Uteri	-	-	31	28.8	-	7.0
Colon and Rectum	312	292.5	293	283.5	58.5	41.6
Corpus and Uterus, NOS	-	-	160	167.6	-	26.3
Esophagus	55	48.8	12	14.2	10.0	1.6
Hodgkin Lymphoma	17	15.6	10	12.6	3.5	2.7
Kaposi Sarcoma	0	1.8	1	0.4	~	~
Kidney and Renal Pelvis	97	113.1	62	66.3	18.0	10.4
Larynx	28	31.8	5	8.3	5.0	~
Leukemia	111	110.8	72	73.6	21.2	11.3
Liver††	24	35.3	6	15.2	4.5	~
Lung and Bronchus	345	371.6	280	320.2	62.5	43.5
Melanoma of the Skin	117	134.2	101	99.9	22.9	19.0
Mesothelioma	16	12.3	6	3.9	2.9	~
Myeloma	48	40.7	37	28.5	9.0	5.3
Non-Hodgkin Lymphoma	115	143.9	96	117.4	21.6	15.0
Oral Cavity and Pharynx	76	85.7	26	44.4	13.9	4.3
Ovary	-	-	76	74.6	-	13.8
Pancreas	74	63.9	43	60.4	13.7	6.2
Prostate	1,006	1,026.3	-	-	181.1	-
Soft Tissues	11	19.2	13	16.5	2.1	1.8
Stomach	33	40.6	30	24.0	6.0	4.4
Testis	32	27.5	-	-	8.0	-
Thyroid	11	27.0	55	70.2	2.2	12.6
Urinary Bladder	244	224.3	76	67.1	44.4	11.0

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	3,654	3,755.0	3,174	3,195.6	548.9	412.0
Brain††	50	45.6	44	33.5	8.3	7.1
Breast	8	9.4	917	935.7	~	121.7
Cervix Uteri	-	-	44	34.9	-	8.3
Colon and Rectum	425	364.4	441	368.7	63.0	49.9
Corpus and Uterus, NOS	-	-	255	206.7	-	33.9
Esophagus	41	60.3	21	18.0	6.1	2.3
Hodgkin Lymphoma	22	18.6	11	14.3	4.3	1.8
Kaposi Sarcoma	2	2.2	0	0.5	~	~
Kidney and Renal Pelvis	151	138.6	68	83.1	23.1	8.8
Larynx	42	38.8	5	10.1	6.3	~
Leukemia	127	138.4	92	94.6	19.1	11.7
Liver††	31	43.6	12	19.2	4.7	1.3
Lung and Bronchus	407	457.5	308	402.4	60.1	39.4
Melanoma of the Skin	151	166.2	104	121.6	23.3	15.9
Mesothelioma	14	15.3	4	5.0	2.0	~
Myeloma	48	50.3	31	36.5	7.3	3.6
Non-Hodgkin Lymphoma	155	179.0	168	150.0	23.2	20.3
Oral Cavity and Pharynx	72	105.6	50	55.8	10.9	6.2
Ovary	-	-	94	92.8	-	12.8
Pancreas	58	78.8	73	77.6	8.6	8.2
Prostate	1,276	1,246.8	-	-	188.9	-
Soft Tissues	28	23.8	17	20.8	4.5	2.6
Stomach	56	50.8	33	31.3	8.0	3.9
Testis	41	32.7	-	-	8.9	-
Thyroid	32	33.1	100	83.3	5.3	17.2
Urinary Bladder	281	281.2	64	87.1	41.1	7.1

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	3,195	3,299.8	2,807	2,826.1	543.7	412.4
Brain††	45	43.2	30	31.3	7.6	5.2
Breast	6	8.1	805	837.2	~	120.9
Cervix Uteri	-	-	40	33.6	-	7.5
Colon and Rectum	329	315.4	363	312.6	55.4	47.2
Corpus and Uterus, NOS	-	-	186	185.2	-	27.9
Esophagus	50	53.0	20	15.4	8.4	2.9
Hodgkin Lymphoma	18	19.2	13	15.2	3.2	2.4
Kaposi Sarcoma	0	2.2	0	0.4	~	~
Kidney and Renal Pelvis	132	124.8	70	73.4	22.4	10.6
Larynx	25	34.4	10	9.0	4.1	1.5
Leukemia	111	120.9	77	82.3	19.1	11.2
Liver††	21	39.1	12	16.7	3.4	1.8
Lung and Bronchus	370	395.2	313	348.4	63.9	45.3
Melanoma of the Skin	184	148.8	116	115.5	31.8	19.4
Mesothelioma	7	12.8	2	4.2	~	~
Myeloma	44	43.7	35	31.2	7.7	4.8
Non-Hodgkin Lymphoma	158	156.8	133	130.0	27.2	19.0
Oral Cavity and Pharynx	77	95.2	37	49.4	12.8	5.0
Ovary	-	-	84	83.4	-	12.6
Pancreas	76	68.7	78	66.0	12.6	10.3
Prostate	1,041	1,096.5	-	-	175.2	-
Soft Tissues	24	21.9	26	19.0	4.1	3.8
Stomach	49	43.4	23	26.5	8.5	3.1
Testis	38	36.7	-	-	7.2	-
Thyroid	23	31.6	77	83.2	3.9	14.2
Urinary Bladder	222	236.6	75	73.7	38.3	9.9

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	6,795	6,761.5	5,768	5,873.1	562.9	409.9
Brain††	87	90.5	81	67.0	7.3	6.4
Breast	10	16.6	1,805	1,762.1	0.9	130.0
Cervix Uteri	-	-	66	74.6	-	5.5
Colon and Rectum	666	643.9	605	632.4	55.7	39.9
Corpus and Uterus, NOS	-	-	382	389.3	-	26.9
Esophagus	116	108.8	35	31.3	9.4	2.3
Hodgkin Lymphoma	46	39.6	41	32.0	3.9	3.5
Kaposi Sarcoma	2	4.9	0	0.9	~	~
Kidney and Renal Pelvis	242	258.9	164	152.6	20.1	11.8
Larynx	64	70.9	12	18.8	5.2	0.9
Leukemia	271	247.6	156	168.4	22.7	10.5
Liver††	80	80.8	48	34.3	6.3	3.2
Lung and Bronchus	806	805.8	610	712.4	67.0	43.1
Melanoma of the Skin	403	307.6	310	247.9	33.7	24.8
Mesothelioma	15	25.8	6	8.5	1.3	~
Myeloma	91	89.3	56	63.4	7.5	3.9
Non-Hodgkin Lymphoma	316	321.4	245	266.1	26.3	16.5
Oral Cavity and Pharynx	204	196.8	79	102.6	16.3	5.5
Ovary	-	-	147	174.7	-	10.6
Pancreas	138	140.5	121	133.7	11.5	8.1
Prostate	2,115	2,247.0	-	-	172.3	-
Soft Tissues	42	45.2	41	40.1	3.3	3.0
Stomach	77	88.4	52	53.7	6.6	3.3
Testis	80	77.2	-	-	7.0	-
Thyroid	89	66.7	183	183.1	7.3	15.3
Urinary Bladder	515	478.1	158	148.8	44.0	10.2

Source: MCSS January 2011. 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 2004-2008.

†† 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, 2004-2008

	Males		Females		Average Annual Rate§	
Cancer Site	**Observed**	**Expected†**	**Observed**	**Expected†**	**Males**	**Females**
All Sites	31,191	31,341.1	29,475	29,032.3	558.8	420.6
Brain††	476	476.4	332	360.0	7.5	4.8
Breast	76	75.2	9,258	8,972.5	1.4	130.4
Cervix Uteri	-	-	421	437.5	-	5.9
Colon and Rectum	2,805	2,944.1	2,786	2,883.0	51.1	39.6
Corpus and Uterus, NOS	-	-	1,957	1,975.0	-	27.4
Esophagus	498	509.0	129	143.9	8.7	1.9
Hodgkin Lymphoma	226	221.9	182	185.0	3.4	2.6
Kaposi Sarcoma	47	29.7	4	4.2	0.7	~
Kidney and Renal Pelvis	1,268	1,264.3	710	751.4	21.1	10.2
Larynx	337	332.6	100	92.6	6.0	1.5
Leukemia	1,181	1,151.7	853	800.5	21.4	12.2
Liver††	483	394.1	179	162.3	8.0	2.6
Lung and Bronchus	3,491	3,588.5	3,527	3,320.0	66.0	53.0
Melanoma of the Skin	1,523	1,502.6	1,327	1,372.1	26.2	18.6
Mesothelioma	103	108.3	47	37.8	2.1	0.7
Myeloma	404	405.9	313	291.3	7.4	4.6
Non-Hodgkin Lymphoma	1,561	1,503.2	1,257	1,259.8	28.3	18.0
Oral Cavity and Pharynx	958	967.5	550	507.6	15.7	7.7
Ovary	-	-	937	887.4	-	13.2
Pancreas	644	642.2	618	608.6	11.7	9.0
Prostate	10,173	10,269.0	-	-	182.1	-
Soft Tissues	247	226.2	216	208.8	4.2	3.0
Stomach	394	395.1	239	246.5	7.3	3.4
Testis	465	483.4	-	-	6.5	-
Thyroid	382	361.9	1,085	1,085.1	5.8	15.2
Urinary Bladder	1,965	2,056.7	681	672.2	39.2	9.9

Source: MCSS January 2011. 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 2004-2008.

†† 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 Leukemia	204.1	C91.1
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	Dakota	Ramsey	Washington
	Carver	Hennepin	Scott	
Southeastern Minnesota (SE)	Dodge	Goodhue	Olmsted	Wabasha
	Fillmore	Houston	Rice	Winona
	Freeborn	Mower	Steele	
South Central Minnesota (SC)	Blue Earth	Le Sueur	Nicollet	Waseca
	Brown	Martin	Sibley	Watonwan
	Faribault			
Southwestern Minnesota (SW)	Big Stone	Lac Qui Parle	Nobles	Rock
	Chippewa	Lincoln	Pipestone	Swift
	Cottonwood	Lyon	Redwood	Yellow Medicine
	Jackson	Murray	Renville	
	Kandiyohi			
Central Minnesota (Central)	Benton	Isanti	Mille Lacs	Stearns
	Cass	Kanabec	Morrison	Todd
	Chisago	McLeod	Pine	Wadena
	Crow Wing	Meeker	Sherburne	Wright
West Central Minnesota (WC)	Clay	Grant	Pope	Traverse
	Douglas	Otter Tail	Stevens	Wilkin
Northwestern Minnesota (NW)	Beltrami	Kittson	Marshall	Polk
	Clearwater	Lake of the Woods	Norman	Red Lake
	Hubbard	Mahnomen	Pennington	Roseau
Northeastern Minnesota (NE)	Aitkin	Carlton	Itasca	Lake
	Beck	Cook	Koochiching	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.

$$aarate_{x-y} = \sum_{i=x}^{y}\left[\left(\frac{count_i}{pop_i}\right) \times 100{,}000 \times \left(\frac{stdmil_i}{\sum_{j=x}^{y} stdmil_j}\right)\right]$$

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 National Cancer Institute, Surveillance Research Program, Joinpoint Regression Program (http://srab.cancer.gov/joinpoint) version 3.4.3, with a maximum of three joinpoints (i.e. four line segments). Joinpoint takes annual age-adjusted cancer rates and their standard errors and identifies points in time where trends change direction and calculates the Annual Percent Change (APC) during the intervals between these points, called a segment. 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.

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.

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.