

# Appendices

## 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 cancer 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)            |
|----------------------------------|---------------------------------|--------------------------------------|
| <b>Oral Cavity and Pharynx</b>   |                                 | 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                 |                                      |
| <b>Digestive System</b>          |                                 | 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                               |   |
| Pancreas   | C250-C259                               |   |
| Retroperitoneum                                      | C480                                    |   |
| Peritoneum, Omentum, and Mesentery                   | C481-C482                               |   |
| Other Digestive Organs                               | C268-C269, C488                         |   |
| <b>Respiratory System</b>                            |   | 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<br>Respiratory Organs | C339, C381-C383, C388, C390, C398, C399 |   |
| <b>Mesothelioma</b>                                  | All sites                               | 9050-9055   |
| <b>Bones and Joints</b>                              | C400-C419                               | Excluding 9590-9989, 9050-9055, 9140  |
| <b>Soft Tissue including Heart</b>                   | C380, C470-C479, C490-C499              | Excluding 9590-9989, 9050-9055, 9140  |
| <b>Skin excluding Basal and Squamous</b>             |   |   |
| 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 |
| <b>Kaposi Sarcoma</b>                                | All sites                               | 9140  |
| <b>Breast</b>  | C500-C509                               | Excluding 9590-9989, 9050-9055, 9140  |
| <b>Female Genital System</b>                         |   | 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                               |   |
| <b>Male Genital System</b>                           |   | Excluding 9590-9989, 9050-9055, 9140  |
| Prostate   | C619                                    |   |

|                                       |   |  |
|---------------------------------------|---|--|
| Testis                                | C620-C629   |  |
| Penis                                 | C600-C609   |  |
| Other Male Genital Organs             | C630-C639   |  |
| <b>Urinary System</b>                 |   | Excluding 9590-9989, 9050-9055, 9140   |
| Urinary Bladder                       | C670-C679   |  |
| Kidney and Renal Pelvis               | C649, C659  |  |
| Ureter                                | C669  |  |
| Other Urinary Organs                  | C680-C689   |  |
| <b>Eye and Orbit</b>                  | C690-C699   | Excluding 9590-9989, 9050-9055, 9140   |
| <b>Brain and Other Nervous System</b> |   |  |
| 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   |
| <b>Endocrine System</b>               |   | Excluding 9590-9989, 9050-9055, 9140   |
| Thyroid                               | C739  |  |
| Other Endocrine including Thymus      | C379, C740-C749, C750-C759  |  |
| <b>Lymphoma</b>                       |   |  |
| 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   |
| <b>Multiple Myeloma</b>               | All sites   | 9731-9732, 9734  |
| <b>Leukemia</b>                       |   |  |
| 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   |
| Myeloid and Monocytic Leukemia   |                                       |   |
| Acute Myeloid Leukemia           | All sites                             | 9840, 9861, 9866, 9867, 9871-9874,<br>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,<br>9963, 9964   |
|                                  | C420-C421,C424                        | 9827  |
|                                  |                                       |   |
| <b>Miscellaneous</b>             | All sites                             | 9740-9741, 9750-9758, 9760-9769, 9950,<br>9960-9962, 9970, 9975, 9980, 9982-9987,<br>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)           |
|------------------------------------|--------------------------|----------------------------------|
| <b>Oral Cavity and Pharynx</b>     |                          |                                  |
| 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                              |
| <b>Digestive System</b>            |                          |                                  |
| 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               |

|   |  |                              |
|---|--|------------------------------|
| <b>Respiratory System</b>                             |  |                              |
| 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<br>Respiratory Organs | 162.0, 164.2-164.3, 164.8-164.9, 165       | C33, C38.1-C38.3, C38.8, C39 |
|   |  |                              |
| <b>Mesothelioma</b>                                   | N/A  | C45                          |
|   |  |                              |
| <b>Bones and Joints</b>                               | 170  | C40-C41                      |
|   |  |                              |
| <b>Soft Tissue including Heart</b>                    | 164.1, 171                                 | C47, C49, C38.0              |
|   |  |                              |
| <b>Skin excluding Basal and Squamous</b>              |  |                              |
| Melanoma of the Skin                                  | 172  | C43                          |
| Other Non-Epithelial Skin                             | 173  | C44                          |
|   |  |                              |
| <b>Kaposi Sarcoma</b>                                 | N/A  | C46                          |
|   |  |                              |
| <b>Breast</b>   | 174-175                                    | C50                          |
|   |  |                              |
| <b>Female Genital System</b>                          |  |                              |
| 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                      |
|   |  |                              |
| <b>Male Genital System</b>                            |  |                              |
| Prostate  | 185  | C61                          |
| Testis  | 186  | C62                          |
| Penis   | 187.1-187.4                                | C60                          |
| Other Male Genital Organs                             | 187.5-187.9                                | C63                          |
|   |  |                              |
| <b>Urinary System</b>                                 |  |                              |
| 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                          |
|   |  |                              |

|                                       |  |   |
|---------------------------------------|--|---|
| <b>Eye and Orbit</b>                  | 190  | C69   |
| <b>Brain and Other Nervous System</b> | 191, 192   | C70, C71, C72   |
| <b>Endocrine System</b>               |  |   |
| Thyroid                               | 193  | C73   |
| Other Endocrine, including Thymus     | 164.0, 194   | C37, C74-C75  |
| <b>Lymphoma</b>                       |  |   |
| Hodgkin Lymphoma                      | 201  | C81   |
| Non-Hodgkin Lymphoma                  | 200, 202.0-202.2, 202.8-202.9                      | C82-C85, C96.3  |
| <b>Multiple Myeloma</b>               | 203.0, 238.6                                       | C90.0, C90.2  |
| <b>Leukemia</b>                       |  |   |
| 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 |
| <b>Miscellaneous</b>                  | 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: Definition of Minnesota Regions and Minnesota counties included in the Indian Health Service's Contract Health Service Delivery Area (CHSDA)

**Table 1: Minnesota Regions**

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

**Table 2: Minnesota CHSDA Counties**

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|            |                   |                 |
|------------|-------------------|-----------------|
| 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        |                 |

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## 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.

**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.

**MCSS:** 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.

**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 Surveillance Research Program, National Cancer Institute SEER\*Stat software (<http://seer.cancer.gov/seerstat/index.html>) version 6.6.2. Cases diagnosed with histology defined as a “borderline malignancy” under ICD-O-2 coding rules and “invasive” under ICD-O-3 were not included under data for All Cancer Sites Combined or Miscellaneous cancers. These histologies (9950, 9960-9962, and 9980-9989) are miscellaneous myeloproliferative and lymphoproliferative disorders and myelodysplastic syndromes; they accounted for a total of 1,631 diagnoses over the four-year period 2001-2004.

$$aarrate_{i,j} = \sum_{k=1}^K \left[ \left( \frac{count_{ik}}{pop_k} \right) \times 100,000 \times \left( \frac{std_{jk}}{\sum_{j=1}^K std_{jk}} \right) \right]$$

### 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

All Minnesota trends were calculated using the Surveillance Research Program, National Cancer Institute 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. Only the APC for the segment ending in 2006 is presented.

### ***Cumulative Lifetime Risk***

Cumulative lifetime risk was calculated using DevCan (<http://srab.cancer.gov/devcan>) version 6.3.0, using site-, sex-, and age-specific incidence, cancer mortality and all cause mortality in Minnesota for 2004-2006. It represents the estimated percentage of newborns in Minnesota in 2004-2006 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 2004-2006.

### ***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 31-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 6.6.2 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, 2004, obtained by averaging estimates for the mid-year of 2005 and 2006 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 2002-2006. 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 31-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.