

***DATA UPDATE: CANCER INCIDENCE IN
DAKOTA AND WASHINGTON COUNTIES***

MCSS Epidemiology Report 2015:1

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Report Summary

Overview and Overall Approach

This report updates the cancer statistics presented in a 2007 MDH Minnesota Cancer Surveillance System (MCSS) report, titled “Cancer Incidence in Dakota and Washington Counties, MCSS Epidemiology Report 2007:1.” The term “incident cancers” refers to newly diagnosed cancers. The 2007 report compared occurrence of newly diagnosed cancers in Washington and Dakota Counties with cancer incidence across the State of Minnesota. It also evaluated cancer incidence in 8 local communities (locations defined by zip code) within Washington and Dakota Counties. Cancer occurrence in these local communities was compared with cancer incidence across the 7-county Twin Cities metro area. This data update repeats and replicates the analyses presented 2007 report and additionally evaluates occurrence of cancer in more recent years.

The statistical methodology follows standard public health surveillance practice. The analyses compare the numbers of newly diagnosed cancers occurring (or “observed”) over a given time period and geographic area (county or community) with the number that would be typically be expected based on cancer rates in a comparable reference area. These “observed-to-expected” comparisons were performed for both earlier and more recent time periods, several geographic areas, in both males and females, for a large number of cancer types. The methodology is described in greater detail in the Methods section of this report.

Results and Conclusions

The cancer surveillance methods applied in this report did not find the cancer experience of Dakota and Washington County residents to be unusual, compared with the State of Minnesota as a whole. For most cancer types the number of cancers occurring in the two counties did not differ from the numbers expected.

Cancer occurrence was higher than expected in some analyses, lower than expected in others, but most numbers were within the expected range. Several instances were found in which the observed numbers of cancers was statistically significantly higher than the number expected. However this in itself is not surprising given the inherent variability of cancer rates and the large number of analyses performed. Cancer occurrence fluctuates widely over time, especially within small geographic areas, when considered over a short time frame, or when the cancer type is uncommon. MCSS experience in many other community-level evaluations of this type has been that cancer occurrence is often sporadically elevated for one or more combinations of cancer type, time period, gender, and geographic location. Where elevations in cancer occurrence were found in this analysis they usually did not follow consistent patterns. However breast cancer was a notable exception.

New breast cancer cases occurred more often than expected in both Dakota and Washington Counties. From 2003 to 2012 the number of new breast cancer cases was about 10% more frequent than expected in both counties. This relative percentage represents about 150 women in each county. Additionally, for the 1988 to 2002 time period breast cancer appeared to occur more frequently than expected in Washington County, and was higher in Dakota County, again by about 10%. Although these estimated differences are not large on a percentage basis they are noteworthy because they potentially represent a large number of women, and the results are relatively consistent over time. Similarly, from 2003 to 2012 occurrence of prostate cancer was 10% higher than expected among males residing in Washington County. In contrast, lung cancer occurrence in Washington County males from 2003 to 2012 was 20% lower than expected.

Among less common cancers (i.e., cancers affecting fewer people) there were several instances in which the observed numbers were higher than or lower than expected, in both Dakota and Washington Counties. However no clear patterns were found.

The community-level (zip code-based) analyses represent much smaller populations and so need to be interpreted cautiously. For the most part no clear patterns of cancer occurrence were found. However elevated occurrence of colorectal cancer was found in males residing in Oakdale, and elevated lung cancer in males and females residing in South St. Paul.

The complete 2007 report, is available online at:

[Cancer Incidence in Dakota and Washington Counties](http://www.health.state.mn.us/divs/hpcd/cdee/mcss/documents/dakotawashingtoncancerreport.pdf)

[\(<http://www.health.state.mn.us/divs/hpcd/cdee/mcss/documents/dakotawashingtoncancerreport.pdf>\)](http://www.health.state.mn.us/divs/hpcd/cdee/mcss/documents/dakotawashingtoncancerreport.pdf)

For more information about cancer in Minnesota, risk factors for cancer, and ways to prevent cancer, community members are invited to visit our website: [MN Public Health Data Access](https://apps.health.state.mn.us/mndata/cancer)

[\(<https://apps.health.state.mn.us/mndata/cancer>\)](https://apps.health.state.mn.us/mndata/cancer)

Background and Purpose of This Report

This report provides a data update of the information earlier presented in the 2007 MCSS (MCSS) report, "Cancer Incidence in Dakota and Washington Counties, MCSS Epidemiology Report 2007:1." The 2007 report presented information on cancer incidence (occurrence of newly diagnosed cancer) among residents of Dakota and Washington Counties. The report was intended to address concerns about cancer and environmental contaminants in communities located east of the Minneapolis-St. Paul metropolitan area (the East Metro). The 2007 report analyzed occurrence of new cancer in Washington and Dakota counties diagnosed between the years 1988-2002, and cancer in eight east metro communities diagnosed between the years 1996-2004. The eight east metro communities were represented by zip code areas.

This update builds on the 2007 report by providing similar analyses for more recent years. It repeats the analyses presented in Tables 2, 4, and 7-15 of the 2007 report, using the same time periods presented in the 2007 report. Since the time of the 2007 report the MCSS has collected information on additional persons diagnosed with cancer during these time periods, so the results differ slightly from those presented in the 2007 report. The report also includes analyses for more recent years; 2003-2012 for the county-level analyses and 2005-2012 for the community level analyses, for comparison across time periods. Readers are referred to the earlier report for more detailed descriptions of the motivation for the study, methods used, and strengths and limitations of the analyses. The strengths and limitations of the 2007 analysis apply equally to this report.

Comparison across earlier and more recent time periods can be useful because the frequency of cancer occurrence (i.e. cancer rate) tends to vary substantially over time within small geographic areas, especially for cancer types that are relatively uncommon. By comparing results between time periods, staff sought to identify situations in which cancer occurrence has been consistently high or low over time. Such findings would strengthen the evidence that the underlying cancer incidence in a geographic area actually differs from what would be expected. By contrast, differences in cancer occurrence that do not persist over time are considered likely to reflect the random fluctuation inherent in cancer incidence.

These analyses provide an overall picture of the cancer experience of the east metro population. The population-level statistics reported here compare the actual cancer occurrence from all combined causes with the number that would typically be expected. These statistics reflect underlying cancer rates. Cancer is very common in Minnesota and throughout the United States. Rates of cancer occurrence vary by community for reasons that are not usually understood. Cancer rates in a community, and the statistics presented here reflect the combined influence of multiple factors (examples include genetics, age, tobacco use, and use of cancer screening), as well as a strong role for chance. However the methods used here cannot isolate specific factors that could account for cancer experience of a given community.

Methods

The methodology used in this report represents the standard of public health surveillance practice. The methodology allows assessment of whether the number of cancer cases occurring for a given cancer type, geographic area, and calendar period is unusually high or low. Cancer case information was obtained from the Minnesota Cancer Surveillance System (the State of Minnesota's central, population-based cancer registry) for two time periods, 1988-2002 and 2003-2012, for Washington and Dakota counties. Similar information was obtained for the time periods 1996-2004 and 2005-2012 for eight east metro communities (Tables 7-14) and for the eight communities combined. The 1988-2002 time period for county-level analysis and 1994-2004 time period for community-level analysis were used for consistency with the 2007 report. For the current update MCSS staff evaluated similar cancer types as analyzed in the 2007 report.

The statistics include the *observed* number of newly diagnosed cancers in each geographic area, the number of cancers that would be *expected* based on comparison with larger reference populations, the ratio of observed and expected numbers of cancers, and the 95th percent confidence interval surrounding the ratio. These statistics are described briefly below, and are discussed more completely in the 2007 report.

The *observed* number of cancers is a direct count of incident cases obtained from the MCSS. The *expected* number of cancer cases is a statistically-modeled estimate or projection. It is an estimate of the number of cases that would occur in the county or community if cancer rates were identical to those in the reference population. Two reference populations were used in this study; the state of Minnesota was used as the reference population for county-level analyses, and the seven county metropolitan area of Minneapolis-Saint Paul was used as the reference population for community-level analyses.

The initial step in evaluating whether the number of cancer cases occurring is unusually high or low is to determine the statistical significance of the result (i.e., the observation or analysis). Underlying the statistical methodology is an estimate of cancer rates, and these rates are estimated with uncertainty. A test of statistical significance (assuming a 0.05 significance level) identifies those results that would likely occur less than 5% of the time, if the underlying rate in the community of interest were identical to that of the larger reference population. We used statistical significance to identify instances in which the observed number of cancers differed from the number expected. Statistically significant results are designated with an asterisk in the results tables. However a single statistical test of significance by itself cannot be used to judge whether the observation is truly unusual or a result of the vagaries of statistical evaluation. This is only one of several analyses and judgments are required to come to this conclusion, but it is a widely used first screening test in this process.

Other statistics reported in the tables are the observed-to-expected ratio and the 95% confidence intervals around this ratio. The observed-to-expected ratio is used to gauge the proportional difference between the observed and expected numbers. For example, a ratio of 1.5 suggests that 1.5 times as many cancer cases were observed than expected (50% more). However, direct comparison of the magnitude of the observed and expected counts and their difference provides a more concrete understanding of the results. Confidence intervals are statistical estimates of the range of plausible values for the observed-to-expected ratio.

The cancer surveillance methodology used here is intended to identify unusually high or low occurrence of cancer in geographically defined areas (counties, or communities defined by zip code), without regard to the explanations for these deviations. For common cancers (lung, breast, prostate, colorectal) the methodology is reliably able to detect fairly small deviations from expected. However for less common or rare cancers or for small geographic areas it is able to detect deviations from expected only when these deviations are large. This means that it is not possible to rule out the possibility that less common or rare cancers are actually occurring at a relatively high frequency but are not detected by these cancer surveillance methods.

Results

The text of this section reports all statistically significant results; that is, the combinations of sex, county or community, and cancer type in which the observed number of cancers was either higher or lower than expected, using statistical significance as the criterion. The majority of findings were not statistically significant. For the most part results that were not statistically significant are not called out in the text. See Tables 1-11 for complete results, including those that were not statistically significant. As noted in the Methods section, an evaluation of whether cancer occurrence is unusual begins with identifying statistically significant results, but also considers of the number of cancer cases involved (the population size), effect size, consistency of results over time, and biological plausibility.

County-Level Results

Washington County

Among males residing in Washington County from 1988-2002 the number of cancers observed was lower than the number expected for all cancers combined and cancers of the lung and larynx (Table 1a). From 2003-2012 the observed number of cancers was higher than expected for melanoma, prostate cancer, leukemia, and mesothelioma; and lower than expected for oral, pancreatic, and lung cancers. Observed numbers of lung cancers were lower than expected in both time periods.

Among females residing in Washington County in 1988-2002 the number of cancer cases observed was lower than expected for Hodgkin lymphoma and leukemia (Table 1b). From 2003-2012 the number of cancers observed was higher than expected for all cancers combined, melanoma, and breast cancer; and lower than expected for cancer of the small intestine. The number of cancers observed in Washington County females did not differ from expected in both time periods for any of these cancers.

For the time period 2003-2012 the number of melanomas of the skin observed was higher than expected in both genders.

Dakota County

Among males residing in Dakota County in 1998-2002 the observed number of cancers did not differ from expected for any of the cancers evaluated (Table 2a). From 2003-2012 the numbers of cancers observed for all types combined, esophagus, colorectum, and pancreas were lower than expected.

Among Dakota County females in 1998-2002 the observed number of cancers was higher than expected for all cancers combined, liver cancer, and breast cancer (Table 2b). In 2013-2012 the observed number of breast cancer cases was again higher than expected, was higher for mesothelioma, and was lower for bladder cancer. The number of observed cancers did not differ from expected in both genders in either time period (Tables 2a, 2b).

Summary of County-Level Results

Staff compared observed and expected numbers of cancer for several cancer types, separately by county, time period, and gender. A small proportion of these analyses found statistically significant differences between the numbers of cancers observed and the numbers expected. However no clear patterns were evident. For the 1988-2002 time period the total number of cancers observed was slightly lower than expected in Washington County males and slightly higher than expected in Dakota County females. For the 2013 time period combining all time periods the number of cancers observed was slightly higher than expected in Washington County females, and slightly lower than expected in Dakota County males.

Of the 96 analyses in males (2 counties, 2 time periods, 24 cancer types), the number of cancers observed was lower than expected in 10, higher than expected in 4, and did not differ from expected in 82. Of the 104 analyses in females (2 counties, 2 time periods, 26 cancer types), the number of cancers observed was lower than expected in 5, higher than expected in 8, and did not differ from expected in 91.

The most consistent relationship in the county-level analyses was higher than expected numbers of breast cancers in females (Washington County 2013-2012, Dakota County 1988-2002 and 2013-2012). Differences between observed and expected numbers of three other cancers were also observed with some consistency: In 2003-2012, the number of melanomas of the skin observed was higher than expected in both genders in Washington County. Also in 2003-2012, observed numbers of mesothelioma, a rare cancer, were higher than expected in Washington County males and Dakota County females. Finally, in Washington County males, observed numbers of lung cancer were lower than expected in both 1988-2002 and 2003-2012.

Zip Code-Level Results

Overview and Guide to Interpretation

MCSS staff estimated cancer statistics for 8 individual communities, which were smaller geographic areas defined by zip code, and for the 8 communities combined. Two time periods were considered, 1996-2004 and 2005-2012. Fourteen cancer types (including all cancers combined) were evaluated for males; and 15 (including all cancers combined) for females.

As noted in the 2007 report, cancer statistics reported for the zip code-defined communities should be interpreted cautiously for at least three reasons. First, the estimates produced by the methods used in this report have large error when the numbers of cancer cases are small. The zip code-based populations are small, and the numbers of cancer cases are correspondingly small (relative to the number of cases needed to produce precise estimates). The issue is more pronounced for less common cancers (e.g., liver, brain, and pancreatic cancers) than those that occur frequently (e.g., breast, lung, prostate cancers). For perspective, in 2010 the eight communities ranged in population from 3,418 to 43,281, which are much smaller than the Washington and Dakota County populations of 238,136 and 398,552 respectively. Population counts are 2010 US Census figures.

For example among females residing in Cottage Grove between 2005 and 2012 11 bladder cancer cases were observed, compared to 10 expected. The resulting observed-to-expected ratio of 1.1 (10% more cases than expected) is not statistically significant. Due to the error inherent in making estimates in small populations, the confidence intervals indicate a plausible estimate of the observed-to-expected ratio ranges from 0.6 to 2.0 (i.e., between 40% fewer cancers than expected and 100% more [a doubling of] cancers than expected). That is, the observed-to-expected estimate is very imprecise, meaning that substantially different results cannot be ruled out.

Second, estimation of observed-to-expected ratios for multiple geographic areas, as MCSS staff has done here, compounds the potential for obtaining false positive results (i.e., results that show fewer or more cancer cases than expected when this is not actually occurring). As detailed below, MCSS estimated observed-to-expected ratios for 522 combinations of geographic area, cancer type, and gender at the community level. Although comprehensive, this large number of analyses will inevitably have produced several false-positive results.

Third, the zip code-based results incorporate population size estimates that are fairly uncertain. Observed-to-expected estimates are sensitive to population size. As discussed in the original 2007 report, zip code population estimates are available only for 10-year US census years, and population sizes incorporated for other years are necessarily “guestimates”.

The first two issues described above, small sample size and multiple comparisons, are well-discussed in the statistical literature. The section “Cancer Incidence for Geographic Regions within Dakota and Washington Counties” from the original 2007 report provides additional useful background for understanding all three issues.

In total MCSS staff performed 522 analyses at the community level, including 252 for males (i.e., 9 geographic areas, 14 cancer types, and 2 time periods) and 270 for females (9 geographic areas, 15 cancer types, and 2 time periods). Among males 18 (7.1%) of the analyses in males and 19 (7.0%) of analyses in females found an observed number of cancers that was either lower than or higher than the number expected, based on a statistically significant p-value.

Complete results for males are presented in Tables 3a-11a, and for females in Tables 3b-11b. Tables 3-11 include both the results that were statistically significant (instances in which the observed number of cancers was either higher or lower than expected at the $p < 0.05$ level) and those that were not. Results from Tables 3-11 that were statistically significant in at least one of the two time periods have been distilled into Tables 12a,b. These summary tables (Tables 12a,b) are intended to highlight the positive results, and facilitate evaluation of consistency of positive results over the two time periods, by cancer type, and between males and females. Finally, Table 13 provides a tabulation of the instances in which the numbers of observed cancers were higher than or lower than the numbers expected in both time periods.

Zip code-level results that were statistically significant are identified below. The text focuses on positive findings; results that were not statistically significant are not called out in the text. Results are provided for each geographic area individually, and for the eight communities combined. The results are summarized at the end of the section.

Zip code 55128 (Oakdale)

Among males residing in Oakdale in 1996-2004 the number of colorectal cancers observed was higher than expected (Table 3a). In 2005-2012 the number of all cancer types combined was higher than expected. The observed-to-expected ratio for colorectal cancer appeared higher than expected but did not reach statistical significance. The colorectal cancer results suggest that occurrence of this cancer is persistently elevated among men in Oakdale. The numbers of other cancer types did not differ from expected in either time period.

Among females in Oakdale in 1996-2004 the number of lung cancers observed was higher than expected (Table 3b). In 2005-2012 the number of observed cancers was higher than expected for all cancers combined, breast cancer, and thyroid cancer.

Zip code 55042 (Lake Elmo)

Among male residents of Lake Elmo in 1996-2004 the number of oral cancers observed was higher than expected (Table 4a). In 2005-2012 the number of lung cancers was lower than expected, and number of prostate cancers was higher than expected.

Among Lake Elmo females the number of observed cancers did not differ from the number expected for any of the cancers evaluated, in either 1996-2004 or 2005-2012 (Table 4b).

Zip code 55016 (Cottage Grove)

Among Cottage Grove residents the number of observed cancers did not differ from the number expected in either gender, in either 1996-2004 or 2005-2012 (Table 5a, 5b).

Zip codes 55125 and 55129 (Woodbury)

Among male residents residing in Woodbury in 1996-2004 the number of lung cancers observed was lower than expected (Table 6a). Although the observed number of oral cancer cases in 1996-2004 also appeared lower than expected, the result missed statistical significance.

In 2005-2012 the numbers of observed oral-, colorectal-, lung cancer, and lymphoma were lower than expected; and the number of prostate cancers observed was higher than expected. The oral and lung cancer results over the two time periods suggest that incidence of these cancers among Woodbury men are persistently lower than expected.

Among female Woodbury residents in 1996-2004 the number of observed cancers did not differ from the number expected for any of the cancers evaluated (Table 6b). In 2005-2012 the number of lymphomas was higher than expected (in contrast to lower than expected numbers in males).

Zip code 55055 (Newport)

Among male residents of Newport in 1996-2004 the number of observed cancers did not differ from the number expected for any of the cancers evaluated (Table 7a). In 2005-2012 the number of lymphomas in males was higher than expected.

Among female residents of Newport in 1996-2004 the number of observed cancers did not differ from the number expected for any of the cancers evaluated (Table 7b). In 2005-2012 the number of kidney cancer cases in females was higher than expected.

Zip code 55071 (St. Paul Park)

Among male residents of Saint Paul Park in 1996-2004 the number of observed all cancer types combined was higher than expected (Table 8a). In 2005-2012 the number of cancers in males did not differ from the number expected for any of the cancers evaluated.

Among female residents of Saint Paul Park in 1996-2004 the number of observed cancers was higher than expected for liver cancer (Table 8b). In 2005-2012 the number of lung cancer cases observed in females was higher than expected.

Zip code 55033 (Hastings)

Among male residents of Hastings in 1996-2004 the number of cancers observed did not differ from the number expected for any of the cancers evaluated (Table 9a). In 2005-2012 the number of prostate cancers was lower than expected and the number of lung cancer cases was higher than expected.

Among female residents of Hastings in 1996-2004 the number of breast cancer cases observed was lower than the number expected (Table 9b). In 2005-2012 the number of pancreatic and ovarian cancers in females was lower than expected.

Zip code 55075 (South St. Paul)

Among male residents of South St. Paul the observed numbers of all cancer types combined and lung cancer appeared higher than expected in 1996-2004, but neither result reached statistical significance (Table 10a). In 2005-2012 the number observed for all cancer types combined and for lung cancer were higher than expected and statistically significant.

Among female residents of South St. Paul the observed numbers of all cancer types combined and lung cancer were higher than expected in both time periods (Table 10b). In combination these results suggest persistently

high incidence of lung cancer in both males and females, with lung cancer largely accounting for high incidence of cancer overall in South St Paul.

Eight Zip Code-Defined Communities Combined

For the 1996-2004 time period among male residents of the eight east metro communities combined, the number of observed cancers did not differ from the number expected for any of the cancers evaluated (Table 11a). In 2005-2012 the numbers of oral and pancreatic cancers among males were lower than expected.

For the 1996-2004 time period among female residents of the eight east metro communities combined, the number of observed colorectal cancers was lower than expected (Table 11b). In 2005-2012 among females the observed numbers of all cancers combined and uterine cancers were higher than expected.

Summary of Zip Code-Level Results

For the most part, MCSS staff did not find unusual patterns of cancer occurrence in the community-level analyses (Tables 12a,b, 13). For most combinations of geographic location, cancer type, and gender, the numbers of cancers observed in the community-level analyses did not differ from the number expected in these communities. In most instances where differences were seen, these differences were not consistent. For example, within the zip code-defined areas the cancer types that occurred more frequently than expected in one time period usually did not occur more frequently in the other time period (Table 13). Similarly, cancer types that occurred more often than expected in one gender did not occur more often than expected in the other gender (Tables 12a,b). In addition, cancer types that occurred more frequently in one zip code-defined location usually did not occur more frequently in other geographic areas (Tables 12a,b). Consistency of positive statistical findings across time period, gender, or geographic area are not necessary requirements for identifying unusual occurrence of cancer, but when present strengthen the evidence that the observed results are real.

MCSS staff did identify patterns of higher cancer occurrence in two instances. First, among male residents of Oakdale the number of colorectal cancer cases appeared higher than expected (but was not statistically significant) in 1996-2004 (Table 4a). In 2005-2012 the higher number of colorectal cancer cases was elevated and statistically significant. These results suggest persistently higher than expected colorectal cancer incidence in male residents of Oakdale.

Results also indicate persistently elevated occurrence of lung cancer in South St. Paul. The number of lung cancers observed among males appeared higher than expected in 1996-2004, but the result was not statistically significant (Table 10a). In 2005-2012 the elevated number of lung cancers among male residents of South St. Paul males was statistically significant.

In females the numbers of all types of cancer combined and lung cancers among South St. Paul females were higher than expected and statistically significant in both time periods (Table 10b).

The largest ratio of observed-to-expected cancers was 7.0 for liver cancer in St. Paul Park females, 1996-2004 (Table 8b). This observed-to-expected ratio was based on a very small number of cases (n=3 cases), and in the 2005-2012 time period no liver cancer cases were observed.

Tables: County-Level Results

Table 1a. Observed and Expected New Cancers for Male Residents of Washington County ¹

| Cancer Type | 1988-2002 | | | | | 2003-2012 | | | | |
|-------------------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| All types combined | 4339 | 4553 | -214 | 1.0 | (0.9, 1.0) * | 5368 | 5322 | 46 | 1.0 | (1.0, 1.0) |
| Childhood cancer ² | 73 | 78 | -5 | 0.9 | (0.7, 1.2) | 73 | 65 | 8 | 1.1 | (0.9, 1.4) |
| Oral | 156 | 160 | -4 | 1.0 | (0.8, 1.1) | 137 | 177 | -40 | 0.8 | (0.6, 0.9) * |
| Esophagus | 51 | 59 | -8 | 0.9 | (0.6, 1.1) | 84 | 83 | 1 | 1.0 | (0.8, 1.2) |
| Stomach | 65 | 78 | -13 | 0.8 | (0.6, 1.1) | 64 | 76 | -12 | 0.8 | (0.7, 1.1) |
| Small intestine | 18 | 21 | -3 | 0.8 | (0.5, 1.3) | 23 | 28 | -5 | 0.8 | (0.5, 1.2) |
| Colorectal | 473 | 505 | -32 | 0.9 | (0.9, 1.0) | 473 | 483 | -10 | 1.0 | (0.9, 1.1) |
| Liver | 35 | 38 | -3 | 0.9 | (0.6, 1.3) | 59 | 74 | -15 | 0.8 | (0.6, 1.0) |
| Pancreas | 86 | 82 | 4 | 1.1 | (0.8, 1.3) | 93 | 120 | -27 | 0.8 | (0.6, 0.9) * |
| Larynx | 43 | 61 | -18 | 0.7 | (0.5, 0.9) * | 46 | 56 | -10 | 0.8 | (0.6, 1.1) |
| Lung | 546 | 601 | -55 | 0.9 | (0.8, 1.0) * | 510 | 611 | -101 | 0.8 | (0.8, 0.9) * |
| Loft tissue | 39 | 36 | 3 | 1.1 | (0.8, 1.5) | 49 | 39 | 10 | 1.3 | (0.9, 1.7) |
| Melanoma | 187 | 175 | 12 | 1.1 | (0.9, 1.2) | 321 | 282 | 39 | 1.1 | (1.0, 1.3) * |

| Cancer Type | 1988-2002 | | | | | 2003-2012 | | | | |
|----------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| Prostate | 1314 | 1372 | -58 | 1.0 | (0.9, 1.0) | 1783 | 1660 | 123 | 1.1 | (1.0, 1.1) * |
| Testes | 96 | 88 | 8 | 1.1 | (0.9, 1.3) | 69 | 76 | -7 | 0.9 | (0.7, 1.2) |
| Bladder | 272 | 281 | -9 | 1.0 | (0.9, 1.1) | 363 | 343 | 20 | 1.1 | (1.0, 1.2) |
| Kidney | 154 | 151 | 3 | 1.0 | (0.9, 1.2) | 226 | 223 | 3 | 1.0 | (0.9, 1.2) |
| Brain | 90 | 87 | 3 | 1.0 | (0.8, 1.3) | 84 | 81 | 3 | 1.0 | (0.8, 1.3) |
| Thyroid | 35 | 40 | -5 | 0.9 | (0.6, 1.2) | 61 | 64 | -3 | 0.9 | (0.7, 1.2) |
| Hodgkin lymphoma | 47 | 43 | 4 | 1.1 | (0.8, 1.4) | 28 | 38 | -10 | 0.7 | (0.5, 1.1) |
| Non-Hodgkin lymphoma | 196 | 218 | -22 | 0.9 | (0.8, 1.0) | 281 | 266 | 15 | 1.1 | (0.9, 1.2) |
| Multiple myeloma | 46 | 51 | -5 | 0.9 | (0.7, 1.2) | 84 | 72 | 12 | 1.2 | (0.9, 1.4) |
| Leukemia | 163 | 160 | 3 | 1.0 | (0.9, 1.2) | 240 | 202 | 38 | 1.2 | (1.0, 1.3) * |
| Mesothelioma | 23 | 17 | 6 | 1.3 | (0.8, 2.0) | 29 | 18 | 11 | 1.6 | (1.1, 2.3) * |

¹ Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

² Childhood cancers include all cancer types for males up to 19 years of age.

Table 1b. Observed and Expected New Cancers for Female Residents of Washington County ¹

| Cancer Type | 1988-2002 | | | | | 2003-2012 | | | | |
|-------------------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| All types combined | 4205 | 4241 | -36 | 1.0 | (1.0, 1.0) | 5076 | 4899 | 177 | 1.0 | (1.0, 1.1) * |
| Childhood cancer ² | 55 | 65 | -10 | 0.9 | (0.6, 1.1) | 46 | 54 | -8 | 0.9 | (0.6, 1.1) |
| Oral | 64 | 72 | -8 | 0.9 | (0.7, 1.1) | 72 | 84 | -12 | 0.9 | (0.7, 1.1) |
| Esophagus | 11 | 16 | -5 | 0.7 | (0.3, 1.2) | 24 | 24 | 0 | 1.0 | (0.7, 1.5) |
| Stomach | 34 | 40 | -6 | 0.9 | (0.6, 1.2) | 34 | 40 | -6 | 0.8 | (0.6, 1.2) |
| Small intestine | 14 | 16 | -2 | 0.9 | (0.5, 1.4) | 12 | 24 | -12 | 0.5 | (0.3, 0.9) * |
| Colorectal | 425 | 450 | -25 | 0.9 | (0.9, 1.0) | 419 | 437 | -18 | 1.0 | (0.9, 1.1) |
| Liver | 15 | 17 | -2 | 0.9 | (0.5, 1.5) | 31 | 31 | 0 | 1.0 | (0.7, 1.4) |
| Pancreas | 61 | 67 | -6 | 0.9 | (0.7, 1.2) | 104 | 100 | 4 | 1.0 | (0.9, 1.3) |
| Larynx | 10 | 13 | -3 | 0.7 | (0.4, 1.4) | 10 | 14 | -4 | 0.7 | (0.3, 1.3) |
| Lung | 413 | 415 | -2 | 1.0 | (0.9, 1.1) | 570 | 553 | 17 | 1.0 | (0.9, 1.1) |
| Soft tissue | 32 | 29 | 3 | 1.1 | (0.8, 1.6) | 30 | 33 | -3 | 0.9 | (0.6, 1.3) |
| Melanoma | 157 | 162 | -5 | 1.0 | (0.8, 1.1) | 322 | 254 | 68 | 1.3 | (1.1, 1.4) * |
| Breast | 1527 | 1466 | 61 | 1.0 | (1.0, 1.1) | 1704 | 1552 | 152 | 1.1 | (1.0, 1.2) * |

| Cancer Type | 1988-2002 | | | | | 2003-2012 | | | | |
|----------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| Cervix | 112 | 106 | 6 | 1.1 | (0.9, 1.3) | 71 | 73 | -2 | 1.0 | (0.8, 1.2) |
| Uterus | 273 | 277 | -4 | 1.0 | (0.9, 1.1) | 349 | 346 | 3 | 1.0 | (0.9, 1.1) |
| Ovary | 155 | 161 | -6 | 1.0 | (0.8, 1.1) | 144 | 144 | 0 | 1.0 | (0.8, 1.2) |
| Bladder | 100 | 93 | 7 | 1.1 | (0.9, 1.3) | 111 | 110 | 1 | 1.0 | (0.8, 1.2) |
| Kidney | 75 | 81 | -6 | 0.9 | (0.7, 1.2) | 117 | 123 | -6 | 1.0 | (0.8, 1.1) |
| Brain | 60 | 62 | -2 | 1.0 | (0.7, 1.2) | 53 | 59 | -6 | 0.9 | (0.7, 1.2) |
| Thyroid | 100 | 110 | -10 | 0.9 | (0.7, 1.1) | 220 | 194 | 26 | 1.1 | (1.0, 1.3) |
| Hodgkin lymphoma | 22 | 33 | -11 | 0.7 | (0.4, 1.0) * | 36 | 29 | 7 | 1.3 | (0.9, 1.7) |
| Non-Hodgkin lymphoma | 187 | 172 | 15 | 1.1 | (0.9, 1.3) | 206 | 209 | -3 | 1.0 | (0.9, 1.1) |
| Multiple myeloma | 44 | 39 | 5 | 1.1 | (0.8, 1.5) | 43 | 51 | -8 | 0.8 | (0.6, 1.1) |
| Leukemia | 85 | 111 | -26 | 0.8 | (0.6, 0.9) * | 145 | 130 | 15 | 1.1 | (0.9, 1.3) |
| Mesothelioma | 3 | 5 | -2 | 0.7 | (0.1, 1.9) | 2 | 6 | -4 | 0.3 | (0.0, 1.2) |

¹ Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

² Childhood cancers include all cancer types for females up to 19 years of age.

Table 2a. Observed and Expected New Cancers for Male Residents of Dakota County ¹

| Cancer type | 1988-2002 | | | | | 2003-2012 | | | | |
|-------------------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| All types combined | 7628 | 7701 | -73 | 1.0 | (1.0, 1.0) | 8227 | 8408 | -181 | 1.0 | (1.0, 1.0) * |
| Childhood cancer ² | 149 | 139 | 10 | 1.1 | (0.9, 1.3) | 107 | 110 | -3 | 1.0 | (0.8, 1.2) |
| Oral | 269 | 267 | 2 | 1.0 | (0.9, 1.1) | 292 | 281 | 11 | 1.0 | (0.9, 1.2) |
| Esophagus | 98 | 98 | 0 | 1.0 | (0.8, 1.2) | 98 | 131 | -33 | 0.7 | (0.6, 0.9) * |
| Stomach | 116 | 131 | -15 | 0.9 | (0.7, 1.1) | 115 | 120 | -5 | 1.0 | (0.8, 1.2) |
| Small intestine | 36 | 36 | 0 | 1.0 | (0.7, 1.4) | 46 | 44 | 2 | 1.0 | (0.8, 1.4) |
| Colorectal | 836 | 849 | -13 | 1.0 | (0.9, 1.1) | 710 | 765 | -55 | 0.9 | (0.9, 1.0) * |
| Liver | 57 | 64 | -7 | 0.9 | (0.7, 1.2) | 126 | 116 | 10 | 1.1 | (0.9, 1.3) |
| Pancreas | 123 | 136 | -13 | 0.9 | (0.8, 1.1) | 158 | 189 | -31 | 0.8 | (0.7, 1.0) * |
| Larynx | 83 | 101 | -18 | 0.8 | (0.7, 1.0) | 85 | 88 | -3 | 1.0 | (0.8, 1.2) |
| Lung | 950 | 1005 | -55 | 0.9 | (0.9, 1.0) | 920 | 958 | -38 | 1.0 | (0.9, 1.0) |
| Loft tissue | 62 | 63 | -1 | 1.0 | (0.8, 1.3) | 63 | 63 | 0 | 1.0 | (0.8, 1.3) |
| Melanoma | 329 | 297 | 32 | 1.1 | (1.0, 1.2) | 436 | 451 | -15 | 1.0 | (0.9, 1.1) |
| Prostate | 2305 | 2311 | -6 | 1.0 | (1.0, 1.0) | 2511 | 2582 | -71 | 1.0 | (0.9, 1.0) |
| Testes | 183 | 165 | 18 | 1.1 | (1.0, 1.3) | 147 | 134 | 13 | 1.1 | (0.9, 1.3) |

| Cancer type | 1988-2002 | | | | | 2003-2012 | | | | |
|----------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| Bladder | 479 | 475 | 4 | 1.0 | (0.9, 1.1) | 554 | 541 | 13 | 1.0 | (0.9, 1.1) |
| Kidney | 237 | 252 | -15 | 0.9 | (0.8, 1.1) | 385 | 353 | 32 | 1.1 | (1.0, 1.2) |
| Brain | 153 | 151 | 2 | 1.0 | (0.9, 1.2) | 119 | 133 | -14 | 0.9 | (0.7, 1.1) |
| Thyroid | 76 | 70 | 6 | 1.1 | (0.9, 1.4) | 107 | 105 | 2 | 1.0 | (0.8, 1.2) |
| Hodgkin lymphoma | 87 | 78 | 9 | 1.1 | (0.9, 1.4) | 69 | 64 | 5 | 1.1 | (0.8, 1.4) |
| Non-Hodgkin lymphoma | 374 | 369 | 5 | 1.0 | (0.9, 1.1) | 420 | 424 | -4 | 1.0 | (0.9, 1.1) |
| Multiple myeloma | 97 | 86 | 11 | 1.1 | (0.9, 1.4) | 102 | 113 | -11 | 0.9 | (0.7, 1.1) |
| Leukemia | 287 | 275 | 12 | 1.0 | (0.9, 1.2) | 330 | 324 | 6 | 1.0 | (0.9, 1.1) |
| Mesothelioma | 36 | 29 | 7 | 1.2 | (0.9, 1.7) | 32 | 29 | 3 | 1.1 | (0.8, 1.6) |

¹ Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

² Childhood cancers include all cancer types for males up to 19 years of age.

Table 2b. Observed and Expected New Cancers for Female Residents of Dakota County¹

| Cancer type | 1988-2002 | | | | | 2003-2012 | | | | |
|-------------------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| All types combined | 7597 | 7395 | 202 | 1.0 | (1.0, 1.1) * | 8155 | 8090 | 65 | 1.0 | (1.0, 1.0) |
| Childhood cancer ² | 130 | 116 | 14 | 1.1 | (0.9, 1.3) | 103 | 91 | 12 | 1.1 | (0.9, 1.4) |
| Oral | 133 | 126 | 7 | 1.1 | (0.9, 1.3) | 125 | 139 | -14 | 0.9 | (0.8, 1.1) |
| Esophagus | 29 | 29 | 0 | 1.0 | (0.7, 1.5) | 32 | 39 | -7 | 0.8 | (0.6, 1.2) |
| Stomach | 69 | 70 | -1 | 1.0 | (0.8, 1.2) | 61 | 67 | -6 | 0.9 | (0.7, 1.2) |
| Small intestine | 35 | 28 | 7 | 1.2 | (0.9, 1.7) | 45 | 39 | 6 | 1.2 | (0.8, 1.5) |
| Colorectal | 737 | 788 | -51 | 0.9 | (0.9, 1.0) | 750 | 722 | 28 | 1.0 | (1.0, 1.1) |
| Liver | 43 | 30 | 13 | 1.4 | (1.0, 1.9) * | 46 | 51 | -5 | 0.9 | (0.7, 1.2) |
| Pancreas | 120 | 117 | 3 | 1.0 | (0.9, 1.2) | 149 | 164 | -15 | 0.9 | (0.8, 1.1) |
| Larynx | 29 | 23 | 6 | 1.3 | (0.8, 1.8) | 17 | 23 | -6 | 0.7 | (0.4, 1.2) |
| Lung | 758 | 718 | 40 | 1.1 | (1.0, 1.1) | 901 | 906 | -5 | 1.0 | (0.9, 1.1) |
| Soft tissue | 42 | 51 | -9 | 0.8 | (0.6, 1.1) | 52 | 56 | -4 | 0.9 | (0.7, 1.2) |
| Melanoma | 303 | 290 | 13 | 1.0 | (0.9, 1.2) | 417 | 427 | -10 | 1.0 | (0.9, 1.1) |
| Breast | 2659 | 2528 | 131 | 1.1 | (1.0, 1.1) * | 2698 | 2550 | 148 | 1.1 | (1.0, 1.1) * |

| Cancer type | 1988-2002 | | | | | 2003-2012 | | | | |
|----------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| Cervix | 168 | 190 | -22 | 0.9 | (0.8, 1.0) | 111 | 123 | -12 | 0.9 | (0.7, 1.1) |
| Uterus | 454 | 476 | -22 | 1.0 | (0.9, 1.0) | 570 | 565 | 5 | 1.0 | (0.9, 1.1) |
| Ovary | 298 | 279 | 19 | 1.1 | (1.0, 1.2) | 235 | 238 | -3 | 1.0 | (0.9, 1.1) |
| Bladder | 156 | 162 | 0.96 | 1.0 | (0.8, 1.1) | 153 | 180 | -27 | 0.8 | (0.7, 1.0) * |
| Kidney | 159 | 141 | 1.13 | 1.1 | (1.0, 1.3) | 185 | 202 | -17 | 0.9 | (0.8, 1.1) |
| Brain | 114 | 110 | 1.04 | 1.0 | (0.9, 1.2) | 100 | 99 | 1 | 1.0 | (0.8, 1.2) |
| Thyroid | 218 | 201 | 1.09 | 1.1 | (0.9, 1.2) | 316 | 330 | -14 | 1.0 | (0.9, 1.1) |
| Hodgkin lymphoma | 74 | 63 | 1.17 | 1.2 | (0.9, 1.5) | 41 | 50 | -9 | 0.8 | (0.6, 1.1) |
| Non-Hodgkin lymphoma | 313 | 302 | 1.04 | 1.0 | (0.9, 1.2) | 373 | 346 | 27 | 1.1 | (1.0, 1.2) |
| Multiple myeloma | 72 | 68 | 1.06 | 1.1 | (0.8, 1.3) | 78 | 84 | -6 | 0.9 | (0.7, 1.2) |
| Leukemia | 197 | 196 | 1.01 | 1.0 | (0.9, 1.2) | 240 | 217 | 23 | 1.1 | (1.0, 1.3) |
| Mesothelioma | 7 | 8 | 0.88 | 0.9 | (0.4, 1.8) | 18 | 10 | 8 | 1.7 | (1.0, 2.8) * |

¹ Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

² Childhood cancers include all cancer types for females up to 19 years of age.

Tables: Zip Code-Level Results

Table 3a. Observed and Expected New Cancers for Males, Zip code area 55128 (Oakdale) ¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types combined | 481 | 459 | 1.0 | 1.0 | 1.1 | 591 | 528 | 1.1 | 1.0 | 1.2 * |
| Oral | 9 | 14 | 0.6 | 0.3 | 1.2 | 14 | 17 | 0.8 | 0.5 | 1.4 |
| Colorectal | 57 | 43 | 1.3 | 1.0 | 1.7 * | 55 | 43 | 1.3 | 1.0 | 1.7 |
| Liver | 8 | 5 | 1.6 | 0.7 | 3.1 | 8 | 9 | 0.9 | 0.4 | 1.8 |
| Pancreas | 6 | 9 | 0.7 | 0.3 | 1.5 | 8 | 12 | 0.7 | 0.3 | 1.3 |
| Lung | 59 | 56 | 1.0 | 0.8 | 1.3 | 57 | 57 | 1.0 | 0.8 | 1.3 |
| Prostate | 135 | 140 | 1.0 | 0.8 | 1.1 | 182 | 157 | 1.2 | 1.0 | 1.3 |
| Testes | 13 | 9 | 1.5 | 0.8 | 2.5 | 10 | 8 | 1.3 | 0.6 | 2.5 |
| Bladder | 28 | 29 | 1.0 | 0.6 | 1.4 | 39 | 33 | 1.2 | 0.8 | 1.6 |
| Kidney | 20 | 16 | 1.3 | 0.8 | 2.0 | 23 | 21 | 1.1 | 0.7 | 1.6 |
| Brain | 9 | 7 | 1.2 | 0.6 | 2.3 | 11 | 7 | 1.5 | 0.7 | 2.6 |
| Thyroid | 5 | 4 | 1.2 | 0.4 | 2.8 | 5 | 6 | 0.8 | 0.3 | 1.9 |
| Lymphoma | 28 | 31 | 0.9 | 0.6 | 1.3 | 44 | 36 | 1.2 | 0.9 | 1.6 |

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 18 | 16 | 1.1 | 0.6 | 1.7 | 24 | 21 | 1.1 | 0.7 | 1.7 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 3b. Observed and Expected New Cancers in Females, Zip code area 55128 (Oakdale) ¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types | 484 | 482 | 1.0 | 0.9 | 1.1 | 625 | 554 | 1.1 | 1.0 | 1.2 | * |
| Oral | 7 | 8 | 0.9 | 0.3 | 1.8 | 9 | 9 | 1.0 | 0.4 | 1.8 | |
| Colorectal | 34 | 44 | 0.8 | 0.5 | 1.1 | 48 | 45 | 1.0 | 0.8 | 1.4 | |
| Liver | 1 | 2 | 0.5 | 0.0 | 2.5 | 8 | 4 | 1.9 | 0.8 | 3.8 | |
| Pancreas | 7 | 8 | 0.8 | 0.3 | 1.7 | 11 | 11 | 1.0 | 0.5 | 1.7 | |
| Lung | 73 | 55 | 1.3 | 1.0 | 1.7 | 73 | 64 | 1.1 | 0.9 | 1.4 | * |
| Breast | 163 | 162 | 1.0 | 0.9 | 1.2 | 208 | 170 | 1.2 | 1.1 | 1.4 | * |
| Uterus | 28 | 30 | 0.9 | 0.6 | 1.4 | 34 | 36 | 0.9 | 0.6 | 1.3 | |
| Ovary | 18 | 16 | 1.1 | 0.7 | 1.8 | 13 | 16 | 0.8 | 0.4 | 1.4 | |
| Bladder | 13 | 11 | 1.2 | 0.6 | 2.0 | 18 | 12 | 1.5 | 0.9 | 2.3 | |
| Kidney | 5 | 9 | 0.5 | 0.2 | 1.3 | 12 | 12 | 1.0 | 0.5 | 1.7 | |
| Brain | 6 | 5 | 1.1 | 0.4 | 2.4 | 5 | 6 | 0.9 | 0.3 | 2.0 | |
| Thyroid | 16 | 13 | 1.3 | 0.7 | 2.0 | 31 | 20 | 1.5 | 1.0 | 2.2 | * |
| Lymphoma | 25 | 27 | 0.9 | 0.6 | 1.3 | 30 | 31 | 1.0 | 0.6 | 1.4 | |

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 12 | 11 | 1.1 | 0.6 | 1.9 | 19 | 15 | 1.3 | 0.8 | 2.0 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 4a. Observed and Expected New Cancers in Males, Zip code area 55042 (Lake Elmo)¹

| Cancer Type | 1996-2004 | | | | | | 2005-2012 | | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|---|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types combined | 124 | 141 | 0.9 | 0.7 | 1.0 | | 187 | 192 | 1.0 | 0.8 | 1.1 | |
| Oral | 11 | 5 | 2.3 | 1.2 | 4.2 | * | 2 | 6 | 0.3 | 0.0 | 1.1 | |
| Colorectal | 9 | 13 | 0.7 | 0.3 | 1.3 | | 13 | 16 | 0.8 | 0.4 | 1.4 | |
| Liver | 0 | 2 | 0.0 | 0.0 | 2.2 | | 1 | 3 | 0.3 | 0.0 | 1.7 | |
| Pancreas | 2 | 3 | 0.7 | 0.1 | 2.6 | | 2 | 4 | 0.5 | 0.1 | 1.6 | |
| Lung | 15 | 18 | 0.9 | 0.5 | 1.4 | | 10 | 21 | 0.5 | 0.2 | 0.9 | * |
| Prostate | 43 | 45 | 1.0 | 0.7 | 1.3 | | 79 | 60 | 1.3 | 1.0 | 1.6 | * |
| Testes | 2 | 2 | 1.1 | 0.1 | 3.9 | | 2 | 2 | 1.2 | 0.1 | 4.2 | |
| Bladder | 4 | 9 | 0.5 | 0.1 | 1.2 | | 13 | 12 | 1.1 | 0.6 | 1.9 | |
| Kidney | 3 | 5 | 0.6 | 0.1 | 1.8 | | 12 | 8 | 1.5 | 0.8 | 2.6 | |
| Brain | 3 | 2 | 1.5 | 0.3 | 4.4 | | 1 | 2 | 0.4 | 0.0 | 2.3 | |
| Thyroid | 0 | 1 | 0.0 | 0.0 | 3.1 | | 5 | 2 | 2.3 | 0.7 | 5.4 | |
| Lymphoma | 10 | 9 | 1.1 | 0.5 | 2.0 | | 9 | 13 | 0.7 | 0.3 | 1.4 | |
| Leukemia | 3 | 4 | 0.7 | 0.1 | 2.0 | | 5 | 7 | 0.7 | 0.2 | 1.6 | |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 4b. Observed and Expected New Cancers in Females, Zip code area 55042 (Lake Elmo) ¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types | 111 | 119 | 0.9 | 0.8 | 1.1 | 154 | 160 | 1.0 | 0.8 | 1.1 |
| Oral | 1 | 2 | 0.5 | 0.0 | 2.8 | 2 | 3 | 0.7 | 0.1 | 2.6 |
| Colorectal | 8 | 10 | 0.8 | 0.4 | 1.6 | 13 | 12 | 1.1 | 0.6 | 1.8 |
| Liver | 0 | 1 | 0.0 | 0.0 | 7.3 | 0 | 1 | 0.0 | 0.0 | 3.1 |
| Pancreas | 3 | 2 | 1.6 | 0.3 | 4.6 | 1 | 3 | 0.3 | 0.0 | 1.8 |
| Lung | 7 | 13 | 0.5 | 0.2 | 1.1 | 19 | 17 | 1.1 | 0.7 | 1.7 |
| Breast | 52 | 43 | 1.2 | 0.9 | 1.6 | 56 | 52 | 1.1 | 0.8 | 1.4 |
| Uterus | 4 | 8 | 0.5 | 0.1 | 1.3 | 9 | 11 | 0.8 | 0.4 | 1.5 |
| Ovary | 4 | 4 | 1.0 | 0.3 | 2.5 | 5 | 5 | 1.0 | 0.3 | 2.4 |
| Bladder | 1 | 2 | 0.4 | 0.0 | 2.3 | 2 | 3 | 0.6 | 0.1 | 2.2 |
| Kidney | 3 | 2 | 1.3 | 0.3 | 3.8 | 2 | 4 | 0.6 | 0.1 | 2.0 |
| Brain | 1 | 1 | 0.7 | 0.0 | 4.2 | 0 | 2 | 0.0 | 0.0 | 2.2 |
| Thyroid | 1 | 3 | 0.3 | 0.0 | 1.8 | 6 | 6 | 1.0 | 0.4 | 2.2 |
| Lymphoma | 5 | 6 | 0.8 | 0.3 | 1.9 | 8 | 8 | 0.9 | 0.4 | 1.9 |

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 5 | 3 | 1.9 | 0.6 | 4.5 | 4 | 4 | 1.0 | 0.3 | 2.6 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 5a. Observed and Expected New Cancers in Males, Zip code area 55016 (Cottage Grove)¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types combined | 433 | 420 | 1.0 | 0.9 | 1.1 | 551 | 560 | 1.0 | 0.9 | 1.1 |
| Oral | 7 | 14 | 0.5 | 0.2 | 1.0 | 18 | 19 | 1.0 | 0.6 | 1.5 |
| Colorectal | 37 | 37 | 1.0 | 0.7 | 1.4 | 53 | 45 | 1.2 | 0.9 | 1.5 |
| Liver | 6 | 5 | 1.2 | 0.4 | 2.6 | 9 | 9 | 1.0 | 0.4 | 1.8 |
| Pancreas | 12 | 8 | 1.5 | 0.8 | 2.7 | 9 | 13 | 0.7 | 0.3 | 1.4 |
| Lung | 62 | 50 | 1.3 | 1.0 | 1.6 | 51 | 58 | 0.9 | 0.6 | 1.1 |
| Prostate | 119 | 127 | 0.9 | 0.8 | 1.1 | 157 | 167 | 0.9 | 0.8 | 1.1 |
| Testes | 13 | 10 | 1.3 | 0.7 | 2.2 | 11 | 9 | 1.2 | 0.6 | 2.1 |
| Bladder | 31 | 24 | 1.3 | 0.9 | 1.8 | 24 | 33 | 0.7 | 0.5 | 1.1 |
| Kidney | 23 | 15 | 1.5 | 1.0 | 2.3 | 30 | 23 | 1.3 | 0.9 | 1.9 |
| Brain | 9 | 8 | 1.2 | 0.5 | 2.2 | 10 | 9 | 1.1 | 0.5 | 2.1 |
| Thyroid | 4 | 4 | 0.9 | 0.2 | 2.3 | 3 | 7 | 0.4 | 0.1 | 1.2 |
| Lymphoma | 30 | 29 | 1.0 | 0.7 | 1.5 | 36 | 39 | 0.9 | 0.6 | 1.3 |
| Leukemia | 10 | 15 | 0.7 | 0.3 | 1.2 | 25 | 22 | 1.1 | 0.7 | 1.7 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 5b. Observed and Expected New Cancers in Females, Zip code area 55016 (Cottage Grove) ¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types | 381 | 392 | 1.0 | 0.9 | 1.1 | 532 | 522 | 1.0 | 0.9 | 1.1 |
| Oral | 6 | 7 | 0.9 | 0.3 | 2.0 | 7 | 9 | 0.8 | 0.3 | 1.7 |
| Colorectal | 26 | 30 | 0.9 | 0.6 | 1.3 | 35 | 39 | 0.9 | 0.6 | 1.3 |
| Liver | 1 | 2 | 0.6 | 0.0 | 3.3 | 2 | 4 | 0.5 | 0.1 | 2.0 |
| Pancreas | 5 | 6 | 0.9 | 0.3 | 2.0 | 14 | 10 | 1.5 | 0.8 | 2.5 |
| Lung | 46 | 39 | 1.2 | 0.9 | 1.6 | 57 | 55 | 1.0 | 0.8 | 1.3 |
| Breast | 133 | 137 | 1.0 | 0.8 | 1.2 | 160 | 165 | 1.0 | 0.8 | 1.1 |
| Uterus | 23 | 25 | 0.9 | 0.6 | 1.4 | 43 | 35 | 1.2 | 0.9 | 1.7 |
| Ovary | 9 | 13 | 0.7 | 0.3 | 1.3 | 19 | 15 | 1.3 | 0.8 | 2.0 |
| Bladder | 8 | 7 | 1.1 | 0.5 | 2.2 | 11 | 10 | 1.1 | 0.6 | 2.0 |
| Kidney | 8 | 7 | 1.1 | 0.5 | 2.1 | 17 | 11 | 1.5 | 0.9 | 2.4 |
| Brain | 10 | 6 | 1.8 | 0.9 | 3.3 | 5 | 6 | 0.8 | 0.3 | 1.9 |
| Thyroid | 15 | 13 | 1.1 | 0.6 | 1.8 | 30 | 23 | 1.3 | 0.9 | 1.9 |
| Lymphoma | 13 | 22 | 0.6 | 0.3 | 1.0 | 29 | 28 | 1.0 | 0.7 | 1.5 |

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 7 | 9 | 0.7 | 0.3 | 1.5 | 20 | 14 | 1.4 | 0.9 | 2.2 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 6a. Observed and Expected New Cancers in Males, Zip code area 55125-29 (Woodbury) ¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types combined | 624 | 674 | 0.9 | 0.9 | 1.0 | 959 | 974 | 1.0 | 0.9 | 1.0 | |
| Oral | 13 | 22 | 0.6 | 0.3 | 1.0 | 16 | 32 | 0.5 | 0.3 | 0.8 | * |
| Colorectal | 62 | 62 | 1.0 | 0.8 | 1.3 | 54 | 79 | 0.7 | 0.5 | 0.9 | * |
| Liver | 6 | 8 | 0.8 | 0.3 | 1.7 | 13 | 16 | 0.8 | 0.4 | 1.4 | |
| Pancreas | 16 | 13 | 1.3 | 0.7 | 2.1 | 13 | 22 | 0.6 | 0.3 | 1.0 | |
| Lung | 47 | 80 | 0.6 | 0.4 | 0.8 | 84 | 102 | 0.8 | 0.7 | 1.0 | * |
| Prostate | 185 | 199 | 0.9 | 0.8 | 1.1 | 332 | 283 | 1.2 | 1.1 | 1.3 | * |
| Testes | 14 | 15 | 0.9 | 0.5 | 1.5 | 10 | 16 | 0.6 | 0.3 | 1.2 | |
| Bladder | 47 | 41 | 1.1 | 0.8 | 1.5 | 70 | 58 | 1.2 | 0.9 | 1.5 | |
| Kidney | 23 | 24 | 1.0 | 0.6 | 1.5 | 36 | 40 | 0.9 | 0.6 | 1.2 | |
| Brain | 8 | 12 | 0.7 | 0.3 | 1.3 | 20 | 16 | 1.3 | 0.8 | 2.0 | |
| Thyroid | 6 | 7 | 0.9 | 0.3 | 1.9 | 18 | 13 | 1.4 | 0.8 | 2.2 | |
| Lymphoma | 44 | 47 | 0.9 | 0.7 | 1.3 | 51 | 68 | 0.7 | 0.6 | 1.0 | * |
| Leukemia | 30 | 25 | 1.2 | 0.8 | 1.7 | 50 | 40 | 1.3 | 0.9 | 1.7 | |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 6b. Observed and Expected New Cancers in Females, Zip code area 55125-29 (Woodbury)¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types | 644 | 690 | 0.9 | 0.9 | 1.0 | 1026 | 992 | 1.0 | 1.0 | 1.1 |
| Oral | 11 | 12 | 0.9 | 0.5 | 1.7 | 13 | 17 | 0.8 | 0.4 | 1.3 |
| Colorectal | 46 | 58 | 0.8 | 0.6 | 1.1 | 69 | 76 | 0.9 | 0.7 | 1.1 |
| Liver | 1 | 3 | 0.3 | 0.0 | 1.9 | 7 | 7 | 1.0 | 0.4 | 2.0 |
| Pancreas | 6 | 11 | 0.6 | 0.2 | 1.2 | 15 | 18 | 0.8 | 0.5 | 1.4 |
| Lung | 58 | 70 | 0.8 | 0.6 | 1.1 | 93 | 108 | 0.9 | 0.7 | 1.1 |
| Breast | 217 | 235 | 0.9 | 0.8 | 1.1 | 318 | 312 | 1.0 | 0.9 | 1.1 |
| Uterus | 44 | 42 | 1.1 | 0.8 | 1.4 | 80 | 65 | 1.2 | 1.0 | 1.5 |
| Ovary | 19 | 23 | 0.8 | 0.5 | 1.3 | 27 | 29 | 0.9 | 0.6 | 1.4 |
| Bladder | 17 | 14 | 1.2 | 0.7 | 1.9 | 15 | 19 | 0.8 | 0.4 | 1.3 |
| Kidney | 13 | 13 | 1.0 | 0.5 | 1.7 | 16 | 22 | 0.7 | 0.4 | 1.2 |
| Brain | 8 | 9 | 0.9 | 0.4 | 1.7 | 17 | 12 | 1.5 | 0.8 | 2.3 |
| Thyroid | 21 | 22 | 1.0 | 0.6 | 1.5 | 50 | 42 | 1.2 | 0.9 | 1.6 |
| Lymphoma | 39 | 39 | 1.0 | 0.7 | 1.4 | 72 | 54 | 1.3 | 1.0 | 1.7 |

*

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 12 | 17 | 0.7 | 0.4 | 1.2 | 27 | 27 | 1.0 | 0.6 | 1.4 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 7a. Observed and Expected New Cancers in Males, Zip code area 55055 (Newport)¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types combined | 59 | 64 | 0.9 | 0.7 | 1.2 | 70 | 68 | 1.0 | 0.8 | 1.3 | |
| Oral | 2 | 2 | 1.1 | 0.1 | 3.8 | 0 | 2 | 0.0 | 0.0 | 1.7 | |
| Colorectal | 3 | 6 | 0.5 | 0.1 | 1.4 | 6 | 6 | 1.1 | 0.4 | 2.4 | |
| Liver | 0 | 1 | 0.0 | 0.0 | 5.4 | 2 | 1 | 1.8 | 0.2 | 6.5 | |
| Pancreas | 2 | 1 | 1.6 | 0.2 | 5.9 | 1 | 2 | 0.6 | 0.0 | 3.6 | |
| Lung | 7 | 8 | 0.9 | 0.3 | 1.8 | 10 | 7 | 1.4 | 0.6 | 2.5 | |
| Prostate | 19 | 21 | 0.9 | 0.5 | 1.4 | 20 | 21 | 1.0 | 0.6 | 1.5 | |
| Testes | 1 | 1 | 1.5 | 0.0 | 8.4 | 0 | 1 | 0.0 | 0.0 | 5.6 | |
| Bladder | 4 | 4 | 0.9 | 0.2 | 2.3 | 3 | 4 | 0.7 | 0.1 | 2.1 | |
| Kidney | 1 | 2 | 0.5 | 0.0 | 2.7 | 5 | 3 | 1.8 | 0.6 | 4.3 | |
| Brain | 1 | 1 | 1.3 | 0.0 | 7.3 | 0 | 1 | 0.0 | 0.0 | 4.5 | |
| Thyroid | 0 | 0 | 0.0 | 0.0 | 8.7 | 0 | 1 | 0.0 | 0.0 | 4.9 | |
| Lymphoma | 5 | 4 | 1.2 | 0.4 | 2.9 | 10 | 5 | 2.2 | 1.1 | 4.0 | * |
| Leukemia | 2 | 2 | 0.9 | 0.1 | 3.4 | 2 | 3 | 0.8 | 0.1 | 2.9 | |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 7b. Observed and Expected New Cancers in Females, Zip code area 55055 (Newport)¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types | 70 | 73 | 1.0 | 0.7 | 1.2 | 75 | 60 | 1.3 | 1.0 | 1.6 |
| Oral | 0 | 1 | 0.0 | 0.0 | 3.0 | 2 | 1 | 2.0 | 0.2 | 7.2 |
| Colorectal | 5 | 7 | 0.7 | 0.2 | 1.6 | 6 | 5 | 1.2 | 0.4 | 2.6 |
| Liver | 0 | 0 | 0.0 | 0.0 | 11.0 | 1 | 0 | 2.1 | 0.1 | 12.0 |
| Pancreas | 1 | 1 | 0.8 | 0.0 | 4.2 | 0 | 1 | 0.0 | 0.0 | 2.9 |
| Lung | 9 | 8 | 1.1 | 0.5 | 2.0 | 11 | 7 | 1.5 | 0.8 | 2.7 |
| Breast | 24 | 24 | 1.0 | 0.6 | 1.5 | 25 | 18 | 1.4 | 0.9 | 2.1 |
| Uterus | 2 | 4 | 0.5 | 0.1 | 1.7 | 7 | 4 | 1.8 | 0.7 | 3.7 |
| Ovary | 1 | 2 | 0.4 | 0.0 | 2.4 | 1 | 2 | 0.6 | 0.0 | 3.4 |
| Bladder | 2 | 2 | 1.1 | 0.1 | 4.0 | 2 | 1 | 1.4 | 0.2 | 5.2 |
| Kidney | 2 | 1 | 1.4 | 0.2 | 5.0 | 5 | 1 | 3.8 | 1.2 | 8.8 |
| Brain | 1 | 1 | 1.3 | 0.0 | 7.3 | 0 | 1 | 0.0 | 0.0 | 6.5 |
| Thyroid | 2 | 2 | 1.2 | 0.1 | 4.2 | 1 | 2 | 0.6 | 0.0 | 3.3 |
| Lymphoma | 6 | 4 | 1.4 | 0.5 | 3.1 | 5 | 3 | 1.5 | 0.5 | 3.5 |

*

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 2 | 2 | 1.1 | 0.1 | 3.9 | 1 | 2 | 0.6 | 0.0 | 3.6 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 8a. Observed and Expected New Cancers in Males, Zip code area 55071 (St. Paul Park) ¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types combined | 128 | 103 | 1.2 | 1.0 | 1.5 | 94 | 105 | 0.9 | 0.7 | 1.1 |
| Oral | 2 | 3 | 0.6 | 0.1 | 2.3 | 2 | 3 | 0.6 | 0.1 | 2.2 |
| Colorectal | 8 | 10 | 0.8 | 0.4 | 1.6 | 9 | 9 | 1.1 | 0.5 | 2.0 |
| Liver | 1 | 1 | 0.9 | 0.0 | 5.0 | 2 | 2 | 1.2 | 0.1 | 4.3 |
| Pancreas | 5 | 2 | 2.5 | 0.8 | 5.8 | 1 | 2 | 0.4 | 0.0 | 2.3 |
| Lung | 17 | 14 | 1.3 | 0.7 | 2.0 | 10 | 12 | 0.9 | 0.4 | 1.6 |
| Prostate | 41 | 34 | 1.2 | 0.9 | 1.6 | 25 | 32 | 0.8 | 0.5 | 1.2 |
| Testes | 1 | 1 | 1.1 | 0.0 | 6.3 | 0 | 1 | 0.0 | 0.0 | 3.1 |
| Bladder | 13 | 7 | 1.9 | 1.0 | 3.2 | 10 | 7 | 1.5 | 0.7 | 2.8 |
| Kidney | 2 | 3 | 0.6 | 0.1 | 2.1 | 2 | 4 | 0.5 | 0.1 | 1.7 |
| Brain | 0 | 1 | 0.0 | 0.0 | 2.8 | 1 | 1 | 0.7 | 0.0 | 4.1 |
| Thyroid | 0 | 1 | 0.0 | 0.0 | 5.3 | 2 | 1 | 1.7 | 0.2 | 6.2 |
| Lymphoma | 9 | 6 | 1.4 | 0.6 | 2.7 | 5 | 7 | 0.7 | 0.2 | 1.6 |
| Leukemia | 2 | 3 | 0.6 | 0.1 | 2.2 | 5 | 4 | 1.2 | 0.4 | 2.8 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 8b. Observed and Expected New Cancers in Females, Zip code area 55071 (St. Paul Park)¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| All types | 108 | 91 | 1.2 | 1.0 | 1.4 | 109 | 95 | 1.2 | 0.9 | 1.4 |
| Oral | 3 | 2 | 2.0 | 0.4 | 5.7 | 2 | 2 | 1.3 | 0.2 | 4.6 |
| Colorectal | 8 | 9 | 0.9 | 0.4 | 1.8 | 11 | 8 | 1.4 | 0.7 | 2.6 |
| Liver | 3 | 0 | 7.0 | 1.4 | 20.4 * | 0 | 1 | 0.0 | 0.0 | 5.2 |
| Pancreas | 2 | 2 | 1.2 | 0.1 | 4.4 | 3 | 2 | 1.5 | 0.3 | 4.5 |
| Lung | 17 | 11 | 1.5 | 0.9 | 2.4 | 20 | 11 | 1.8 | 1.1 | 2.7 * |
| Breast | 30 | 31 | 1.0 | 0.7 | 1.4 | 22 | 30 | 0.7 | 0.5 | 1.1 |
| Uterus | 6 | 6 | 1.1 | 0.4 | 2.3 | 7 | 6 | 1.1 | 0.4 | 2.3 |
| Ovary | 5 | 3 | 1.7 | 0.5 | 3.9 | 6 | 3 | 2.3 | 0.8 | 4.9 |
| Bladder | 3 | 2 | 1.4 | 0.3 | 4.1 | 4 | 2 | 2.0 | 0.5 | 5.0 |
| Kidney | 1 | 2 | 0.6 | 0.0 | 3.1 | 3 | 2 | 1.4 | 0.3 | 4.2 |
| Brain | 3 | 1 | 3.0 | 0.6 | 8.9 | 1 | 1 | 1.1 | 0.0 | 6.0 |
| Thyroid | 3 | 2 | 1.5 | 0.3 | 4.3 | 3 | 3 | 0.9 | 0.2 | 2.7 |
| Lymphoma | 7 | 5 | 1.4 | 0.6 | 2.8 | 6 | 5 | 1.2 | 0.4 | 2.5 |

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 3 | 2 | 1.4 | 0.3 | 4.1 | 4 | 2 | 1.7 | 0.5 | 4.4 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 9a. Observed and Expected New Cancers in Males, Zip code area 55033 (Hastings) ¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types combined | 524 | 533 | 1.0 | 0.9 | 1.1 | 632 | 643 | 1.0 | 0.9 | 1.1 | |
| Oral | 17 | 16 | 1.0 | 0.6 | 1.7 | 18 | 20 | 0.9 | 0.5 | 1.4 | |
| Colorectal | 62 | 51 | 1.2 | 0.9 | 1.6 | 49 | 52 | 0.9 | 0.7 | 1.2 | |
| Liver | 4 | 6 | 0.7 | 0.2 | 1.7 | 6 | 10 | 0.6 | 0.2 | 1.3 | |
| Pancreas | 8 | 10 | 0.8 | 0.3 | 1.6 | 13 | 15 | 0.9 | 0.5 | 1.5 | |
| Lung | 62 | 67 | 0.9 | 0.7 | 1.2 | 89 | 71 | 1.3 | 1.0 | 1.5 | * |
| Prostate | 153 | 168 | 0.9 | 0.8 | 1.1 | 156 | 193 | 0.8 | 0.7 | 0.9 | * |
| Testes | 11 | 8 | 1.3 | 0.7 | 2.4 | 9 | 8 | 1.1 | 0.5 | 2.2 | |
| Bladder | 36 | 35 | 1.0 | 0.7 | 1.4 | 43 | 41 | 1.0 | 0.8 | 1.4 | |
| Kidney | 16 | 18 | 0.9 | 0.5 | 1.5 | 34 | 25 | 1.3 | 0.9 | 1.9 | |
| Brain | 11 | 8 | 1.4 | 0.7 | 2.6 | 7 | 9 | 0.8 | 0.3 | 1.7 | |
| Thyroid | 2 | 4 | 0.5 | 0.1 | 1.7 | 7 | 7 | 1.0 | 0.4 | 2.0 | |
| Lymphoma | 36 | 35 | 1.0 | 0.7 | 1.4 | 49 | 44 | 1.1 | 0.8 | 1.5 | |
| Leukemia | 19 | 18 | 1.0 | 0.6 | 1.6 | 28 | 26 | 1.1 | 0.7 | 1.6 | |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 9b. Observed and Expected New Cancers in Females, Zip code area 55033 (Hastings) ¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types | 452 | 486 | 0.9 | 0.8 | 1.0 | 590 | 598 | 1.0 | 0.9 | 1.1 | |
| Oral | 5 | 8 | 0.6 | 0.2 | 1.4 | 7 | 10 | 0.7 | 0.3 | 1.4 | |
| Colorectal | 50 | 48 | 1.1 | 0.8 | 1.4 | 59 | 51 | 1.2 | 0.9 | 1.5 | |
| Liver | 1 | 2 | 0.5 | 0.0 | 2.5 | 3 | 5 | 0.7 | 0.1 | 1.9 | |
| Pancreas | 4 | 9 | 0.5 | 0.1 | 1.2 | 5 | 13 | 0.4 | 0.1 | 0.9 | * |
| Lung | 48 | 56 | 0.9 | 0.6 | 1.1 | 69 | 71 | 1.0 | 0.8 | 1.2 | |
| Breast | 132 | 161 | 0.8 | 0.7 | 1.0 | 193 | 181 | 1.1 | 0.9 | 1.2 | * |
| Uterus | 25 | 29 | 0.8 | 0.5 | 1.3 | 51 | 38 | 1.3 | 1.0 | 1.7 | |
| Ovary | 17 | 16 | 1.1 | 0.6 | 1.7 | 8 | 17 | 0.5 | 0.2 | 0.9 | * |
| Bladder | 15 | 12 | 1.3 | 0.7 | 2.1 | 13 | 14 | 0.9 | 0.5 | 1.6 | |
| Kidney | 12 | 9 | 1.3 | 0.7 | 2.2 | 11 | 13 | 0.8 | 0.4 | 1.5 | |
| Brain | 5 | 5 | 1.0 | 0.3 | 2.3 | 6 | 6 | 1.0 | 0.4 | 2.1 | |
| Thyroid | 13 | 12 | 1.1 | 0.6 | 1.9 | 17 | 20 | 0.8 | 0.5 | 1.3 | |
| Lymphoma | 33 | 28 | 1.2 | 0.8 | 1.6 | 35 | 34 | 1.0 | 0.7 | 1.4 | |

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 10 | 12 | 0.9 | 0.4 | 1.6 | 19 | 16 | 1.2 | 0.7 | 1.9 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 10a. Observed and Expected New Cancers in Males, Zip code area 55075 (South St Paul)¹

| Cancer type | 1996-2004 | | | | | 2005-2012 | | | | | |
|--------------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | |
| All types combined | 468 | 433 | 1.1 | 1.0 | 1.2 | 451 | 405 | 1.1 | 1.0 | 1.2 | * |
| Oral | 10 | 12 | 0.8 | 0.4 | 1.5 | 11 | 13 | 0.9 | 0.4 | 1.6 | |
| Colorectal | 43 | 42 | 1.0 | 0.7 | 1.4 | 30 | 34 | 0.9 | 0.6 | 1.3 | |
| Liver | 5 | 5 | 1.1 | 0.4 | 2.6 | 12 | 6 | 1.9 | 1.0 | 3.4 | |
| Pancreas | 8 | 8 | 1.0 | 0.4 | 1.9 | 10 | 9 | 1.1 | 0.5 | 2.0 | |
| Lung | 70 | 55 | 1.3 | 1.0 | 1.6 | 70 | 45 | 1.6 | 1.2 | 2.0 | * |
| Prostate | 146 | 135 | 1.1 | 0.9 | 1.3 | 112 | 118 | 1.0 | 0.8 | 1.1 | |
| Testes | 7 | 7 | 1.0 | 0.4 | 2.1 | 6 | 6 | 1.0 | 0.4 | 2.3 | |
| Bladder | 26 | 30 | 0.9 | 0.6 | 1.3 | 32 | 27 | 1.2 | 0.8 | 1.7 | |
| Kidney | 17 | 14 | 1.2 | 0.7 | 2.0 | 15 | 16 | 1.0 | 0.5 | 1.6 | |
| Brain | 11 | 6 | 1.8 | 0.9 | 3.2 | 7 | 5 | 1.3 | 0.5 | 2.7 | |
| Thyroid | 7 | 3 | 2.1 | 0.8 | 4.4 | 3 | 5 | 0.7 | 0.1 | 1.9 | |
| Lymphoma | 34 | 29 | 1.2 | 0.8 | 1.7 | 29 | 28 | 1.1 | 0.7 | 1.5 | |
| Leukemia | 17 | 15 | 1.1 | 0.6 | 1.8 | 17 | 16 | 1.1 | 0.6 | 1.7 | |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 10b. Observed and Expected New Cancers in Females, Zip code area 55075 (South St Paul)¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|-----|---|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | | |
| All types | 487 | 432 | 1.1 | 1.0 | 1.2 | * | 463 | 411 | 1.1 | 1.0 | 1.2 | * |
| Oral | 7 | 7 | 1.0 | 0.4 | 2.0 | | 4 | 7 | 0.6 | 0.2 | 1.5 | |
| Colorectal | 41 | 44 | 0.9 | 0.7 | 1.3 | | 38 | 35 | 1.1 | 0.8 | 1.5 | |
| Liver | 3 | 2 | 1.4 | 0.3 | 4.2 | | 2 | 3 | 0.7 | 0.1 | 2.4 | |
| Pancreas | 10 | 8 | 1.2 | 0.6 | 2.2 | | 6 | 9 | 0.7 | 0.3 | 1.5 | |
| Lung | 70 | 52 | 1.3 | 1.0 | 1.7 | * | 73 | 48 | 1.5 | 1.2 | 1.9 | * |
| Breast | 149 | 137 | 1.1 | 0.9 | 1.3 | | 125 | 122 | 1.0 | 0.9 | 1.2 | |
| Uterus | 28 | 25 | 1.1 | 0.7 | 1.6 | | 28 | 26 | 1.1 | 0.7 | 1.6 | |
| Ovary | 13 | 14 | 1.0 | 0.5 | 1.6 | | 9 | 11 | 0.8 | 0.4 | 1.5 | |
| Bladder | 12 | 11 | 1.1 | 0.6 | 1.9 | | 6 | 9 | 0.6 | 0.2 | 1.4 | |
| Kidney | 13 | 9 | 1.5 | 0.8 | 2.6 | | 18 | 9 | 2.0 | 1.2 | 3.2 | * |
| Brain | 9 | 5 | 1.9 | 0.9 | 3.6 | | 2 | 4 | 0.5 | 0.1 | 1.7 | |
| Thyroid | 13 | 10 | 1.3 | 0.7 | 2.3 | | 12 | 14 | 0.9 | 0.4 | 1.5 | |
| Lymphoma | 25 | 26 | 1.0 | 0.6 | 1.4 | | 27 | 25 | 1.1 | 0.7 | 1.7 | |

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|----------------------------|--------------|--------------|----------------|----------------|----------------------------|--------------|--------------|
| | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI | Cases Observed | Cases Expected | Observed-to-Expected Ratio | Lower 95% CI | Upper 95% CI |
| Leukemia | 9 | 11 | 0.8 | 0.4 | 1.5 | 15 | 12 | 1.3 | 0.7 | 2.1 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 11a. Observed and Expected New Cancers in Males, Combined Zip code areas for Eight Communities¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | | |
|--------------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|---|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | |
| All types combined | 2841 | 2842 | -1 | 1.0 | 1.0 1.0 | 3535 | 3489 | 46 | 1.0 | 1.0 1.0 | |
| Oral | 71 | 89 | -18 | 0.8 | 0.6 1.0 | 81 | 113 | -32 | 0.7 | 0.6 0.9 | * |
| Colorectal | 281 | 265 | 16 | 1.1 | 0.9 1.2 | 269 | 283 | -14 | 0.9 | 0.8 1.1 | |
| Liver | 30 | 32 | -2 | 0.9 | 0.6 1.3 | 53 | 57 | -4 | 0.9 | 0.7 1.2 | |
| Pancreas | 59 | 53 | 6 | 1.1 | 0.8 1.4 | 57 | 79 | -22 | 0.7 | 0.5 0.9 | * |
| Lung | 339 | 348 | -9 | 1.0 | 0.9 1.1 | 381 | 374 | 7 | 1.0 | 0.9 1.1 | |
| Prostate | 841 | 870 | -29 | 1.0 | 0.9 1.0 | 1063 | 1030 | 33 | 1.0 | 1.0 1.1 | |
| Testes | 62 | 54 | 8 | 1.1 | 0.9 1.5 | 48 | 51 | -3 | 0.9 | 0.7 1.2 | |
| Bladder | 189 | 180 | 9 | 1.1 | 0.9 1.2 | 234 | 215 | 19 | 1.1 | 1.0 1.2 | |
| Kidney | 105 | 97 | 8 | 1.1 | 0.9 1.3 | 157 | 141 | 16 | 1.1 | 0.9 1.3 | |
| Brain | 52 | 46 | 6 | 1.1 | 0.8 1.5 | 57 | 52 | 5 | 1.1 | 0.8 1.4 | |
| Thyroid | 24 | 26 | -2 | 0.9 | 0.6 1.4 | 43 | 43 | 0 | 1.0 | 0.7 1.4 | |
| Lymphoma | 196 | 193 | 3 | 1.0 | 0.9 1.2 | 233 | 242 | -9 | 1.0 | 0.8 1.1 | |
| Leukemia | 101 | 101 | 0 | 1.0 | 0.8 1.2 | 156 | 141 | 15 | 1.1 | 0.9 1.3 | |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 11b. Observed/Expected Cancer Incidence in Females, Combined zip code areas for Eight Communities¹

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | | | |
|-------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|---|--|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | | |
| All types | 2737 | 2781 | -44 | 1.0 | 0.9 1.0 | 3574 | 3408 | 166 | 1.0 | 1.0 1.1 | * | |
| Oral | 40 | 47 | -7 | 0.9 | 0.6 1.2 | 46 | 57 | -11 | 0.8 | 0.6 1.1 | | |
| Colorectal | 218 | 250 | -32 | 0.9 | 0.8 1.0 | 279 | 272 | 7 | 1.0 | 0.9 1.2 | | |
| Liver | 10 | 12 | -2 | 0.8 | 0.4 1.5 | 23 | 25 | -2 | 0.9 | 0.6 1.4 | | |
| Pancreas | 38 | 47 | -9 | 0.8 | 0.6 1.1 | 55 | 67 | -12 | 0.8 | 0.6 1.1 | | |
| Lung | 328 | 305 | 23 | 1.1 | 1.0 1.2 | 415 | 377 | 38 | 1.1 | 1.0 1.2 | | |
| Breast | 900 | 929 | -29 | 1.0 | 0.9 1.0 | 1107 | 1052 | 55 | 1.1 | 1.0 1.1 | | |
| Uterus | 160 | 168 | -8 | 0.9 | 0.8 1.1 | 259 | 222 | 37 | 1.2 | 1.0 1.3 | * | |
| Ovary | 86 | 91 | -5 | 0.9 | 0.8 1.2 | 88 | 97 | -9 | 0.9 | 0.7 1.1 | | |
| Bladder | 71 | 62 | 9 | 1.1 | 0.9 1.4 | 71 | 71 | 0 | 1.0 | 0.8 1.3 | | |
| Kidney | 57 | 54 | 3 | 1.1 | 0.8 1.4 | 84 | 75 | 9 | 1.1 | 0.9 1.4 | | |
| Brain | 43 | 35 | 8 | 1.2 | 0.9 1.7 | 36 | 39 | -3 | 0.9 | 0.7 1.3 | | |
| Thyroid | 84 | 78 | 6 | 1.1 | 0.9 1.3 | 150 | 131 | 19 | 1.1 | 1.0 1.3 | | |
| Lymphoma | 153 | 159 | -6 | 1.0 | 0.8 1.1 | 212 | 189 | 23 | 1.1 | 1.0 1.3 | | |

| Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | |
|-------------|----------------|----------------|------------|----------------------------|-------------------------|----------------|----------------|------------|----------------------------|-------------------------|
| | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Difference | Observed-to-Expected Ratio | 95% Confidence Interval |
| Leukemia | 60 | 71 | -11 | 0.9 | 0.6 1.1 | 109 | 94 | 15 | 1.2 | 1.0 1.4 |

¹Statistically significant results (at $\alpha=0.05$ level) are marked with an asterisk.

Table 12a. Distillation of Statistically Significant Results of Zip Code-Level Analyses in Males ¹

| Community | Cancer type | 1996-2004 | | | | | 2005-2012 | | | | | |
|---------------------------|-------------|----------------|----------------|----------------------------|-------------------------|-----|----------------|----------------|----------------------------|-------------------------|-----|---|
| | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | |
| Zip 55128 (Oakdale) | All types | 481 | 459 | 1.0 | 1.0 | 1.1 | 591 | 528 | 1.1 | 1.0 | 1.2 | * |
| Zip 55128 (Oakdale) | Colorectal | 57 | 43 | 1.3 | 1.0 | 1.7 | 55 | 43 | 1.3 | 1.0 | 1.7 | |
| Zip 55042 (Lake Elmo) | Oral | 11 | 5 | 2.3 | 1.2 | 4.2 | 2 | 6 | 0.3 | 0.0 | 1.1 | |
| Zip 55042 (Lake Elmo) | Lung | 15 | 18 | 0.9 | 0.5 | 1.4 | 10 | 21 | 0.5 | 0.2 | 0.9 | * |
| Zip 55042 (Lake Elmo) | Prostate | 43 | 45 | 1.0 | 0.7 | 1.3 | 79 | 60 | 1.3 | 1.0 | 1.6 | * |
| 55016 (Cottage Grove) | -None- | | | | | | | | | | | |
| Zip 55125-29 (Woodbury) | Oral | 13 | 22 | 0.6 | 0.3 | 1.0 | 16 | 32 | 0.5 | 0.3 | 0.8 | * |
| Zip 55125-29 (Woodbury) | Colorectal | 62 | 62 | 1.0 | 0.8 | 1.3 | 54 | 79 | 0.7 | 0.5 | 0.9 | * |
| Zip 55125-29 (Woodbury) | Lung | 47 | 80 | 0.6 | 0.4 | 0.8 | 84 | 102 | 0.7 | 0.6 | 1.0 | |
| Zip 55125-29 (Woodbury) | Prostate | 185 | 199 | 0.9 | 0.8 | 1.1 | 332 | 283 | 1.2 | 1.1 | 1.3 | * |
| Zip 55125-29 (Woodbury) | Lymphoma | 44 | 47 | 0.9 | 0.7 | 1.3 | 51 | 68 | 0.7 | 0.6 | 1.0 | * |
| Zip 55055 (Newport) | Lymphoma | 5 | 4 | 1.2 | 0.4 | 2.9 | 10 | 5 | 2.2 | 1.1 | 4.0 | * |
| Zip 55071 (St. Paul Park) | All types | 128 | 103 | 1.2 | 1.0 | 1.5 | 94 | 105 | 0.9 | 0.7 | 1.1 | |
| Zip 55033 (Hastings) | Lung | 62 | 67 | 0.9 | 0.7 | 1.2 | 89 | 71 | 1.3 | 1.0 | 1.5 | * |

| Community | Cancer type | 1996-2004 | | | | 2005-2012 | | | | | | |
|---------------------------|-------------|----------------|----------------|----------------------------|-------------------------|----------------|----------------|----------------------------|-------------------------|-----|-----|---|
| | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | | |
| Zip 55033 (Hastings) | Prostate | 153 | 168 | 0.9 | 0.8 | 1.1 | 156 | 193 | 0.8 | 0.7 | 0.9 | * |
| Zip 55075 (South St Paul) | All types | 468 | 433 | 1.1 | 1.0 | 1.2 | 451 | 405 | 1.1 | 1.0 | 1.2 | * |
| Zip 55075 (South St Paul) | Lung | 70 | 55 | 1.3 | 1.0 | 1.6 | 70 | 45 | 1.6 | 1.2 | 2.0 | * |
| 8 Zip codes combined | Oral | 71 | 89 | 0.8 | 0.6 | 1.0 | 81 | 113 | 0.7 | 0.6 | 0.9 | * |
| 8 Zip codes combined | Pancreas | 59 | 53 | 1.1 | 0.8 | 1.4 | 57 | 79 | 0.7 | 0.5 | 0.9 | * |

¹ This table lists the statistically significant observed-to-expected results ($\alpha=0.05$ level) reported for males in Tables 3a-11a. The positive findings are drawn from analyses evaluating 252 combinations of cancer type, time period, and geographic area.

Table 12b. Distillation of Statistically Results of Zip Code-Level Analyses in Females¹

| Community | Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | | |
|---------------------------|-------------|----------------|----------------|----------------------------|-------------------------|------|----------------|----------------|----------------------------|-------------------------|-----|---|
| | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | |
| Zip 55128 (Oakdale) | All types | 484 | 482 | 1.0 | 0.9 | 1.1 | 625 | 554 | 1.1 | 1.0 | 1.2 | * |
| Zip 55128 (Oakdale) | Lung | 73 | 55 | 1.3 | 1.0 | 1.7 | 73 | 64 | 1.1 | 0.9 | 1.4 | |
| Zip 55128 (Oakdale) | Breast | 163 | 162 | 1.0 | 0.9 | 1.2 | 208 | 170 | 1.2 | 1.1 | 1.4 | * |
| Zip 55128 (Oakdale) | Thyroid | 16 | 13 | 1.3 | 0.7 | 2.0 | 31 | 20 | 1.5 | 1.0 | 2.2 | * |
| Zip 55042 (Lake Elmo) | -None- | | | | | | | | | | | |
| Zip 55016 (Cottage Grove) | -None- | | | | | | | | | | | |
| Zip 55125-29 (Woodbury) | Lymphoma | 39 | 39 | 1.0 | 0.7 | 1.4 | 72 | 54 | 1.3 | 1.0 | 1.7 | * |
| Zip 55055 (Newport) | Kidney | 2 | 1 | 1.4 | 0.2 | 5.0 | 5 | 1 | 3.8 | 1.2 | 8.8 | * |
| Zip 55071 (St Paul Park) | Liver | 3 | 0 | 7.0 | 1.4 | 20.4 | 0 | 1 | 0.0 | 0.0 | 5.2 | |
| Zip 55071 (St Paul Park) | Lung | 17 | 11 | 1.5 | 0.9 | 2.4 | 20 | 11 | 1.8 | 1.1 | 2.7 | * |
| Zip 55033 (Hastings) | Pancreas | 4 | 9 | 0.5 | 0.1 | 1.2 | 5 | 13 | 0.4 | 0.1 | 0.9 | * |
| Zip 55033 (Hastings) | Breast | 132 | 161 | 0.8 | 0.7 | 1.0 | 193 | 181 | 1.1 | 0.9 | 1.2 | |
| Zip 55033 (Hastings) | Ovary | 17 | 16 | 1.1 | 0.6 | 1.7 | 8 | 17 | 0.5 | 0.2 | 0.9 | * |
| Zip 55075 (South St Paul) | All types | 487 | 432 | 1.1 | 1.0 | 1.2 | 463 | 411 | 1.1 | 1.0 | 1.4 | * |

| Community | Cancer Type | 1996-2004 | | | | | 2005-2012 | | | | | | |
|---------------------------|-------------|----------------|----------------|----------------------------|-------------------------|-----|----------------|----------------|----------------------------|-------------------------|-----|-----|---|
| | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | Cases Observed | Cases Expected | Observed-to-Expected Ratio | 95% Confidence Interval | | | |
| Zip 55075 (South St Paul) | Lung | 70 | 52 | 1.3 | 1.0 | 1.7 | * | 73 | 48 | 1.5 | 1.2 | 1.9 | * |
| Zip 55075 (South St Paul) | Kidney | 13 | 9 | 1.5 | 0.8 | 2.6 | | 18 | 9 | 2.0 | 1.2 | 3.2 | * |
| 8 zip codes combined | All types | 2737 | 2781 | 1.0 | 0.9 | 1.0 | | 3754 | 3408 | 1.0 | 1.0 | 1.1 | * |
| 8 zip codes combined | Colorectal | 218 | 250 | 0.9 | 0.8 | 1.0 | * | 279 | 278 | 1.0 | 0.9 | 1.1 | |
| 8 zip codes combined | Uterus | 160 | 168 | 0.9 | 0.8 | 1.1 | | 259 | 226 | 1.1 | 1.0 | 1.3 | * |

¹ This table lists the statistically significant observed-to-expected results ($\alpha=0.05$ level) reported for females in Tables 3b-11b. The positive findings are drawn from analyses evaluating 270 combinations of cancer type, time period, and geographic area.

Table 13. Comparison of Zip Code-Level Results According to Time Period; 1996-2004 vs. 2005-2012 ¹

| Males | | 2005-2012 | | | |
|-----------|---|-----------------------------|--|----------------------------|-------|
| | | Fewer cancers than expected | Number cancers does not differ from expected | More cancers than expected | Total |
| 1996-2004 | Fewer cancers than expected | 0 | 1 | 0 | 1 |
| | Number of cancers does not differ from expected | 7 | 108 | 7 | 122 |
| | More cancers than expected | 0 | 3 | 0 | 3 |
| | Total | 7 | 112 | 7 | 126 |
| | | | | | |
| Females | | 2005-2012 | | | |
| | | Fewer cancers than expected | Number cancers does not differ from expected | More cancers than expected | total |
| 1996-2004 | Fewer cancers than expected | 0 | 2 | 0 | 3 |
| | Number of cancers does not differ from expected | 2 | 109 | 9 | 129 |
| | More cancers than expected | 0 | 1 | 2 | 3 |
| | Total | 2 | 122 | 11 | 135 |

¹ This table evaluates consistency of findings across the two time periods, 1996-2004 and 2005-2012, summarizing the results of the zip code-level tables (Tables 3-11, with positive results summarized in Tables 12a,b). The number of cancers was considered fewer or more than expected if the difference was statistically significant at the $\alpha=0.05$ level.