

**Estimated Minnesota Cancer Prevalence, January 1, 2000**

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### Background

Cancer prevalence is the number of persons alive on a certain date in a population who were previously diagnosed with cancer. Because individuals continue to require services, support, and care beyond the year in which they were diagnosed, it is an important measure of the burden of cancer in society. An estimated 9.6 million Americans, or 3.4% of the entire population, were living with a history of cancer on January 1, 2000,<sup>1</sup> compared to an estimated 1.2 million newly diagnosed with cancer in 1999.<sup>2</sup> Cancer prevalence in Minnesota has not previously been presented by the Minnesota Cancer Surveillance System (MCSS).

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

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

Because people with a history of cancer can live a normal lifespan, few cancer registries have registered cancer patients for a sufficient length of time to directly measure complete prevalence. In the U.S., the Connecticut cancer registry has registered cancer patients since 1940, and is the source used to approximate complete prevalence. The Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute has registered cancer patients in nine geographic regions covering about ten percent of the U.S. population since 1975, and has nearly complete (95%) follow-up on the vital status of patients. Prevalence percents from the nine SEER regions can be used to estimate limited duration cancer prevalence in geographic areas where cancer registries have operated for a shorter period of time or where follow-up is incomplete. For a complete discussion of SEER methods, see the Overview section of *SEER Cancer Statistics Review, 1975-2000*.<sup>1</sup>

## Methods

MCSS cannot directly calculate prevalence for Minnesota because MCSS has only registered cancers in Minnesota since 1988 and does not have complete follow-up information on the vital status of the individual. However, prevalence percents based on cancer registration in the SEER program have recently been made available in the Cancer Prevalence Database<sup>3</sup> and are the basis for estimating complete and five-year prevalence for Minnesota.

The age-, sex- and site-specific cancer prevalence percents (5-year and 25-year) for the white population in the nine regions participating in the SEER program since 1975 were obtained from the Cancer Prevalence Database 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, 2000, obtained by averaging estimates for the mid-year of 1999 and 2000 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 SEER 9 Region whites during 1995-1999 for five-year prevalence estimates, and during 1988-1999 for complete prevalence. For six sites (brain and nervous system, kidney and renal pelvis, liver and intrahepatic bile duct, lung and bronchus, myeloma, and pancreas), mortality rate ratios were used because MCSS does not include clinically diagnosed cancers. In the SEER database, greater than five percent of these cancers are clinically diagnosed. 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. Complete prevalence was estimated by applying the site-specific ratio of complete and 25-year prevalence in the U.S. from the Cancer Prevalence Database to the 25-year estimates for Minnesota.

## Limitations

The prevalence data presented here are estimates, not actual counts of Minnesotans living with cancer. Adjusting the prevalence percents for the white population in the nine SEER regions by known differences in cancer occurrence between Minnesota and SEER decreased the five-year cancer prevalence estimate for Minnesota by about six percent, and the complete cancer prevalence by about seven percent. 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 SEER 9 Region whites, 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 longer life expectancy than many other states, due in part to having the lowest heart disease mortality rate in the nation. Since Minnesotans live longer, these prevalence estimates may be too low. It is therefore likely that the prevalence estimates presented here represent the lower limits of actual prevalence.

## Results

As of January 1, 2000, an estimated 156,620 Minnesotans were living with a history of cancer (Table 1), or 3.2% of the Minnesota population. An estimated 59,690 of these survivors had been diagnosed in the previous five years (Table 2), or 1.2% of Minnesotans. A total of 22,007 Minnesotans were diagnosed with cancer in 1999.<sup>4</sup>

The number of persons living with a history of cancer for up to five years is very similar for men and women (29,990 and 29,700, respectively). However, the number of women ever diagnosed with cancer and alive on January 1, 2000 (86,540) is much larger than the number of men (70,080). This reflects the fact that women live on average more than five years longer than men, and that breast cancer tends to be diagnosed at a younger age.

Among Minnesota female cancer survivors, two out of five (43% or 37,470 women) have a history of breast cancer; among male cancer survivors, two out of five (41% or 28,480 men) have a history of prostate cancer. These large numbers reflect the facts that breast and prostate cancer accounted for about a third of all cancers diagnosed among men and women in 1999, and that survival is very high. Lung cancer, on the other hand, accounted for 12% of cancers diagnosed in 1999, but only 3% of cancer survivors, because survival is poor.

## Conclusions

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

## References

<sup>1</sup>Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2000*, National Cancer Institute. Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2000](http://seer.cancer.gov/csr/1975_2000), 2003.

<sup>2</sup>American Cancer Society. *Cancer Facts and Figures, 1999*. American Cancer Society. Atlanta, GA. 1999.

<sup>3</sup>Cancer Query System, Cancer Prevalence Database. Available at <http://srab.cancer.gov/prevalence/canques.html>. Statistical Research and Applications Branch, Cancer Control and Population Sciences, National Cancer Institute.

<sup>4</sup>Perkins C, Trute W, Soler J, DeWaard E, Bushhouse S. *Cancer in Minnesota, 1988-1999*, Minnesota Cancer Surveillance System. Minneapolis, MN, <http://www.health.state.mn.us/divs/hpcd/cdee/mcss>, 2003.

**Table 1: Estimated Complete Cancer Prevalence† by Sex and Cancer Type, Minnesota, January 1, 2000**

	Males		Females		Total	
	Persons	% of Survivors	Persons	% of Survivors	Persons	% of Survivors
All Sites Combined	70,080	100%	86,540	100%	156,620	100%
Brain and Nervous System	1,070	1.5%	980	1.1%	2,050	1.3%
Breast	170	0.2%	37,470	43.3%	37,640	24.0%
Cervix Uteri	0	0.0%	3,540	4.1%	3,540	2.3%
Colon and Rectum	8,450	12.1%	9,100	10.5%	17,550	11.2%
Corpus and Uterus, NOS	0	0.0%	9,650	11.2%	9,650	6.2%
Esophagus	260	0.4%	70	0.1%	330	0.2%
Hodgkin Lymphoma	1,300	1.9%	1,170	1.3%	2,470	1.6%
Kidney and Renal Pelvis	2,360	3.4%	1,810	2.1%	4,170	2.7%
Larynx	1,190	1.7%	230	0.3%	1,420	0.9%
Leukemia	1,930	2.8%	1,440	1.7%	3,370	2.2%
Liver and Intrahepatic Bile Duct	100	0.1%	60	0.1%	160	0.1%
Lung and Bronchus	2,620	3.7%	2,420	2.8%	5,040	3.2%
Melanoma of the Skin	3,780	5.4%	4,320	5.0%	8,100	5.2%
Myeloma	380	0.5%	300	0.3%	680	0.4%
Non-Hodgkin Lymphoma	2,910	4.2%	2,830	3.3%	5,740	3.7%
Oral Cavity and Pharynx	2,570	3.7%	1,320	1.5%	3,890	2.5%
Ovary	0	0.0%	3,360	3.9%	3,360	2.1%
Pancreas	190	0.3%	200	0.2%	390	0.2%
Prostate	28,480	40.6%	0	0.0%	28,480	18.2%
Stomach	480	0.7%	330	0.4%	810	0.5%
Testis	2,920	4.2%	0	0.0%	2,920	1.9%
Thyroid	1,100	1.6%	3,540	4.1%	4,640	3.0%
Urinary Bladder	5,960	8.5%	2,140	2.5%	8,100	5.2%

†Estimated number of Minnesotans ever diagnosed with an invasive cancer and alive on January 1, 2000, rounded to the nearest ten persons, using the first malignant primary for a person. Estimates are based on prevalence percentages on January 1, 2000, for the white population in the nine geographic areas participating in the SEER program since 1975,<sup>1,2</sup> adjusted for differences in cancer occurrence between SEER and Minnesota. Please see text for a fuller discussion of methods.

**Table 2: Estimated Five-Year Cancer Prevalence† by Sex and Cancer Type, Minnesota, January 1, 2000**

	Males		Females		Total	
	Persons	% of Survivors	Persons	% of Survivors	Persons	% of Survivors
All Sites Combined	29,990	100%	29,700	100%	59,690	100%
Brain and Nervous System	380	1.3%	360	1.2%	740	1.2%
Breast	70	0.2%	12,780	43.0%	12,850	21.5%
Cervix Uteri	0	0.0%	680	2.3%	680	1.1%
Colon and Rectum	3,270	10.9%	3,240	10.9%	6,510	10.9%
Corpus and Uterus, NOS	0	0.0%	2,420	8.1%	2,420	4.1%
Esophagus	200	0.7%	50	0.2%	250	0.4%
Hodgkin Lymphoma	320	1.1%	280	0.9%	600	1.0%
Kidney and Renal Pelvis	890	3.0%	590	2.0%	1,480	2.5%
Larynx	430	1.4%	90	0.3%	520	0.9%
Leukemia	820	2.7%	570	1.9%	1,390	2.3%
Liver and Intrahepatic Bile Duct	90	0.3%	40	0.1%	130	0.2%
Lung and Bronchus	1,650	5.5%	1,480	5.0%	3,130	5.2%
Melanoma of the Skin	1,420	4.7%	1,360	4.6%	2,780	4.7%
Myeloma	280	0.9%	250	0.8%	530	0.9%
Non-Hodgkin Lymphoma	1,340	4.5%	1,250	4.2%	2,590	4.3%
Oral Cavity and Pharynx	960	3.2%	440	1.5%	1,400	2.3%
Ovary	0	0.0%	1,250	4.2%	1,250	2.1%
Pancreas	150	0.5%	140	0.5%	290	0.5%
Prostate	13,880	46.3%	0	0.0%	13,880	23.3%
Stomach	250	0.8%	140	0.5%	390	0.7%
Testis	700	2.3%	0	0.0%	700	1.2%
Thyroid	310	1.0%	960	3.2%	1,270	2.1%
Urinary Bladder	2,280	7.6%	760	2.6%	3,040	5.1%

† Estimated number of Minnesotans diagnosed with an invasive cancer during 1995-1999 and alive on January 1, 2000, rounded to the nearest ten persons, using the first malignant primary for a person. Estimates are based on prevalence percentages on January 1, 2000, for the white population in the nine geographic areas participating in the SEER program since 1975,<sup>1,2</sup> adjusted for differences in cancer occurrence between SEER and Minnesota. Please see text for a fuller discussion of methods.