MONTANA CANCER CONTROL PROGRAMS

Cancer in Montana
2004-2008

Montana Central Tumor Registry
Annual Report

December 2010
Helena, Montana

MONTANA
Department of Public Health & Human Services

Cancer in Montana
2004-2008

An Annual Report of the
Montana Central Tumor Registry

December 2010

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December 1, 2010

Dear Colleagues and Citizens,

The Montana Department of Public Health and Human Services (DPHHS) is pleased to provide you the Cancer in Montana - 2004-2008 - Montana Central Tumor Registry Annual Report.

This publication was made possible through generous commitment and cooperation among Montana hospitals, cancer registrars, physicians, pathologists, the Montana Office of Vital Statistics, and the Center for Disease Control and Prevention's National Program of Cancer Registries (NPCR). The Montana Cancer Registrars' Association is acknowledged for supporting the Montana Central Tumor Registry (MCTR) and helping to provide vital training to Montana's cancer registrars.

The MCTR is an integral component of Montana's Comprehensive Cancer Control plan. The Montana Cancer Control Coalition (MTCCC) took root in October 2003 when many people came together to identify priority issues for cancer control in Montana. DPHHS is a supporting partner to the MTCCC. Comprehensive Cancer Control is broadly defined as "a coordinated approach to reduce the incidence, morbidity and mortality of cancer through prevention, early detection, treatment, rehabilitation and palliation." The MTCCC developed the Montana Comprehensive Cancer Control (CCC) Plan as a guide for preventing and controlling cancer in Montana. To find more information about the MTCCC, the plan, and to access the Cancer in Montana - 2004-2008 - Montana Central Tumor Registry Annual Report, visit www.cancer.mt.gov.

We hope that you will find this report useful. If you have any questions or need more information please contact Debbi Lemons by e-mail at dlemons@mt.gov or by phone at (406) 444-6786.

Sincerely,

Anna Whiting Sorrell
DPHHS Director

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Executive Summary

Cancer is the second leading cause of death among Montana residents, after diseases of the circulatory system such as heart disease and stroke. Four sites -- prostate, lung and bronchus, female breast, and colon and rectum -- accounted for 57% of all reported cancers in Montana in the interval 2004-2008.

Montana's cancer burden is lower than that of the United States as a whole for all sites combined and for many individual sites. However, more can be done to further reduce the cancer burden in Montana.

- The single greatest cancer prevention measure that can be implemented is smoking prevention or cessation.

  - ✓ More than 90% of cases of cancer of the lung and bronchus are attributable to cigarette smoking and exposure to second-hand smoke. These cancers, accounting for 15% of all newly diagnosed cases in Montana, are therefore almost entirely preventable.

  - ✓ Cigarette smoking also increases the risk of cancers of the sinuses, mouth, throat, liver, pancreas, stomach, kidneys, bladder, colon and rectum, and cervix.

  - ✓ One third of all cancer deaths in Montana are caused by cigarettes.

- Screening for breast, cervical, and colorectal cancer saves lives, either by finding cancer at an early stage when it is most treatable, or by finding and treating precancerous lesions so they do not progress to cancer.

  - ✓ Invasive cervical cancer has been almost eliminated by the widespread use of screening.

  - ✓ Approximately 80% of colorectal cancer could be prevented by colonoscopic screening that can find and remove polyps and other precancerous growths.

  - ✓ More than 95% of women whose breast cancer is diagnosed at the local stage survive for five or more years after diagnosis, compared to fewer than 25% of women whose cancer is diagnosed at the distant stage.

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Acknowledgments

This report would not be possible without the efforts of the Montana Central Tumor Registry staff and the personnel at all reporting facilities that diagnose or treat patients with reportable cancers in Montana. The Montana Central Tumor Registry receives cancer and other tumor reports from many sources: hospitals, radiation treatment centers, physicians, pathology laboratories, the Montana Office of Vital Statistics, and other states where Montana residents go for diagnosis or treatment. Their contribution and cooperation is acknowledged and sincerely appreciated.

Bruce Schwartz and David Fulgham, statisticians in the Office of Vital Statistics, are acknowledged for their contribution of Montana mortality data. Mortality data for 2004-2008 were provided and used to calculate Montana mortality rates.

The Montana Central Tumor Registry would also like to acknowledge its funding sources. The Montana Central Tumor Registry is funded in part by the Montana State General Fund and in part by the Centers for Disease Control – National Program of Cancer Registries (NPCR) under Cooperative Agreement DP07-703 93.283.

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Confidentiality of Cancer Information

Confidentiality is of vital importance to the Montana Central Tumor Registry. The privacy of patients and reporting hospitals, laboratories, and physicians is strictly maintained. Confidentiality is an issue of increasing concern to cancer registries. Montana state statutes, federal laws, and the policies of the Montana Central Tumor Registry prohibit the release of any individually identifiable information to third parties.

Montana cancer data are published only in statistically summarized form so that individual patients, hospitals, or physicians cannot be identified or re-identified through linkage to other data sources. To protect privacy, and to insure reliable statistical estimates, the Montana Central Tumor Registry suppresses rates and counts if there are fewer than five cases or if the relative standard error around an estimated rate is greater than 25% of the estimate. In general, this means that county-level and race-specific data are unavailable, apart from All Sites Combined. More detailed data may be requested by county health departments and health care organizations.

The Montana Central Tumor Registry has recently formed a Data Use Review Committee to act on requests for data sets and make recommendations on data use. The goal of this committee is to make Montana cancer data available for public health activities and research while protecting the confidentiality of individual data. Data sharing policies and procedures for requesting data sets can be found at www.cancer.mt.gov under the link to the Cancer Surveillance and Epidemiology Program.

To further protect confidential information, the Montana Central Tumor Registry is increasingly receiving data in electronic formats. Electronic files can be submitted through the State of Montana File Transfer Service, which is protected under a Secure Socket Layer and meets national and state standards for electronic data transfer using AES encryption and is approved by National Institutes of Standards and Technology (NIST) for FIPS 140-2 level 2 uses. The Montana Central Tumor Registry fax is also electronically secure. Any fax received is automatically saved to a secure server and not printed on a fax machine.

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Introduction

Cancer is a general term for cells that grow out of control, no longer perform their normal functions, and invade other tissues. The Montana Central Tumor Registry collects data on all cancers diagnosed in patients who are residents of Montana or residents of other states who are diagnosed or treated for cancer in Montana.

Cancer was the second leading cause of death in Montana from 2004 through 2008, after diseases of the circulatory system such as heart disease and stroke. A total of 28,526 tumor cases were reported to the Montana Central Tumor Registry in this interval, including invasive and in-situ cancers, benign tumors, and tumors of uncertain behavior. Invasive tumors accounted for 24,073 cases (84%); carcinoma in-situ accounted for 3,778 cases (13%). Cancers were reported for 44 primary anatomical sites and in 981 cases the origin (primary site) of the cancer was unknown or not clearly defined.

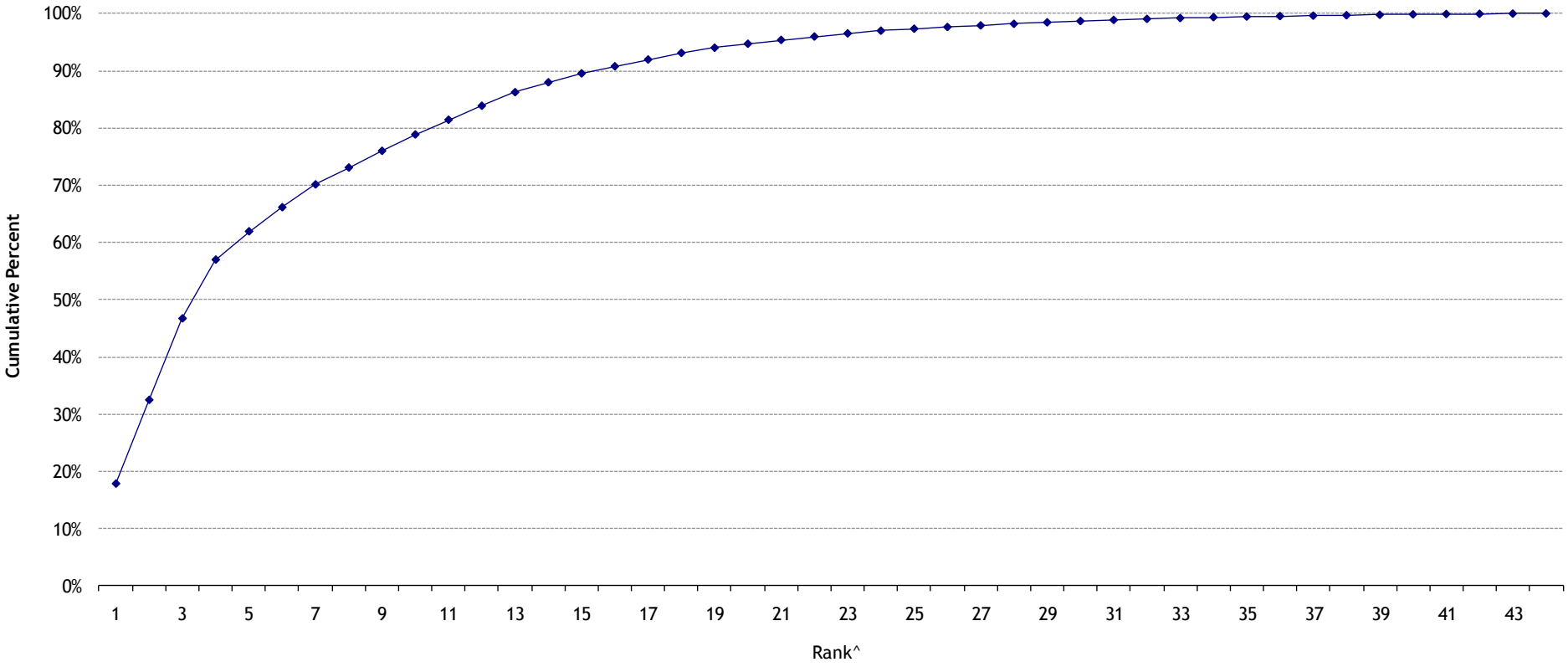
Four sites (prostate, lung and bronchus, female breast, and colon and rectum) accounted for 57% of all incident cancers in Montana from 2004 through 2008. Cancer at the remaining 40 sites was relatively rare and only 17 sites accounted for more than 1% of all cancers. A complete tabulation of cancers reported to the Montana Central Tumor Registry is presented in Figure 1 and Table 1.

This report provides detailed summaries for All Sites Combined and the four most common types of cancer diagnosed among Montana residents (prostate, lung and bronchus, female breast, and colon and rectum), plus cervical cancer. Although invasive cervical cancer is now rare, it was the most common cause of cancer death among women in the United States through the first part of the twentieth century. Since the widespread use of the Papanicolau (Pap) smear screening test was institutionalized in the 1950s, most women are spared ever developing cervical cancer because precancerous lesions are found and treated. However, a decline in Pap screening participation could lead to an upturn in the incidence of invasive cervical cancer, so this is monitored closely.

The summaries include age-adjusted incidence and mortality rates for Montana and the United States, stage at diagnosis, age-specific incidence rates by sex, 10-year incidence trends, and relative survival for Montana residents. All rates are age-adjusted to the 2000 standard million population.[1] These rates are <u>not</u> comparable to rates age-adjusted to any other reference population. For example, in the past it was conventional to adjust rates using the 1970 standard million population.

[1] See Appendix F. See also R. N. Anderson and H. M. Rosenberg, Age Standardization of Death Rates: Implementation of the Year 2000 Standard. National Vital Statistics Report, Vol 47, no. 3. Hyattsville, MD: National Center for Health Statistics, 1998.

Figure 1. Ranked Cumulative Percent of Invasive Cancers by Anatomical Site#, Montana 2004-2008



See site groupings on next page.

^ Sites were ranked in descending order according to their respective percentage of the total number of invasive cancer cases. Then cumulative percentages were computed and graphed. To read this graph, examine the y-axis, for example 50%, and drop an imaginary line down to the x-axis, in this case rank number 3. This tells you that three cancer sites (prostate, lung & bronchus, and breast) account for 50% of invasive cancer cases, according to this grouping. Similarly, eight sites account for approximately 75% of all cases.

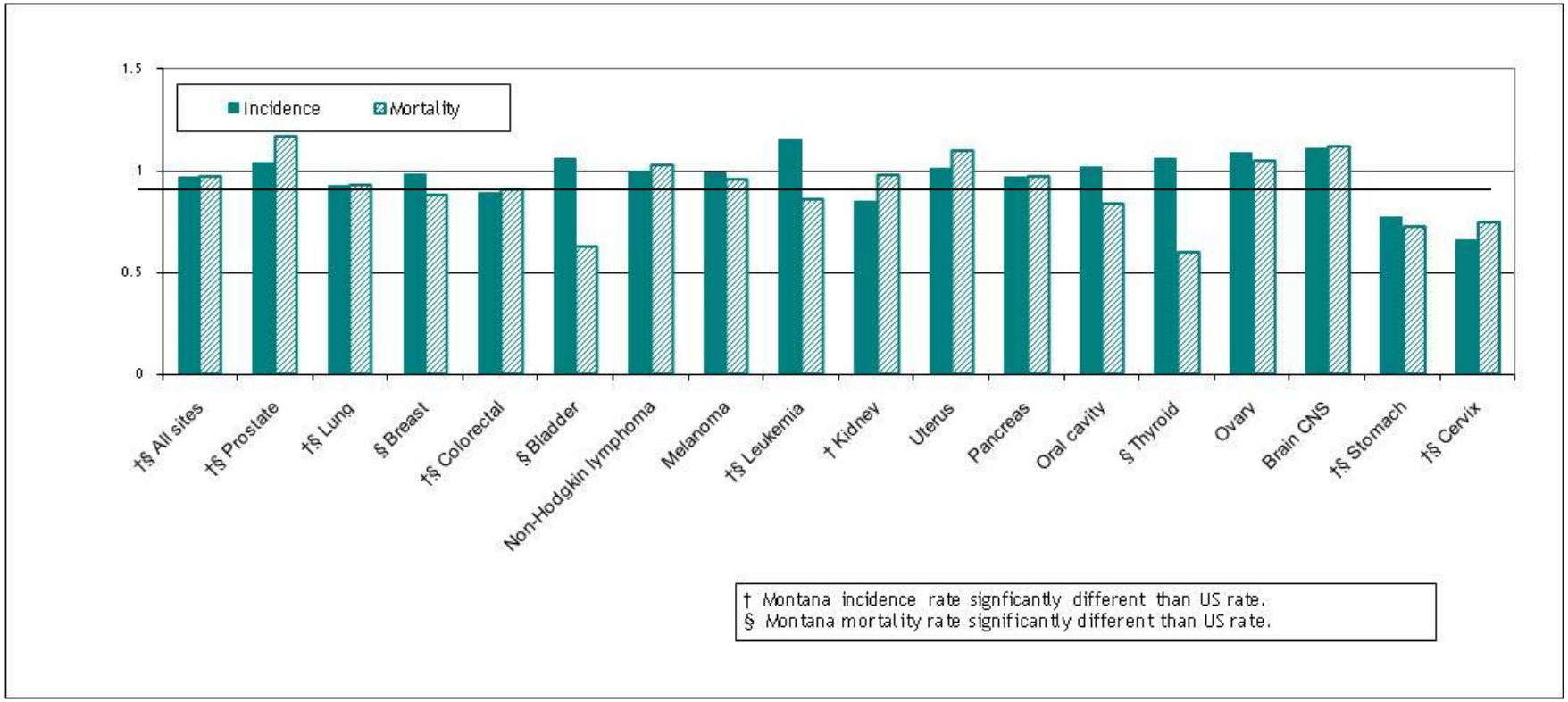
Table 1. Ranked Cumulative Percent of Invasive Cancers by Anatomical Site, 2004-2008

Rank	Anatomical Site Grouping*	MALE	FEMALE	Percent of Total Cases	Ranked Cumulative Percent	Incidence Rate ***	95% Confidence Interval	
1	Prostate	4,211		17.76%	17.76%	161.5	(156.5 - 166.5)	†
2	Lung & Bronchus	1,794	1,676	14.64%	32.40%	64.8	(62.6 - 67.0)	‡
3	Breast	27	3,353	14.26%	46.66%	62.7	(69.5 - 64.8)	‡
4	Colon & Rectum	1,281	1,155	10.28%	56.94%	45.0	(43.2 - 46.8)	‡
5	Bladder**	889	285	4.95%	61.89%	21.7	(20.4 - 22.9)	
6	Non-Hodgkin Lymphoma*	550	449	4.21%	66.11%	18.7	(17.5 - 19.9)	
7	Melanoma	512	434	3.99%	70.10%	18.0	(16.9 - 19.2)	
8	Leukemia	410	290	2.95%	73.05%	13.4	(12.4 - 14.4)	
9	Uterus		693	2.92%	75.97%	24.0	(22.2 - 25.8)	‡
10	Kidney & Renal Pelvis	428	251	2.86%	78.84%	12.7	(11.7 - 13.7)	
11	Pancreas	323	287	2.57%	81.41%	11.1	(10.2 - 12.0)	
12	Oral Cavity & Pharynx	414	165	2.44%	83.86%	10.6	(9.7 - 11.5)	
13	Thyroid	130	434	2.38%	86.23%	11.5	(10.5 - 12.5)	†
14	Ovary		409	1.73%	87.96%	14.2	(12.8 - 15.6)	
15	Brain & Other CNS	228	142	1.56%	89.52%	7.2	(6.4 - 7.9)	
16	Multiple Myeloma	165	130	1.24%	90.77%	5.5	(4.8 - 6.1)	‡
17	Stomach	172	109	1.19%	91.95%	5.1	(4.5 - 5.8)	
18	Esophagus	224	50	1.16%	93.11%	5.0	(4.4 - 5.6)	
19	Liver & Bile Duct	139	75	0.90%	94.01%	3.8	(3.3 - 4.4)	‡
20	Larynx	124	40	0.69%	94.70%	3.0	(2.5 - 3.4)	‡
21	Soft Tissue	84	76	0.67%	95.38%	3.2	(2.7 - 3.7)	
22	Cervix		140	0.59%	95.97%	5.5	(4.6 - 6.5)	‡
23	Testis	131		0.55%	96.52%	5.9	(4.9 - 6.9)	
24	Hodgkin Lymphoma*	61	50	0.47%	96.99%	2.3	(1.9 - 2.7)	
25	Small Intestine	39	44	0.35%	97.34%	1.5	(1.2 - 1.9)	‡
26	Other Biliary	37	33	0.30%	97.63%	1.3	(1.0 - 1.6)	
27	Anus & Anal Canal	17	49	0.28%	97.91%	1.2	(0.9 - 1.5)	
28	Vulva		65	0.27%	98.19%	2.2	(1.7 - 2.8)	‡
29	Other Skin Cancers	30	32	0.26%	98.45%	1.2	(0.9 - 1.5)	‡
30	Eye	30	25	0.23%	98.68%	1.0	(0.8 - 1.3)	
31	Bones & Joints	26	21	0.20%	98.88%	0.9	(0.7 - 1.2)	
32	Gallbladder	11	31	0.18%	99.06%	0.8	(0.5 - 1.0)	‡
33	Other Endocrine	20	15	0.15%	99.20%	0.7	(0.5 - 1.0)	
34	Peritoneum	~	33	0.15%	99.35%	0.6	(0.4 - 0.9)	
35	Nasal Cavity & Sinuses	21	6	0.11%	99.46%	0.5	(0.3 - 0.7)	‡
36	Ureter	15	~	0.08%	99.54%	~	~	
37	Retroperitoneum	~	15	0.08%	99.62%	~	~	
38	Penis	18		0.08%	99.70%	0.7	(0.4 - 1.0)	
39	Other Female Genital Organs		18	0.08%	99.77%	0.7	(0.4 - 1.0)	
40	Vagina		18	0.08%	99.85%	~	~	
41	Other Digestive Organs	8	6	0.06%	99.91%	~	~	
42	Trachea & Pleura	5	~	0.03%	99.94%	~	~	
43	Other Urinary Organs	~	6	0.03%	99.97%	~	~	
44	Other Male Genital Organs	6		0.03%	100.00%	~	~	
	Total Excluding Unknowns	12,587	11,117	100.00%				
	Unknown and Ill-defined Sites	514	467			18.3	(17.1 - 19.4)	
	Total Invasive Cancers	13,101	11,584			459.0	(453.2 - 464.8)	‡

* Non-Hodgkin Lymphoma (NHL) and Hodgkin Lymphoma are not included in the anatomical site (e.g., lymphoma of the stomach is counted as a lymphoma, not stomach cancer).
** Incidence includes all invasive cases plus bladder in-situ cases.
*** Per 100,000, age-adjusted to the 2000 Standard Million.
~ Indicates fewer than 5 cases or relative standard error greater than 25% of estimated rate.
† Montana rate statistically significantly higher than US rate. ‡ Montana rate statistically significantly lower than US rate.

Montana's cancer incidence or mortality or both were lower than those of the United States as a whole for all sites combined, for three of the four most common sites (lung and bronchus, female breast, and colorectal), and for many other sites (kidney, oral cavity, stomach, liver, larynx, cervix, and small intestine) (Table 1 and Figure 2). Montana's incidence of prostate and thyroid cancer were higher than those of the United States. Rates at other sites were not different.

Figure 2. Montana Cancer Incidence and Mortality Rates Relative to the United States



Standardized incidence and mortality ratios. Ratios less than 1.0 indicate Montana rates are lower than national rates. Ratios greater than 1.0 indicate Montana rates are higher than national rates. Statistically significant differences are indicated by † for incidence rates and § for mortality rates.

Cancer Among American Indian Residents of Montana, 2004-2008

Identifying American Indian Patients in the Montana Central Tumor Registry

American Indians are often misclassified in health records systems, including tumor registries. This underestimates the cancer burden of American Indians. Montana and 45 other states collaborate with the Indian Health Service (IHS) Division of Epidemiology to perform annual records linkages between state tumor registry files and IHS administrative files from 1990 forward. Each year the Montana Central Tumor Registry reclassifies an average of 25 to 30 patients to American Indian through this process. This greatly improves the accuracy of cancer data for American Indian residents of Montana.

Computing Cancer Incidence Rates for American Indians

Montana has a relatively small population overall, approximately 967,000 in 2008. There are fewer than 70,000 American Indian residents of Montana, 7% of the total population, with fewer than 250 cases of cancer per year. Small numbers yield statistically unreliable rates that fluctuate substantially from year to year. Apart from All Sites Combined, the relative standard errors around the incidence rates for American Indians (Table 2) are greater than 25%, indicating a large margin of error around the rate.

Cancer Incidence Among American Indian Residents of Montana

The most common incident cancers among American Indian residents of Montana are the same as those for the state as a whole: prostate, breast, lung and bronchus, and colon and rectum. The incidence rates of prostate and breast cancers among American Indian residents are not statistically significantly different than the statewide incidence rates. American Indian residents have statistically significantly higher incidence rates of lung, colorectal, kidney, stomach, and liver cancers.

The disparities in cancer incidence between American Indian and other residents of Montana are associated with differences in lifestyle and screening participation. Approximately 85% of cases of **lung cancer** are attributable to smoking cigarettes; 54% of American Indian adults in Montana smoke, compared to 14% of White adults in Montana.[2] Smoking is also a risk factor for **stomach and kidney cancers**.

Infection with *Helicobacter pylori* is a risk factor for **stomach cancer**. *H. pylori* is a bacterium that infects the lining of the stomach and causes chronic irritation. Irritation can lead to ulcers and stomach cancer.[3] Among American Indian residents of Montana, the kinds of stomach cancer associated with *H. pylori* account for one half of all cases, while among White residents they account for only one third of all cases. This is consistent with studies of stomach cancer among American Indians in other parts of the United States.[4] *H. pylori*

2 Montana Tobacco Use Prevention Program. 2009. Adult Tobacco Use in Montana. *Results of the 2008 Montana Adult Tobacco Survey*. Helena, MT.
3 McNamara, D, El-Omar, E. 2008. *Dig Liver Dis* epub May 15, 2008.
4 Wiggins et al. 2008. *Cancer* 113(Suppl 5):1225-1233.

Table 2. Cancer Incidence Statewide and Among American Indian Residents of Montana, 2004-2008

Primary Site	Statewide		American Indian		
	Incidence *	95% CI **	Incidence	95% CI §	
All sites	459.0	(453.2 – 464.8)	557.3	(521.6 – 593.0)	†
Prostate	161.5	(156.5 – 166.5)	153.5	(124.0 – 182.9)	
Breast (female)	119.6	(115.5 – 123.7)	122.3	(101.1 – 143.6)	
Lung and bronchus	64.8	(62.6 – 67.0)	99.9	(84.3 – 115.5)	†
Colon and rectum	45.0	(43.2 – 46.8)	69.5	(56.5 – 82.6)	†
Uterus	24.0	(22.2 – 25.8)	30.9	(20.4 – 41.3)	
Bladder	21.7	(20.4 – 22.9)	17.8	(10.7 – 24.8)	
Non-Hodgkin lymphoma	18.7	(17.5 – 19.9)	21.4	(14.3 – 28.5)	
Melanoma	18.0	(16.9 – 19.2)	5.2	(1.7 – 8.6)	‡
Ovary	14.2	(12.8 – 15.6)	13.7	(6.5 – 20.9)	
Leukemia	13.4	(12.4 – 14.4)	10.5	(5.8 – 15.1)	
Kidney and renal pelvis	12.7	(11.7 – 13.7)	23.9	(17.0 – 30.7)	†
Thyroid	11.5	(10.5 – 12.5)	7.5	(4.2 – 10.9)	
Pancreas	11.1	(10.2 – 12.0)	12.9	(7.0 – 18.8)	
Brain and other CNS	7.2	(6.4 – 7.9)	7.4	(3.8 – 11.0)	
Cervix	5.5	(4.6 – 6.5)	10.0	(4.7 – 15.3)	
Multiple myeloma	5.5	(4.8 – 6.1)	9.9	(5.0 – 14.7)	
Stomach	5.1	(4.5 – 5.8)	13.7	(8.2 – 19.2)	†
Esophagus	5.0	(4.4 – 5.6)	3.9	(0.8 – 7.0)	
Liver and bile duct	3.8	(3.3 – 4.4)	15.8	(10.0 – 21.6)	†

Sites account for 80% of all cancers statewide and for 85% of all cancers among American Indians.
* Incidence rates per 100,000 population, age-adjusted to the 2000 Standard Population.
** CI = Confidence Interval. True incidence is within this range with 95% certainty.
§ Apart from All Sites Combined, all relative standard errors computed for American Indian incidence rates are greater than 25% of the point estimate.
† Indicates that American Indian incidence rate is statistically significantly higher than statewide incidence rate.
‡ Indicates that American Indian incidence rate is statistically significantly lower than statewide incidence rate.

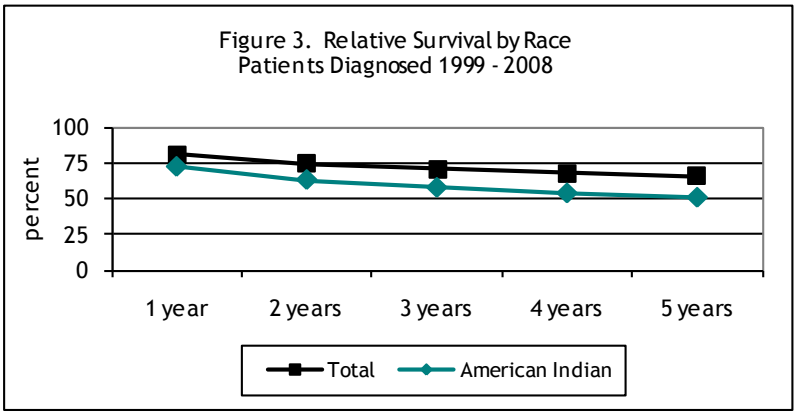
infection is usually acquired in childhood or adolescence and usually lasts throughout life. It is less common in more affluent communities and more common where community sanitation is poor and housing conditions are crowded.[5]

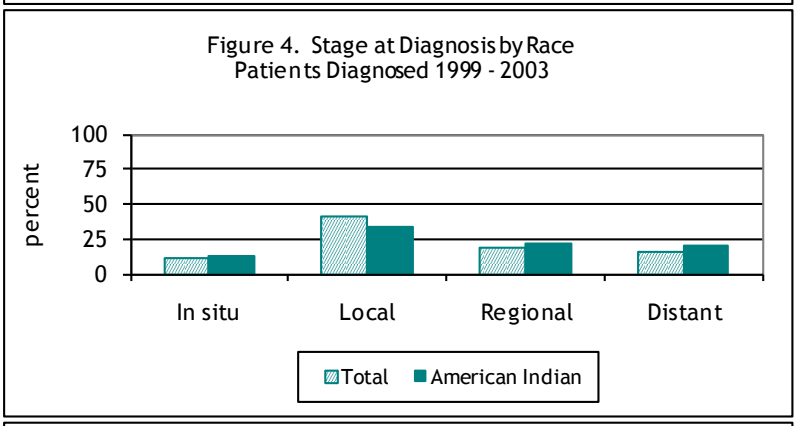
Cirrhosis of the liver (chronic inflammation and fibrosis from several causes) increases the risk of **liver cancer**. The most common causes of cirrhosis are alcohol abuse and chronic infection with Hepatitis B or C. Even moderate alcohol consumption in combination with chronic hepatitis can cause cirrhosis. The National Cancer Institute recommends Hepatitis B vaccination to reduce the risk of liver cancer.[6]

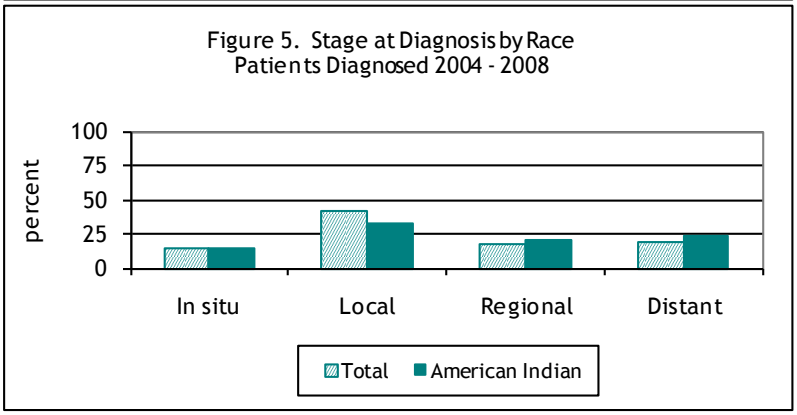
5 Brown LM. 2000. *Epidemiol Rev* 22:283-297.
6 http://www.cancer.gov/pdq/prevention/hepatocellular/HealthProfessinal/page2

Colorectal cancer is almost entirely preventable by endoscopic screening. Among American Indian adults in Montana age 50 years and older, 43% have ever had an endoscopy, compared to 57% of White adults age 50 and older in Montana.[7]

Cancer survival among American Indian residents of Montana is slightly lower than survival for all residents for patients diagnosed between 1999 and 2008 (Figure 3). The lower survival is attributable in part to later stage at diagnosis among American Indian patients, which did not improve between 1999-2003 and 2004-2008 (Figures 4 and 5).







7 Montana Behavioral Risk Factor Surveillance System, 2008 Survey. http://74.205.72.25/html/brfss-index.shtml

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Summary Tables

All Sites Combined

Prostate

Lung and Bronchus

Breast (female)

Colon and Rectum

Cervix

All Sites Combined

Incidence and Mortality Summary[a]

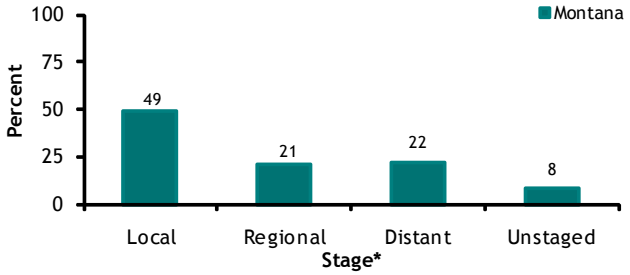
Incidence	Incidence Rate[b]		
	Male †	Female	Total †
U.S.	556.3	415.3	473.1
Montana	520.0	410.8	459.0
95% CI	(510.9 - 529.0)	(403.1 - 418.4)	(453.2 - 464.8)

	Montana only		
No. of Cases:	Male	Female	Total
Invasive	12,639	11,434	24,073
In-Situ	1,226	2,552	3,778
Uncertain	49	61	110
Benign	203	362	565

Mortality	Mortality Rate[b]		
	Male †	Female †	Total †
U.S.	229.2	157.8	186.9
Montana	206.4	152.1	174.8
95% CI	(201.6 - 211.2)	(147.5 - 156.7)	(172.8 - 176.9)

	Montana only		
No. of Deaths:	Male	Female	Total
All Cancers	4,986	4,519	9,505

Stage at Diagnosis



* SEER data for stage at diagnosis are unavailable for all cancers combined.

† Montana rates are statistically significantly lower than U.S. rates.

a Rates include all invasive cases plus bladder in-situ cases.

b Incidence and mortality rates are per 100,000 age-adjusted to the 2000 Standard Million Population. Montana age-adjusted rates are for 2004-2008. U.S. age-adjusted rates are for 2002-2006 based on USCS.

Risk and Associated Factors

Age: As we age, we are more likely to develop cancer. Cancer is most often found in people over the age of 60.

Sex: Looking at all cancers combined, men are more likely to be diagnosed with a cancer than women.

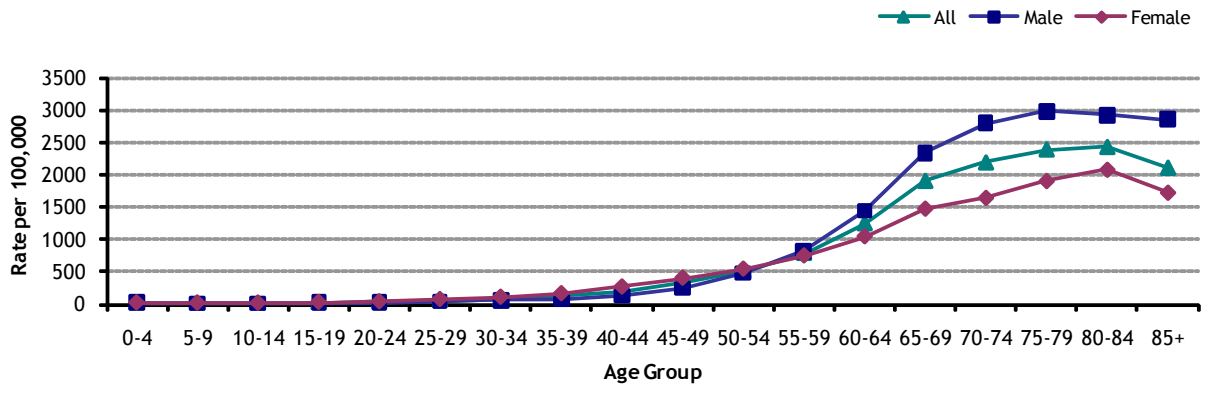
Race: Looking at all cancers, African Americans are more likely to be diagnosed with cancer than people of other races.

Family history and genetics: Many kinds of cancer tend to recur in families, and a family history of cancer in a near relative is a risk factor for developing that kind of cancer. However, it is often not clear whether familial aggregation of cancer is due to shared environments, shared genetic predispositions, or both. Some cancers are associated with specific genetic conditions or mutations, but these account for a very small proportion of cancers. More than 90% of all cancers are sporadic, that is, not due to an inherited genetic susceptibility.

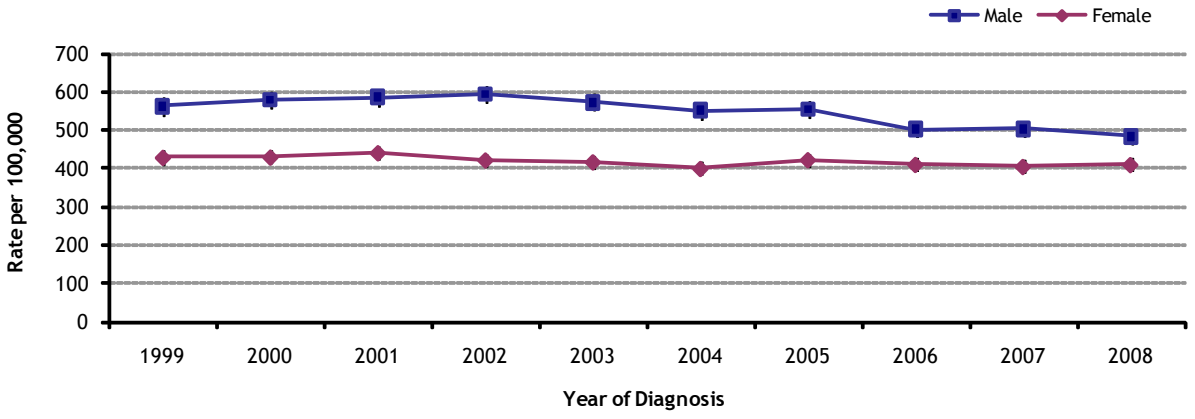
Prevention: Healthy lifestyles can substantially reduce the risk of cancer. The risk of developing many kinds of cancer increases with smoking, obesity, high-fat and low-fiber diets, and a sedentary lifestyle. In addition, screening and early detection can find cancers or precursor lesions at an early stage, when they are the most treatable.

All Sites Combined

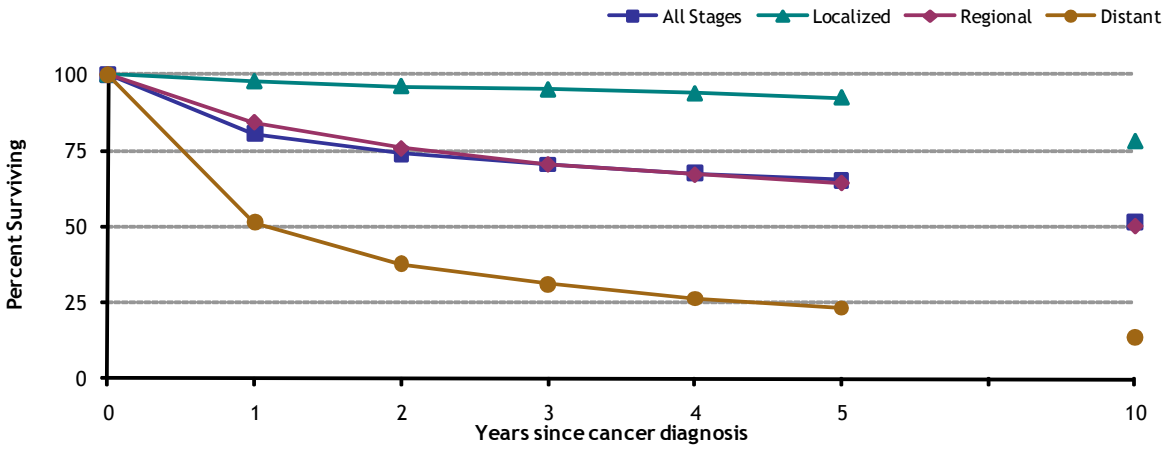
Age-Specific Incidence Rates, 2004-2008



Ten-Year Trend[c], 1999-2008



Relative Survival, 1999-2008



c Confidence intervals (95%) are shown with vertical bar.

Prostate

Incidence and Mortality Summary[a]

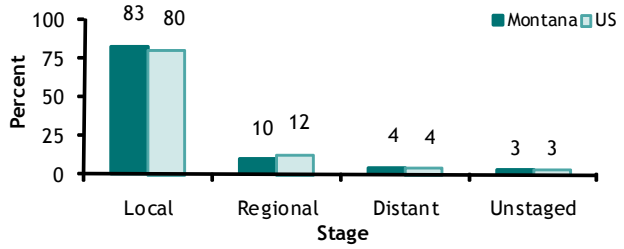
Incidence	Incidence Rate[b]		
	Male ‡	Female	Total
U.S.	155.1		
Montana	161.5		
95% CI	(156.5 - 166.5)		

	Montana only		
No. of Cases:	Male	Female	Total
Invasive	4,211		
In-Situ	358		
Uncertain	0		
Benign	0		

Mortality	Mortality Rate[b]		
	Male ‡	Female	Total
U.S.	25.6		
Montana	27.6		
95% CI	(26.1 - 29.0)		

	Montana only		
No. of Deaths:	Male	Female	Total
Prostate	622		

Stage at Diagnosis[c]



Risk and Associated Factors

Age: Age is the strongest risk factor for prostate cancer, with most men diagnosed after age 65.

Race: African American men are more likely to be diagnosed with prostate cancer than men of other races.

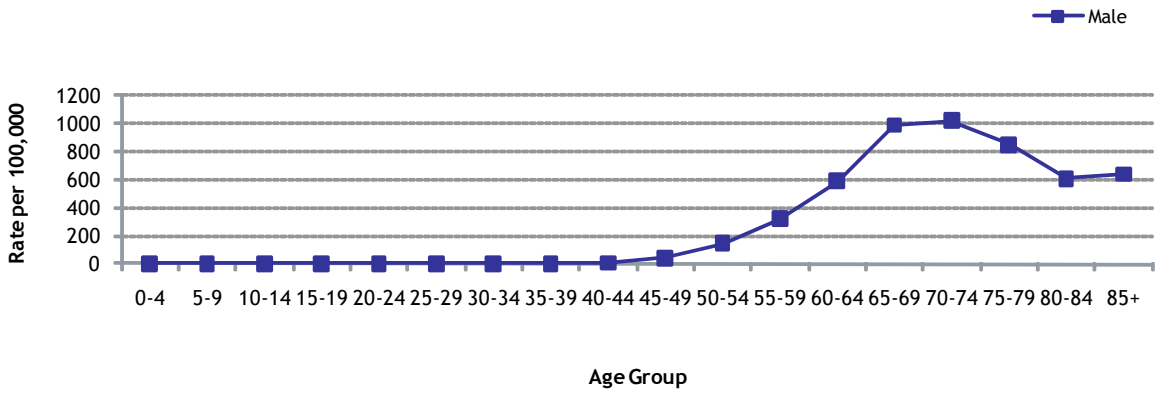
Diet: A diet high in animal fat or low in fruits and vegetables may increase the risk of prostate cancer.

Family History: Risk of prostate cancer increases if a man's father or brother had the disease.

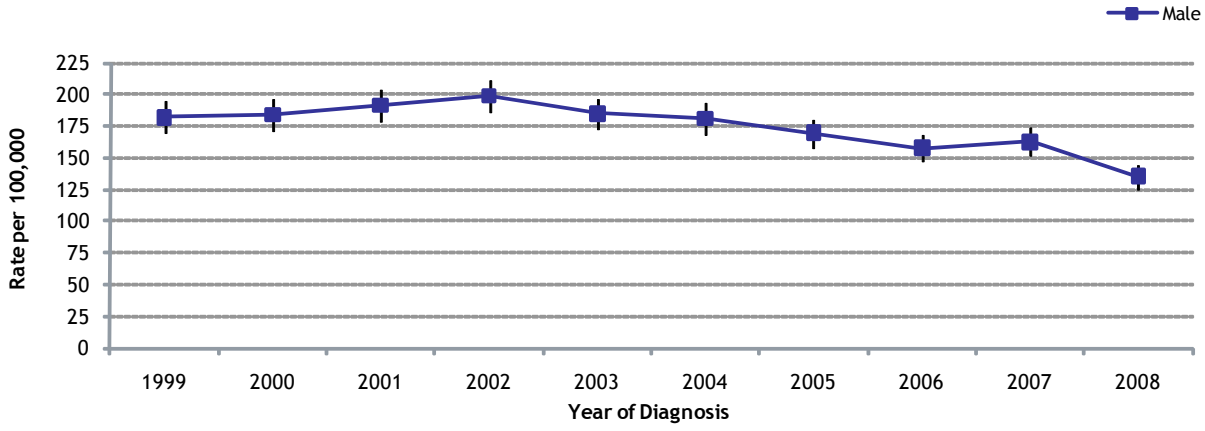
a Rates inlcude invasive cancers only.
b Incidence and mortality rates are per 100,000 age-adjusted to the 2000 Standard Million Population. Montana age-adjusted rates are for 2004-2008. U.S. age-adjusted rates are for 2002-2006 based on USCS.
c Montana stage at diagnosis are for 2004-2008; SEER data for stage at diagnosis are 1999-2006.
‡ Montana rate is statistically significantly higher than U.S. rate.

Prostate

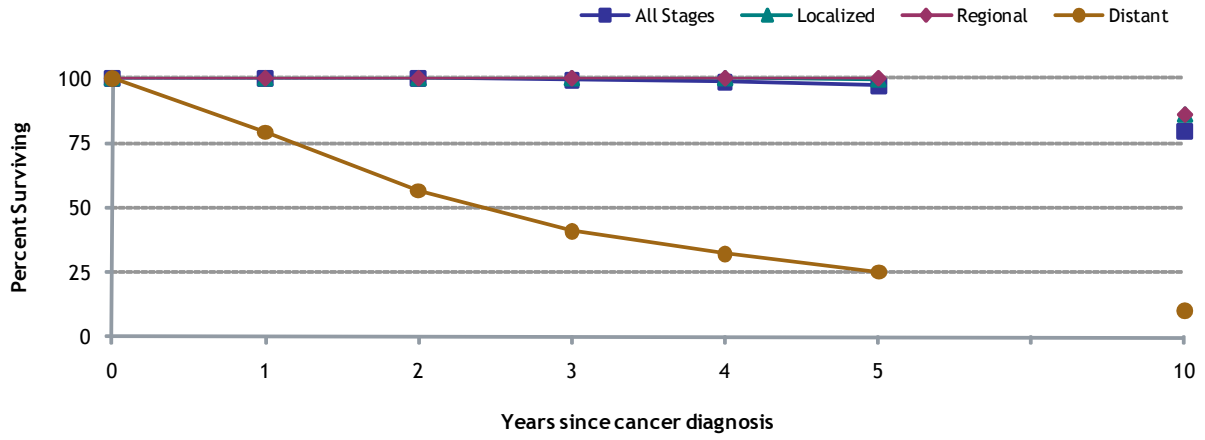
Age-Specific Incidence Rates, 2004-2008



Ten-Year Trend[d], 1999-2008



Relative Survival, 1999-2008



d Confidence intervals (95%) are shown with vertical bar.

Lung and Bronchus

Incidence and Mortality Summary[a]

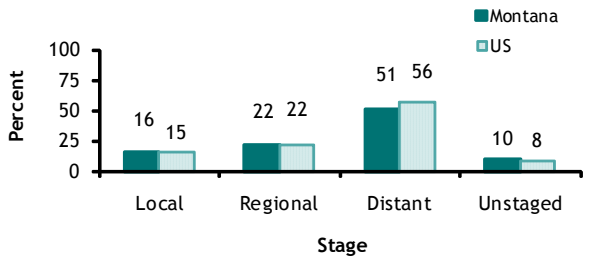
Incidence	Incidence Rate[b]		
	Male †	Female	Total †
U.S.	86.8	55.8	68.9
Montana	73.2	58.5	64.8
95% CI	(69.8 - 76.7)	(55.7 - 61.3)	(62.6 - 67.0)

	Montana only		
No. of Cases:	Male	Female	Total
Invasive	1,794	1,676	3,470
In-Situ	~	~	~
Uncertain	~	~	~
Benign	0	0	0

Mortality	Mortality Rate[b]		
	Male †	Female	Total †
U.S.	70.5	40.9	53.4
Montana	59.3	42.5	49.8
95% CI	(56.8 - 61.9)	(39.9 - 45.1)	(47.6 - 52.0)

	Montana only		
No. of Deaths:	Male	Female	Total
Lung & Bronc	1,442	1,234	2,676

Stage at Diagnosis[c]



Risk and Associated Factors

Lung cancer is the most commonly diagnosed cancer worldwide and the most common cause of cancer death. It is almost entirely preventable because nearly all cases can be attributed to avoidable risk factors.

Smoking and Exposure to Secondhand Smoke: More than 90% of all cases of lung cancer are attributable to cigarette smoking. The remaining 10% is attributable to exposure to second hand smoke or radon.

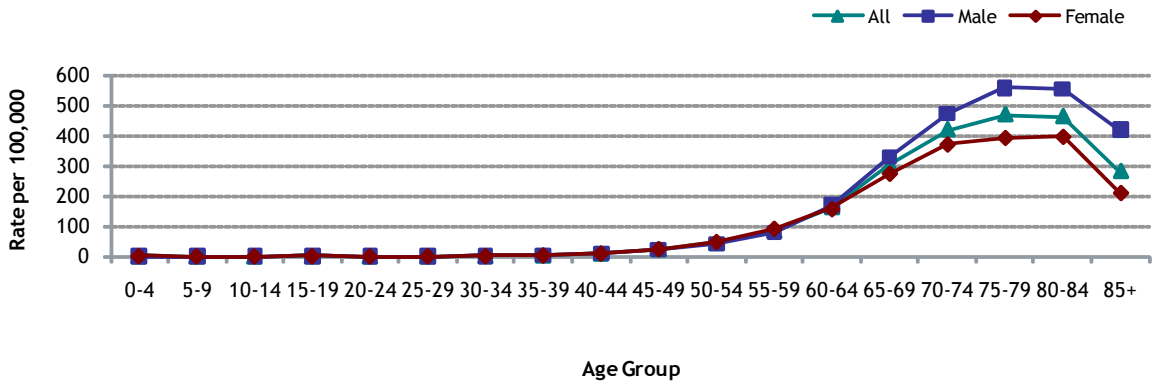
Occupation: People exposed to asbestos are at increased risk of developing lung cancer. Those who smoke and are exposed to asbestos are at even greater risk.

Environment: Exposure to radon increases the risk of developing lung cancer. People who smoke and are exposed to radon are at even greater risk. Some regions have high levels of naturally occurring radon which may enter homes. Simple home test kits are available and ventilation of basements or crawl spaces is an effective form of remediation.

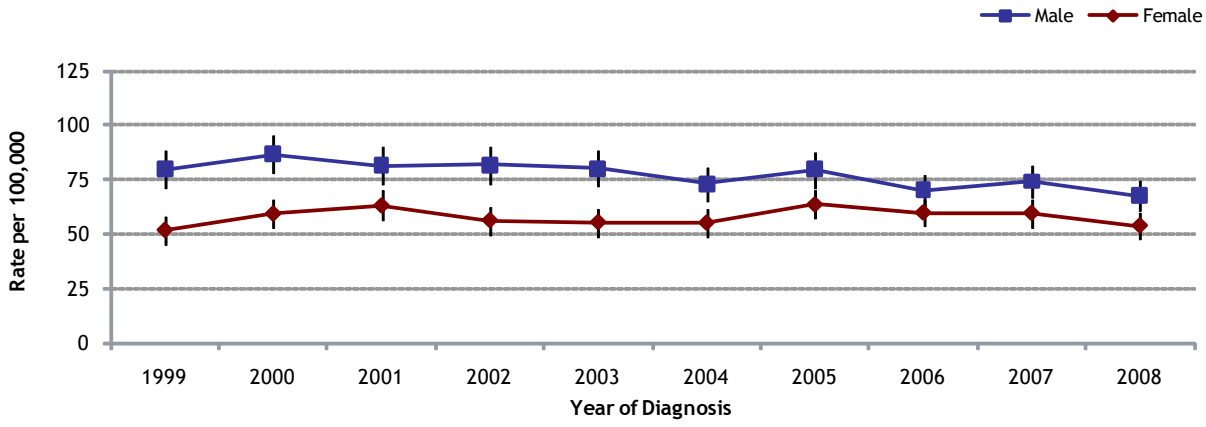
a Rates include invasive cases only.
b Incidence and mortality rates are per 100,000 age-adjusted to the 2000 Standard Million Population. Montana age-adjusted rates are for 2004-2008. U.S. age-adjusted rates are for 2002-2006 based on USCS.
c Montana stage at diagnosis are for 2004-2008; SEER data for stage at diagnosis are 1999-2006.
† Montana rates statistically significantly lower than U.S. rates.
~ Counts are suppressed when fewer than 5 cases to ensure confidentiality and statistical reliability.

Lung and Bronchus

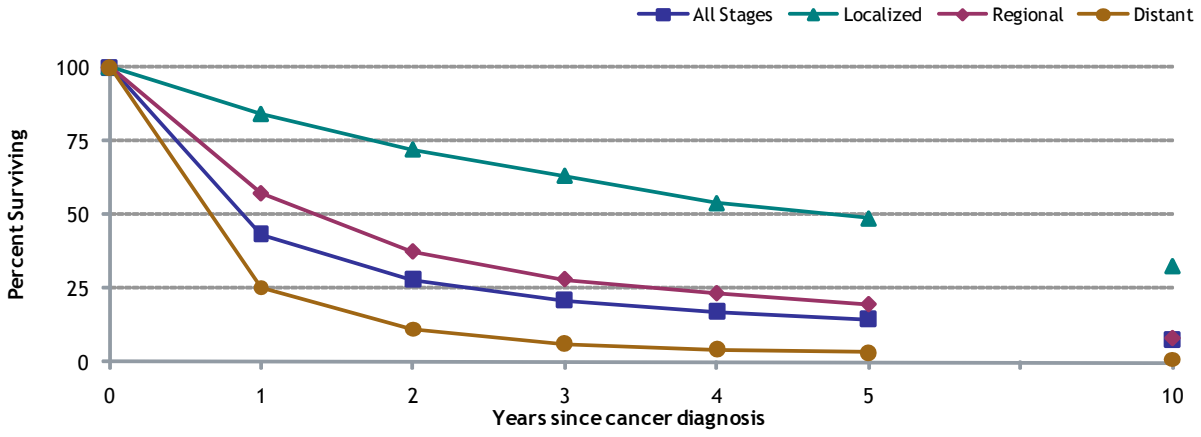
Age-Specific Incidence Rates, 2004-2008



Ten-Year Trend[d], 1999-2008



Relative Survival, 1999-2008



d Confidence intervals (95%) are shown with vertical bar.

Breast (female)

Incidence and Mortality Summary[a]

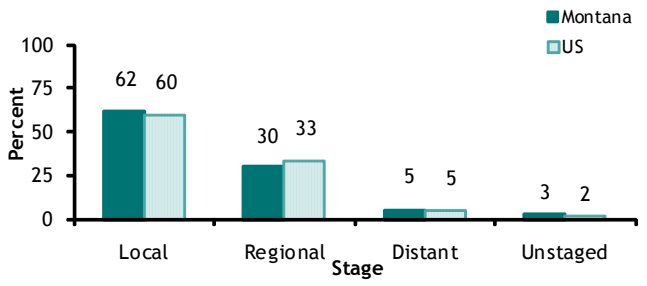
Incidence	Incidence Rate[b]		
	Male	Female	Total
U.S.		121.7	
Montana		119.6	
95% CI		(115.5 - 123.7)	

	Montana only		
No. of Cases:	Male	Female	Total
Invasive		3,353	
In-Situ		797	
Uncertain		0	
Benign		~	

Mortality	Mortality Rate[b]		
	Male	Female †	Total
U.S.		24.5	
Montana		20.5	
95% CI		(18.1 - 22.9)	

	Montana only		
No. of Deaths:	Male	Female	Total
Breast		602	

Stage at Diagnosis[c]



Risk and Associated Factors

Age: Age is the most important risk factor for breast cancer. Incidence increases rapidly from age 20 through 50, then levels off slightly.

Race: Overall, breast cancer is more common in white women compared to women of other races, although it is more common in younger black women than younger white women.

Physical Activity: Women who are physically inactive throughout life appear to have an increased risk of breast cancer.

Obesity: Women who are obese after menopause have an increased risk of breast cancer.

Genetics: Breast cancer in a first-degree female relative is a risk factor for breast cancer. Between 5% and 10% of breast cancer has been attributed to specific genetic mutations, including the BRCA1 or BRCA2 genes. However, 90% or more of newly diagnosed cases of breast cancer occur in women who do not have a known family history of breast cancer and who do not have a recognized genetic mutation.

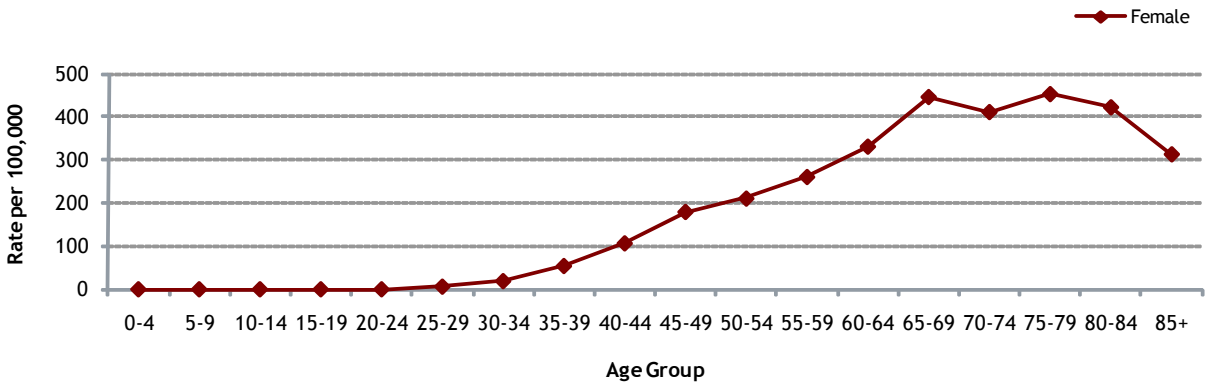
Family History: A woman's risk increases if she has a history of breast cancer in her family, especially if her mother, sister or daughter had breast cancer before the age of 40.

Reproductive History: The risk of breast cancer is increased among women who experience menarche at an early age, women who experience menopause at a late age, and women who have never had children. These effects are believed to be mediated by estrogen. Early first full-term pregnancy, higher number of births, and breastfeeding reduce the risk for breast cancer.

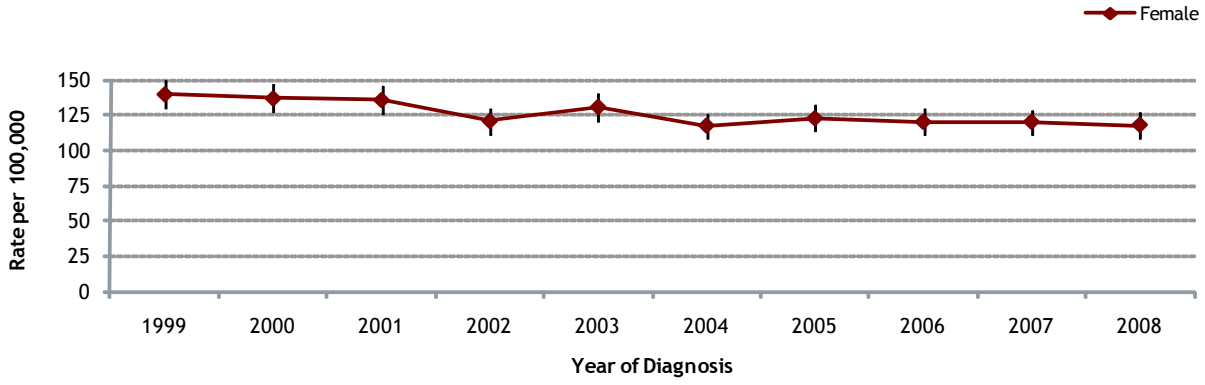
a Rates include invasive cases only.
b Incidence and mortality rates are per 100,000 age-adjusted to the 2000 Standard Million Population. Montana age-adjusted rates are for 2004-2008. U.S. age-adjusted rates are for 2002-2006 based on USCS.
c Montana stage at diagnosis are for 2004-2008; SEER data for stage at diagnosis are 1999-2006.
† Montana rate statistically significantly lower than U.S. rates.
~ Counts are suppressed when fewer than 5 cases to ensure confidentiality and statistical reliability.

Breast (female)

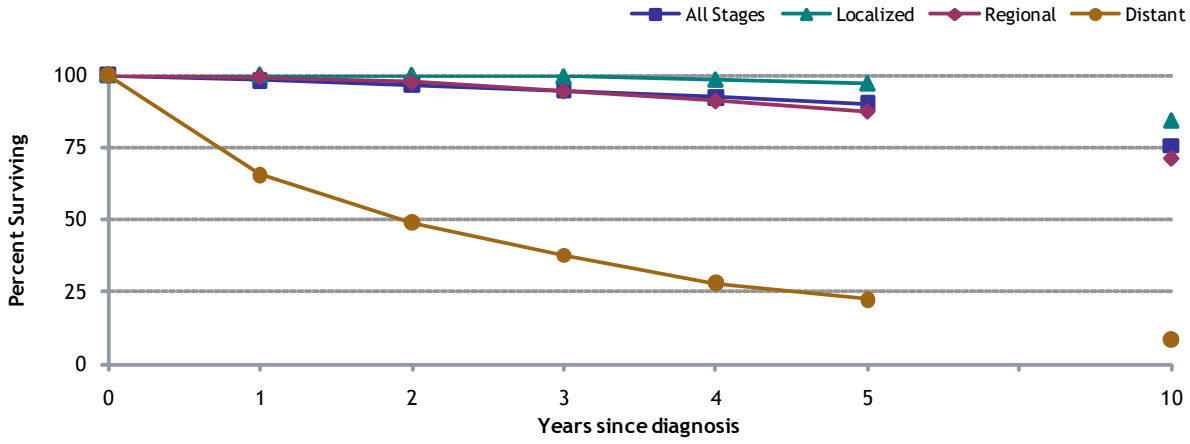
Age-Specific Incidence Rates, 2004-2008



Ten-Year Trend[d], 1999-2008



Relative Survival, 1999-2008



d Confidence intervals (95%) are shown with vertical bar.

Colon & Rectum

Incidence and Mortality Summary[a]

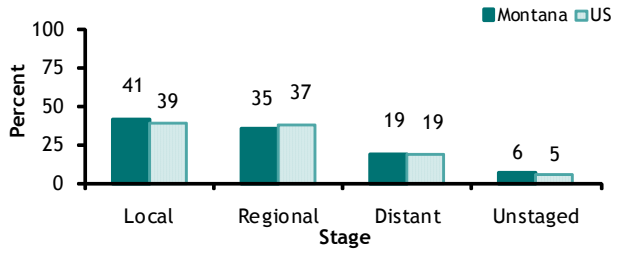
Incidence	Incidence Rate[b]		
	Male †	Female †	Total †
U.S.	59.1	43.6	50.4
Montana	51.3	39.4	45.0
95% CI	(48.5 - 54.2)	(37.1 - 41.7)	(43.2 - 46.8)

	Montana only		
No. of Cases:	Male	Female	Total
Invasive	1,281	1,155	2,436
In-Situ	51	32	83
Uncertain	8	14	22
Benign	0	0	0

Mortality	Mortality Rate[b]		
	Male †	Female †	Total †
U.S.	21.9	15.4	18.2
Montana	17.4	13.8	15.5
95% CI	(15.4 - 19.3)	(11.4 - 15.3)	(13.8 - 17.1)

	Montana only		
No. of Deaths:	Male	Female	Total
Colon & Rect	421	427	848

Stage at Diagnosis[c]



Risk and Associated Factors

Age: The incidence of colorectal cancer begins to increase around age 35 but increases most rapidly after age 50 and peaks after age 70. Ninety percent of all colorectal cancers are diagnosed after age 50.

Sex: Males are diagnosed with colorectal cancer slightly more than females.

Race: African Americans are diagnosed with colorectal cancer slightly more than other races.

Diet: A diet high in fat and low in fruits and vegetables may increase the risk of colorectal cancer.

Smoking: People who smoke are more likely to develop polyps and colorectal cancer.

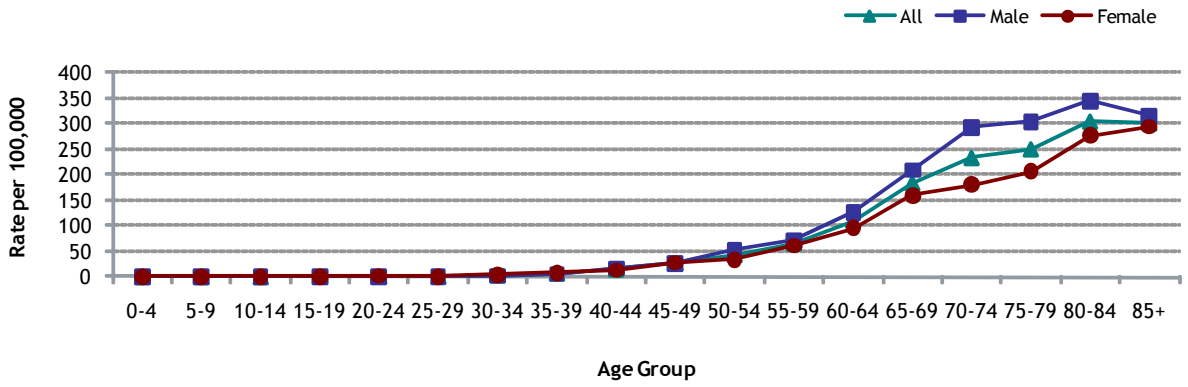
Polyps: Polyps, or growths on the inner wall of the colon or rectum, are common in people over 50. Most are benign, but some polyps can develop into cancer.

Genetics: People who have a parent or sibling with colorectal cancer are more likely to develop colorectal cancer themselves. Changes in specific genes, such as the hereditary nonpolyposis colon cancer (HNPCC) gene or the adenomatous polyposis controller (APC) gene, increase the risk of colorectal cancer. Genetic predisposition accounts for a small proportion of cases of colon cancer.

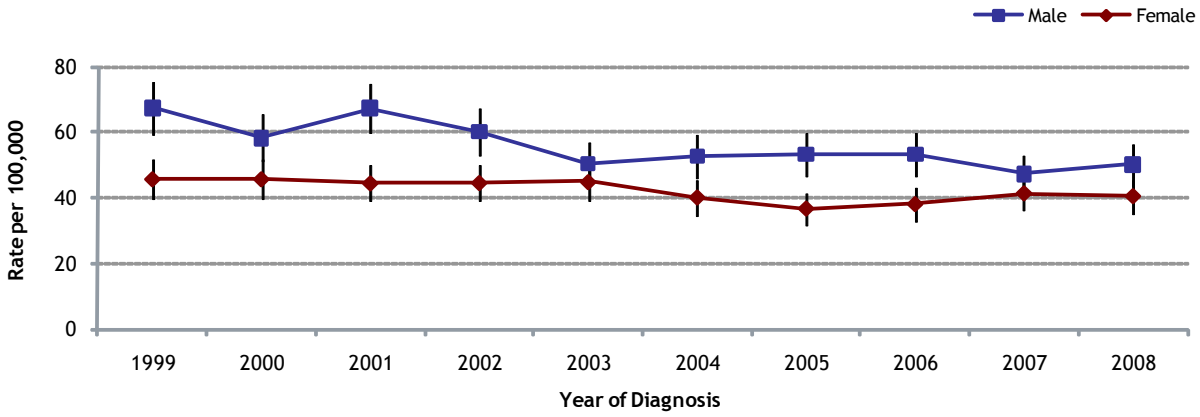
a Rates include invasive cases only.
b Incidence and mortality rates are per 100,000 age-adjusted to the 2000 Standard Million Population. Montana age-adjusted rates are for 2004-2008. U.S. age-adjusted rates are for 2002-2006 based on USCS.
c Montana stage at diagnosis are for 2004-2008; SEER data for stage at diagnosis are 1999-2006.
† Montana rates statistically significantly lower than U.S. rates.

Colon & Rectum

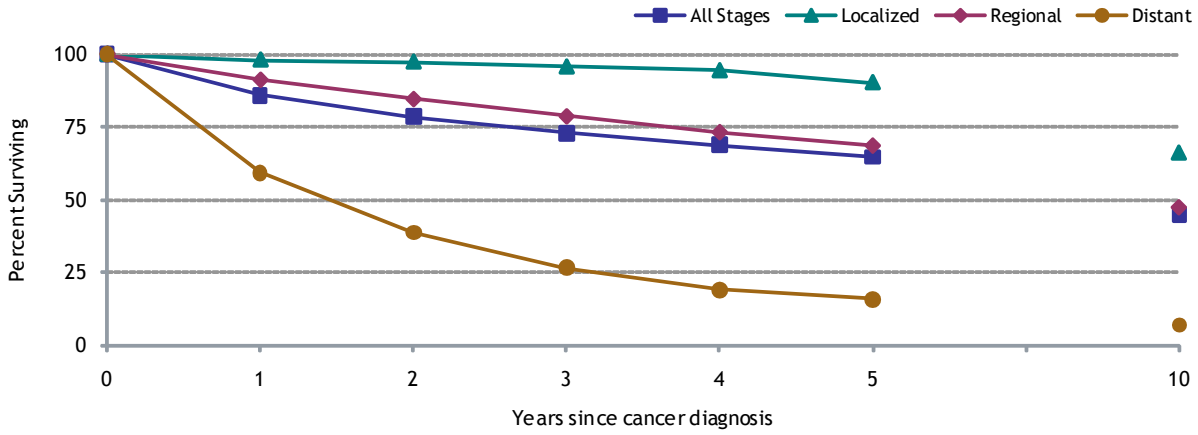
Age-Specific Incidence Rates, 2004-2008



Ten-Year Trend[d], 1999-2008



Relative Survival, 1999-2008



d Confidence intervals (95%) are shown with vertical bar.

Cervix

Incidence and Mortality Summary[a]

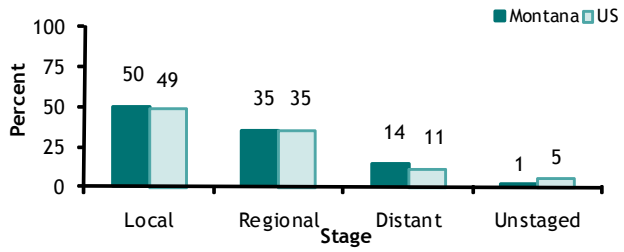
Incidence	Incidence Rate[b]		
	Male	Female †	Total
U.S.		8.3	
Montana		5.5	
95% CI		(4.6 - 6.5)	

	Montana only		
No. of Cases:	Male	Female	Total
Invasive		140	
In-Situ		1,126	
Uncertain		0	
Benign		0	

Mortality	Mortality Rate[b]		
	Male	Female	Total
U.S.		2.5	
Montana		1.8	
95% CI		(0.6 - 3.0)	

	Montana only		
No. of Deaths:	Male	Female	Total
Cervix		49	

Stage at Diagnosis[c]



Risk and Associated Factors

Age: Invasive cervical cancer occurs most often in women over 40 but precursor lesions may occur at younger ages. Regular cytological screening with the Papanicolau (Pap) test has reduced the incidence of invasive cervical cancer and increased the discovery and treatment of precancerous lesions among younger women.

Race: Hispanic women have the highest rates of cervical cancer followed by African Americans, Asians, whites, and American Indians.

Human papillomaviruses (HPVs): HPV has emerged as a necessary but not sufficient risk factor for cervical cancer. HPV infections are very common but more than 90% of such infections spontaneously disappear with no apparent ill-effects. A small proportion of women develop persistent infections that confer increased risk of cervical cancer, but additional risk factors seem to be required for invasive cancer to develop.

Other Factors: Cofactors that appear to act together with persistent HPV infection to increase the risk of cervical cancer include the number of lifetime sexual partners, prolonged (10 or more years) use of oral contraceptives, high parity, and cigarette smoking.

a Rates include invasive cases only.
b Incidence and mortality rates are per 100,000 age-adjusted to the 2000 Standard Million Population. Montana age-adjusted rates are for 2004-2008. U.S. age-adjusted rates are for 2002-2006 based on USCS.
c Montana stage at diagnosis are for 2004-2008; SEER data for stage at diagnosis are 1999-2006.
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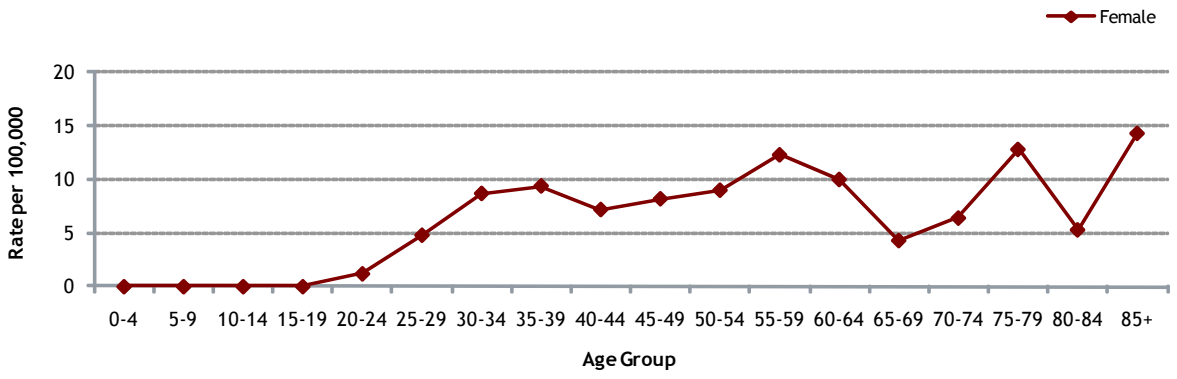
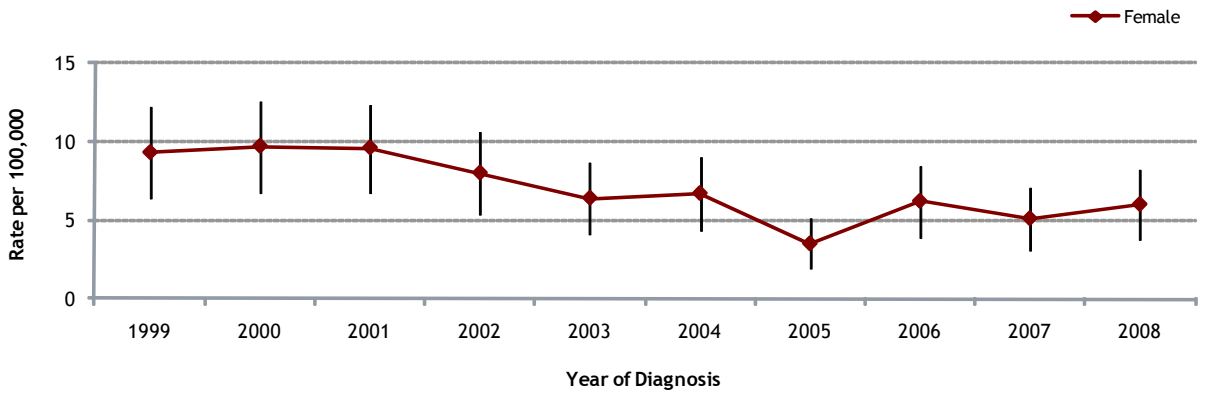
Cervix

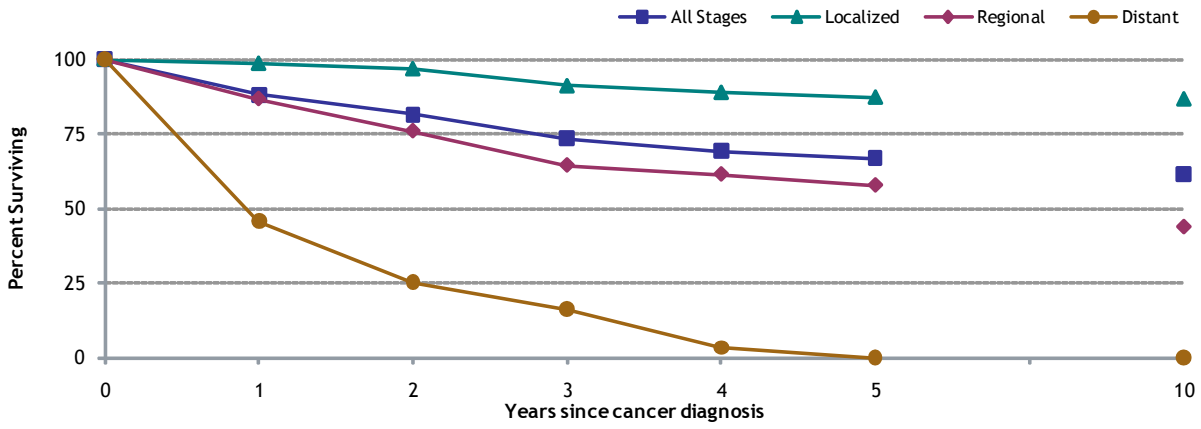
Age-Specific Incidence Rates, 2004-2008



Ten-Year Trend[d], 1999-2008



Relative Survival, 1999-2008



d Confidence intervals (95%) are shown with vertical bar.

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Appendices

A. Overview of the Montana Central Tumor Registry

B. Technical Notes and Definitions

C. Stage at Diagnosis

D. County Incidence Rates for All Sites Combined

E. Count of Cancers Reported by Anatomical Site and Sex

F. Montana Population by County, 2000 Census

   Montana Population Estimates by Year, Age, and Sex, 2004 - 2008

   2000 Standard Million Population

G. ICD-O-3 Codes by Anatomical Site

H. Resources

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Appendix A
Overview of the Montana Central Tumor Registry

Purpose of the Montana Central Tumor Registry

The Montana Central Tumor Registry is a central state registry of all cancers diagnosed and/or treated in Montana. The Montana Central Tumor Registry uses a computer data system designed for the collection, storage, management, and analysis of the data collected and maintained.

Central cancer registries are organizations that collect, store, analyze, and interpret cancer data on people who are diagnosed and/or treated for cancer in population-based areas. The primary objective of the Montana Central Tumor Registry is to analyze the incidence, mortality, survival, and the changing frequency of cancer in Montana residents. Analysis is possible with complete, timely and quality data reporting.

Follow-up is conducted yearly on patients registered in the Montana Central Tumor Registry and is a necessary part of adequate care for cancer patients. It also provides valuable data for cancer end-results research. Follow-up ensures continued medical surveillance and assures that cancer patients continue to see a physician for examination at least once a year. Meaningful end-result reporting can only be accomplished when a follow-up program is highly successful.

A central registry allows a hospital and its physicians to compare their cancer patient experiences and outcomes in managing certain types of cancer with results experienced elsewhere in the state.

History of the Montana Central Tumor Registry

The Montana Central Tumor Registry has had a long, but sporadic, history. A number of Montana physicians, medical record staff, and other organizations have contributed to the database that exists today.

The first effort at a Montana tumor registry began in the 1950s. It was called the Mary Swift Tumor Clinic in Butte, MT and it was funded by a legacy donation. This registry contained mostly Butte residents and was under operation until 1983. Some of those patients are still registered on the Montana Central Tumor Registry today.

In 1970, the Montana Medical Education and Research Foundation, Mountain States Regional Medical Program, established a Central Tumor Registry. It existed only for 18 months. This was phased out after the federal government discontinued funding the program. These data were never used.

In 1975, the Montana Foundation for Medical Care attempted to re-establish the Tumor Registry, which only lasted another 18 months. This attempt failed not by choice of the participating hospitals, but because federal funds were once again eliminated. At that time, 33 hospitals were voluntarily participating in the program. Again, these data were never used. In 1979, the Montana Legislature approved funding for the Montana Central Tumor Registry for two years. It was under the direction of the Department of Health and Environmental Sciences (DHES). Although the hospitals were concerned about the possible collapse of

funding again, the program won the confidence of 46 hospitals that were willing to contribute their cancer data in order to provide uniform statewide cancer reporting.

Based largely on the favorable experience reported to it, the 1981 Montana Legislature continued funding the Montana Central Tumor Registry and made cancer a reportable disease, requiring all hospitals in the state to report their cancer cases.

The 1983 Montana Legislature approved House Bill 113, which provided for cancer reporting by independent clinical laboratories in addition to hospitals. This was important in helping the Montana Central Tumor Registry obtain more complete, reliable statistics and in furthering the objective of a valid population-based cancer registry for the state.

The 1997 Montana Legislature approved House Bill 370, which provided for cancer reporting from physicians or other health care practitioners who diagnose and/or treat patients without referring them to a hospital. The purpose of this addition to the law was to obtain even more complete cancer reporting. Currently, physicians provide diagnostic and treatment information on cases queried by the Montana Central Tumor Registry.

In 2008, the Montana Central Tumor Registry initiated a rules change under the Montana Procedures Act to modify several existing reporting rules ARM 37.8.1801 - 1802. The modified rules apply to cancer cases reported to the Montana Central Tumor Registry starting in 2009. The rules updated reportable ambiguous terms, clarified reporting timeliness, required reporting of physical address, Hispanic origin, supporting text, recurrence date, payer, occupation, industry, tobacco history, and alcohol history.

Data Collection

The Montana Central Tumor Registry collects data on all cancer patients who are residents of Montana or residents of other states who are diagnosed and/or treated for cancer in Montana. The Montana Central Tumor Registry has many interstate exchange agreements with other states where Montana residents may go for diagnosis or treatment of cancer and is able to collect data from those states. Residents of other states are not included in this report. As of November 2010, there are about 153,000 cases registered on the Montana Central Tumor Registry.

Reportable Cancer Cases

According to the Administrative Rules of Montana (37.8.1801), the following tumors are to be submitted for reporting. Hospitals and physicians are required to submit reportable cancer cases to the Montana Central Tumor Registry within six months after the patient is first seen with cancer.

A. All malignant neoplasms (including in-situ)

EXCEPTION: Basal Cell Carcinoma or Squamous Cell Carcinoma of the skin.

NOTE: BCC and SCC of the labia, vagina, vulva, clitoris, penis, scrotum, prepuce, and anus must be included. Carcinoma in-situ of the cervix (CIS), intraepithelial neoplasia grade III (8077/2) of the cervix (CIN III), prostate (PIN III), vulva (VIN III), vagina (VAIN III), and anus (AIN III) are required by the Montana Central Tumor Registry because of their in-situ classification.

B. All benign tumors of the brain

INCLUDES: meninges, brain, spinal cord, cranial nerves and other parts of the CNS, pituitary gland, craniopharyngeal duct, and pineal gland

C. All carcinoid tumors (malignant, benign, and NOS)

D. Ambiguous Terms (terms that constitute diagnoses that are not histologically confirmed)

Apparent(ly)	Appears	Comparable with
Compatible with	Consistent with	Favor(s)
Malignant appearing	Most likely	Presumed
Probable	Suspect(ed)	Suspicious (for)
Typical (of)		

Quality Assurance of Data Collected

Accuracy and consistency are essential in tumor registry reporting. The Montana Central Tumor Registry performs quality control review on all abstracts and follow-ups received. Procedures for review include visual review, computerized data edits, and hospital or physician queries.

The Montana Central Tumor Registry will perform quality assurance tasks upon receipt of abstracts from each reporting institution. Periodic review procedures also include re-abstracting of cases and casefinding studies. The reporting facility is required to resolve incomplete, incorrect, or inconsistent data upon Montana Central Tumor Registry query.

The Montana Central Tumor Registry Advisory Group was established in January 2009. The group was selected to help the Montana Central Tumor Registry develop best-practices for registry operations, submissions, changes, and reporting barriers. Experts in the registry field are used when needed. The group provides advice only; there are no responsibilities for those selected. The group meets twice yearly and presently consists of experienced and new registrars and Montana Central Tumor Registry staff.

Registry Certification

The Montana Central Tumor Registry submits data annually to the North American Association of Central Cancer Registries (NAACCR) for evaluation and certification. This submission is required because of our cooperative agreement with the CDC and its purpose is two-fold.

The first purpose is to recognize population based registries that have achieved excellence in the areas of completeness of case ascertainment, quality of the data, and timeliness.

Secondly, the purpose is to provide confidential feedback which individual registries can use to identify current and future resource and training needs.

Silver or Gold certification of incidence data is required to publish the cancer data in Cancer in North America: 1995-2006, Volumes I (Incidence), II (Mortality), and III (Combined U.S. Incidence).

The Montana Central Tumor Registry has met Gold or Silver Certification standards since 1999. Obtaining Gold or Silver certification reflects the ongoing efforts of all the facilities that report complete, timely, and quality cancer data to the Montana Central Tumor Registry. Below are our results by year:

Year of Data	Certification Results
1999	Silver
2000	Silver
2001	Silver
2002	Silver
2003	Gold
2004	Gold
2005	Gold
2006	Silver
2007	Silver

NAACCR
Registry Certification on Quality, Completeness, and Timeliness
Summary of Certification Measures

Registry Element	Gold Standard	Silver Standard
1. Completeness of case ascertainment	95%	90%
2. Completeness of information		
Missing/Unk "age at diagnosis"	<=2%	<=3%
Missing/Unk "sex"	<=2%	<=3%
Missing/Unk "race"	<=3%	<=5%
Missing/Unk "state/county"	<=2%	<=3%
3. Death Certificate Only cases	<=3%	<=5%
4. Duplicate primary cases	<=1 per 1000	<=2 per 1,000
5. Passing Edits	100%	97%
6. Timeliness	Data submitted within 23 months of close of year.	

Appendix B
Technical Notes and Definitions

Incidence and Mortality Rates

A population's burden of cancer depends in large part on its size and age distribution because cancer is generally, although not exclusively, a disease of middle age and older. Therefore, cancer incidence and mortality are reported as standardized rates: the number of cases or deaths per 100,000 people, age-adjusted to a reference population to minimize the effect of variation in age distributions between populations. Standardized rates can be compared between Montana and the United States as a whole, or between a given county and Montana as a whole. All incidence rates are standardized to the 2000 U.S. Standard Million Population by the direct method.[8] Comparisons cannot be made between rates calculated from different reference populations.

Incidence rate: The cancer incidence rate is the number of new cases diagnosed during a specified time period, per 100,000 people (using the annual population estimates summed over the time period in the denominator). All incidence rates are calculated for invasive cancers only except for bladder, which are calculated for invasive and in-situ cancers. Basal cell carcinoma and squamous cell carcinoma of the skin were excluded.

Mortality rate: The mortality rate is the number of deaths occurring in the population during a specified time period, per 100,000 people (using the annual population estimates summed over the time period in the denominator). The U.S. mortality data were provided by the National Program of Cancer Registries of the Centers for Disease Control and Prevention and published in the United States Cancer Statistics (USCS).

95% Confidence Intervals

Confidence intervals (95%) are provided for all computed rates for Montana. The confidence intervals provide information regarding the reliability of the estimates. There is a 95% probability that the true value of the incidence or mortality rate lies within the interval.

Risk Factors

Risk factors are listed in the site-specific cancer summaries for the four most common cancers, cervical cancer, and all sites combined. These listings briefly summarize information from a few selected references. Cancers are complex diseases and have multiple factors contributing to their development. The risk factors presented in this report are not intended to be a definitive and comprehensive list; rather they are a starting point for the interested reader. Risk factors may change with continuing research.

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8 See Appendix F. See also R. N. Anderson and H. M. Rosenberg, Age Standardization of Death Rates: Implementation of the Year 2000 Standard. National Vital Statistics Report, Vol 47, no. 3. Hyattsville, MD: National Center for Health Statistics, 1998.

Data Limitations

Montana is a sparsely populated state, with a total estimated population of 902,195 in the year 2000 and a population density of approximately 6 per square mile. County population sizes ranged from 493 in Petroleum County to 129,352 in Yellowstone County in the 2000 census.

Because of the low population numbers and relative rarity of some forms of cancer, the numbers of cancer cases and cancer deaths can be very small. Small numbers are particularly problematic when data are subdivided by county, sex, or age. Aggregating data over a five-year period helps to offset the instability, but does not eliminate it. Caution must be exercised when examining incidence rates by county and incidences of relatively rare cancers. The size of county populations should be taken into consideration when examining incidence rates among counties.

National Rates

Incidence and mortality rates from the NPCR were used as estimates of U.S. rates for comparison to Montana rates. These data are published in the USCS and are available on the web at http://apps.nccd.cdc.gov/uscs/.

National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program were used as comparison for stage at diagnosis. SEER data are gathered from 11 geographic areas of the U.S. These geographic areas are considered by SEER to be "reasonably representative subsets of the United States Population."[9] These data are available on the web at http://seer.cancer.gov/statistics/.

Age-specific Incidence Rates

Montana age-specific rates are calculated for five-year age groupings by dividing the number of cases by the total five-year population of that age group and are expressed as a rate per 100,000 people.

[9] http://seer.cancer.gov

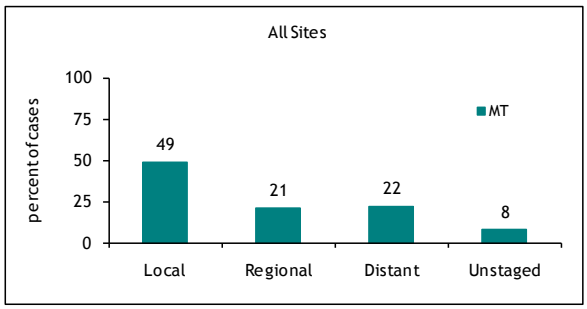
Appendix C
Stage at Diagnosis

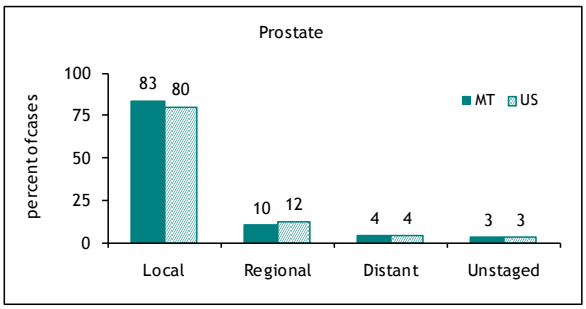
The staging of cancers is based on the extent of disease, its extent of spread to surrounding tissue and/or regional lymph nodes, and the presence or absence of distant metastases. The stages in order of increasing spread are in-situ, localized, regional, and distant. The Montana Central Tumor Registry data contain the stage of diagnosis coded according to the *AJCC Collaborative Staging System* version 02.02.00.

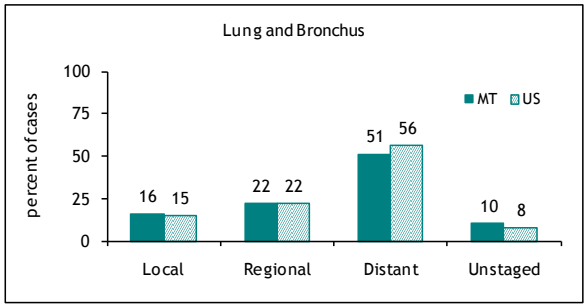
In-situ	A neoplasm that fulfills all the microscopic criteria for a malignancy but does not invade or penetrate surrounding tissue. It is non-invasive.
Localized	An invasive neoplasm confined entirely to the organ of origin.
Regional	A neoplasm that has extended beyond the limits of the organ of origin directly into the surrounding organs or tissues; into regional lymph nodes; or both direct extension and regional lymph node involvement.
Distant	A neoplasm that has spread to parts of the body remote from the primary tumor, either by direct extension or by discontinuous metastasis.
Unstaged	Information is not sufficient to assign a stage.

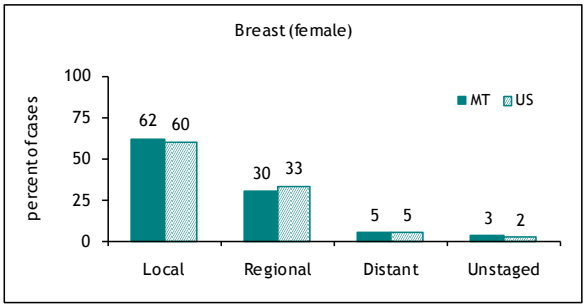
Frequency distributions of cases according to their stage at diagnosis are provided in the detailed summaries of all cancer sites combined and the 16 most common cancers (see Table 1, page 3), accounting for 91% of all cancers diagnosed in Montana, on the next two pages.

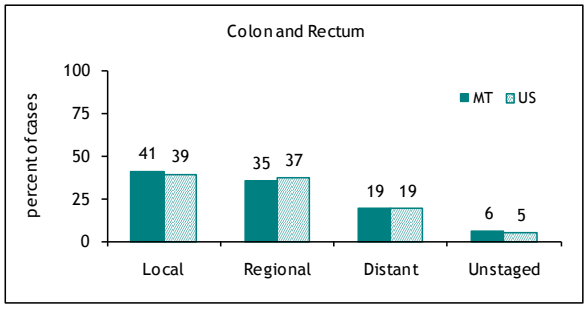
Stage at Diagnosis by Site, 2004-2008

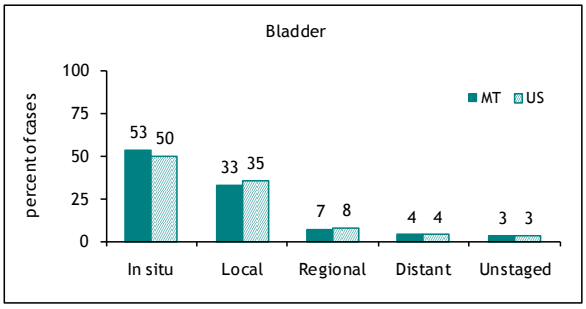


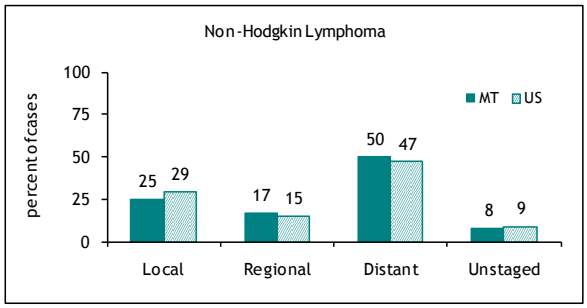


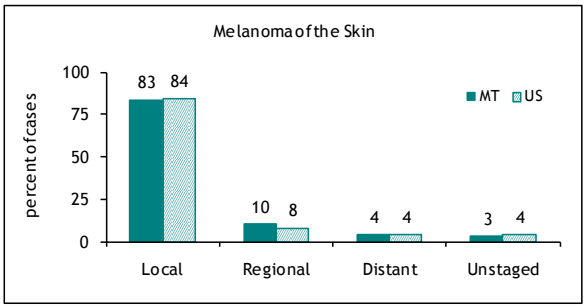


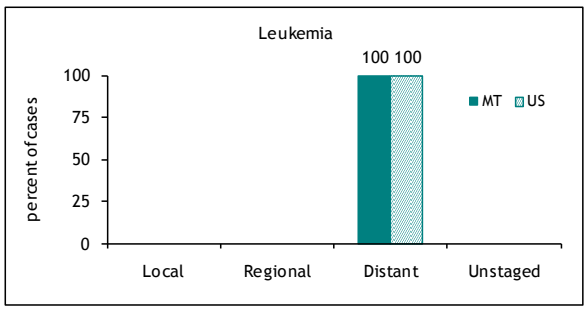


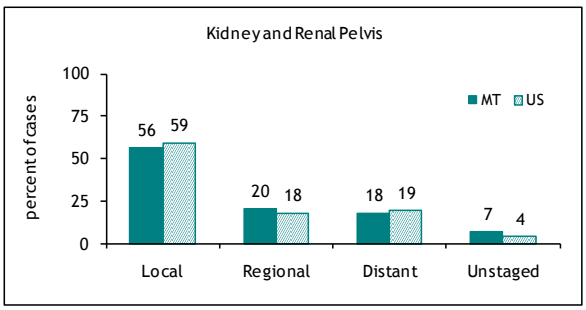


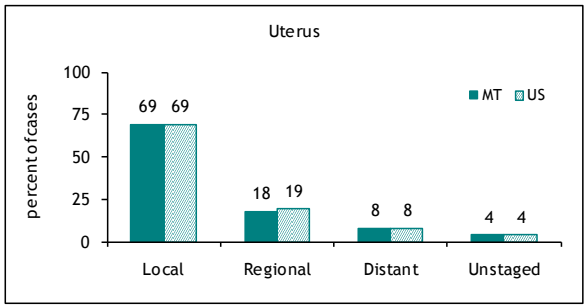


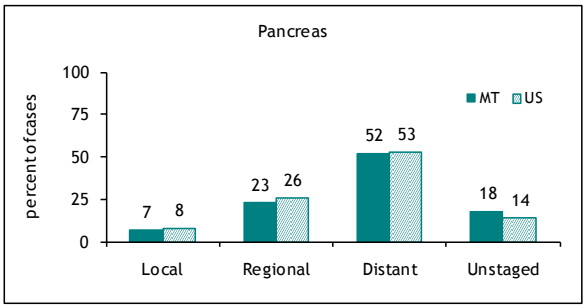


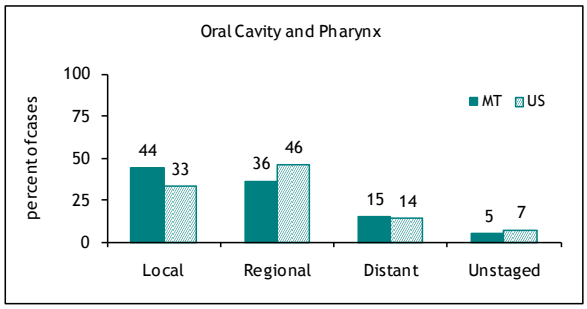


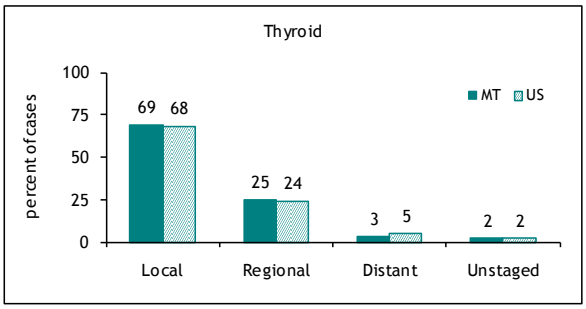

Leukemia
percent of cases
100
75
50
25
0
100 100
MT
US
Local
Regional
Distant
Unstaged

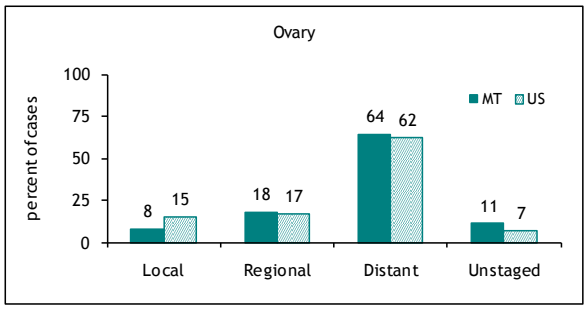

Kidney and Renal Pelvis
percent of cases
100
75
50
25
0
56 59
20 18
18 19
7 4
MT
US
Local
Regional
Distant
Unstaged

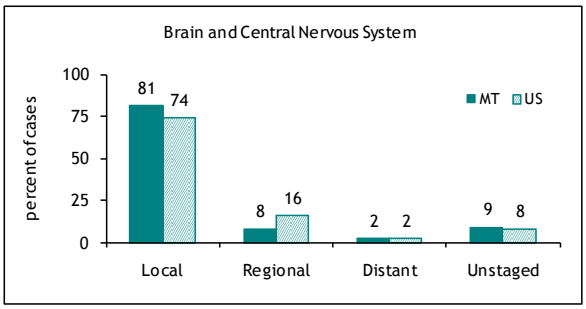

Uterus
percent of cases
100
75
50
25
0
69 69
18 19
8 8
4 4
MT
US
Local
Regional
Distant
Unstaged

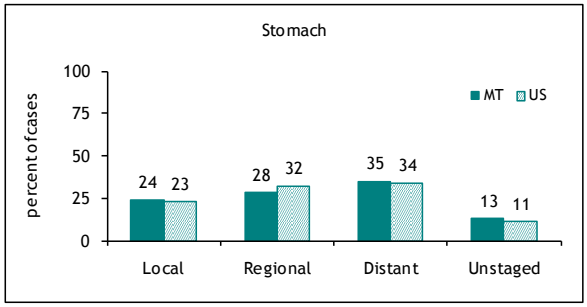

Pancreas
percent of cases
100
75
50
25
0
7 8
23 26
52 53
18 14
MT
US
Local
Regional
Distant
Unstaged

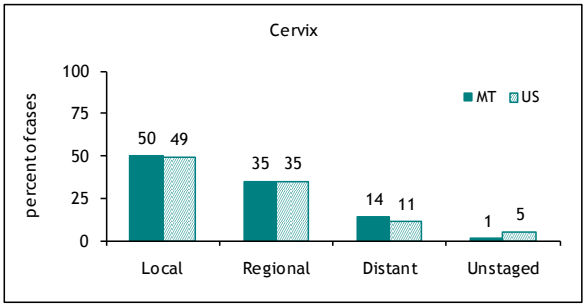

Oral Cavity and Pharynx
percent of cases
100
75
50
25
0
44 33
36 46
15 14
5 7
MT
US
Local
Regional
Distant
Unstaged


Thyroid
percent of cases
100
75
50
25
0
69 68
25 24
3 5
2 2
MT
US
Local
Regional
Distant
Unstaged


Ovary
percent of cases
100
75
50
25
0
8 15
18 17
64 62
11 7
MT
US
Local
Regional
Distant
Unstaged


Brain and Central Nervous System
percent of cases
100
75
50
25
0
81 74
8 16
2 2
9 8
MT
US
Local
Regional
Distant
Unstaged


Stomach
percent of cases
100
75
50
25
0
24 23
28 32
35 34
13 11
MT
US
Local
Regional
Distant
Unstaged


Cervix
percent of cases
100
75
50
25
0
50 49
35 35
14 11
1 5
MT
US
Local
Regional
Distant
Unstaged

Appendix D
County Incidence Rates, All Sites Combined
2004-2008

	All Sites Combined*			All Sites Combined*	
County of Residence	Rate per 100,000	95% CI for rates	County of Residence	Rate per 100,000	95% CI for rates
Montana	459.0	(453.2 - 464.8)			
Beaverhead	393.8	(339.4 - 448.3)	Madison	379.7	(324.7 - 434.8)
Big Horn	422.8	(365.8 - 479.7)	Meagher	535.4	(408.2 - 662.5)
Blaine	482.3	(408.3 - 556.3)	Mineral	513.4	(426.8 - 600.0)
Broadwater	429.0	(358.8 - 499.2)	Missoula	439.3	(420.3 - 458.4)
Carbon	452.8	(399.6 - 506.0)	Musselshell	514.0	(430.8 - 597.2)
Carter	227.2	(133.1 - 321.4)	Park	453.8	(410.9 - 496.8)
Cascade	448.5	(429.4 - 467.6)	Petroleum	~	~
Chouteau	497.0	(421.8 - 572.2)	Phillips	421.7	(347.7 - 495.6)
Custer	496.3	(444.1 - 548.4)	Pondera	538.4	(461.1 - 615.7)
Daniels	376.2	(275.1 - 477.2)	Powder River	371.6	(262.0 - 481.2)
Dawson	546.6	(483.3 - 609.9)	Powell	389.4	(329.5 - 449.4)
Deer Lodge	381.3	(331.3 - 431.3)	Prairie	594.1	(430.9 - 757.2)
Fallon	494.1	(390.9 - 597.4)	Ravalli	423.7	(398.3 - 449.2)
Fergus	530.7	(479.7 - 581.6)	Richland	382.6	(330.9 - 434.3)
Flathead	499.9	(479.4 - 520.5)	Roosevelt	522.9	(456.4 - 589.4)
Gallatin	403.0	(381.1 - 425.0)	Rosebud	488.7	(419.8 - 557.5)
Garfield	493.2	(339.3 - 647.1)	Sanders	509.5	(458.2 - 560.8)
Glacier	462.0	(405.6 - 518.4)	Sheridan	408.7	(333.7 - 483.6)
Golden Valley	658.5	(462.0 - 855.0)	Silver Bow	354.7	(328.5 - 380.8)
Granite	390.0	(300.1 - 479.8)	Stillwater	499.5	(438.2 - 560.8)
Hill	488.2	(440.4 - 536.1)	Sweet Grass	429.1	(347.5 - 510.6)
Jefferson	450.4	(390.8 - 510.0)	Teton	442.2	(375.8 - 508.6)
Judith Basin	553.0	(427.0 - 679.0)	Toole	459.4	(383.2 - 535.6)
Lake	437.0	(405.2 - 468.9)	Treasure	736.8	(485.0 - 988.6)
Lewis & Clark	451.8	(428.2 - 475.4)	Valley	467.6	(406.4 - 528.8)
Liberty	522.5	(401.3 - 643.6)	Wheatland	481.8	(366.7 - 596.8)
Lincoln	464.6	(427.3 - 501.9)	Wibaux	564.2	(385.0 - 743.4)
McCone	447.8	(312.9 - 582.6)	Yellowstone	522.0	(505.6 - 538.3)

* Rates include all invasive cases plus bladder in-situ cases.
~ Rates are suppressed if there were fewer than 5 cases or the relative standard error was 25% or greater.

Appendix E
Count of Cancers Reported by Anatomical Site and Sex
2004-2008

PRIMARY CANCER SITES	MALE	FEMALE	PRIMARY CANCER SITES	MALE	FEMALE
TOTAL, ALL CANCERS	**13,101**	**11,584**	**Female Genital System**		
			Cervix	---	140
Oral Cavity and Pharynx			Uterus	---	693
Lip	70	28	Ovary	---	409
Tongue	93	33	Vagina	---	18
Major Salivary gland	49	24	Vulva	---	65
Floor of Mouth	19	13	Other Female Genital Organs	---	18
Gum & Other Mouth	36	28			
Nasopharynx	13	6	**Male Genital System**		
Tonsil	84	19	Prostate	4,211	---
Oropharynx	12	~	Testis	131	---
Hypopharynx	28	6	Penis	18	---
Pharynx	10	~	Other Male Genital Organs	6	---
Digestive System			**Urinary System**		
Esophagus	224	50	Bladder	889	285
Stomach	172	109	Kidney & Renal Pelvis	428	251
Small Intestine	39	44	Ureter	15	4
Colon	866	875	Other Urinary Organs	~	6
Rectum & Rectosigmoid	415	280			
Anus & Anocanal	17	49	**Brain & Other Nervous System**		
Liver & Intrahepatic Bile Duct	139	75	Brain	216	136
Gallbladder	11	31	Other Nervous System	12	6
Other Biliary	37	33			
Pancreas	323	287	**Endocrine System**		
Retroperitoneum	~	15	Thyroid Gland	130	434
Peritoneum	~	33	Other Endocrine	20	15
Other Digestive Organs	8	6			
			Lymphomas**		
Respiratory System			Hodgkin Lymphoma	61	50
Nasal Cavity & Sinuses	21	6	Non-Hodgkin Lymphoma	550	449
Larynx	124	40			
Lung & Bronchus	1,794	1,676	**Multiple Myeloma**	165	130
Trachea & Pleura	5	~			
			Leukemias		
Bones & Joints	26	21	Acute Lymphocytic	34	30
			Chronic Lymphocytic	153	108
Soft Tissue	84	76	Acute Myeloid	121	93
			Chronic Myeloid	54	33
Skin			Other Leukemia	48	26
Melanoma	512	434			
Other Skin	30	32	**Eye**	30	25
Breast	27	3,353	**Unknown and Ill-defined Sites**	**514**	**467**

* Malignant neoplasms include all invasive cases plus bladder-insitu cases.
** Non-Hodgkin Lymphoma (NHL) and Hodgkin Lymphoma are not included in the anatomical site (e.g., lymphoma of the stomach is counted as a lymphoma, not stomach cancer).
~ Counts are suppressed when fewer than 5 cases to ensure confidentiality and statistical reliability.

Appendix F
Montana Population by County, 2000*

FIPS Code	County Name	Male	Female	Total	Percent of Total Population
1	Beaverhead	4,713	4,489	9,202	1.0%
3	Big Horn	6,249	6,422	12,671	1.4%
5	Blaine	3,460	3,549	7,009	0.8%
7	Broadwater	2,236	2,149	4,385	0.5%
9	Carbon	4,785	4,767	9,552	1.1%
11	Carter	662	698	1,360	0.2%
13	Cascade	39,756	40,601	80,357	8.9%
15	Chouteau	2,997	2,973	5,970	0.7%
17	Custer	5,724	5,972	11,696	1.3%
19	Daniels	988	1,029	2,017	0.2%
21	Dawson	4,490	4,569	9,059	1.0%
23	Deer Lodge	4,703	4,714	9,417	1.0%
25	Fallon	1,434	1,403	2,837	0.3%
27	Fergus	5,787	6,106	11,893	1.3%
29	Flathead	36,911	37,560	74,471	8.3%
31	Gallatin	35,274	32,557	67,831	7.5%
33	Garfield	660	619	1,279	0.1%
35	Glacier	6,553	6,694	13,247	1.5%
37	Golden Valley	539	503	1,042	0.1%
39	Granite	1,450	1,380	2,830	0.3%
41	Hill	8,306	8,367	16,673	1.8%
43	Jefferson	5,045	5,004	10,049	1.1%
45	Judith Basin	1,209	1,120	2,329	0.3%
47	Lake	13,028	13,479	26,507	2.9%
49	Lewis & Clark	27,360	28,356	55,716	6.2%
51	Liberty	1,063	1,095	2,158	0.2%
53	Lincoln	9,542	9,295	18,837	2.1%
55	McCone	987	990	1,977	0.2%
57	Madison	3,465	3,386	6,851	0.8%
59	Meagher	968	964	1,932	0.2%
61	Mineral	2,000	1,884	3,884	0.4%
63	Missoula	47,875	47,927	95,802	10.6%
65	Musselshell	2,196	2,301	4,497	0.5%
67	Park	7,745	7,949	15,694	1.7%
69	Petroleum	259	234	493	0.1%
71	Phillips	2,305	2,296	4,601	0.5%
73	Pondera	3,169	3,255	6,424	0.7%
75	Powder River	916	942	1,858	0.2%
77	Powell	4,228	2,952	7,180	0.8%
79	Prairie	619	580	1,199	0.1%
81	Ravalli	17,910	18,160	36,070	4.0%
83	Richland	4,801	4,866	9,667	1.1%
85	Roosevelt	5,264	5,356	10,620	1.2%
87	Rosebud	4,712	4,671	9,383	1.0%
89	Sanders	5,166	5,061	10,227	1.1%
91	Sheridan	2,039	2,066	4,105	0.5%
93	Silver Bow	17,108	17,498	34,606	3.8%
95	Stillwater	4,178	4,017	8,195	0.9%
97	Sweet Grass	1,800	1,809	3,609	0.4%
99	Teton	3,174	3,271	6,445	0.7%
101	Toole	2,716	2,551	5,267	0.6%
103	Treasure	439	422	861	0.1%
105	Valley	3,802	3,873	7,675	0.9%
107	Wheatland	1,118	1,141	2,259	0.3%
109	Wibaux	513	555	1,068	0.1%
111	Yellowstone	63,084	66,268	129,352	14.3%
	Montana			**902,195**	

* U.S. Census Bureau Population.

Population Figures for Montana
By Five-Year Age Groups and Year, 2004-2008

Males

Age Group	2004	2005	2006	2007	2008
0-4	28,868	29,196	29,844	30,530	31,323
5-9	29,175	29,207	29,336	29,713	29,903
10-14	33,384	32,542	31,985	31,393	31,154
15-19	35,519	35,249	34,872	34,714	34,388
20-24	36,180	36,510	36,988	36,450	36,860
25-29	27,808	29,565	31,530	33,661	34,524
30-34	26,399	26,557	26,159	26,432	27,245
35-39	27,352	26,980	27,683	27,986	28,253
40-44	34,763	33,493	32,120	30,672	29,655
45-49	37,519	37,682	37,520	37,402	36,573
50-54	36,460	37,367	37,975	38,319	38,459
55-59	29,900	31,719	33,921	34,786	35,807
60-64	22,855	23,748	24,577	26,812	28,275
65-69	17,161	17,671	18,304	19,082	20,488
70-74	13,916	13,917	14,011	14,364	14,669
75-79	11,344	11,583	11,644	11,639	11,527
80-84	7,891	7,966	8,109	8,158	8,314
85+	5,904	6,206	6,460	6,851	7,068
Total	462,398	467,158	473,038	478,964	484,485

Females

Age Group	2004	2005	2006	2007	2008
0-4	27,443	28,027	28,347	29,051	29,791
5-9	27,770	27,515	27,716	27,880	28,391
10-14	31,785	30,897	30,185	29,701	29,282
15-19	32,696	32,716	32,551	32,488	32,209
20-24	32,264	32,408	32,548	31,777	32,289
25-29	26,256	27,732	29,148	31,114	31,666
30-34	25,527	25,446	25,261	25,547	26,406
35-39	27,841	27,608	27,763	27,919	27,988
40-44	36,090	34,561	33,184	31,978	30,560
45-49	38,581	38,731	38,944	38,371	37,769
50-54	35,801	37,034	37,932	38,867	39,487
55-59	28,538	30,441	32,575	33,580	34,934
60-64	22,406	23,258	23,891	25,862	26,937
65-69	17,845	18,167	18,751	19,438	20,674
70-74	15,518	15,505	15,586	15,722	16,056
75-79	13,893	14,127	14,106	14,095	13,855
80-84	11,451	11,310	11,348	11,354	11,483
85+	11,866	12,247	12,554	12,916	13,178
Total	463,571	467,730	472,390	477,660	482,955

2000 Standard Million Population Figures By Five-Year Age Groups

Age Group	Population
0-4	69,135
5-9	72,533
10-14	73,032
15-19	72,169
20-24	66,478
25-29	64,529
30-34	71,044
35-39	80,762
40-44	81,851
45-49	72,118
50-54	62,716
55-59	48,454
60-64	38,793
65-69	34,264
70-74	31,773
75-79	26,999
80-84	17,842
85+	15,508
Total	1,000,000

Source: SEER Program, National Cancer Institute, 2003.

Appendix G
Standard Site Analysis Categories
ICD-O-3 Codes by Anatomical Site

Site Group	ICD-O-3 Site Codes	ICD-O-3 Histology (Type)
Oral Cavity and Pharynx		
Lip	C000-C009	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Tongue	C019-C029	
Salivary Gland	C079-C089	
Floor of Mouth	C040-C049	
Gum and Other Mouth	C030-C039, C050-C059, C060-C069	
Nasopharynx	C110-C119	
Tonsil	C090-C099	
Oropharynx	C100-C109	
Hypopharynx	C129, C130-C139	
Other Oral Cavity and Pharynx	C140, C142-C148	
Digestive System		
Esophagus	C150-C159	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Stomach	C160-C169	
Small Intestine	C170-C179	
Colon	C180-C189, C260	
Rectum & Rectosigmoid	C199-C209	
Anus, Anal Canal, and Anorectum	C210-C212, C218	
Liver	C220	
Intrahepatic Bile Duct	C221	
Gallbladder	C239	
Other Biliary	C240-C249	
Pancreas	C250-C259	
Retroperitoneum	C480	
Peritoneum, Omentum, and Mesentery	C481-C482	
Other Digestive Organs	C268-C269, C488	
Respiratory System		
Nose, Nasal Cavity, and Middle Ear	C300-C301, C310-C319	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Larynx	C320-C329	
Lung and Bronchus	C340-C349	
Pleura	C384	
Trachea, Mediastinum, and Other Respiratory Organs	C339, C381-C383, C388, C390, C398, C399	
Bones and Joints	C400-C419	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Soft Tissue Including Heart	C380, C470-C479, C490-C499	Excluding 9590-9989, and sometimes 9050-9055, 9140+

Site Group	ICD-O-3 Site Codes	ICD-O-3 Histology (Type)
Skin Excluding Basal and Squamous		
Melanoma of the Skin	C440-C449	8720-8790
Other Non-Epithelial Skin	C440-C449	Excluding 8000-8005, 8010-8045, 8050-8084, 8090-8110, 8720-8790, 9590-9989, and sometimes 9050-9055, 9140+
Breast	C500-C509	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Female Genital System		
Cervix Uteri	C530-C539	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Corpus Uteri and Uterus	C540-C549, C559	
Ovary	C569	
Vagina	C529	
Vulva	C510-C519	
Other Female Genital Organs	C570-C589	
Male Genital System		
Prostate	C619	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Testis	C620-C629	
Penis	C600-C609	
Other Male Genital Organs	C630-C639	
Urinary System		
Urinary Bladder	C670-C679	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Kidney and Renal Pelvis	C649, C659	
Ureter	C669	
Other Urinary Organs	C680-C689	
Eye and Orbit	C679-C699	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Brain and Other Nervous System		
Brain	C710-C719	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Cranial Nerves and Other Nervous System	C710-C719	9530-9539
	C700-C709, C720-C729	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Endocrine System		
Thyroid	C739	Excluding 9590-9989, and sometimes 9050-9055, 9140+
Other Endocrine Including Thymus	C379, C740-C749, C750-C759	
Lymphoma		
Hodgkin Lymphoma		
Hodgkin – Nodal	C024, C098-C099, C111, C142, C379, C422, C770-C779	9650-9667
Hodgkin – Extranodal	All Other Sites	

Site Group	ICD-O-3 Site Codes	ICD-O-3 Histology (Type)
Non-Hodgkin Lymphoma		
NHL – Nodal	C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9596, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9714-9719, 9727-9729, 9823, 9827
NHL – Extranodal	All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9596, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9714-9719, 9727-9729
	All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779	9823, 9827
Myeloma		9731-9732, 9734
Leukemia		
Lymphocytic Leukemia		
Acute Lymphocytic Leukemia		9826, 9835-9837
Chronic Lymphocytic Leukemia	C420, C421, C424	9823
Other Lymphocytic Leukemia		9820, 9832-9834, 9940
Myeloid and Monocytic Leukemia		
Acute Myeloid Leukemia		9840, 9861, 9866, 9867, 9871-9874, 9895-9897, 9910, 9920
Acute Monocytic Leukemia		9891
Chronic Myeloid Leukemia		9863, 9875, 9876, 9945, 9946
Other Myeloid/Monocytic Leukemia		9860, 9930
Other Leukemia		
Other Acute Leukemia		9801, 9805, 9931
Aleukemic, Subleukemic, and NOS		9733, 9742, 9800, 9831, 9870, 9948, 9963, 9964
	C420, C421, C424	9827
Mesothelioma		9050-9055
Kaposi Sarcoma		9140
Miscellaneous		9740-9741, 9750-9758, 9760-9769, 9950, 9960-9962, 9970, 9975, 9980, 9982-9987, 9989
	C760-C768, C809	Excluding 9590-9989, and sometimes 9050-9055, 9140+
	C420-C424	
	C770-C779	

Appendix H
Resources

For more information about the cancers described here, please refer to the following resources:

Schottenfeld D, Fraumei J (eds). Cancer Epidemiology and Prevention, 3rd ed. Oxford University Press, New York: 2006.

Altekruse SF, Kosary CL, Krapcho M, Neyman N, Aminou R, Waldron W, Ruhl J, Howlader N, Tatalovich Z, Cho H, Mariotto A, Eisner MP, Lewis DR, Cronin K, Chen HS, Feuer EJ, Stinchcomb DG, Edwards BK (eds). SEER Cancer Statistics Review, 1975-2007, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2007/, based on November 2009 SEER data submission, posted to the SEER web site, 2010.

U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999-2006 Incidence and Mortality Web-based Report*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2010. Available at: www.cdc.gov/uscs.
National Cancer Institute. http://www.cancer.gov.

Please visit our website at www.cancer.mt.gov.

For more information about the **Montana Cancer Control Program**, contact Ginny Furshong, Program Manager, 406-444-6888, gfurshong@mt.gov.

For more information about the **Montana Cancer Screening Program**, contact Mark Wamsley, Program Manager, 406-444-3385, mwamsley@mt.gov.

For more information about the **Cancer Surveillance and Epidemiology Program**, contact Carol Ballew, PhD, Program Manager, 406-444-6988, cballew@mt.gov.

For more information about the **Montana Central Tumor Registry**, contact Debbi Lemons, Coordinator, 406-444-6786, dlemons@mt.gov.

Alternative formats of this document will be provided upon request. Please contact Dr. Ballew.

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