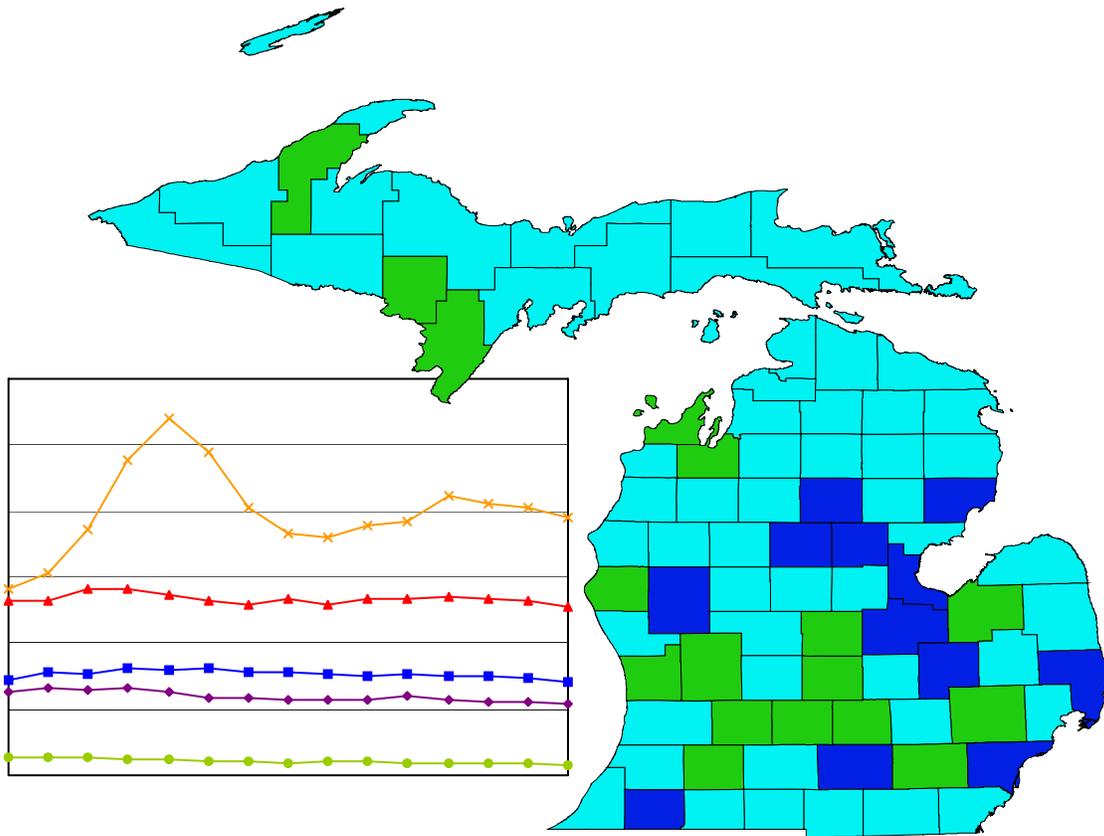


The Cancer Burden in Michigan: Selected Statistics

(Date of Report: December 2006)



Developed by the Michigan Public Health Institute (MPHI) in support of the Michigan Cancer Consortium Initiative (MCCI).

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Background

This report describes the cancer burden in Michigan using morbidity and mortality, and the human and financial costs associated with cancer to the extent to which data are available at this time. Five cancer sites are presented: breast, cervical, colorectal, lung and prostate. Throughout this report, breast cancer statistics refer to female breast cancer only.

Presented in this report are epidemiological analyses of cancer mortality from years 1990 to 2004 and incidence from 1989 to 2003 for the selected cancer sites.¹ Mortality data are from the Michigan Resident Death Files and incidence data are from the Michigan Resident Cancer Incidence File, which are both provided by the Michigan Department of Community Health, Division of Vital Records and Health Statistics.² Michigan rates are compared with national mortality and incidence rates from the SEER Cancer Statistics Review, which is produced by the National Cancer Institute.³ Unless otherwise specified, all incidence and mortality rates referred to in the text are age-adjusted according to the 2000 standard U.S. population.⁴

Also presented are data on the stage at diagnosis for cases reported in Michigan and relative survival rates for the selected cancer sites. Relative survival rates were obtained from the SEER Cancer Statistics Review.

Comparisons of incidence and mortality rates amongst Michigan counties and changes in the percentage of cases diagnosed at an early stage in counties are presented graphically on maps of Michigan.

A summary of data on cancer-related behavioral risk factors is also presented. Behavior data for Michigan residents were obtained from the Michigan Department of Community Health Behavioral Risk Factor Survey System (BRFSS), the Michigan State Board of Education's Michigan Youth Risk Behavior Survey (YRBS), and the Special Cancer Behavioral Risk Factor Survey (SCBRFS), from the Michigan Department of Community Health and the Michigan Public Health Institute.⁵

¹ Whenever possible, the data quoted in this report are the most recent available. Frequently, there is an 18- to 24-month interval between the time a cancer is diagnosed and the time that information is available from the Michigan Cancer Surveillance Program (MCSP). However, Cancer mortality data for any given year generally are available from the MCSP within several months after the close of that calendar year; the mortality data that are available often are more recent than the incidence data.

² Michigan Resident Cancer Incidence File Updated with cases processed by November 22, 2005, and 1985-2004 Michigan Resident Death Files, Vital Records and Health Data Development Section, Michigan Department of Community Health.

³ ³ Ries LAG, Harkins D, Krapcho M, Mariotto A, Miller BA, Feuer EJ, Clegg L, Eisner MP, Horner MJ, Howlander N, Hayat M, Hankey BF, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2003*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2003/, based on November 2005 SEER data submission, posted to the SEER web site, 2006. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country. Trends in cancer incidence, mortality and patient survival in the United States are derived from this database. SEER data are collected from nine or twelve geographic areas that represent, respectively, an estimated 9 or 14% of the US population. The long-term incidence trends and survival data for this report are from five states—Connecticut, Hawaii, Iowa, New Mexico, and Utah—and four metropolitan areas— Detroit, Atlanta, San Francisco-Oakland, and Seattle-Puget Sound. Additional tables provide more recent incidence rates and trends for SEER from twelve areas (the nine areas above plus Los Angeles, San Jose-Monterey, and the Alaska Native Registry) since 1992. In 2002 Kentucky, Greater California (all remaining uncovered counties), Louisiana and New Jersey all became SEER participants.

⁴ Michigan Department of Community Health (MDCH), Vital Records and Health Data Development Section.

⁵ Behavioral Risk Factor Surveillance System (1990-2005), Michigan Department of Community Health; 2005 Michigan Youth Risk Behavior Survey, Michigan State Board of Education; 2004 Special Cancer Behavioral Risk Factor Survey, Michigan Department of Community Health and Michigan Public Health Institute.

Analyses of years of life lost due to the selected cancers are presented for Michigan and the United States. Data for the United States were taken from the SEER Cancer Statistics Review, and United States 2003 Life Tables were used to calculate years of life lost in Michigan as well as nationally.⁶

Analyses of some of the financial costs of cancer are presented. Payment data are from Blue Cross Blue Shield of Michigan, Medicare Part A and Medicare Part B.⁷ Hospitalization data are from the statewide hospital discharge database at the Michigan Department of Community Health and from Blue Cross Blue Shield of Michigan.⁸

A graphic presentation of the distribution of mammography and radiation therapy facilities in Michigan is shown. Mammography and radiation therapy facility data were obtained from the Michigan Department of Consumer Industry Services, Radiation Safety Section.⁹ ArcView GIS software was used to analyze the proportion of the population within specified distances of mammography and radiation therapy facilities in Michigan.

The appendices include charts of incidence and mortality rates by county for the cancer sites.

The Health Plan Employer Data and Information Set (HEDIS®)¹⁰ is depicted graphically. HEDIS measures have been obtained from Quality Compass® 2006, a registered trademark of The National Committee for Quality Assurance¹¹ (NCQA).

An electronic copy of the full report is available on the Michigan Cancer Consortium (MCC) website at: www.michigancancer.org.

⁶ United States Life Tables, 2003; National Vital Statistics Reports from the Centers for Disease Control and Prevention

⁷ Blue Cross Blue Shield of Michigan, Center for Healthcare Quality; Blue Care Network; Medicare Part A and Medicare Part B from Michigan Peer Review Organization and Wisconsin Physician Service, Medicare Central Data Unit.

⁸ Michigan Resident Hospitalizations Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

⁹ Michigan Department of Consumer Industry Services, Radiation Safety Section ; “Mammography Facility Status in Michigan” and “Therapy Accelerator Facilities in Michigan”, September 21st, 2006.

¹⁰ HEDIS® is a registered trademark for the National Committee on Quality Assurance (NCQA)

¹¹ The source for data contained in this publication is Quality Compass® 2006 and is used with the permission of the National Committee for Quality Assurance (NCQA). Any analysis, interpretation, or conclusion based on these data is solely that of the authors, and NCQA specifically disclaims responsibility for any such analysis, interpretation, or conclusion. Quality Compass is a registered trademark of NCQA.

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Selected Cancer Sites: All, Breast, Cervical, Colorectal, Lung, and Prostate

This section of the report presents the findings of epidemiological analyses of cancer mortality and incidence for the five selected cancer sites: breast, cervical, colorectal, lung, and prostate. The numbers of estimated deaths due to cancer and estimated new cancer cases for 2006 were available from the American Cancer Society.¹

Michigan Mortality and Incidence

Age-adjusted mortality rates in 2004 and age-adjusted incidence rates in 2003 are presented for the selected cancers. These were calculated by the direct age-adjustment method, using the 2000 U.S. population age distribution as the standard population, to allow comparisons across population subgroups.²

Comparisons of age-adjusted mortality and incidence rates between gender and racial groups are presented, as are age-specific rates. The proportions of cases diagnosed at different stages are compared between gender and racial groups to highlight disparities where they exist.

Michigan-specific data on rates of survival from the selected cancers are not available at this time. National data from the National Cancer Institute's SEER program on relative survival rates are presented. The relative survival rate represents the likelihood that a patient will survive their cancer for some specified time (usually five years) after their initial cancer diagnosis.³

¹ Cancer Facts and Figures 2006, American Cancer Society. Available at: <http://www.cancer.org/downloads/STT/CAFF2006PWSecured.pdf>.

² Michigan Department of Community Health (MDCH), Vital Records and Health Data Development Section.

³ Relative survival rates for cases diagnosed 1996-2002.

County Mortality and Incidence

Ten-year age-adjusted incidence and mortality rates are presented for the selected cancers for each county. Rates were calculated by the direct age-adjustment method using the 2000 US population age distribution, and annual state population estimates based on actual size of the county populations for years 1994 to 2003 and 1995 to 2004 were used in calculating ten-year incidence and mortality rates, respectively. Z tests were used to compare rates among counties, identifying counties with significantly higher or lower rates than the all-county rate. In conducting the Z tests, the age-adjusted rate for all counties combined was calculated including only deaths in the state for which the county was known. Differences in age-adjusted incidence and mortality rates were tested at 95% confidence levels.

Stage at Diagnosis, by Site and by County

The percentages of cancer cases diagnosed at the localized stage (Breast, Colorectal, and Prostate Cancer) and at the in-situ stage (Cervical Cancer) are presented for each county for the time periods from 1991 to 1993 and 2001 to 2003 to highlight where changes in the percentages of cases diagnosed at a localized or in-situ stage have occurred. The percentage of cases localized at diagnosis is calculated out of all invasive cancers of the specific sites; the percentage of cases in-situ at diagnosis is calculated out of all invasive and in-situ cancers of the specific sites. To illustrate changes in stage at diagnosis, counties were ranked according to the percentage of resident cases that were diagnosed while the cancer was still localized and/or in-situ in the first three-year period. Counties were divided into quartiles for these ranked percentages. The same percentage ranges were used to classify counties during the second three-year period to allow comparison over time.

Conclusions from this analysis by county must take into consideration the various factors contributing to changes in stage at diagnosis at the county level. One factor to consider is the limitation of the low number of cases in some counties. Several counties had fewer than 20 reported cancer cases for at least one of the time periods and cancer sites. Therefore, a decrease in the percentage of cases localized at diagnosis could reflect a relatively small change in the number of cases at each stage. Also, it is important to note that changes in reporting and staging practices could have changed over time within a county. Usually increases in the percentage of cases localized or in-situ at diagnosis can be associated with an increase in screening but an equivalent decline in the percentage localized or in-situ does not necessarily reflect changes in prevention practices or quality of care. Yet, as an illustration of changing trends in stage at diagnosis, comparing the maps across time periods reveals where broad changes have occurred in the state as a whole.

Average Mammography Workload, by County

Mammography workload data were obtained from the Michigan Department of Community Health's Radiation Safety Section.⁴ Monthly patient workloads are provided by mammography facility staff that assist during annual inspections of mammography machines. In some cases, the data received can accurately reflect the mammography facility's true patient workload, but other times will only represent the facility respondent's best estimate of the total mammography patient workload. This analysis was based on the inspections of 4,129 machines with only 57 of these machines having no workload data recorded. For different reasons, one mammography machine may get inspected more than once in a calendar year, but the data used in this analysis only considers one inspection per machine when determining total mammography workload.

The average number of mammograms per 1000 women over the age of 40 was calculated by county for two time periods, 1996-1999 and 2000-2003, using the 1998 and 2002 Michigan female aged 40 and older populations, respectively. The percent change in mammography workload for each county was then calculated by using the average number of mammograms for the two time periods. It is important to note that the number of mammography machines per county may vary from year to year, and the percent change calculated for each county is not adjusted for any fluctuation in the number of mammography machines operating within each county. A follow-up survey has been planned to gather more detailed information on mammography facilities throughout the state of Michigan. Results of the survey will be published in a separate report.

⁴ Michigan Department of Community Health, Radiation Safety Section obtained November 2004.

Summary

Analyses of deaths due to cancer and new cancer cases at all sites combined are shown in Tables 1 and 2. Most cancer cases and deaths occur in the population aged 55 years and older.

Tables showing statistics for five sites follow: breast cancer (Tables 3 through 11), cervical cancer (Tables 12 through 19), colorectal cancer (Tables 20 through 27), lung cancer (Tables 28 through 35), and prostate cancer (Tables 36 through 43).

Cancer mortality and incidence rates are higher in the older age groups for breast, colorectal, lung and prostate cancer. Cervical cancer mortality rates also increase with age, however cervical cancer incidence rates peak among women age 40-49 years and old stabilize and then decrease amongst women ages 65 and over.

Mortality rates for each of the cancer sites are higher among blacks than among whites. Although breast cancer incidence rates are higher in white women, breast cancer mortality rates are higher in black women (black to white rate ratio of 0.9 for incidence and 1.5 for mortality). For the other four cancer sites, incidence rates, like mortality rates, are higher among blacks than whites. The largest ratios of mortality rates were the ratios of black to white for cervical cancer and prostate cancer mortality rates which were both equal to 2.1. The ratio of black to white cervical cancer incidence rates was 1.8, and the ratio of black to white prostate cancer incidence rates was 1.7. Colorectal cancer black to white ratios for mortality and incidence rates were both 1.4 and lung cancer ratios for mortality and incidence rates were 1.2 and 1.3, respectively.

Five-year survival rates in the U.S. for each of the five cancer sites reveal a disparity in survival between blacks and whites. For breast and cervical cancer, blacks have a lower survival rate than whites even when cancers are detected at the same stage. The five-year survival rates for colorectal cancer are also lower for blacks than whites. When prostate cancer is detected at a localized or regional stage, the five-year survival rates are 100% for both blacks and whites, but as cancers are detected at a later stage, the five-year survival rates among blacks become lower than the rates among whites.

Significant differences in incidence and mortality rates among counties for each of the five sites over a ten-year period are shown in Figures 1, 2, 4, 5, 7, 8, 10, 11, 13 and 14.

Figures 3, 6, 9, 12, and 15, present maps of the percentage of cases diagnosed when the cancer was at the localized and/or in-situ stage between the time periods of 1991 through 1993 and 2001 through 2003. Diagnosis of cancers at an early stage improved most dramatically for prostate, although improvements in early diagnosis are also seen for breast, cervical and colorectal cancers (changes in the state as a whole are listed in Tables 3, 4, 5, 6, and 7 in the Appendix to this report). Statewide the percentage of prostate cancer cases detected while localized changed from 60.8% in 1991-1993 to 77.8% in 2001-2003. Detection of breast cancer while localized, cervical cancer while in-situ and colorectal cancer while localized showed modest improvement in Michigan. In the timeframe of 1991-1993, 57.7% of breast cancers were diagnosed at the localized stage in Michigan; 60.7% of breast cancer were diagnosed at the localized stage in the time period from 2001 through 2003. Cervical cancer detection while in-situ improved from 82.3% in 1991-1993 to 87.6% in 2001-2003. Colorectal cancer detection at the localized stage improved from 31.9% in 1991-1993 to 37.4% in 2001-2003. Lung cancer detection at the localized stage did not noticeably change. Observed differences in the percentage of cancers diagnosed while localized or in-situ may possibly be due to changes in early detection, changes in coding or pathology review and reporting, changes in record keeping, or due to the introduction of and increased access to new medical treatments.

Table 1.

Number of Cancer Deaths and New Cancer Cases
by *Age Group* and *Gender*, All Sites, Michigan 2003-04

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2004	Total	19,654	249	2,326	8,362	8,717
	Males	10,198	127	1,186	4,528	4,357
	Females	9,456	122	1,140	3,834	4,360
New Cases, 2003	Total	49,659	1,730	9,517	23,305	15,107
	Males	25,835	728	4,055	13,385	7,667
	Females	23,796	998	5,454	9,907	7,437

Table 2.

Cancer Mortality and Incidence Rates
by *Gender* and *Race*, All Sites, Michigan 2003-04

		Rate per 100,000*		Ratio
		Blacks	Whites	Blacks/Whites
2004 Mortality	Total	232.7	184.4	1.3
	Males	301.8	226.0	1.3
	Females	188.7	156.5	1.2
2003 Incidence	Total	547.9	468.4	1.2
	Males	731.6	545.1	1.3
	Females	423.3	417.0	1.0

*Rates are age-adjusted and computed by race and gender.

Table 3.

Estimated Number of Breast Cancer Deaths and
New Breast Cancer Cases, Michigan 2006

Deaths	1,360
New Cases	7,070

Table 4.

Number of Breast Cancer Deaths and
New Breast Cancer Cases by *Age Group*,
Michigan 2003-04

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2004	1,417	18	297	568	534
New Cases, 2003	6,837	160	2,182	2,912	1,583

Table 5.

Breast Cancer Mortality Rates, Michigan 2004 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2004)	US-SEER (2003)
Total	1,417	24.3	25.2
Whites	1,165	22.9	24.6
Blacks	227	33.6	34.1

*Rate per 100,000 race- and gender-specific population.

Table 6.

Breast Cancer Incidence Rates, Michigan 2003 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2003)
Total	6,837	122.8	124.2
Whites	5,892	123.3	128.5
Blacks	770	113.2	120.5

*Rate per 100,000 age- and gender-specific population.

Table 7.

Age-Specific Breast Cancer Mortality Rates, Michigan 2004

	Number	Rate*
25-39 Years	44	4.4
40-49 Years	148	18.4
50-64 Years	389	44.2
65 Years and Over	835	114.2

*Rate per 100,000 age- and gender-specific population.

Table 8.

Age-Specific Breast Cancer Incidence Rates, Michigan 2003

	Number	Rate*
25-39 Years	360	35.3
40-49 Years	1,194	148.7
50-64 Years	2,364	276.4
65 Years and Over	2,911	401.6

*Rate per 100,000 age- and gender-specific population.

Table 9.

Breast Cancer Five-Year Relative Survival Rates
by Stage at Diagnosis and *Race*, US 1996-2002

	Total %	White %	Black %
All stages	88.5	89.7	77.3
Localized	98.1	98.5	93.6
Regional	83.1	84.6	71.8
Distant	26.0	27.7	16.1
Unknown	54.1	56.0	44.9

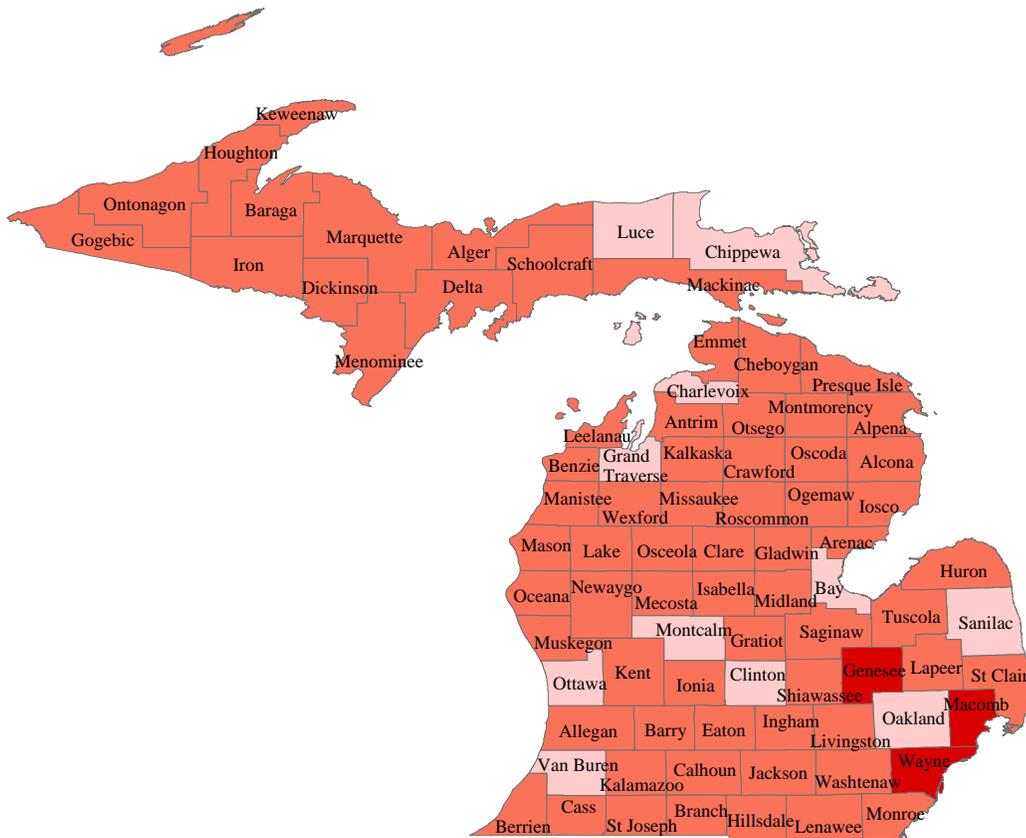
Table 10.

Numbers and Percentages of Invasive Breast Cancer
by Stage at Diagnosis and *Race*,
Michigan Residents, 2003

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	6,837	4,129	60.4	1,971	28.8	255	3.7	482	7.0
Whites	5,892	3,639	61.8	1,651	28.0	191	3.2	411	7.0
Blacks	770	400	51.9	265	34.4	59	7.7	46	6.0

Figure 1.

Breast Cancer Mortality Rates by County, 1995-2004

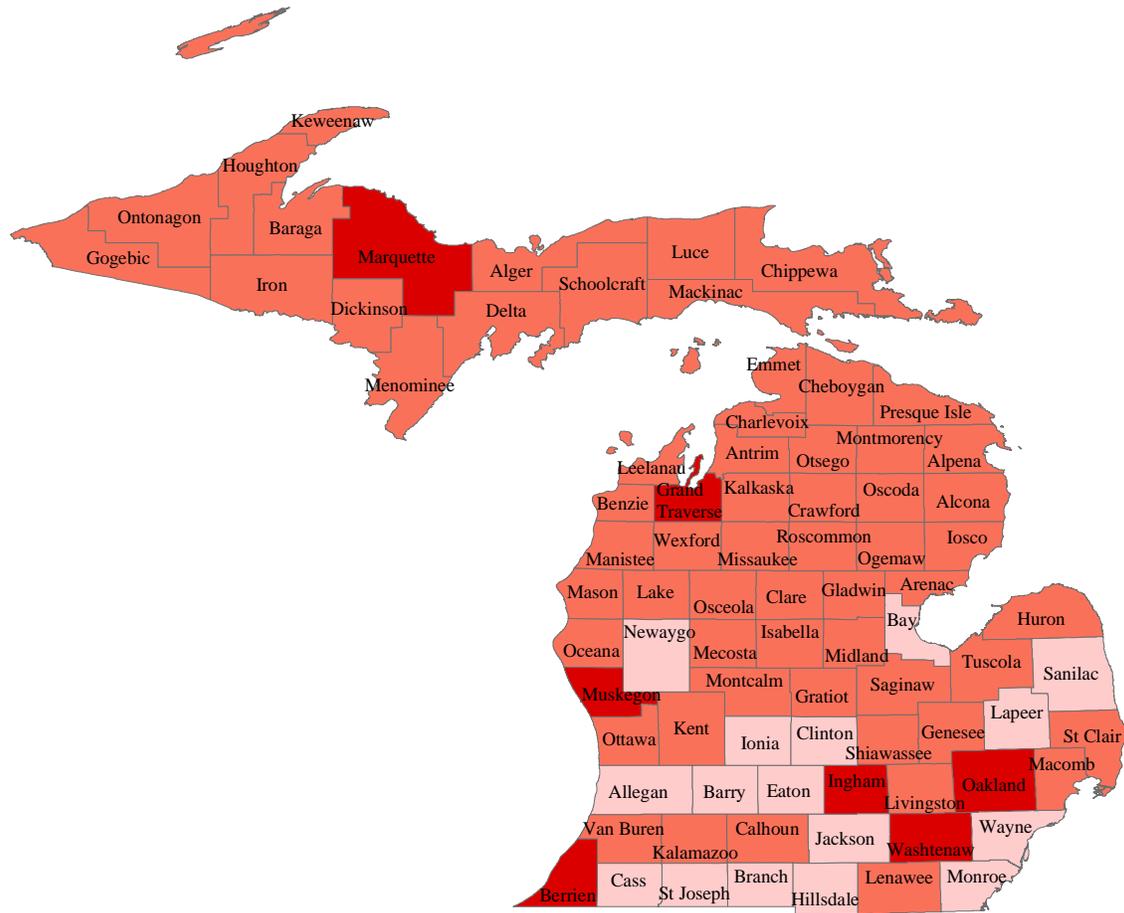


- Counties with significantly lower mortality rates*
- Counties without significantly different mortality rates*
- Counties with significantly higher mortality rates*

*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 2.

Breast Cancer Incidence Rates by County, 1994-2003



- Counties with significantly lower incidence rates*
- Counties without significantly different incidence rates*
- Counties with significantly higher incidence rates*

*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 3.

Percentage of Breast Cancer Cases Localized at Diagnosis by County

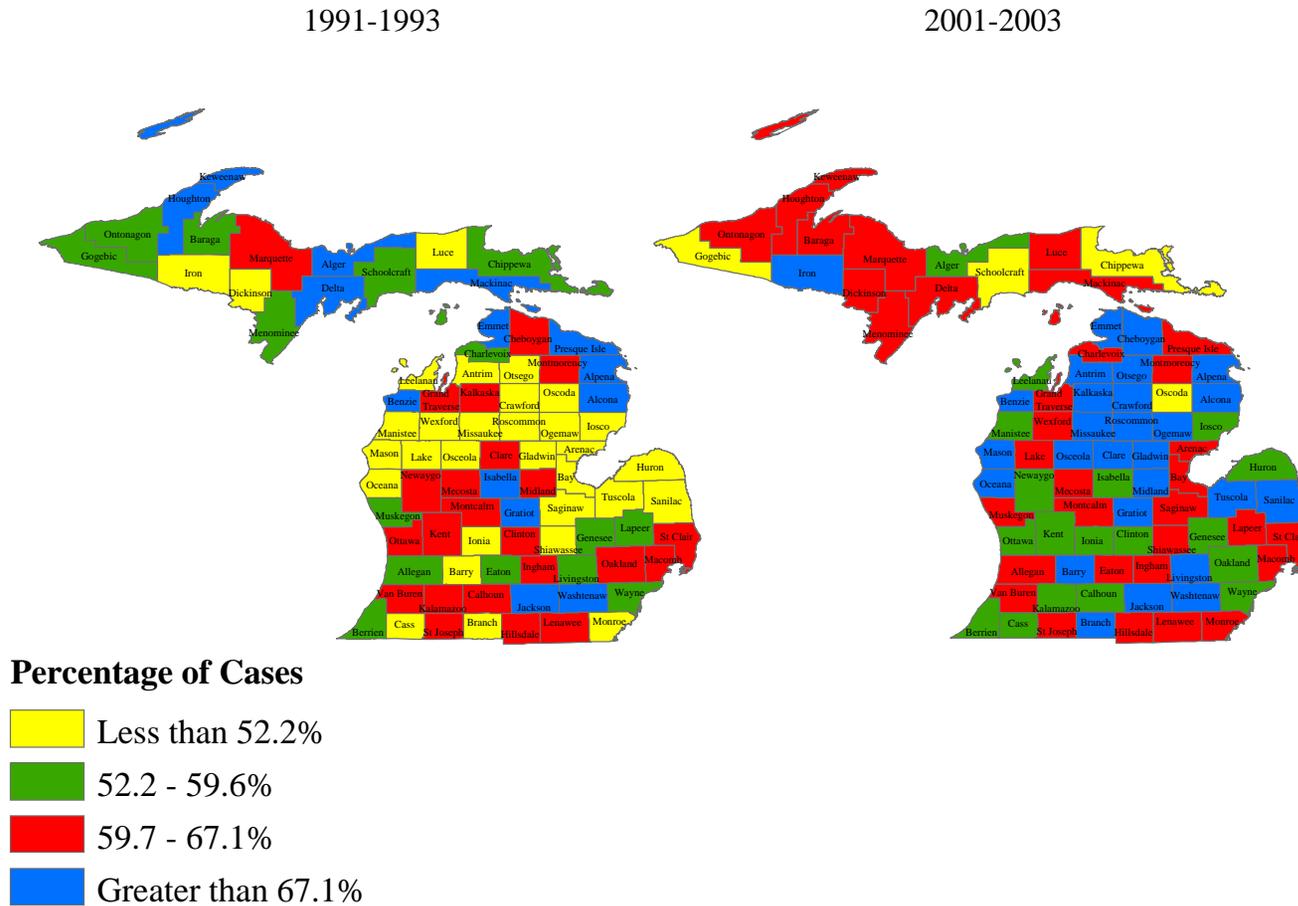


Table 12.

Estimated Number of Cervical Cancer Deaths and
New Cervical Cancer Cases,
Michigan 2006

Deaths	*
New Cases	260

* Not Available

Table 13.

Number of Cervical Cancer Deaths and
New Cervical Cancer Cases by *Age Group*,
Michigan 2003-2004

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2004	118	8	35	50	25
New Cases, 2003	399	74	183	105	36

Table 14.

Cervical Cancer Mortality Rates, Michigan 2004 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2004)	US-SEER (2003)
Total	118	2.1	2.5
Whites	90	1.9	2.2
Blacks	27	4.0	4.7

*Rate per 100,000 age- and gender-specific population.

Table 15.

Cervical Cancer Incidence Rates, Michigan 2003 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2003)
Total	399	7.6	7.1
Whites	288	6.6	6.6
Blacks	84	11.7	10.5

*Rate per 100,000 age- and gender-specific population.

Table 16.

Age-Specific Cervical Cancer Mortality Rates, Michigan 2004

	Number	Rate*
25-39 Years	14	1.4
40-49 Years	19	2.4
50-64 Years	34	3.9
65 Years and Over	51	7.0

*Rate per 100,000 age- and gender-specific population.

Table 17.

Age-Specific Cervical Cancer Incidence Rates, Michigan 2003

	Number	Rate*
25-39 Years	111	10.9
40-49 Years	101	12.6
50-64 Years	108	12.6
65 Years and Over	68	9.4

*Rate per 100,000 age- and gender-specific population.

Table 18.

Cervical Cancer Five-Year Relative Survival Rates
by Stage at Diagnosis and *Race*, US 1996-2002

	Total %	White %	Black %
All stages	71.6	72.8	62.6
Localized	92.0	92.6	86.4
Regional	55.5	56.0	47.6
Distant	14.6	15.5	6.8
Unknown	59.1	61.2	55.9

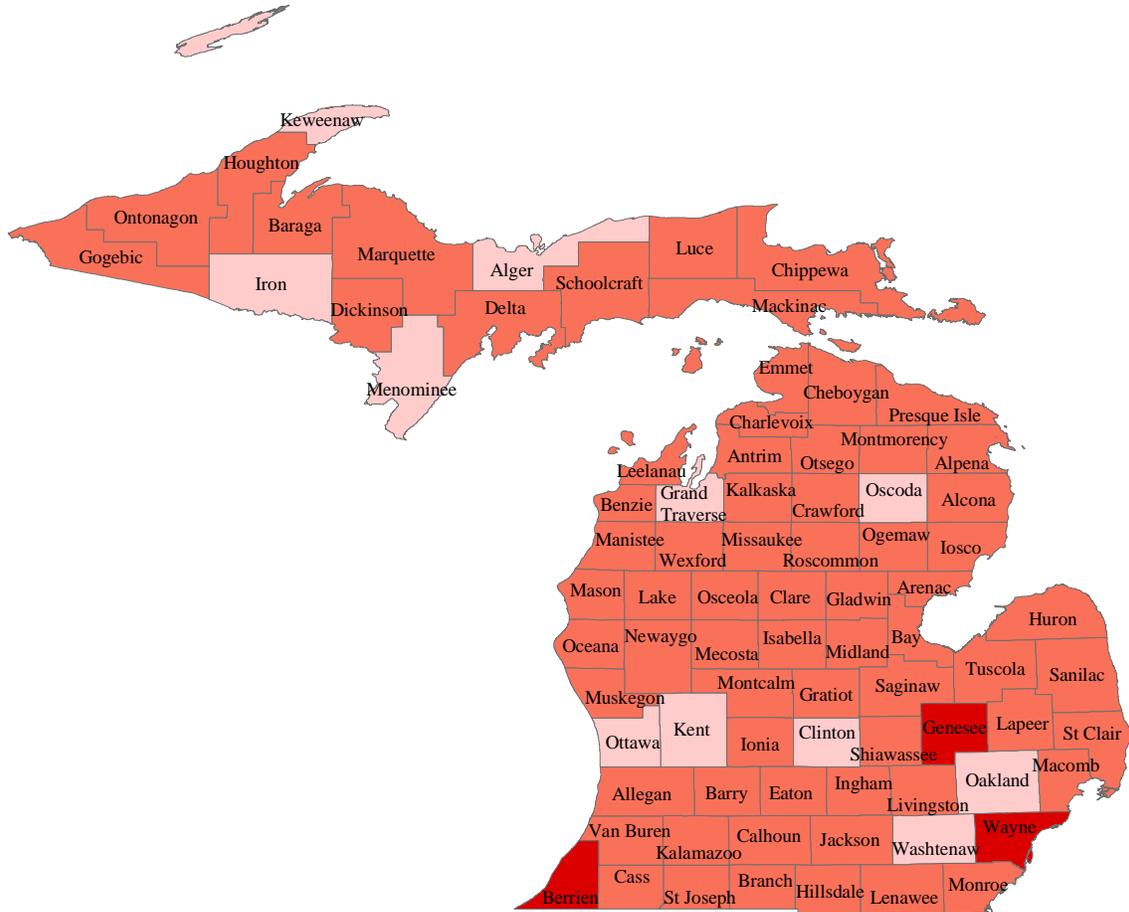
Table 19.

Numbers and Percentages of Invasive Cervical Cancer
(Primary Site) by Stage at Diagnosis and *Race*,
Michigan 2003

		Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
	Total Number	Number	%	Number	%	Number	%	Number	%
Total	399	191	47.9	119	29.8	35	8.8	54	13.5
Whites	288	139	48.3	85	29.5	28	9.7	39	12.5
Blacks	84	40	47.6	29	34.5	7	8.3	8	9.5

Figure 4.

Cervical Cancer Mortality Rates by County, 1995-2004

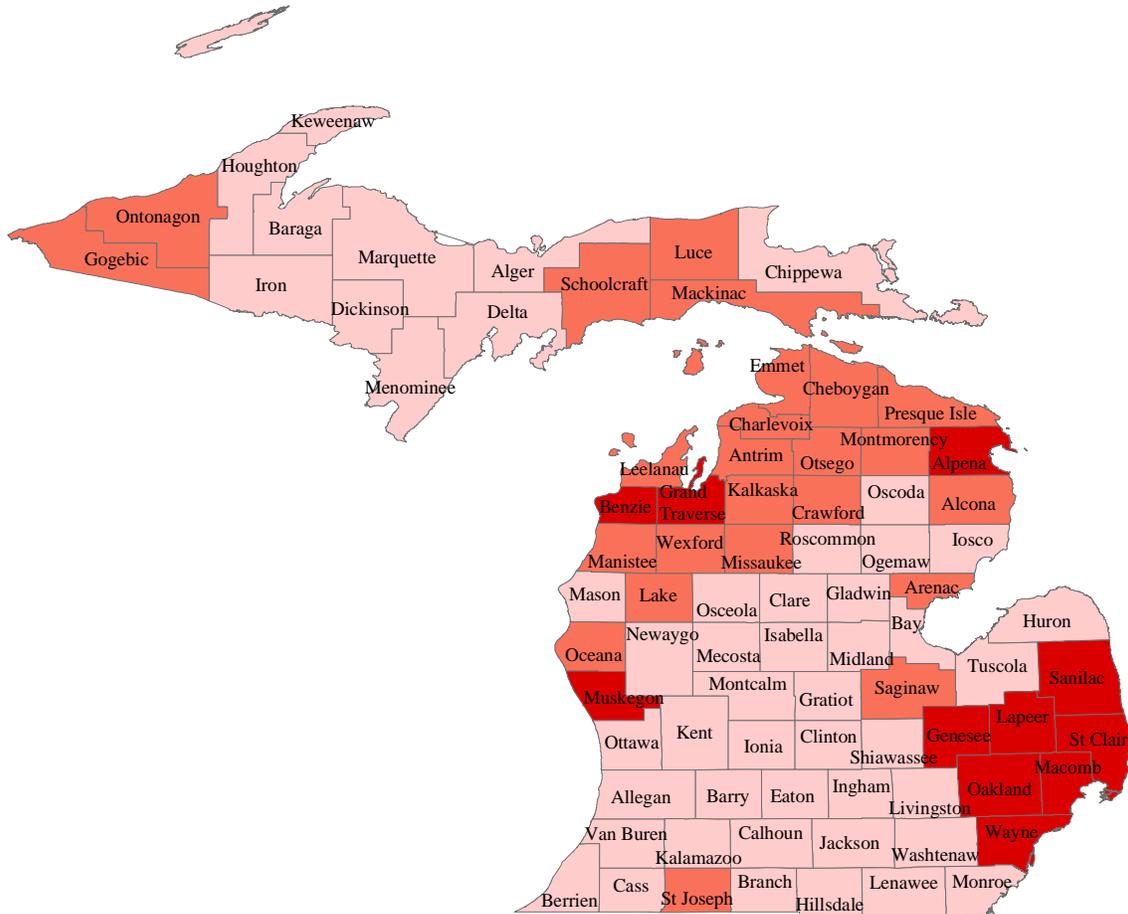


- Counties with significantly lower mortality rates*
- Counties without significantly different mortality rates*
- Counties with significantly higher mortality rates*

*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 5.

In-situ or Invasive Cervical Cancer Incidence Rates by County, 1994-2003



- Counties with significantly lower incidence rates*
- Counties without significantly different incidence rates*
- Counties with significantly higher incidence rates*

*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 6.

Percentage of Cervical Cancer Cases In-situ at Diagnosis by County

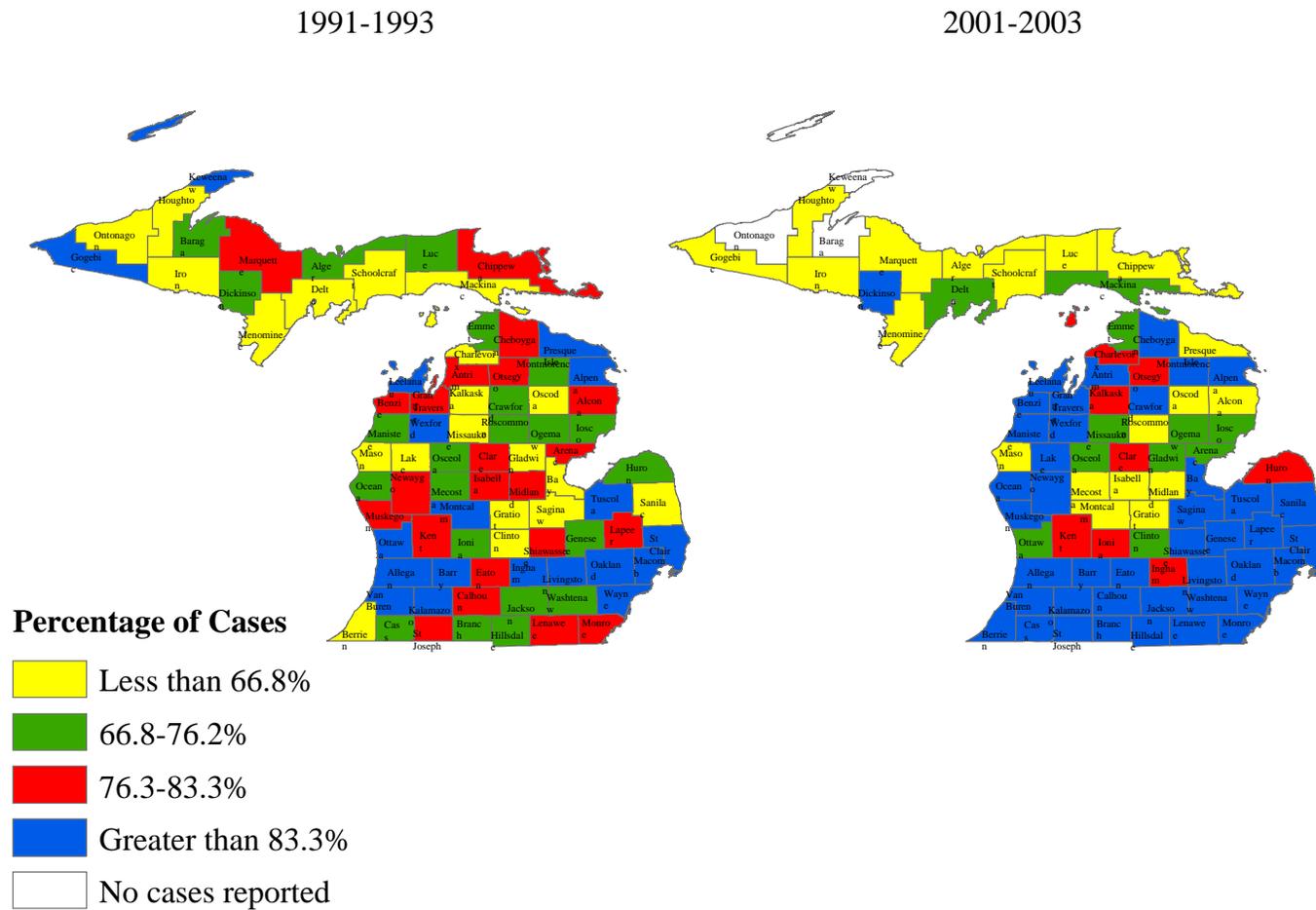


Table 20.

Estimated Number of Colorectal Cancer Deaths and
New Colorectal Cancer Cases,
Michigan 2006

Deaths	1,830
New Cases	4,930

Table 21.

Number of Colorectal Cancer Deaths and
New Colorectal Cancer Cases
by *Age Group* and *Gender*,
Michigan 2003-04

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2004	Total	1,872	11	185	690	986
	Males	940	6	109	384	441
	Females	932	5	76	306	545
New Cases, 2003	Total	5,424	63	801	2,389	2,171
	Males	2,709	32	432	1,311	934
	Females	2,710	31	369	1,074	1,236

Table 22.

Colorectal Cancer Mortality Rates by *Gender*,
Michigan 2004 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2004)	US-SEER (2003)
Total	1,872	18.0	19.0
Males	940	21.8	23.0
White Males	791	20.7	22.4
Black Males	133	31.4	32.1
Females	932	15.2	16.1
White Females	796	14.6	20.4
Black Females	123	19.4	25.4

*Rate per 100,000 race- and gender-specific population.

Table 23.

Colorectal Cancer Incidence Rates by *Gender*,
Michigan 2003 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2003)
Total	5,424	53.1	49.5
Males	2,709	61.4	58.0
White Males	2,217	57.0	57.1
Black Males	407	91.4	72.6
Females	2,710	46.7	42.8
White Females	2,286	44.9	42.4
Black Females	360	55.7	52.5

*Rate per 100,000 race- and gender-specific population.

Table 24.

Age-Specific Colorectal Cancer Mortality Rates by *Gender*, Michigan 2004

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	28	1.4	17	1.7	11	1.1
40-49 Years	80	5.0	43	5.5	37	4.6
50-64 Years	362	21.0	204	24.2	158	18.0
65 Years and Over	1,402	112.5	676	146.0	726	99.3

*Rate per 100,000 age- and gender-specific population.

Table 25.

Age-Specific Colorectal Cancer Incidence Rates by *Gender*, Michigan 2003

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	115	5.6	63	6.1	52	5.1
40-49 Years	361	22.7	194	24.6	167	20.8
50-64 Years	1,381	82.5	775	94.8	603	70.5
65 Years and Over	3,557	287.7	1,673	326.9	1,882	259.7

*Rate per 100,000 age- and gender-specific population.

Table 26.

Colorectal Cancer Five-Year Relative Survival Rates
by Stage at Diagnosis, *Gender* and *Race*, US 1996-2002

	Total %	Males		Females	
		White %	Black %	White %	Black %
All stages	64.1	66.0	55.6	64.2	53.9
Localized	90.4	91.9	85.9	89.9	83.4
Regional	68.1	69.9	62.2	68.2	58.6
Distant	9.8	10.0	7.7	10.3	7.2
Unknown	34.6	40.2	37.5	30.0	32.6

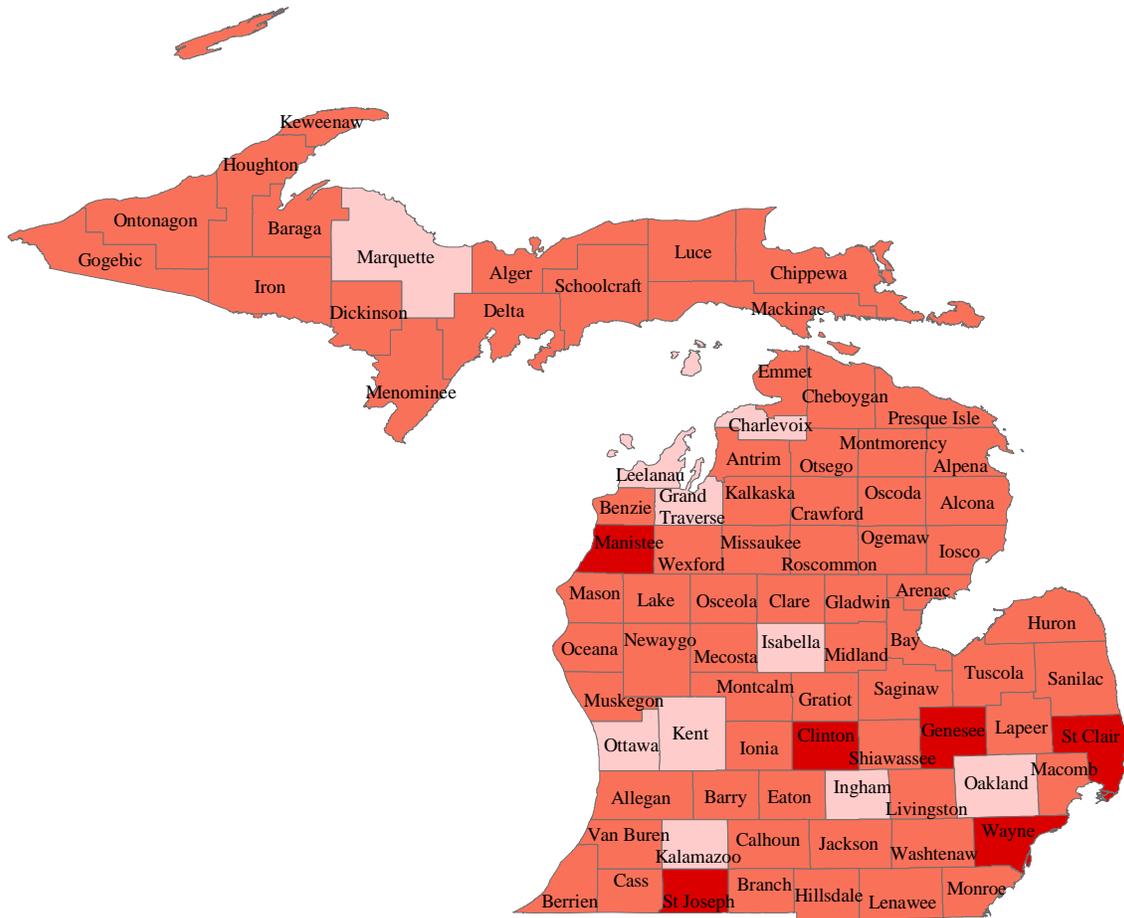
Table 27.

Numbers and Percentages of Invasive Colorectal Cancer
(Primary Site) by Stage at Diagnosis and *Race*,
Michigan 2003

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	5,424	2,096	38.6	1,858	34.3	814	15.0	656	12.1
Whites	4,507	1,763	39.1	1,563	34.7	627	13.9	554	12.3
Blacks	767	275	35.9	248	32.3	164	21.4	80	10.4

Figure 7.

Colorectal Cancer Mortality Rates by County, 1995-2004

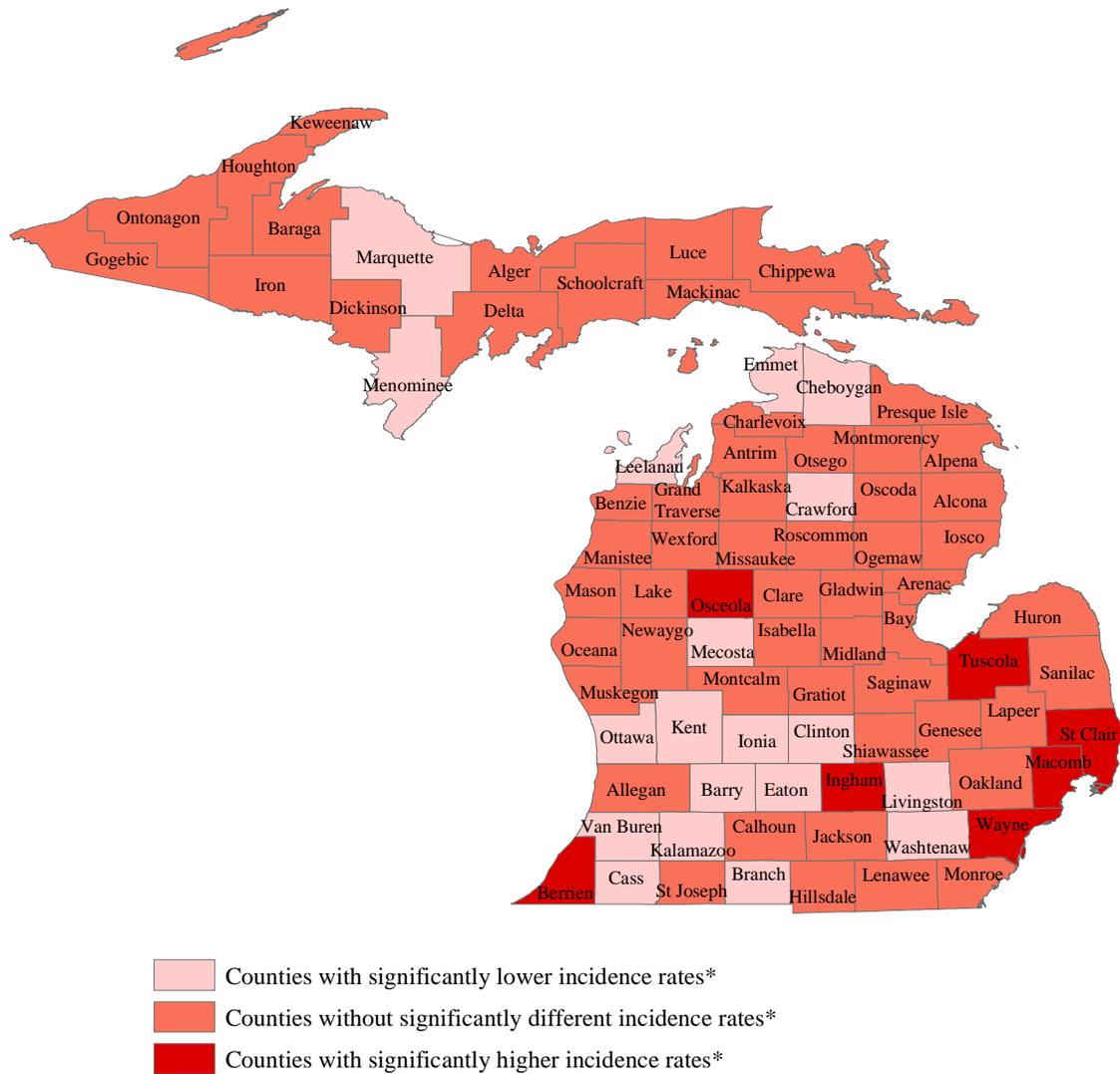


- Counties with significantly lower mortality rates*
- Counties without significantly different mortality rates*
- Counties with significantly higher mortality rates*

*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 8.

Colorectal Cancer Incidence Rates by County, 1994-2003



*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 9.

Percentage of Colorectal Cancer Cases Localized at Diagnosis by County

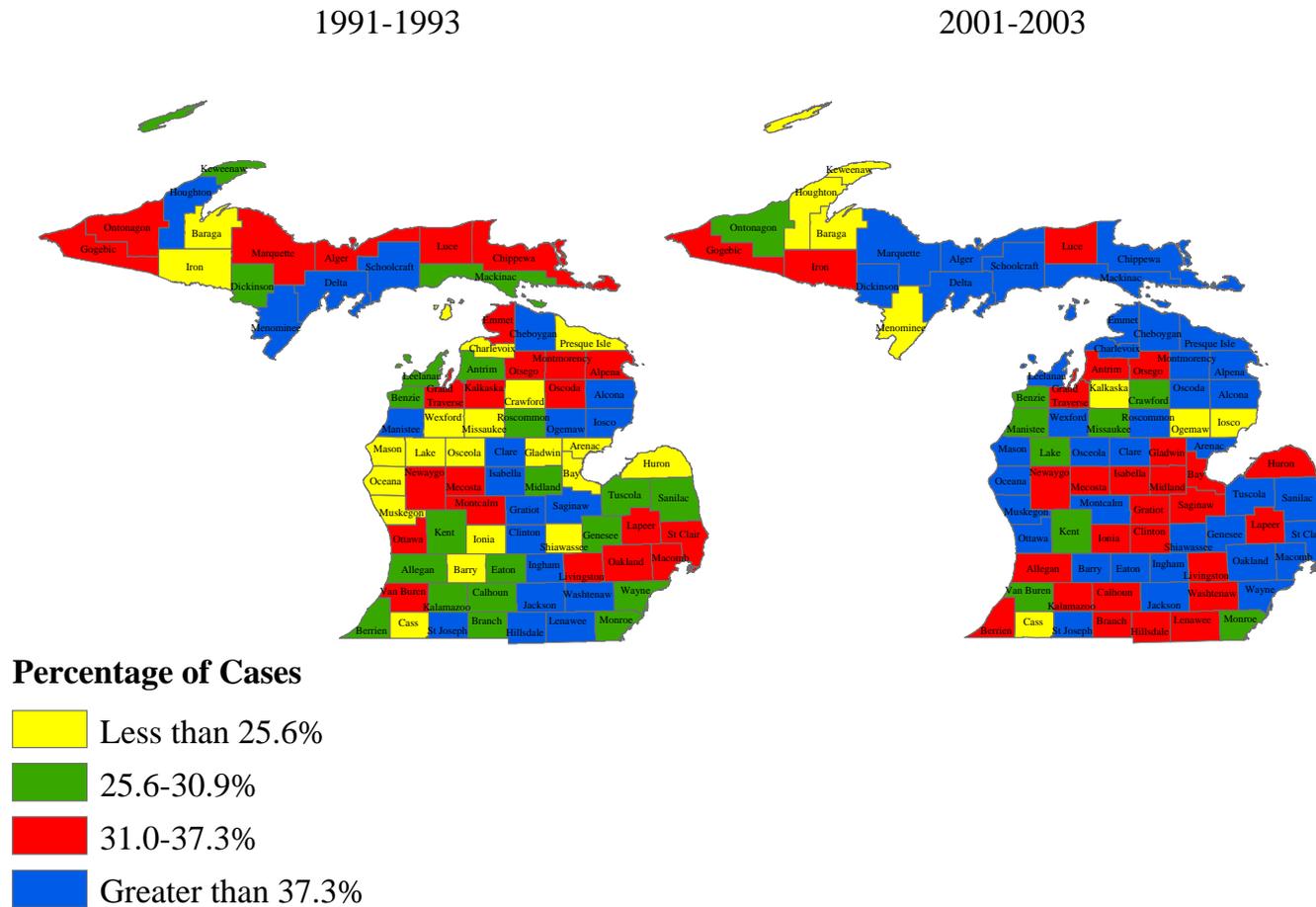


Table 28.

Estimated Number of Lung Cancer Deaths and
New Lung Cancer Cases,
Michigan 2006

Deaths	5,810
New Cases	6,240

Table 29.

Number of Lung Cancer Deaths and
New Lung Cancer Cases
by *Age Group* and *Gender*,
Michigan 2003-04

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2004	Total	5,822	8	603	2,931	2,280
	Males	3,288	5	343	1,688	1,252
	Females	2,534	3	260	1,243	1,028
New Cases, 2003	Total	7,636	13	936	4,084	2,603
	Males	4,230	7	521	2,276	1,426
	Females	3,405	6	415	1,807	1,177

Table 30.

Lung Cancer Mortality Rates by *Gender*, Michigan 2004 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2004)	US-SEER (2003)
Total	5,822	56.8	54.2
Males	3,288	74.8	71.9
White Males	2,787	72.0	71.2
Black Males	452	99.7	93.1
Females	2,534	44.0	41.2
White Females	2,210	43.9	42.2
Black Females	299	46.6	40.3

*Rate per 100,000 race- and gender-specific population.

Table 31.

Lung Cancer Incidence Rates by *Gender*, Michigan 2003 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2003)
Total	7,636	75.2	62.7
Males	4,230	96.0	78.5
White Males	3,544	91.4	77.1
Black Males	635	139.0	115.5
Females	3,405	60.2	51.3
White Females	2,934	59.6	53.9
Black Females	413	64.0	53.5

*Rate per 100,000 race- and gender-specific population.

Table 32.

Age-Specific Lung Cancer Mortality Rates by *Gender*, Michigan 2004

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	25	1.2	12	1.2	13	1.3
40-49 Years	270	17.0	144	18.3	126	15.7
50-64 Years	1,445	84.0	837	99.5	608	69.1
65 Years and Over	4,081	327.4	2,294	444.8	1,787	244.5

*Rate per 100,000 age- and gender-specific population.

Table 33.

Age-Specific Lung Cancer Incidence Rates by *Gender*, Michigan 2003

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	42	2.1	24	2.3	18	1.8
40-49 Years	435	27.3	243	30.8	192	23.9
50-64 Years	2,110	126.1	1,181	144.4	928	108.5
65 Years and Over	5,046	408.1	2,779	543.1	2,267	312.8

*Rate per 100,000 age- and gender-specific population.

Table 34.

Lung Cancer Five-Year Relative Survival Rates
by Stage at Diagnosis, *Gender* and *Race*, US 1996-2002

	Total %	Males		Females	
		White %	Black %	White %	Black %
All stages	15.0	13.4	10.5	17.4	14.5
Localized	49.3	46.0	38.7	53.3	45.8
Regional	15.5	14.6	11.6	17.1	15.5
Distant	2.1	1.7	2.0	2.3	1.9
Unknown	7.9	7.3	7.6	8.0	7.6

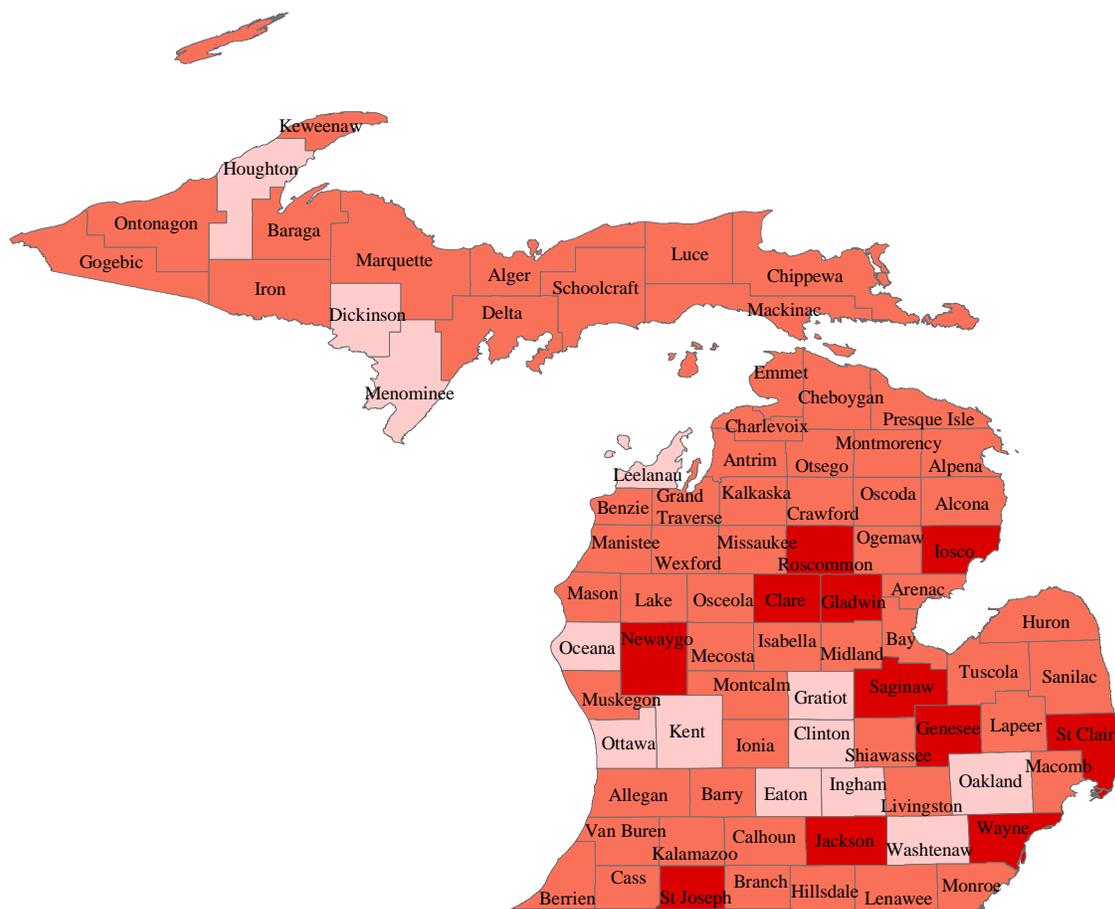
Table 35.

Numbers and Percentages of Invasive Lung Cancer
(Primary Site) by Stage at Diagnosis and *Race*,
Michigan 2003

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	7,636	1,325	17.4	1,819	23.8	3,290	43.1	1,202	15.7
Whites	6,479	1,161	17.9	1,559	24.1	2,693	41.6	1,066	16.5
Blacks	1,048	150	14.3	229	21.9	553	52.8	116	11.1

Figure 10.

Lung Cancer Mortality Rates by County, 1995-2004

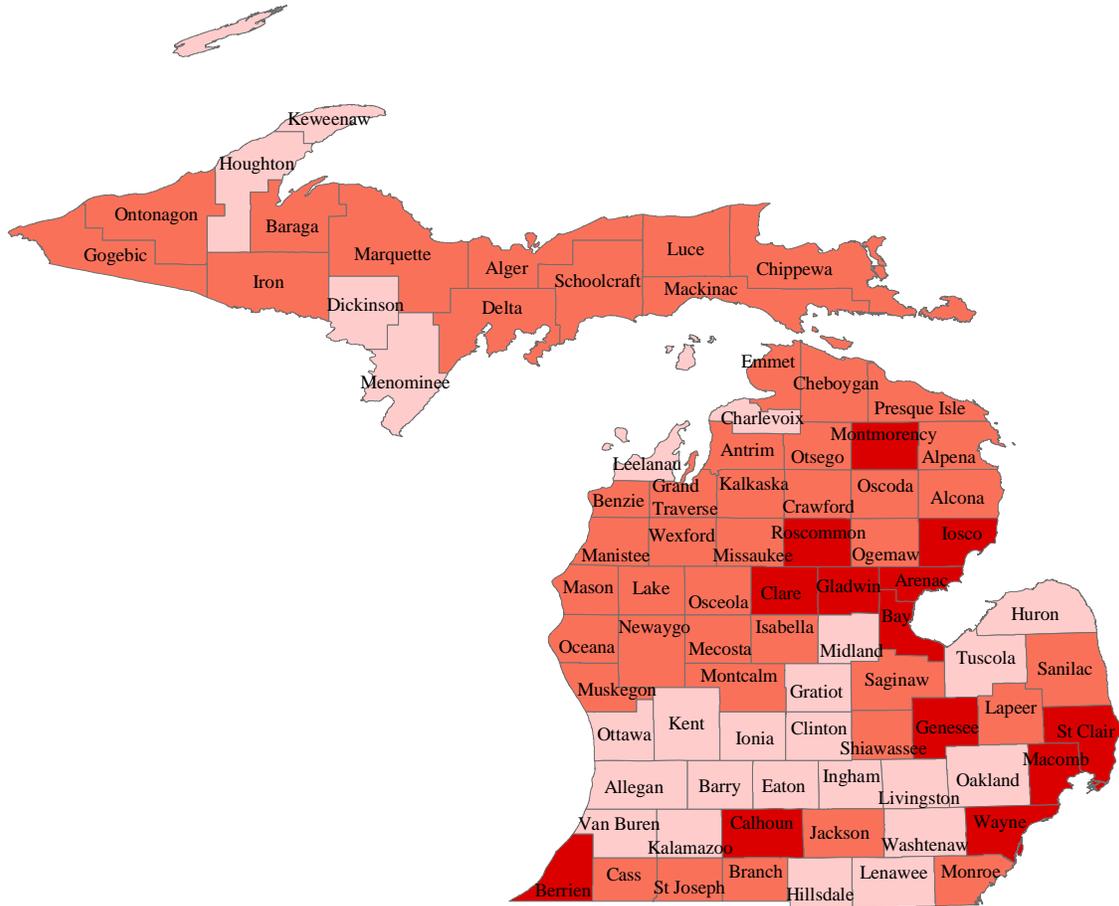


- Counties with significantly lower mortality rates*
- Counties without significantly different mortality rates*
- Counties with significantly higher mortality rates*

*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 11.

Lung Cancer Incidence Rates by County, 1994-2003



- Counties with significantly lower incidence rates*
- Counties without significantly different incidence rates*
- Counties with significantly higher incidence rates*

*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 12.

Percentage of Lung Cancer Cases Localized at Diagnosis by County

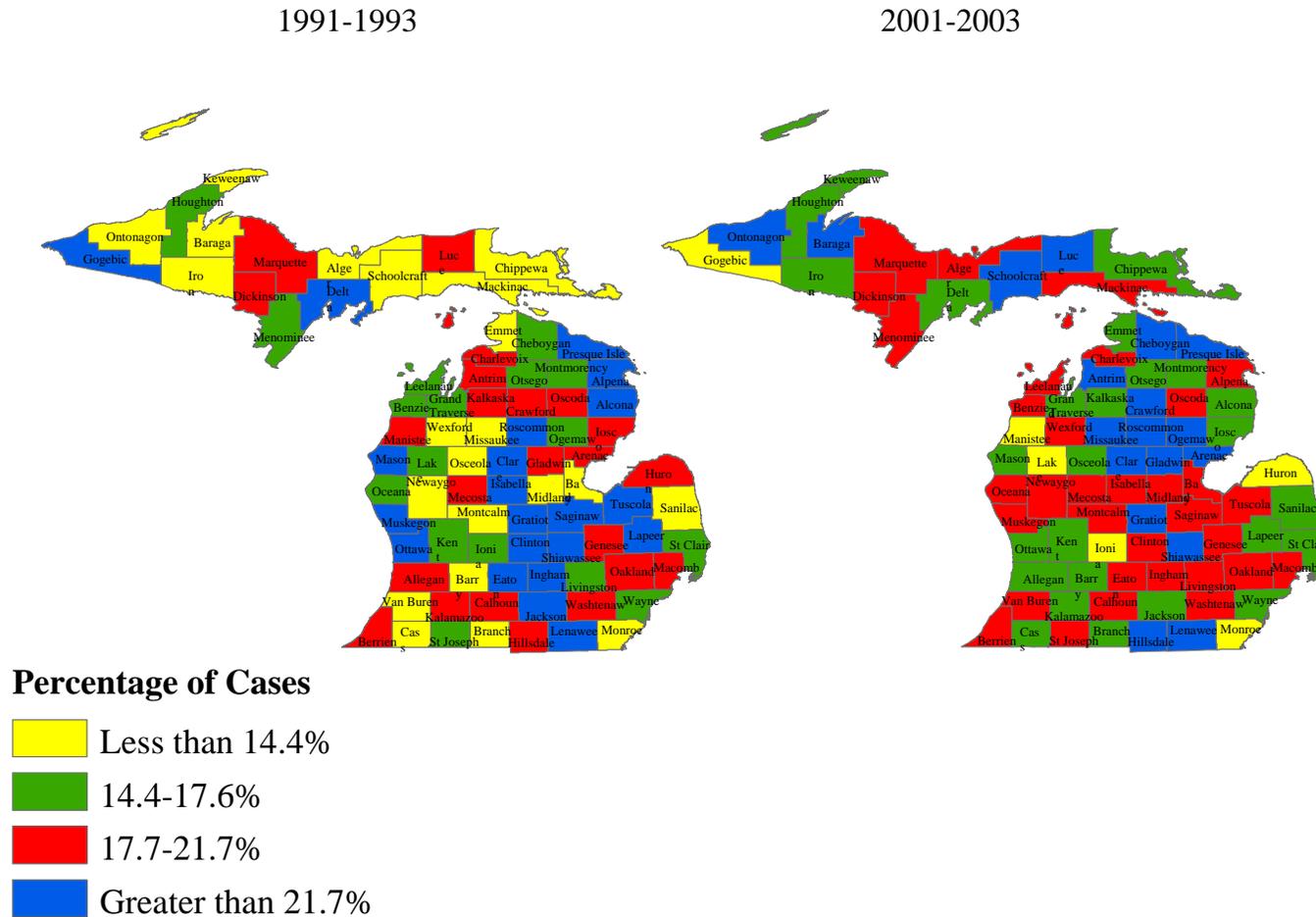


Table 36.

Estimated Number of Prostate Cancer Deaths and
New Prostate Cancer Cases,
Michigan 2006

Deaths	860
New Cases	7,370

Table 37.

Number of Prostate Cancer Deaths and
New Prostate Cancer Cases by *Age Group*,
Michigan 2003-04

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2004	967	1	26	254	686
New Cases, 2003	8,119	3	826	5,105	2,185

Table 38.

Prostate Cancer Mortality Rates, Michigan 2004 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2004)	US-SEER (2003)
Total	967	24.3	26.6
Whites	779	21.9	24.5
Blacks	175	46.4	58.0

*Rate per 100,000 race- and gender-specific population.

Table 39.

Prostate Cancer Incidence Rates, Michigan 2003 vs. US 2003

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2003)
Total	8,119	180.5	164.9
Whites	6,324	159.5	160.0
Blacks	1,259	273.8	247.0

*Rate per 100,000 race- and gender-specific population.

Table 40.

Age-Specific Prostate Cancer Mortality Rates, Michigan 2004

	Number	Rate*
25-39 Years	0	0.0
40-49 Years	9	1.1
50-64 Years	88	10.5
65 Years and Over	869	168.5

*Rate per 100,000 age- and gender-specific population.

Table 41.

Age-Specific Prostate Cancer Incidence Rates, Michigan 2003

	Number	Rate*
25-39 Years	7	0.7
40-49 Years	238	30.2
50-64 Years	2,875	351.5
65 Years and Over	4,998	976.7

*Rate per 100,000 age- and gender-specific population.

Table 42.

Prostate Cancer Five-Year Relative Survival Rates
by Stage at Diagnosis and *Race*, US 1996-2002

	Total %	White %	Black %
All stages	99.9	99.9	97.6
Localized/Regional	100.0	100.0	100.0
Distant	33.3	32.7	31.1
Unknown	79.5	80.5	74.6

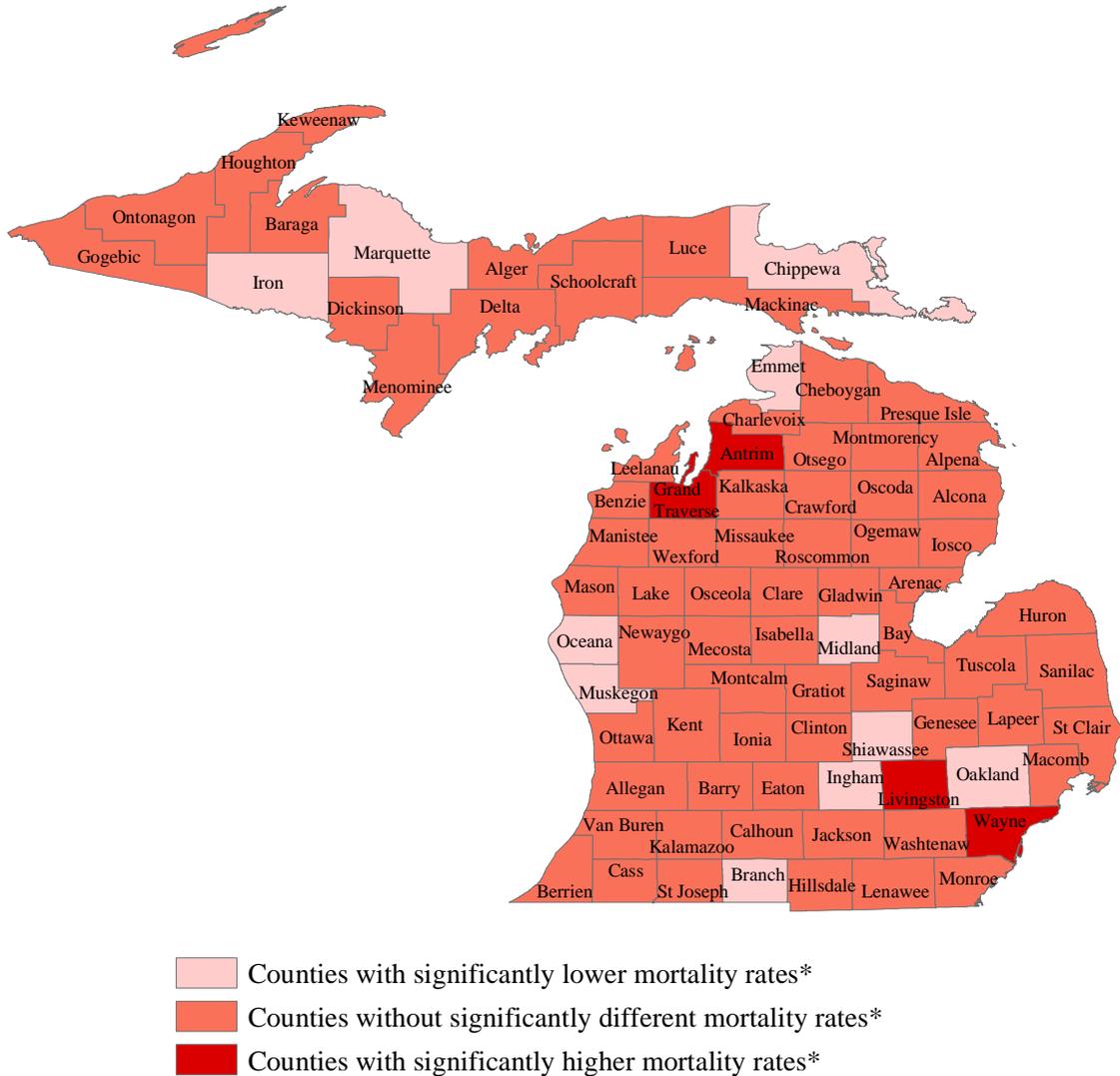
Table 43.

Numbers and Percentages of Invasive Prostate Cancer
(Primary Site) by Stage at Diagnosis and *Race*,
Michigan 2003

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	8,119	6,331	78.0	723	8.9	192	2.4	873	10.8
Whites	6,324	5,007	79.2	550	8.7	129	2.0	638	10.1
Blacks	1,259	972	77.2	159	12.6	61	4.8	67	5.3

Figure 13.

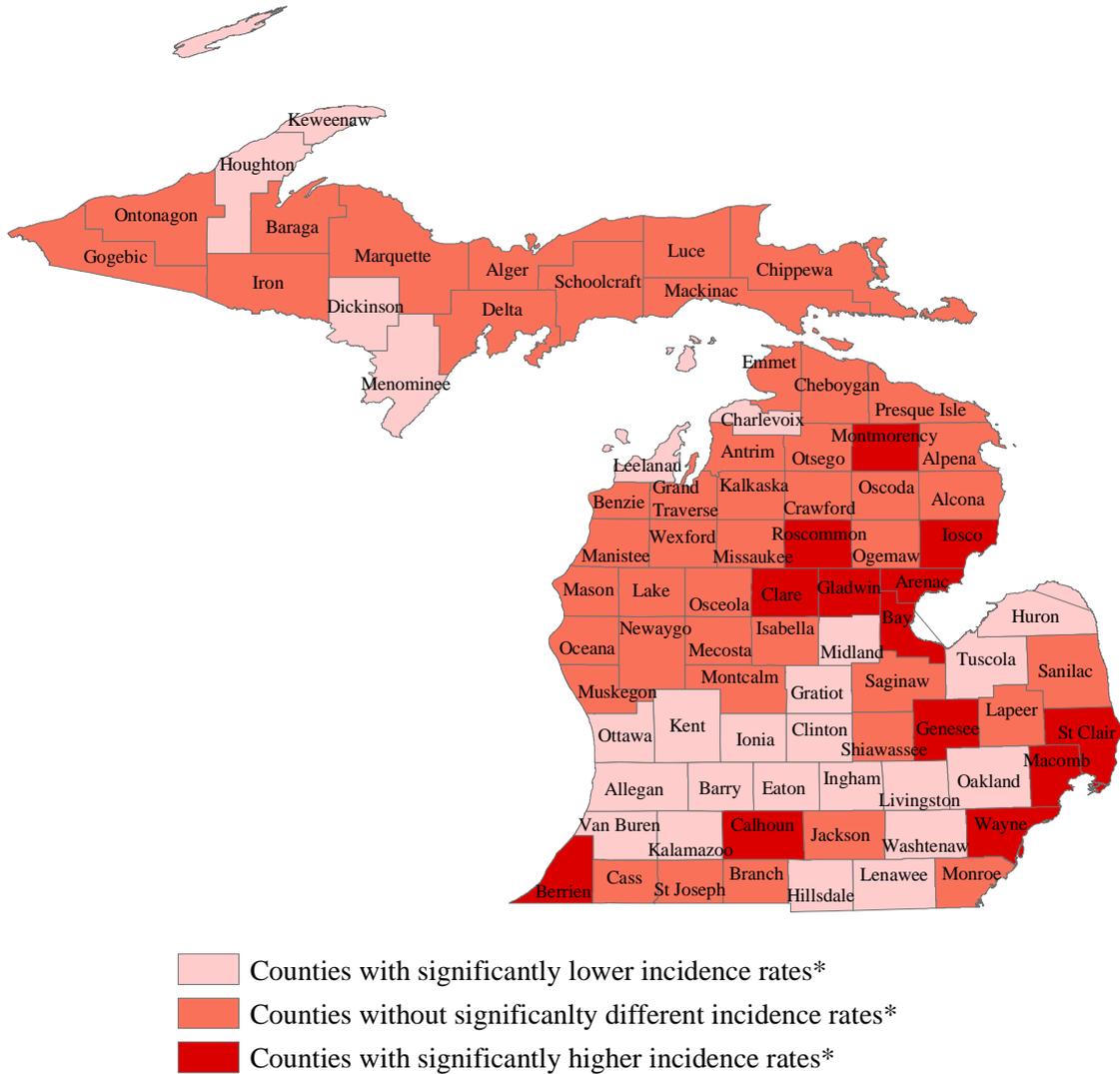
Prostate Cancer Mortality Rates by County, 1995-2004



*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 14.

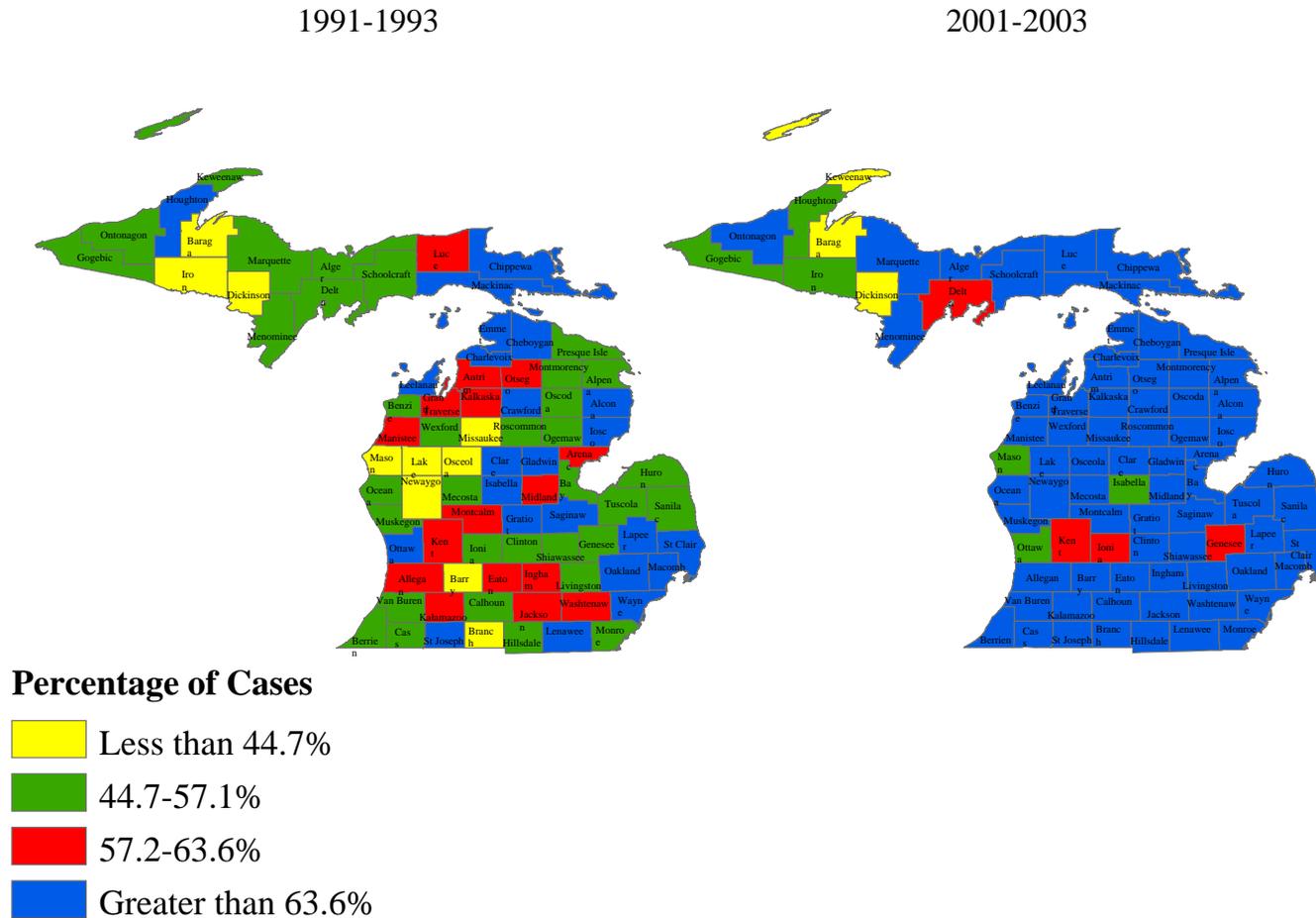
Prostate Cancer Incidence Rates by County, 1994-2003



*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 15.

Percentage of Prostate Cancer Cases Localized at Diagnosis by County



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Time Trends

Changes that occurred in cancer incidence and cancer mortality in Michigan over a ten to fifteen-year period are illustrated in this section. Data on new cancer cases from 1989 to 2003 and deaths due to cancer from 1990 to 2004 were made available from the statewide cancer registry at the Michigan Department of Community Health.¹ The Estimated Annual Percent Change (EAPC) in age-adjusted incidence and mortality rates over multiple-year periods were calculated by regressing the calendar year on the natural log of age-adjusted incidence and mortality rates.^{2,3} Rates were calculated by direct age-adjustment using the 2000 US population age distribution as the standard population.⁴ In the regression equation ($y=mx+b$), x =year and $y=\ln(\text{rate})$. The $EAPC=100*((e^m)-1)$. To test EAPC for statistical significance, t tests were used to test the hypothesis that the slope of the regression line is equal to zero, using two-sided $p=.05$. The EAPC in mortality rates was calculated over the period 1995 to 2004 and EAPC in incidence rates was calculated over the period 1994 to 2003.

The EAPC in mortality and incidence rates for Michigan and the United States over the period 1994 to 2003 are presented for comparison.⁵

Summary

Figures 1 through 3 show the EAPC in mortality rates for the total population, and for women and men for the relevant cancer sites. From 1994 to 2003, Michigan total mortality rates due to breast, cervical, colorectal, lung and prostate cancer all decreased. All changes were statistically significant at $p\leq.05$. Lung cancer mortality rates decreased among men, but increased among women (statistically significant changes at $p\leq.05$).

Figure 4 shows EAPC in mortality rates for Michigan next to EAPC in mortality rates for the United States. Over the time period from 1994 to 2003, both Michigan and the United States had similar EAPC for breast, cervical, colorectal, lung and prostate cancer rates.

Figures 5 through 7 track yearly mortality rates for each cancer site from 1990 to 2004. The mortality rates followed over time are presented for the total population and by gender.

¹ Michigan Resident Cancer Incidence File Updated with cases processed by November 22, 2005, and 1985-2004 Michigan Resident Death Files, Vital Records and Health Data Development Section, Michigan Department of Community Health.

² Annual state population estimates based on the actual size of the Michigan population in years 1985 through 2004 were used in calculating rates. Population data provided by the Department of Management and Budget, received February 15, 2005.

³ Edwards BK, Brown ML, Wingo PA, Howe HL, Ward I, Ries LAG, Schrag D, Jamison PM, Jemal A, Wu XC, Friedman C, Harlan L, Warren J, Anderson RN, Pickle LW. Annual Report to the Nation on the Status of Cancer, 1975-2002, Featuring Population-Based Trends in Cancer Treatment. *Journal of the National Cancer Institute*. October 5, 2005; 97:19, 1407-27.

⁴ Michigan Department of Community Health (MDCH), Vital Records and Health Data Development Section..

⁵ Ries LAG, Harkins D, Krapcho M, Mariotto A, Miller BA, Feuer EJ, Clegg L, Eisner MP, Horner MJ, Howlander N, Hayat M, Hankey BF, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2003*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2003/, based on November 2005 SEER data submission, posted to the SEER web site, 2006

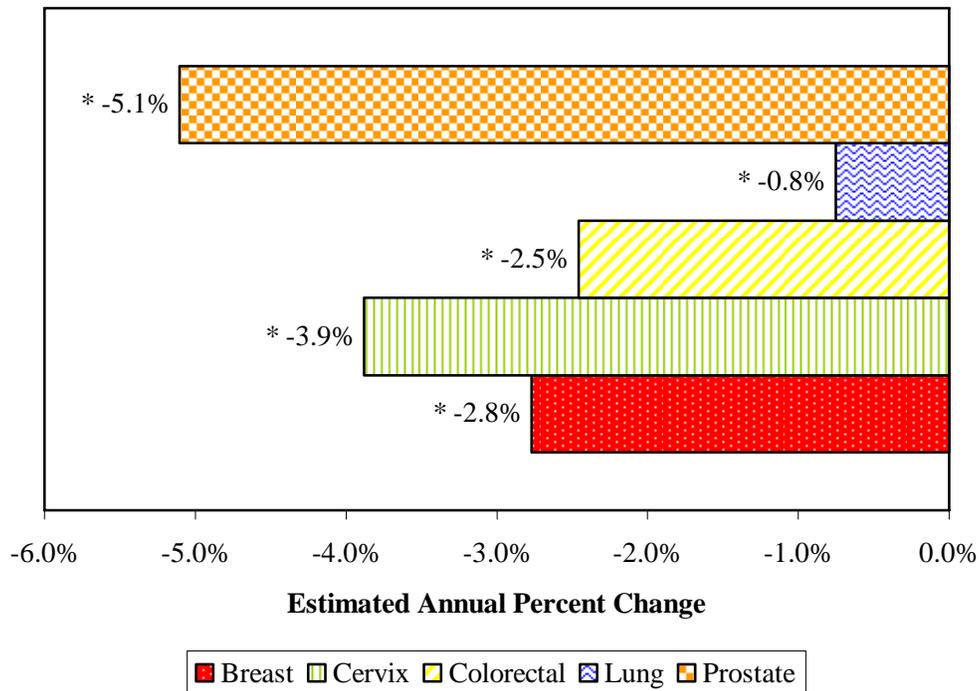
Figures 8 through 10 show the EAPC in incidence rates for the total population, women only and men only for the relevant cancer sites. In the period from 1994 to 2003, breast, cervical, colorectal, and lung cancer incidence rates in Michigan all decreased; the decrease in the rates for cervical, colorectal, and lung cancer sites were statistically significant at $p \leq .05$. Lung cancer incidence among men decreased, while the incidence rate among women increased by 0.7% per year; changes in EAPC among males were statistically significant at $p \leq .05$.

Figure 11 shows EAPC in incidence rates for Michigan and EAPC in incidence rates for the United States. From 1994 to 2003, the greatest difference in EAPC was in lung cancer incidence. EAPC for the U.S. was more negative than that of Michigan. The EAPC in breast, cervical, colorectal, and prostate cancer incidence rates were similar in Michigan and nationally.

Figures 12 through 14 follow the yearly incidence rates by cancer site from 1989 to 2003 for the total population, and women and men separately.

Figure 1.

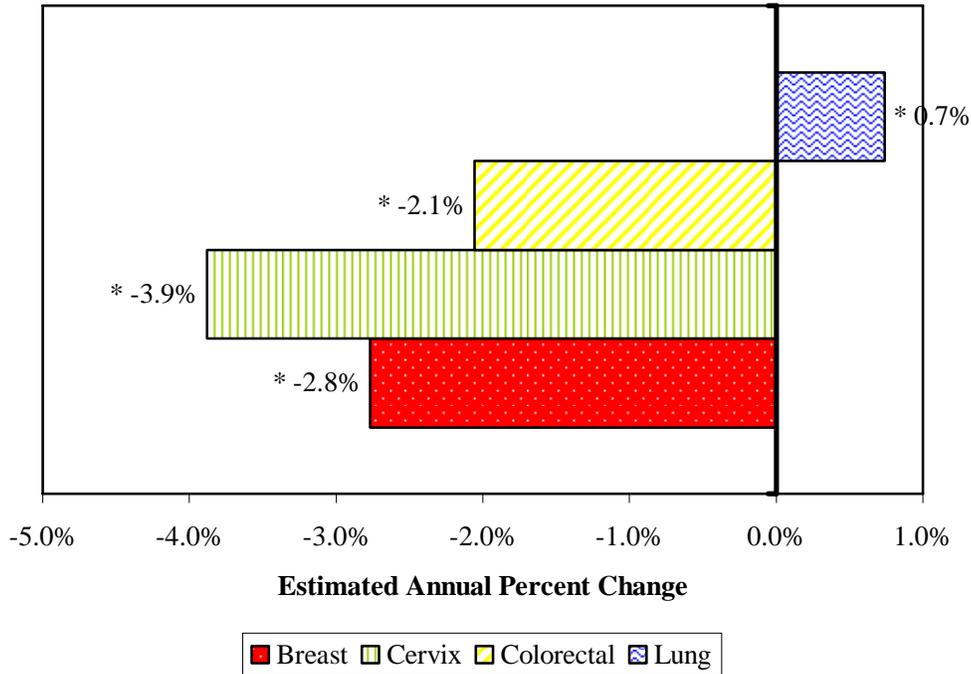
Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan 1995-2004



* The EAPC is significantly different from zero ($p \leq .05$).
 Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 2.

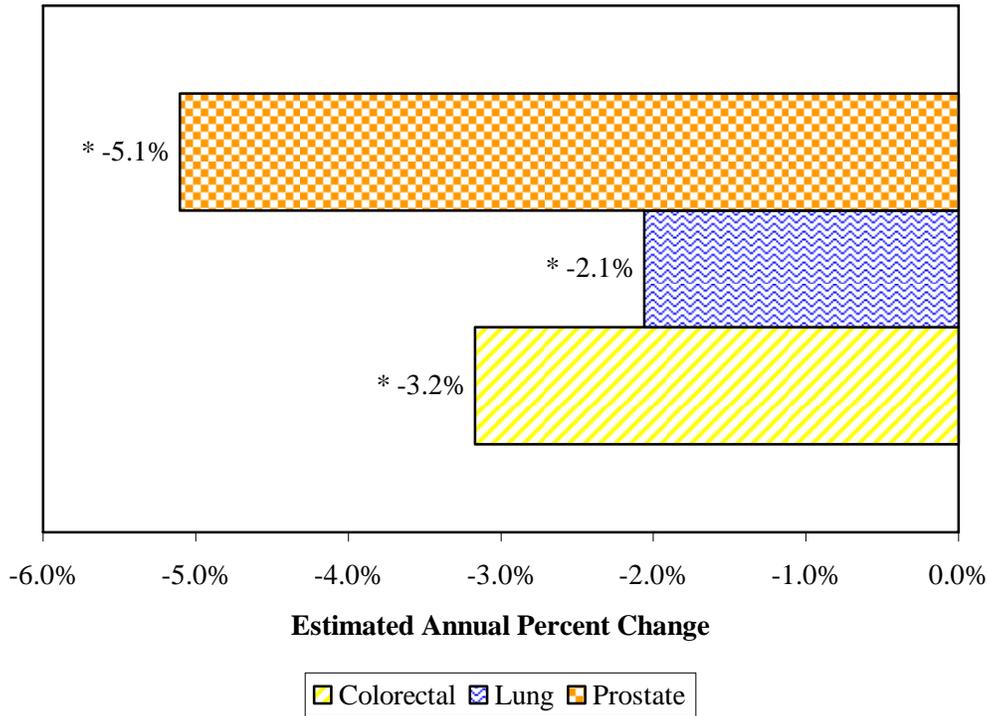
Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan Females 1995-2004



* The EAPC is significantly different from zero ($p \leq .05$).
 Rates are age-adjusted and computed by gender.

Figure 3.

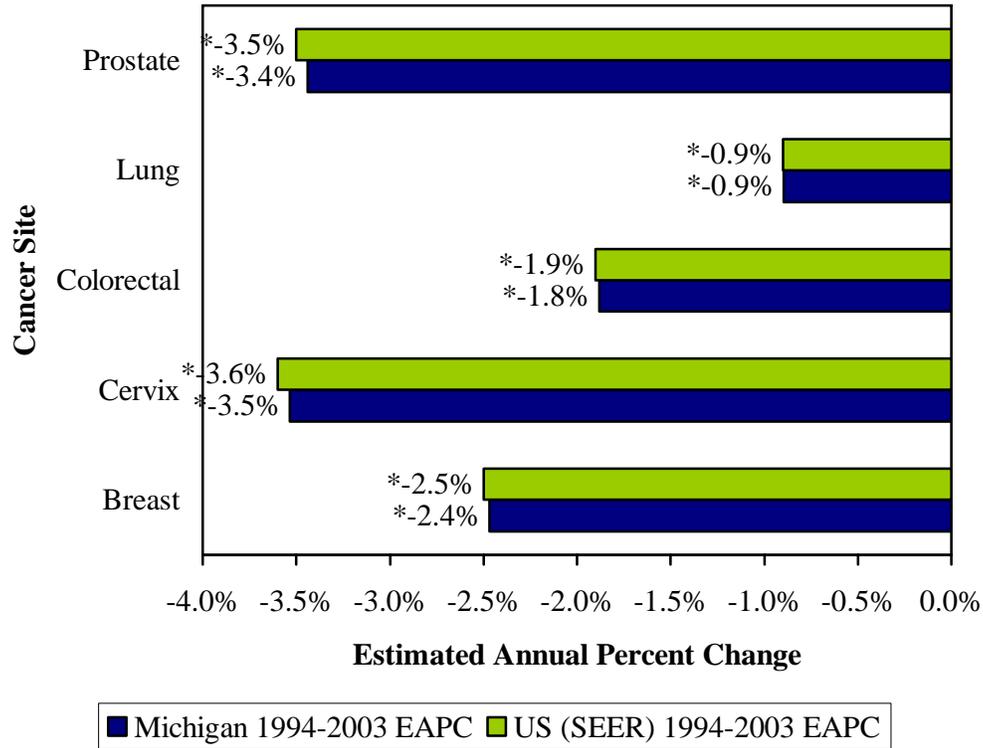
Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan Males 1995-2004



* The EAPC is significantly different from zero ($p \leq .05$).
Rates are age-adjusted and computed by gender.

Figure 4.

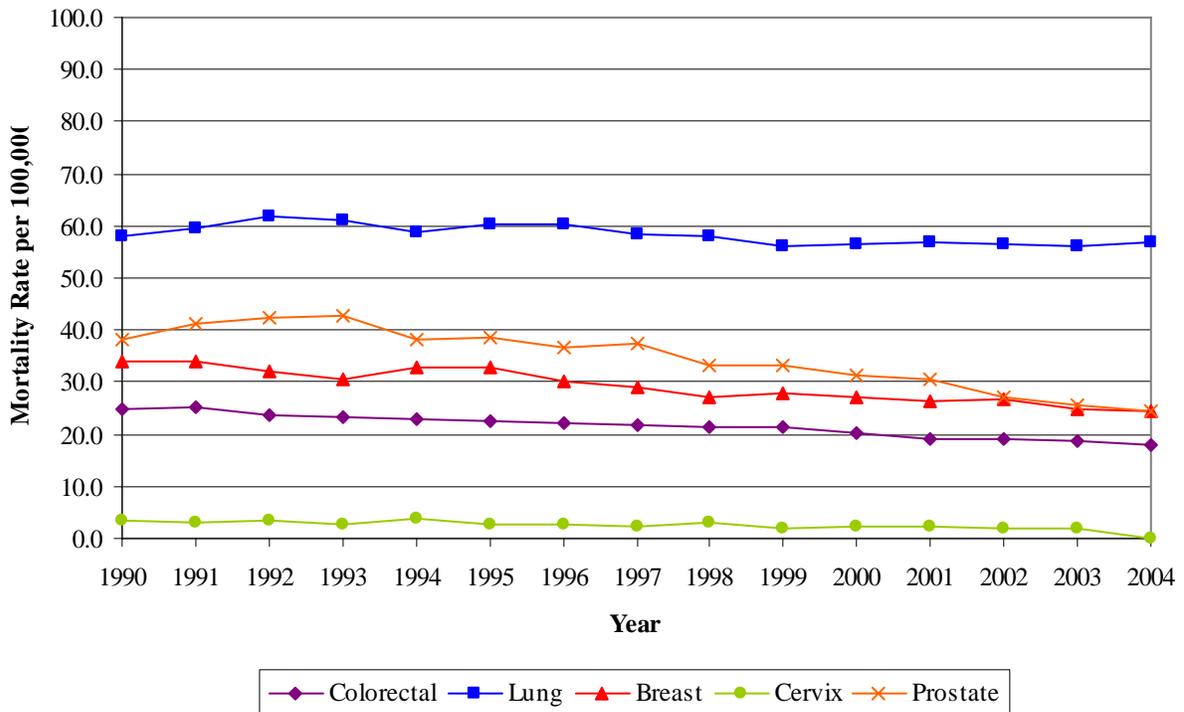
Estimated Annual Percent Change in Mortality Rates, Michigan vs. US 1994-2003



* The EAPC is significantly different from zero ($p \leq 0.05$).
Rates are age-adjusted and computed by gender breast, cervical and prostate cancer.

Figure 5.

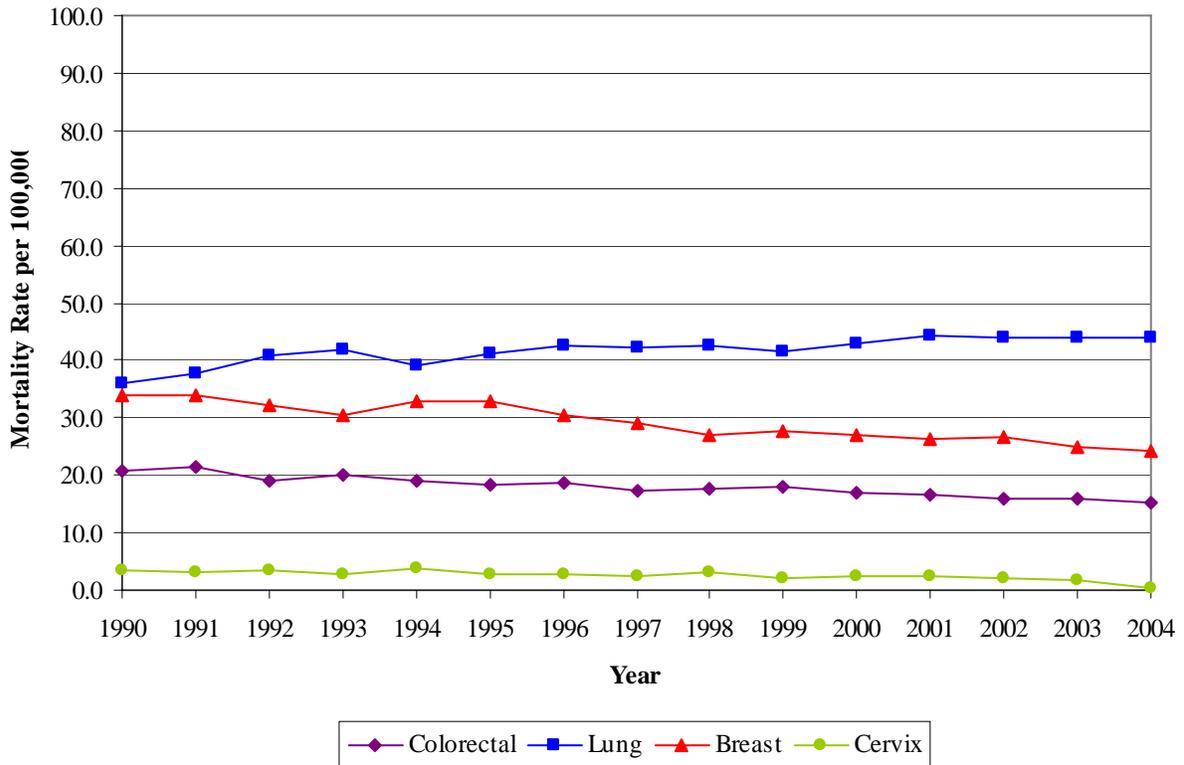
Total Mortality Rates by Cancer Site, Michigan 1990-2004



Rates are age-adjusted per 100,000 population and computed by gender for breast, cervical and prostate cancer.

Figure 6.

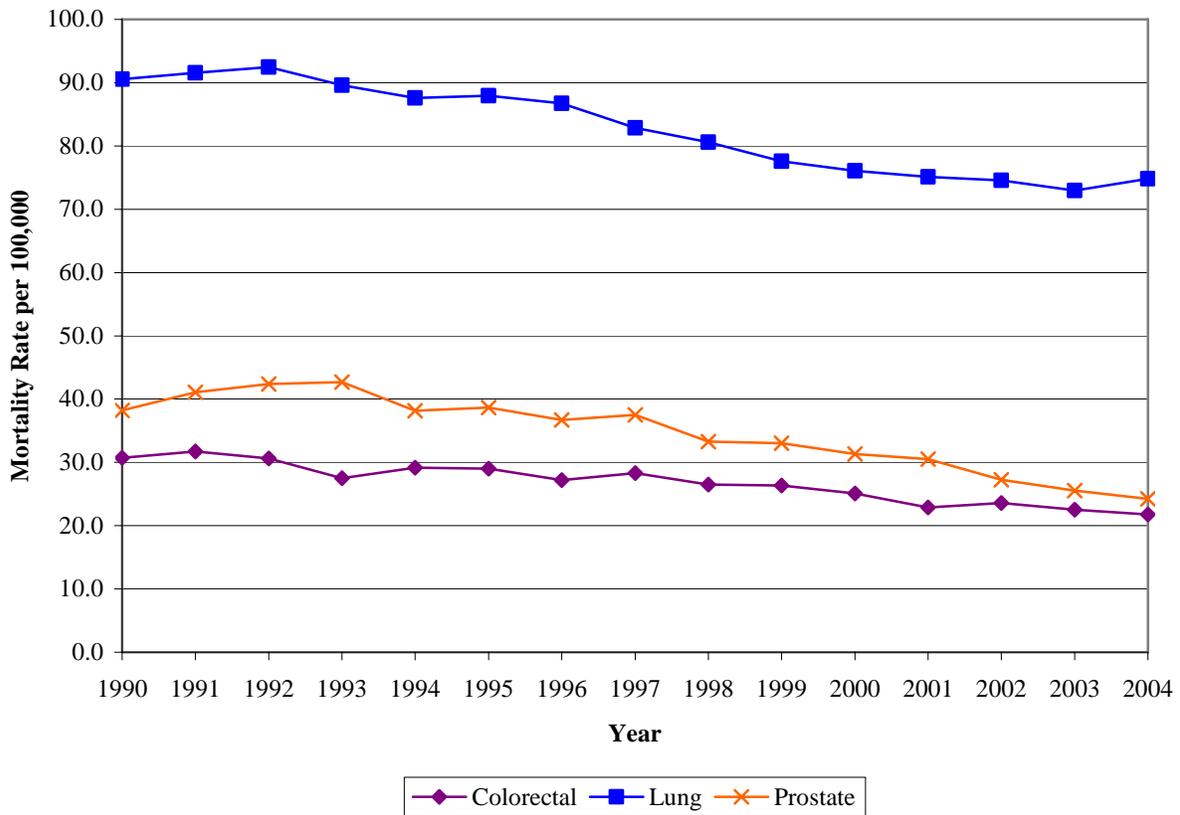
Female Mortality Rates by Cancer Site, Michigan 1990-2004



Rates are age-adjusted per 100,000 gender-specific population.

Figure 7.

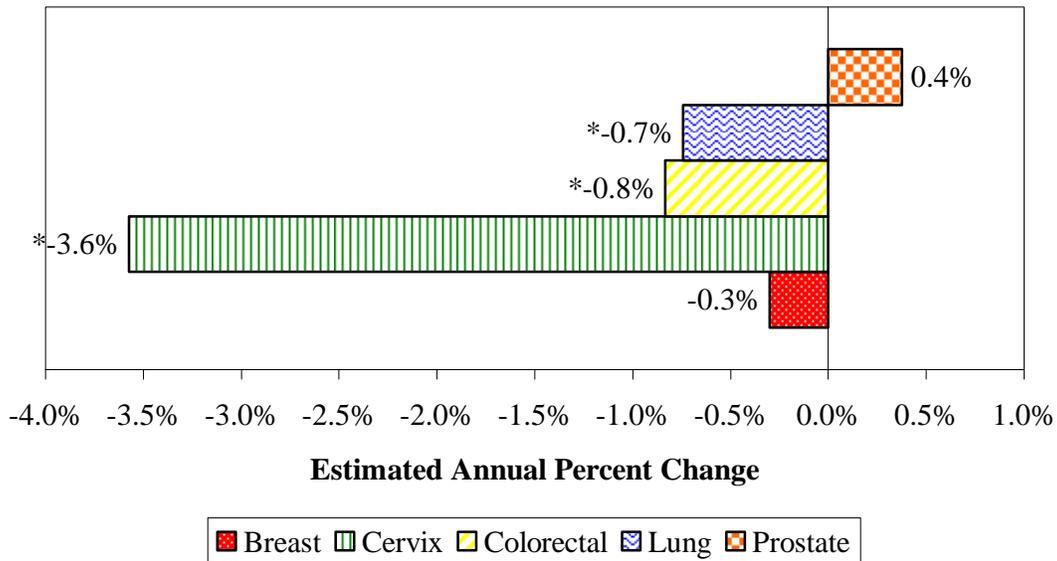
Male Mortality Rates by Cancer Site, Michigan 1990-2004



Rates are age-adjusted per 100,000 gender-specific population.

Figure 8.

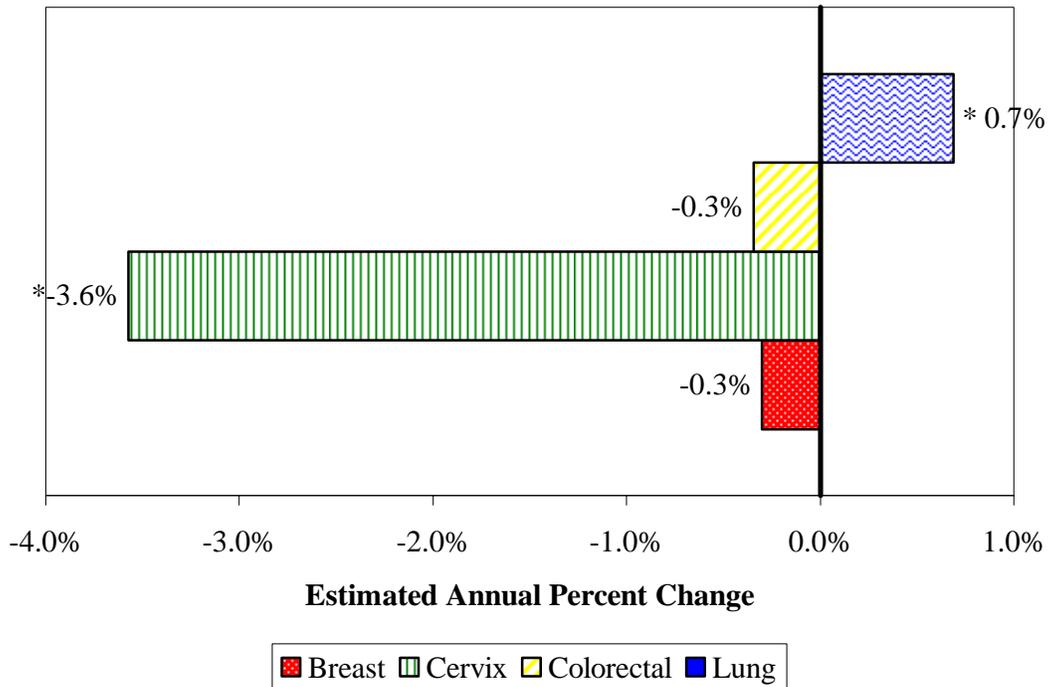
Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan 1994-2003



* The EAPC is significantly different from zero ($p \leq .05$).
 Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 9.

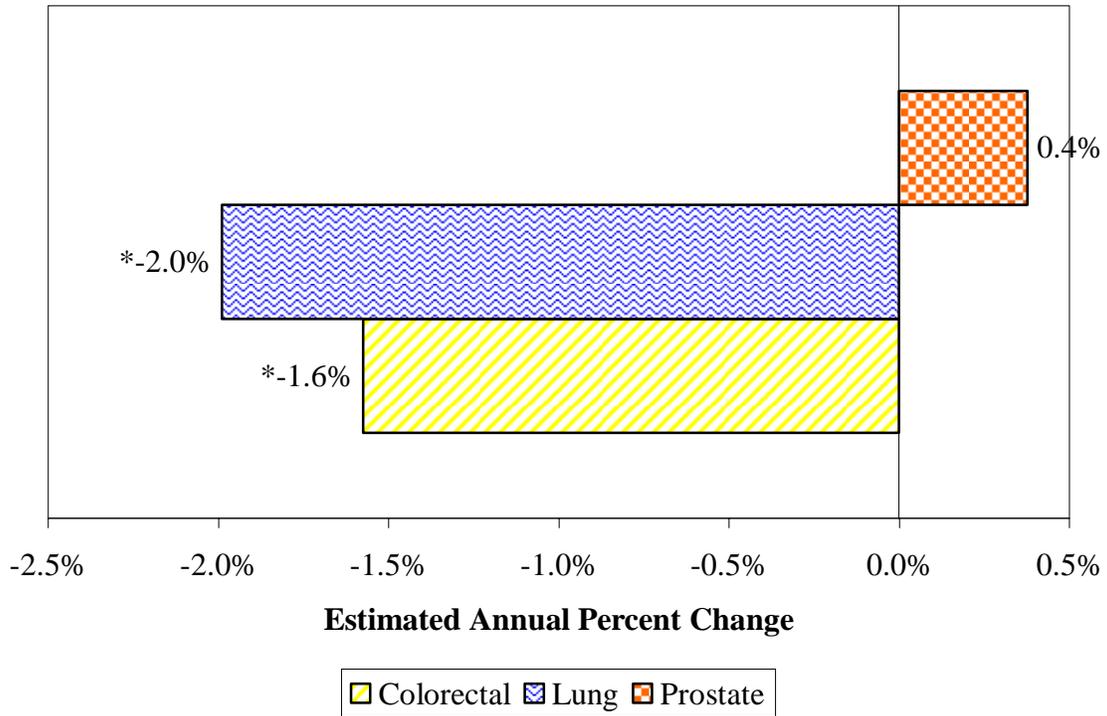
Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan Females 1994-2003



* The EAPC is significantly different from zero ($p \leq .05$).
 Rates are age-adjusted and computed by gender.

Figure 10.

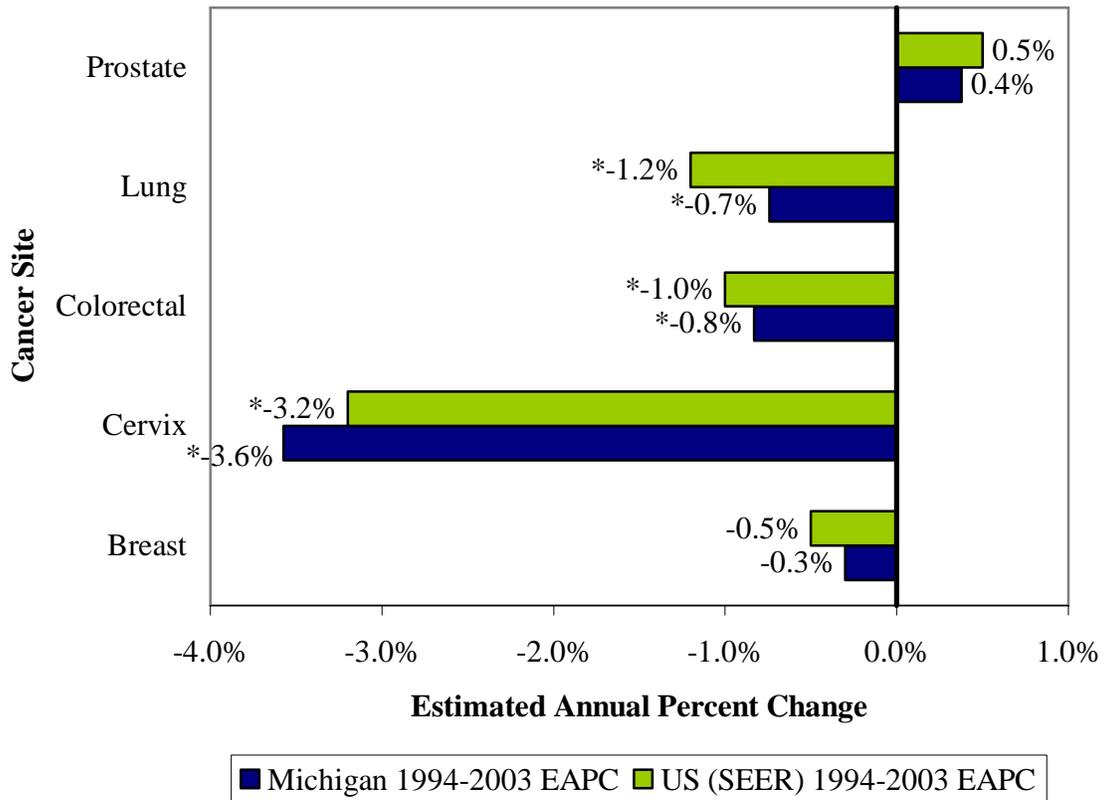
Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan Males 1994-2003



* The EAPC is significantly different from zero ($p \leq .05$).
 Rates are age-adjusted and computed by gender.

Figure 11.

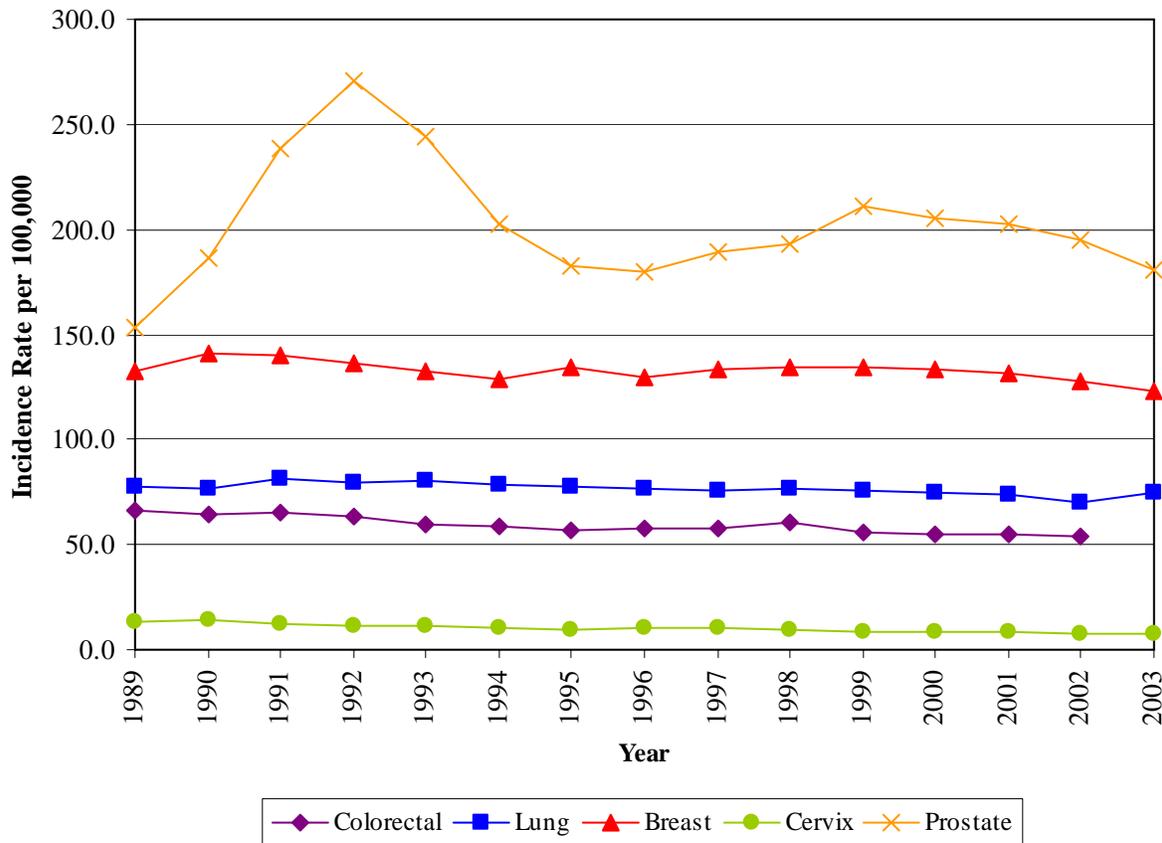
Estimated Annual Percent Change in Incidence Rates, Michigan vs. US 1994-2003



* The EAPC is significantly different from zero ($p \leq .05$).
 Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 12.

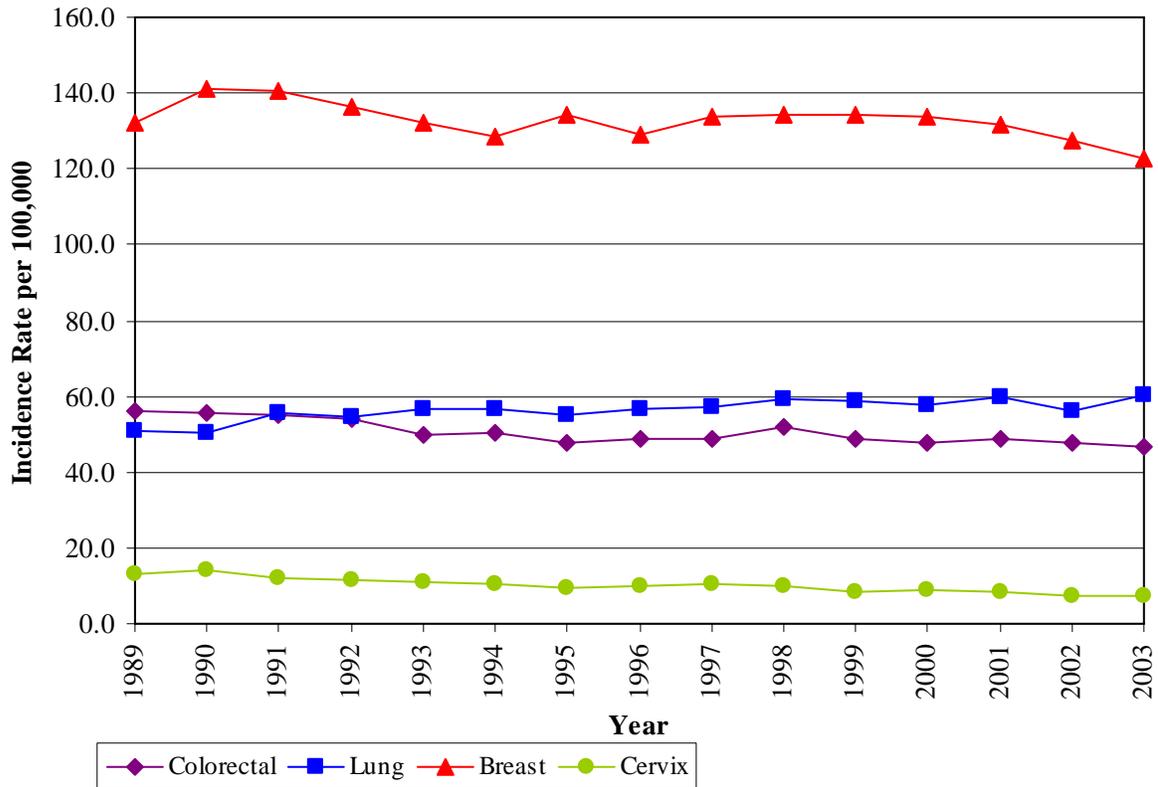
Total Incidence Rates by Cancer Site, Michigan 1989-2003



Rates are age-adjusted per 100,000 population and computed by gender for breast, cervical and prostate cancer.

Figure 13.

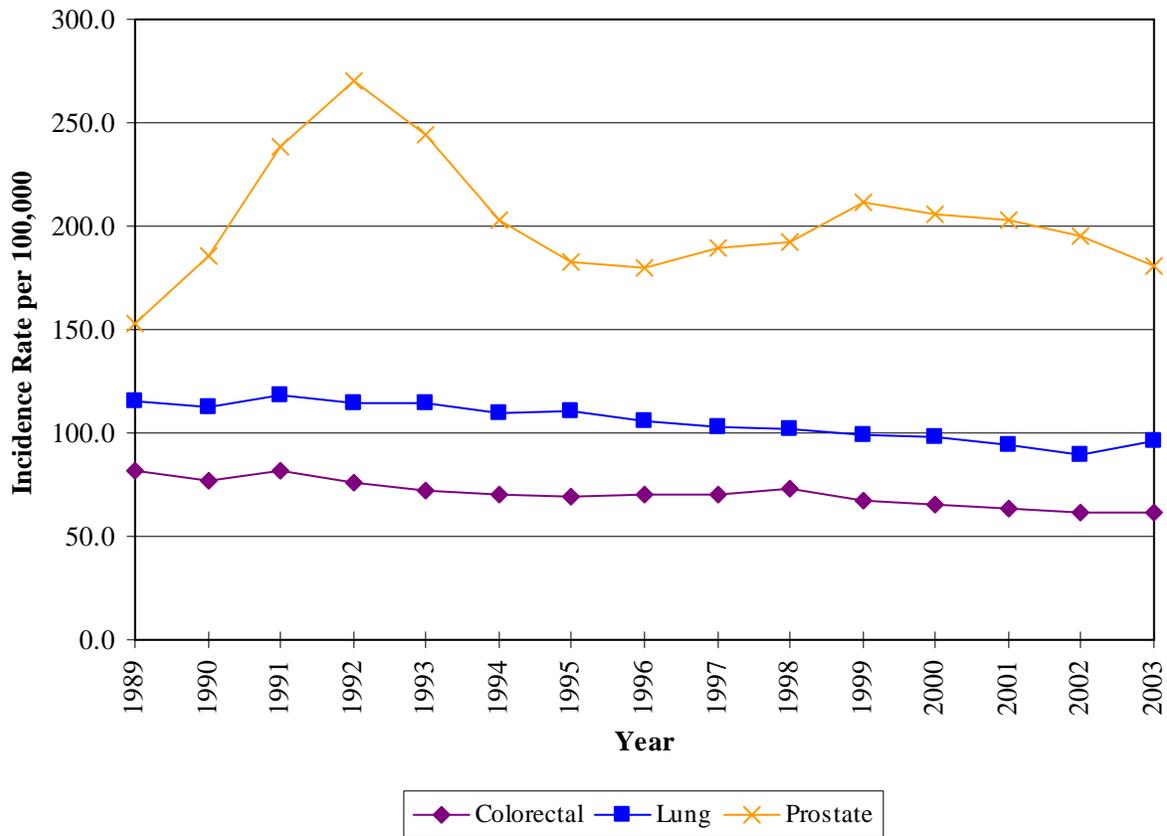
Female Incidence Rates by Cancer Site, Michigan 1989-2003



Rates are age-adjusted per 100,000 gender-specific population.

Figure 14.

Male Incidence Rates by Cancer Site, Michigan 1989-2003



Rates are age-adjusted per 100,000 gender-specific population.

Cancer-Related Behavioral Risk Factors

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Cancer-Related Behavioral Risk Factors Background

Certain behaviors such as individual cancer screening practices and lifestyle choices are relevant to the incidence, morbidity and mortality of breast, cervical, colorectal, lung and prostate cancers. Data relevant to such behaviors are presented in this section of the report.

Behavior data for Michigan residents were obtained from the Michigan Department of Community Health's Behavioral Risk Factor Surveillance System (BRFSS), the Michigan State Board of Education's Michigan Youth Risk Behavior Survey (YRBS), and the Special Cancer Behavioral Risk Factor Survey (SCBRFS), from the Michigan Department of Community Health and the Michigan Public Health Institute.

The Michigan Behavioral Risk Factor Surveillance System (MI BRFSS) is an ongoing state-level telephone survey that the Michigan Department of Community Health regularly conducts in cooperation with the Centers for Disease Control and Prevention (CDC). Each month a random sample of approximately 200 Michigan adults 18 years or older is interviewed. Survey instruments are designed so that a core set of questions dealing with some of the main risk indicators are asked each year while additional questions about areas of importance are rotated in and out of the protocol. This design allows for more precise estimates of major risk or health promotion behaviors as well as allowing for a broad range of questions to be included. Michigan BRFSS data used in this report were collected in the years of 1990 through 2005.¹ Michigan BRFSS reports are available to the public on the Michigan Department of Community Health's website at http://www.michigan.gov/mdch/0,1607,7-132-2945_5104_5279_39424---,00.html. In this report, MI BRFSS data are included to illustrate trends in prevalence rates over time for various behaviors relevant to cancer prevention or detection. Current rates of cervical cancer screening from the MI BRFSS are also presented.

Tables and figures of prevalence rates for risk behaviors among Michigan youth that are included in this section present data from the Youth Risk Behavior Surveillance System (YRBSS). The YRBSS was developed by the CDC to track the prevalence of health-risk behaviors among the nation's youth. The Youth Risk Behavior Survey (YRBS) has been conducted every other year by state and local education agencies across the United States since the spring of 1990 to assess the prevalence of six categories of health risk behaviors among youth grades nine through twelve. Michigan has administered this survey to students at randomly selected public schools across the state. Questions include many areas of risk behaviors from seatbelt use to illicit drug, alcohol and cigarette use, as well as questions about sexual behavior and other topics. Tobacco use and sexual activity data from the 2005 Michigan YRBS are included in this report.²

¹ Behavioral Risk Factor Surveillance Survey (1990-2005). Michigan Department of Community Health, *Health Risk Behaviors, 1990-2004 and 2005 Michigan Behavioral Risk Factor Surveillance System Preliminary Results*.

² Youth Risk Behavior Survey (2005). Centers for Disease Control and Prevention, Available: <http://www.cdc.gov/healthyyouth/yrbs/index> [updated June 9, 2006].

All other data on current prevalence rates of cancer-related risk behaviors presented in this report are from the 2004 Special Cancer Behavioral Risk Factor Survey (SCBRFS). The SCBRFS was initiated to evaluate cancer screening practices and cancer-related issues in Michigan. The 2001-2002 SCBRFS was intended to provide baseline data needed to evaluate impact of projects and programs carried out through the collaborative efforts of the Michigan Cancer Consortium (MCC). The SCBRFS was repeated in 2004 with a majority of the same questions. Data from subsequent surveys are used to compare results against the 2001-2002 survey in order to assess progress toward improving health-related behaviors and cancer screening in Michigan. The target population for the 2004 SCBRFS was men and women in Michigan 40 years of age or older. This age group has the highest incidence and mortality rates for the cancer sites targeted by the Michigan Cancer Consortium Initiative (MCCI) (breast, cervical, colorectal, lung and prostate cancer), and this is the age group for whom regular cancer screening is most recommended. Using telephone surveillance methodology, interviews were conducted with a sample of Michigan residents from the entire state. The sampling design over-sampled for African Americans and included targeted samples of American Indians, Hispanics, Arab Americans, and Asian Americans in order to reach enough members of each special population to allow for risk behavior rate comparisons among these special populations and the general population in Michigan. A total of 4,196 interviews were completed between May 2004 and January 2005.

This section presents a comparison of The Health Plan Employer Data and Information Set (HEDIS) measures for the U.S. and Michigan related to cancer screening and smoking cessation. HEDIS measures are a set of performance standards used to measure quality of managed health care plans. The data are used to set standards for measures for the National Committee for Quality Assurance's (NCQA) accreditation program and to calculate national performance statistics and benchmarks. NCQA has collected the data from managed care organizations and preferred provider organizations. Measures for reporting on breast, cervical, and colorectal cancer screening are included, as well as smoking cessation measures such as advising patients to quit, discussing medications, and discussing strategies for quitting.

Summary

Breast cancer screening

The Michigan Cancer Consortium (MCC), the Michigan Department of Community Health (MDCH) and the American Cancer Society (ACS) recommend that women over the age of 40 years have a mammogram and clinical breast exam (CBE) every year.³

Among Michigan women aged 40 years or older, 55.3% had appropriate screening according to these guidelines in 2004 (Figure 1). Among the special populations surveyed, Arab American women had the lowest prevalence of appropriate screening (43.2%); the prevalence among African American women (51.8%) was also lower than that of the general population.

Since 1991 the proportion of women aged 40 years or older who were appropriately screened for breast cancer has continued to slightly rise, from 49.5% in 1991 to 55.3% in 2004. A slight decline, however, in reported screening rates has been observed in the most recent years, from 58.4% in 2000 to 55.7% in 2004. (Figure 2)

HEDIS measures also show a slight rise in breast cancer screening in recent years from 76.39% in 2003 to 77.20% in 2005. The 2006 HEDIS measure was not included because the data collection methodology has changed and may affect the trend. The definition and population measured, however, are different than those measured by the state Behavioral Risk Factor Surveillance System (BRFSS) and the Special Cancer Behavioral Risk Survey SCBRFS). The HEDIS measures include women ages 50-69 who have had a mammogram in the past 2 years. The screening rates in Michigan are also slightly higher than national rates. (Table 1)

Cervical cancer screening and sexual behaviors

Current MCC and MDCH cervical cancer screening recommendations are that all women should begin Pap tests starting at age 21 or at the age when sexual activity begins.⁴ Sexual activity includes any activity that puts a woman at risk for human papilloma virus (HPV), because infections with certain strains of HPV are the most important risk factor for cervical cancer.⁵

The MCC and MDCH recommend Pap tests be done at least once every three years. In 2004, 82.6% of women aged 18 years or older were screened appropriately according to these guidelines (Figure 3). However, the prevalence of appropriate cervical cancer screening peaked among 50-59 year olds and declined as age increased thereafter.

Among all women aged 18 years or older, the prevalence of appropriate cervical cancer screening did not change noticeably between 1992 and 2004 (Figure 4).

³ Michigan Cancer Consortium (MCC) Recommendations for Breast Cancer Screening, November 17, 2004 [Online]. Available at: <http://www.michigancancer.org/PDFs/EarlyDetectionRecs/MCCBreastCaGuidelines-111704.pdf>.

⁴ Michigan Cancer Consortium (MCC) Recommendations for the Early Diagnosis of Cervical Cancer, 2003 [Online]. Available at: <http://www.michigancancer.org/PDFs/EarlyDetectionRecs/MCCCervCAGuidelines-041703.pdf>.

⁵ American Cancer Society (ACS) [Online]. Available at: http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_Do_we_know_what_causes_cervical_cancer_8.asp?sitearea.

According to HEDIS data, cervical cancer screening rates have improved slightly over recent years from 79.97% in 2003 to 83.74% in 2005. The 2006 measure was excluded due to a change in data collection methodology that may affect the time trend. The measure includes women ages 18-64 who have had a pap smear in the past 3 years. The Michigan HEDIS rates are also higher than the national HEDIS rates. (Table 2)

Sexual activity is associated with risk for cervical cancer because of the link between the sexually transmitted infection with HPV and cervical cancer etiology. Indicators of sexual behaviors among Michigan youth are presented in Table 3. Over Forty-two percent (42.2%) of ninth to twelfth grade students had ever had sexual intercourse. Of these students, 38.3% had not used a condom during their last sexual intercourse and 11.8% had sexual intercourse with four or more people during their lives. Sexual behaviors among Michigan youth do not differ significantly to that of the nation (Figure 5).

Colorectal cancer screening

Recommendations by the MCC and MDCH for colorectal cancer screening include five screening schedule options for a person at average risk for colorectal cancer.⁶ According to these guidelines, all persons at average risk should be screened for colorectal cancer starting at age 50. Appropriate screening may consist of an annual fecal occult blood test (FOBT), a sigmoidoscopy exam once every five years, a sigmoidoscopy exam once every five years with an annual FOBT, a double contrast barium enema (DCBE) once every five years, or a colonoscopy once every ten years.

In 2004, 52.7% of adults aged 50 years or older had one of the recommended colorectal cancer screening tests within the appropriate timeframe (Figure 6). Of the individual tests: 8.7% of adults aged 50 years or older had an annual FOBT and sigmoidoscopy within 5 years; 34.9% of adults aged 50 years or older had a colonoscopy within 10 years; 18.2% of adults aged 50 years or older had a DCBE within 5 years; 27.0% of adults aged 50 years or older had an annual FOBT; 21.2% of adults aged 50 years or older had a sigmoidoscopy within 5 years.

Among the special population groups surveyed, the prevalence of screening according to appropriate timeframes was generally lowest among Hispanics and Asian Americans (Table 4).

Over time, the utilization of FOBT and lower gastrointestinal endoscopic exam increased slightly (Figures 7, 8, 9, 10 and 11).

⁶ Michigan Cancer Consortium (MCC) Recommendations for Breast Cancer Screening, February 2, 2005 [Online]. Available at: <http://www.michigancancer.org/PDFs/EarlyDetectionRecs/MCCColoCaGuidelines-Screening-020205.pdf>.

Lung cancer prevention

Although cigarette smoking is a risk factor for other types of cancer, it is the single most important risk factor in the development of lung cancer. According to the ACS, more than 87% of all lung cancers are attributed to smoking, and additional cases are attributed to environmental exposure to tobacco smoke.⁷

In 2004, 19.7% of the population aged 40 years or older was a current smoker (Figure 12). Of the special populations surveyed, the American Indian and Arab American populations had the highest current smoking rates; among American Indians aged 40 years or older 34.7% were current smokers and among Arab Americans in this age group, 28.2% were current smokers.

Over time, the prevalence of current smoking among adults aged 18 years or older has declined slightly since 1990 (Figure 13). Among this age group, 21.9% were current smokers in 2005.

In 2004, 49.0% of current smokers aged 40 years or older attempted to quit in the previous 12 months (Figure 14). The rates for attempting to quit were higher among some of the special populations surveyed; 50.0% of Asian Americans, 51.2% of Hispanics, 82.2% of Arab Americans, and 66.4% of African Americans had attempted to quit in the past 12 months.

In 2005, 17.0% of Michigan youth (ninth grade through twelfth grade) were current smokers (Table 5). Tobacco use indicators among Michigan youth were similar to the nation; slightly more Michigan students tried to quit smoking than the U.S. average (Figure 15). The percent of current smokers among Michigan youth has decreased from 38.2% in 1997 to 17.0% in 2005 (Figure 16).

According to the 2004 SCBRFS, 68% of those surveyed reported being advised by their doctor of smoking cessation programs and resources (Figure 17). Of all the population groups surveyed, African Americans were the least likely to report being advised of cessation resources by their doctor (49.4%).

HEDIS data on smoking cessation also shows an increase in recent years of patients being advised to quit by their physician (Table 6). The percentage of current or recent quitters ages 18+ who have been advised to quit by their physician has increased from 72.55% in 2003 to 74.02% in 2005. In 2005, 41.17% of current and recent quitters age 18+ were advised if cessation medications and 39.75% discussed quitting strategies with their physician.

⁷ American Cancer Society (ACS) [Online]. Available at:
http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_Do_we_know_what_causes_lung_cancer_26.asp?sitearea.

Prostate cancer screening

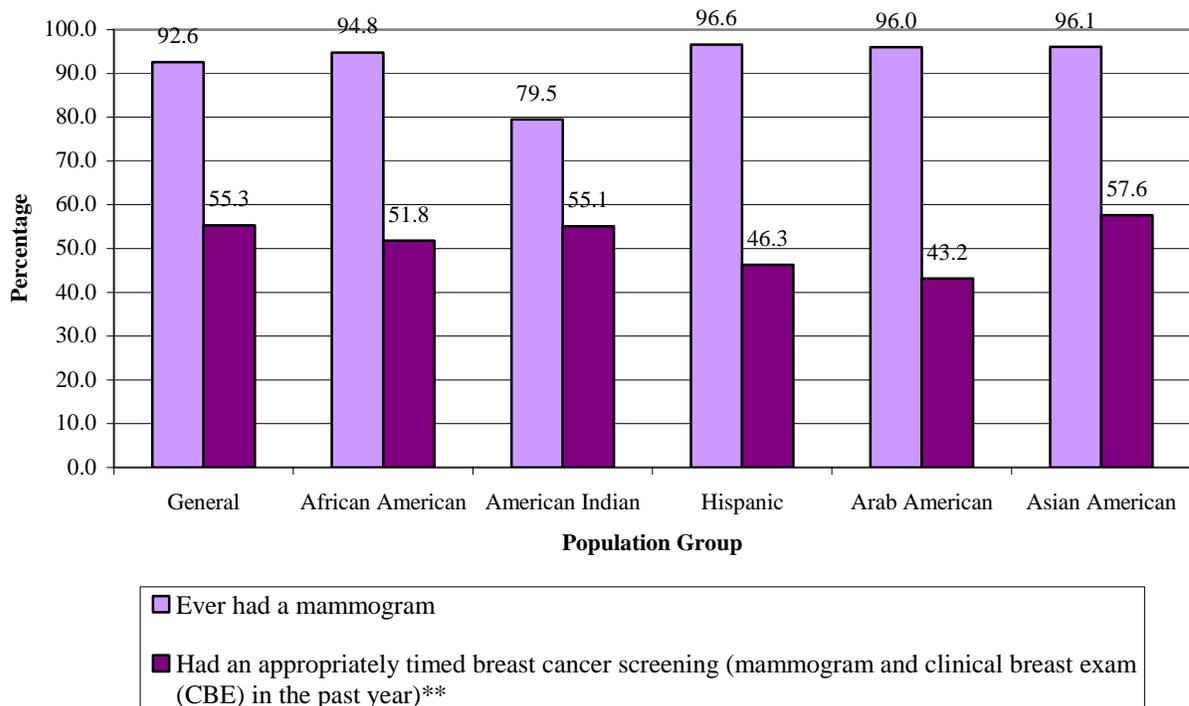
Currently the effectiveness of prostate cancer screening is a topic of investigation. Because prostate cancer grows very slowly, it is unknown whether treatment will help all men with prostate cancer live longer. Finding and treating prostate cancer early may help some men to live longer, but will have no impact on the life span of other men. Prostate cancer treatments may have an effect on a man's quality of life, causing side effects such as impotence and incontinence. The current recommendation is for men to discuss screening with their health care provider to understand their risk and advantages/disadvantages of screening as well as those of treatment options.

Prostate-specific antigen (PSA) testing is one method of screening for prostate cancer. During 2004, 59.3% of men aged 40 years or older had ever had a PSA test (Figure 18). Of the special populations surveyed, the percentage of men ever having had a PSA test was lower among all groups except American Indians (69.9%). Forty-nine percent (49.4%) of African Americans, 42.3% of Hispanics, 48.3% of Arab Americans, and 44.7% of Asian Americans reported ever having had a PSA test.

Figure 19 presents the percentage of Michigan men who discussed PSA testing with their doctor. Among the general population, 55.9% of men had discussed PSA testing with their doctor. Discussion of PSA testing with a doctor was least prevalent among Asian American (43.3%) and Arab American males (45.3%).

Figure 1.

Breast Cancer Screening Among Women Aged 40 Years or Older by Population Group Michigan, 2004



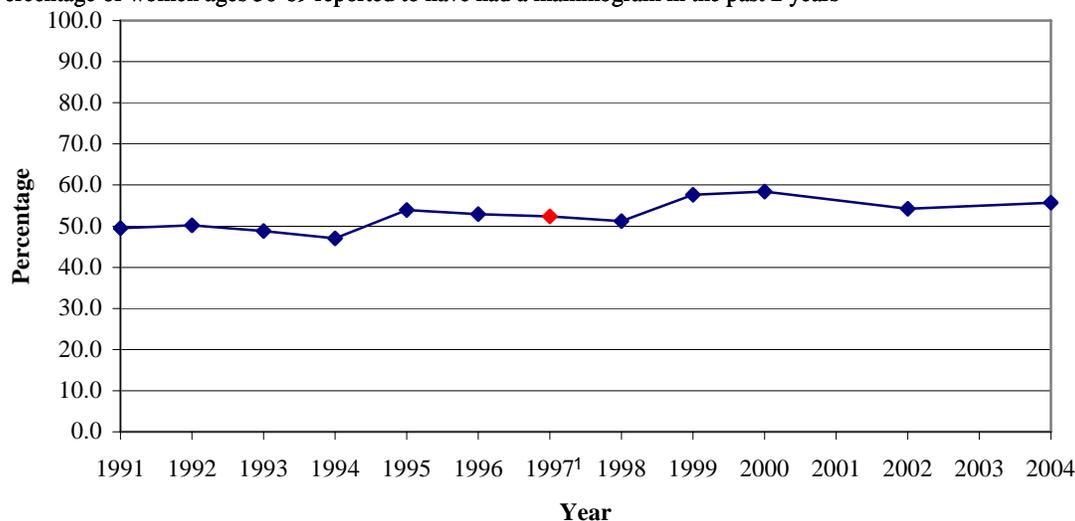
*2004 Cancer Behavioral Risk Factor Survey

**Respondents whose last breast exam was done because of a problem were not included in analysis of appropriate screening.

Figure 2.

Comparison Across Survey Years of the Percentage of Michigan Women Aged 40 Years or Older Who Had Appropriately Timed Breast Cancer Screening

*Percentage of women ages 50-69 reported to have had a mammogram in the past 2 years



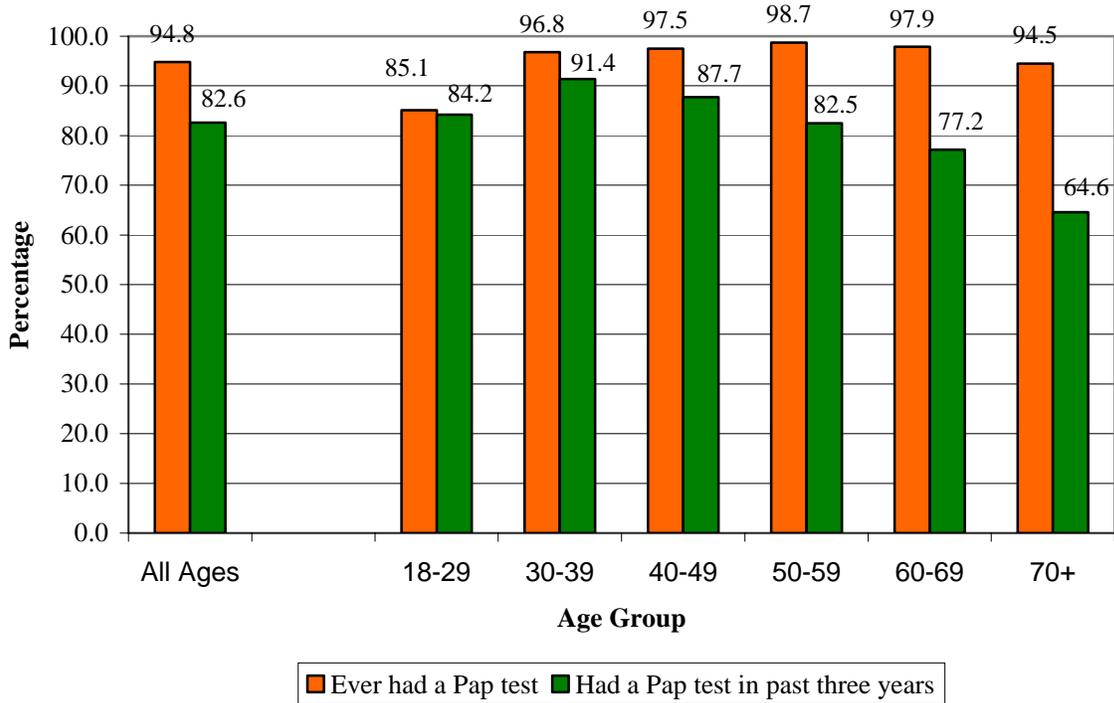
Year	Had Appropriately Timed Breast Cancer Screening ^{1,2} (%)
1991	49.5
1992	50.2
1993	48.8
1994	47.0
1995	53.9
1996	52.9
1997 ¹	55.4, 52.4
1998	51.2
1999	57.6
2000	58.4
2001	(Not asked)
2002	54.2
2003	(Not asked)
2004	55.7

¹ The ACS recommended time frame for appropriate mammography screening changed in 1997 to annually for all women 40 years of age or older. For all previous years, the recommendation was biannual screening for women aged 40 to 49 and annual screening for women aged 50+ years. As appropriate breast screening is a combination of appropriate CBE and appropriate mammography (each within the past year), this indicator changed as well.

² Respondents whose last mammogram was done because of a problem were not included in this analysis.

Figure 3.

Cervical Cancer Screening Among Michigan Women Aged 18 Years or Older by Age Group, 2004*



*Respondents whose last Pap test was done because of a problem were not included in this analysis.

Table 1.

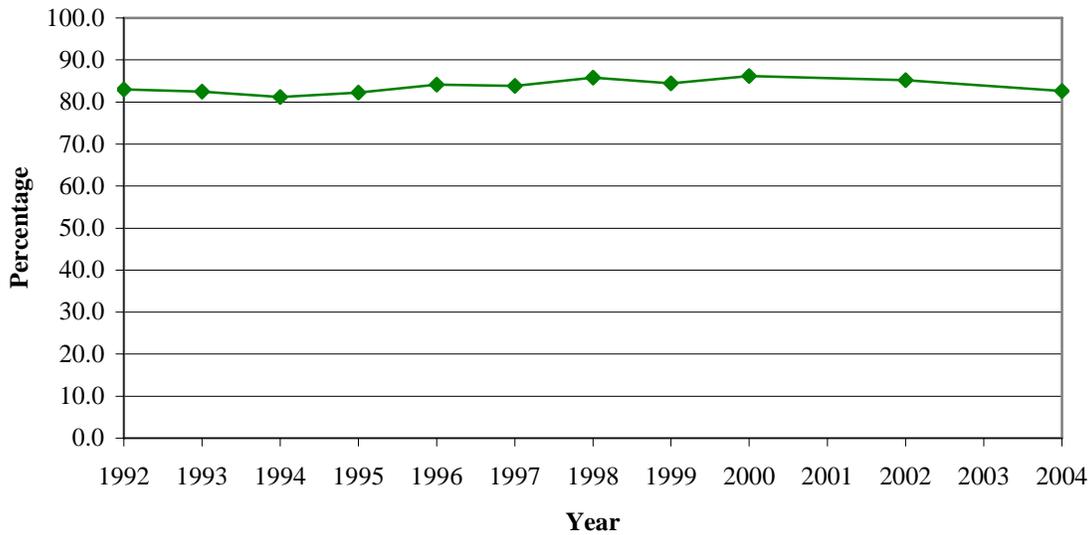
HEDIS Measures* for Breast Cancer Screening Among Women Ages 50-69: MI vs. U.S.

	2003	2004	2005
Michigan	76.39%	76.99%	75.15%
U.S.	74.93%	75.3%	73.41%

*Percentage of women ages 50-69 reported to have had a mammogram in the past 2 years

Figure 4.

Comparison Across Survey Years of Appropriately Timed Cervical Cancer Screening Among Michigan Women Aged 18 Years or Older



Year	Had Appropriately Timed Cervical Cancer Screening (Within Past 3 Years)* (%)
1992	83.0
1993	82.5
1994	81.2
1995	82.2
1996	84.1
1997	83.8
1998	85.8
1999	84.4
2000	86.2
2001	(Not asked)
2002	85.2
2003	(Not asked)
2004	82.6

*Respondents whose last Pap test was done because of a problem were not included in this analysis.

Table 2.

HEDIS Measures* for Cervical Cancer Screening Among Women Ages 18-64: MI vs. U.S.

	2003	2004	2005
Michigan	79.97%	81.76%	83.74%
U.S.	80.46%	81.77%	80.88%

*Percentage of women ages 18-64 reported to have had a pap smear in the past 3 years

Table 3.

Sexual Intercourse Behaviors Among Michigan Youth, 2005

Behavior	MI (%)	Gender		Grades				Race		
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	White (%)	Black (%)	Hispanic (%)
Percentage of students who ever had sexual intercourse	42.2	43.2	41.2	33.8	34.4	48.6	56.9	37.0	67.3	56.2
Percentage of students who had sexual intercourse for the first time before age 13	6.2	8.5	3.9	9.3	5.3	4.1	4.7	3.4	18.6	15.7
Of students who had sexual intercourse during the past three months, % who had used a condom during last sexual intercourse	61.7	64.0	59.7	74.0	71.5	54.8	55.0	60.7	66.0	--
Percentage of students who had sexual intercourse with four or more people during their lives	11.8	14.1	9.6	8.1	8.6	13.7	18.6	8.5	27.6	23.8

Figure 5.

Sexual Behaviors Among Youth Grades 9th-12th Michigan vs. United States, 2005

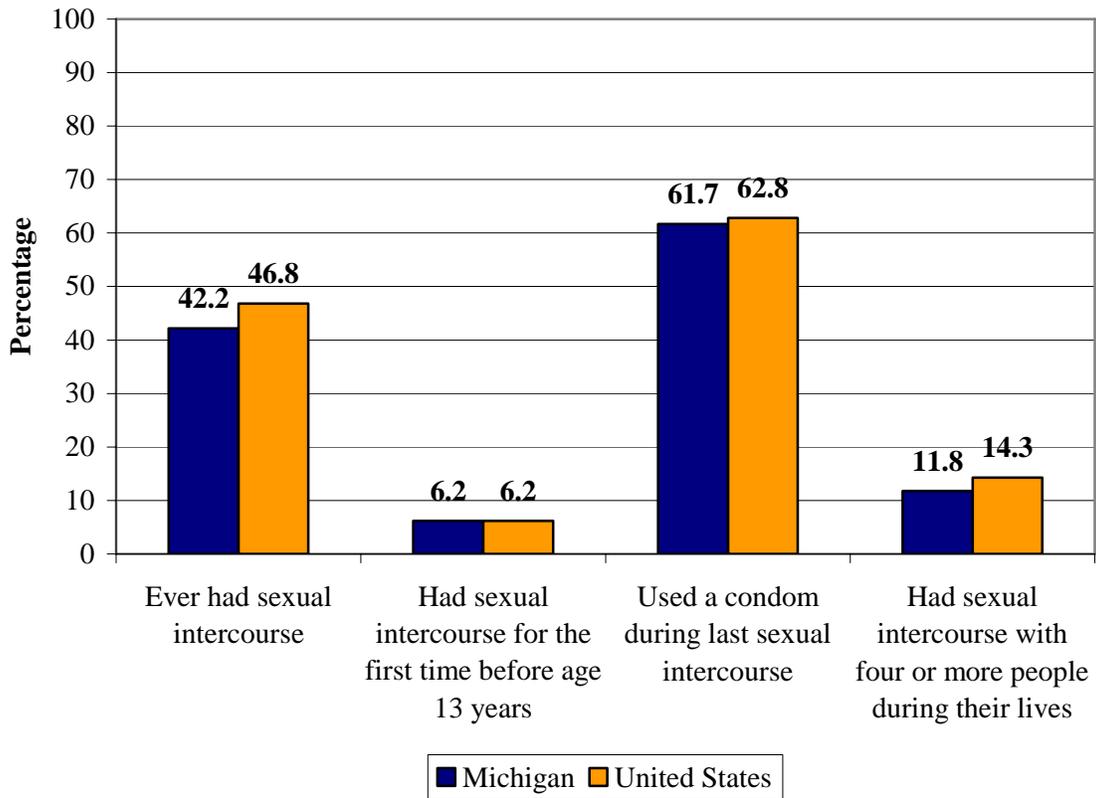
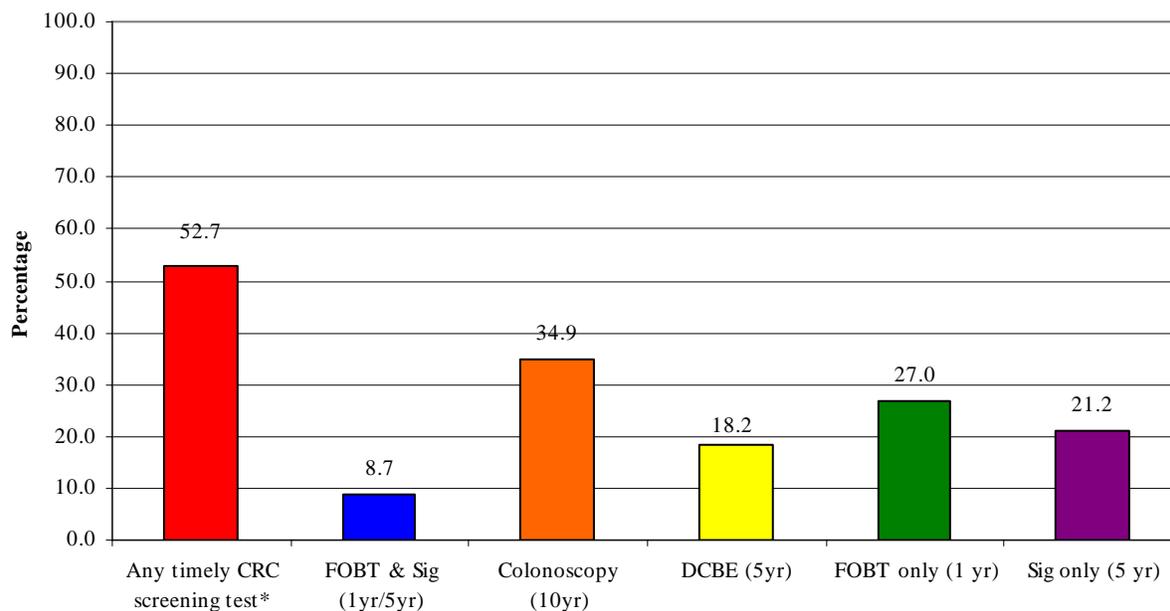


Figure 6.

Colorectal Cancer Screening Among Michigan Residents Aged 50 Years or Older, 2004**



* Any timely CRC screening test includes a FOBT every year or a flexible sigmoidoscopy every 5 years or a colonoscopy every 10 years or a DCBE every 5 years

**Respondents whose last test was done because of a problem were not included in this analysis.

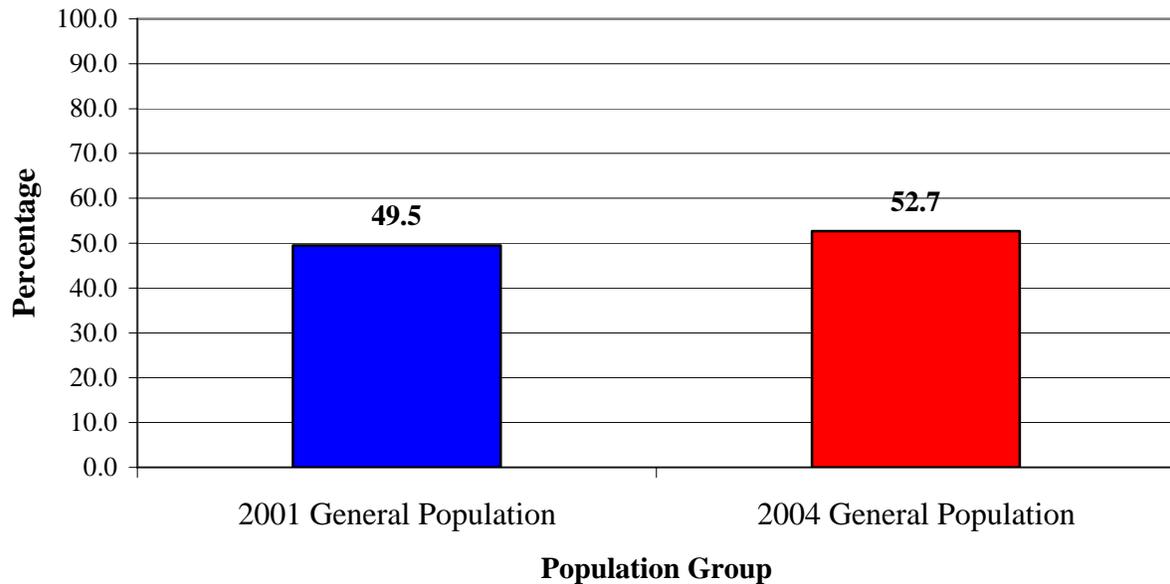
Table 4.

Colorectal Cancer Screening Among Residents Aged 50 Years or Older by Population Group, Michigan 2004**

Colorectal Cancer Screening Exam	General Population (%)	African American (%)	American Indian (%)	Hispanic (%)	Arab American (%)	Asian American (%)
Fecal Occult Blood Test (FOBT) in the past year	27.0	23.7	32.7	16.3	16.6	26.8
Sigmoidoscopy in the past five years	21.2	31.1	27.5	23.1	13.3	18.6
Sigmoidoscopy in the past five years and FOBT in the past year	8.7	10.5	11.3	7.9	8.6	9.9
Colonoscopy in the past ten years	34.9	37.7	31.9	28.9	34.8	15.4
Double Contrast Barium Enema (DCBE) in the past five years	18.2	30.6	11.8	17.8	23.9	11.6
Any timely colorectal cancer screening test*	52.7	53.4	54.6	33.0	46.3	38.6
* Any timely CRC screening test includes a FOBT every year or a flexible sigmoidoscopy every 5 years or a FOBT every year and a flexible sigmoidoscopy every 5 years or a colonoscopy every 10 years or a DCBE every 5 years						
**Respondents whose last test was done because of a problem were not included in this analysis.						

Figure 7.

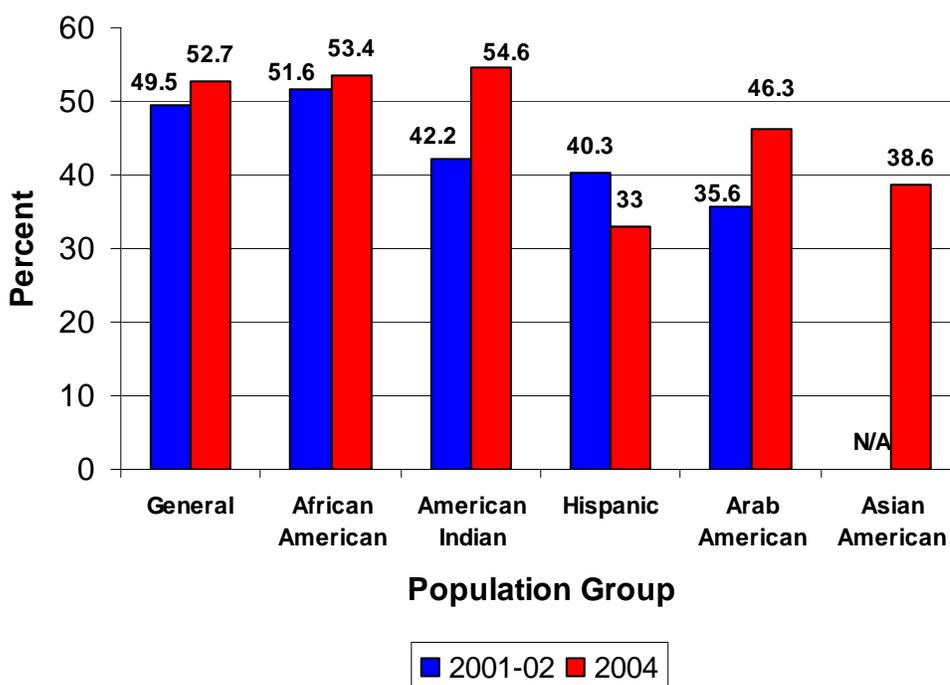
Men and Women Age 50+ Who Had Any Appropriately Timed⁸ Colorectal Cancer Screening, 2001 SCBRFS vs. 2004 SCBRFS



⁸ The MCC's recommendation for colorectal cancer screening is to have either an annual fecal occult blood test (FOBT) or a sigmoidoscopy every five years or a yearly FOBT with a sigmoidoscopy every five years or to have a colonoscopy every ten years or a double contrast barium enema (DCBE) every five years

Figure 8.

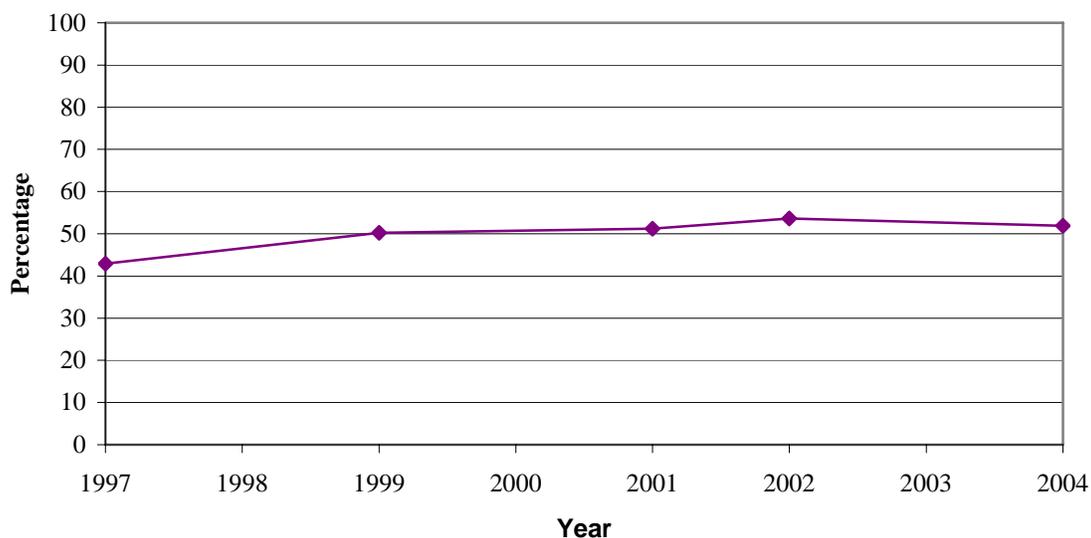
Men and Women 50+ Who Had Any Appropriately Timed⁹
Colorectal Cancer Screening by Population Group, 2001
SCBRFS vs. 2004 SCBRFS



⁹ The MCC's recommendation for colorectal cancer screening is to have either an annual fecal occult blood test (FOBT) or a sigmoidoscopy every five years or a yearly FOBT with a sigmoidoscopy every five years or to have a colonoscopy every ten years or a double contrast barium enema (DCBE) every five years

Figure 9.

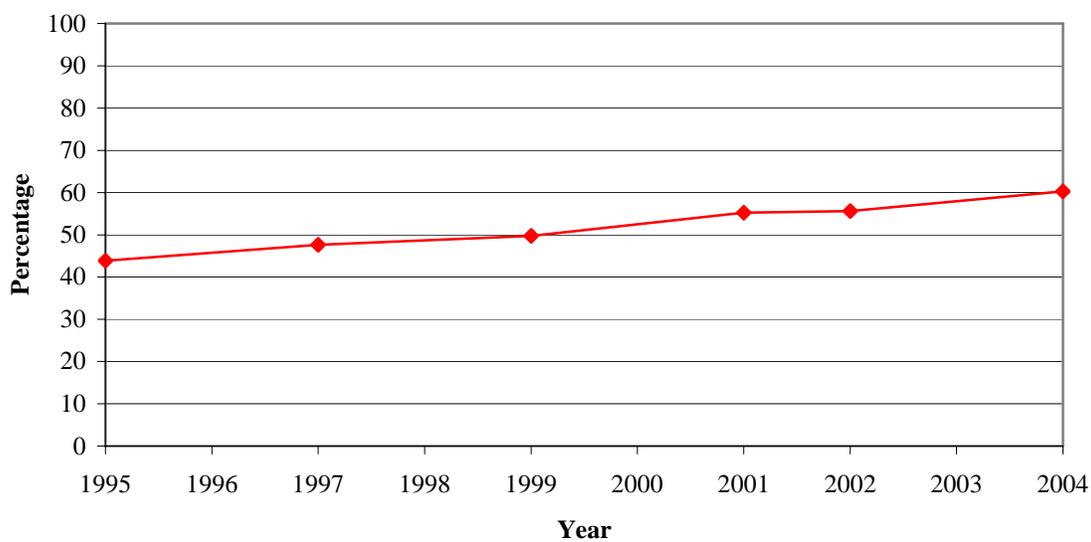
Comparison Across Survey Years of the Percentage of Michigan Residents Aged 50 Years or Older Who Ever Had a Fecal Occult Blood Test (FOBT)



Year	Ever Had an FOBT (%)
1997	42.9
1998	(Not asked)
1999	50.2
2000	(Not asked)
2001	51.2
2002	53.6
2003	(Not asked)
2004	51.9

Figure 10.

Comparison Across Survey Years of the Percentage of Michigan Residents Aged 50 Years or Older Who Ever Had a Lower Gastrointestinal Endoscopic Exam

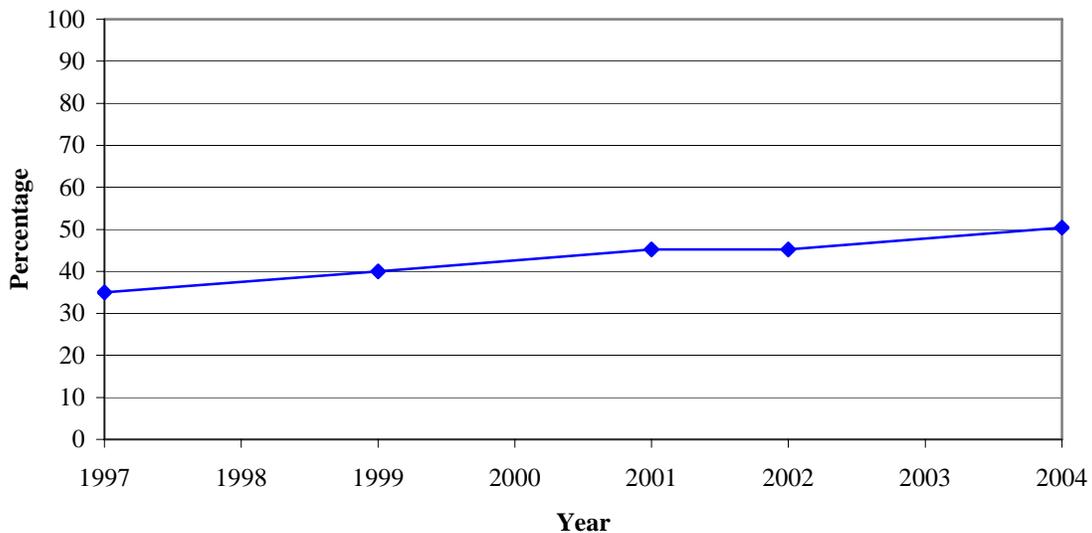


Year	Ever Had a Lower Gastrointestinal Endoscopic Exam* (%)
1995	43.9
1996	(Not asked)
1997	47.6
1998	(Not asked)
1999	49.7
2000	(Not asked)
2001	55.2
2002	55.6
2003	(Not asked)
2004	60.3

*Questions differ slightly over time: 1997—Ever had a sigmoidoscopy or proctoscopy; 1999, 2001, 2002, 2004—Ever had a sigmoidoscopy or colonoscopy

Figure 11.

Comparison Across Survey Years of the Percentage of Michigan Residents Aged 50 Years or Older Who Had a Lower Gastrointestinal Endoscopic Exam within the Past Five Years*



Year	Had a Lower Gastrointestinal Endoscopic Exam Within the Past 5 Years* (%)
1997	35.0
1998	(Not asked)
1999	40.0
2000	(Not asked)
2001	45.2
2002	45.2
2003	(Not asked)
2004	50.4

*Questions differ slightly over time: 1997—Had a sigmoidoscopy or proctoscopy within 5 years; 1999, 2001, 2002—Had a sigmoidoscopy or colonoscopy within 5 years

Figure 12.

Percentage of Adults Aged 40 Years or Older Who Are Current Smokers by Population Group, Michigan 2004

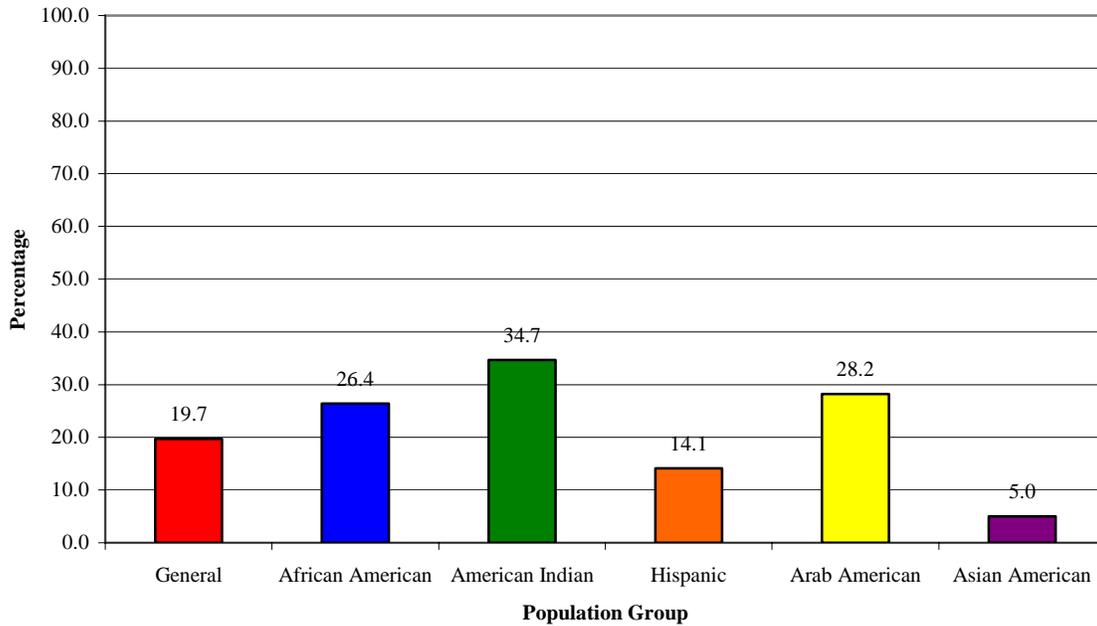
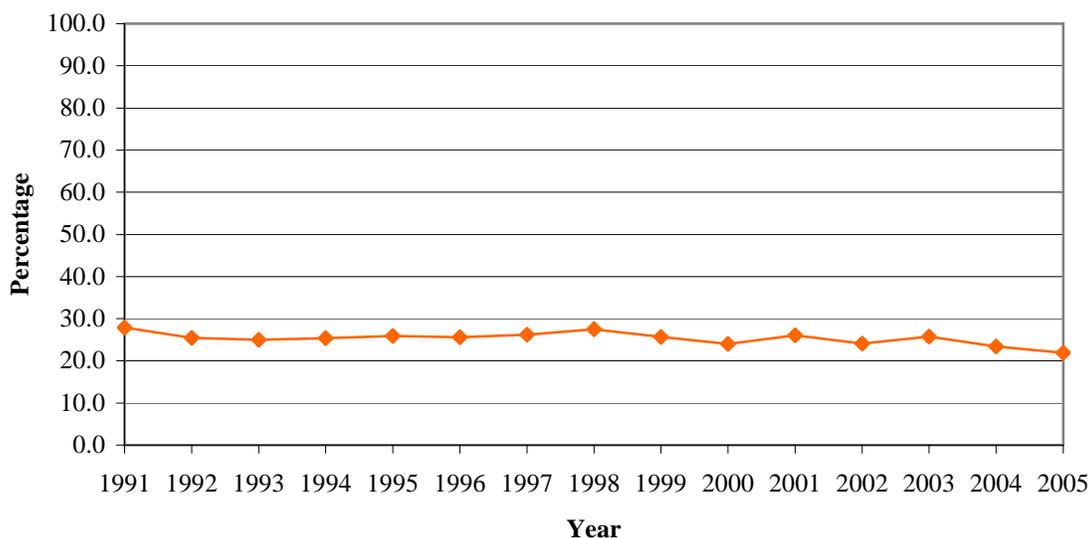


Figure 13.

Comparison Across Survey Years of the Percentage of Michigan Residents Aged 18 or Older Who Are Current Smokers*

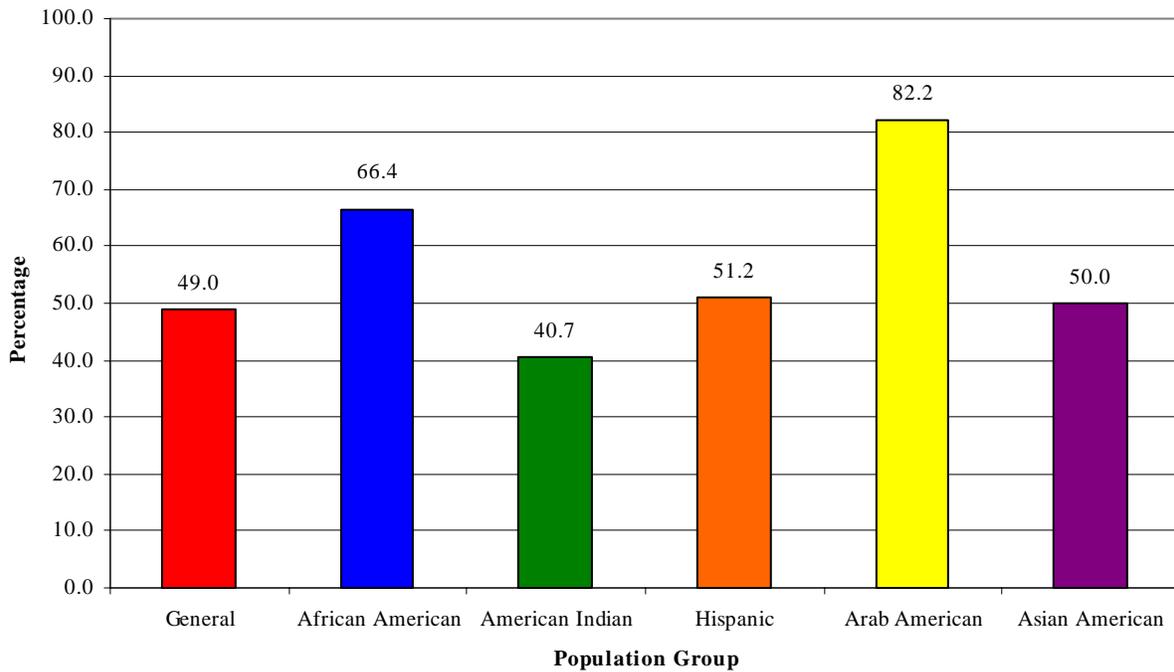


Year	Current Smokers* (%)
1991	27.9
1992	25.5
1993	25
1994	25.4
1995	25.9
1996	25.6
1997	26.2
1998	27.5
1999	25.7
2000	24.0
2001	26.1
2002	24.1
2003	25.8
2004	23.4
2005	21.9

*Current smoking defined as having smoked 100 or more cigarettes in lifetime and smoke on some days now

Figure 14.

Percentage of Current Smokers Who Attempted to Quit in the Past Twelve Months Among Michigan Residents Aged 40 Years or Older by Population Group, 2004*



*Current smoking defined as having smoked 100 or more cigarettes in lifetime and smoke on some days now; stopped smoking for at least one day in attempt to quit

Table 5.

Tobacco Use Indicators Among Michigan Youth, 2005

Behavior	Total (%)	Gender		Grades				Race		
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	White (%)	Black (%)	Hispanic (%)
Percentage of students who ever tried cigarettes, even 1 or 2 puffs	52.4	54.4	50.3	44.4	53.8	54.0	60.7	49.9	58.4	75.1
Percentage of students who smoked a whole cigarette before age 13	16.1	14.1	17.8	14.9	18.2	16.9	12.7	14.0	21.8	27.8
Percentage of students who smoked cigarettes on 1 or more of past 30 days	17.0	16.1	17.8	12.2	18.9	16.7	21.9	18.1	7.6	27.3
Percentage of students who smoked cigarettes on 20 or more of past 30 days	7.8	7.1	8.4	5.0	8.2	8.4	10.6	8.7	3.1	7.9
Percentage of students who smoked 10 or more cigarettes per day on days they smoked during past 30 days	13.6	10.8	15.8	9.9	13.3	17.1	13.6	13.4	--	--
Of students who were <u>current smokers</u> , percentage tried to quit smoking in the past 12 months	57.1	58.6	56.0	57.7	51.5	63.1	58.8	57.7	--	--
Percentage of students who smoked cigars, cigarillos, or little cigars on 1 or more of past 30 days	13.3	7.2	19.0	8.2	13.6	14.2	18.0	13.0	11.3	22.0
<u>Current smokers</u> 18 years and less who purchased cigarettes at a store or gas station during the past 30 days	16.0	7.8	23.8	8.9	13.9	24.6	--	14.5	--	--

Figure 15.

Tobacco Use Indicators Among Youth Grades 9th-12th Michigan vs. United States, 2005

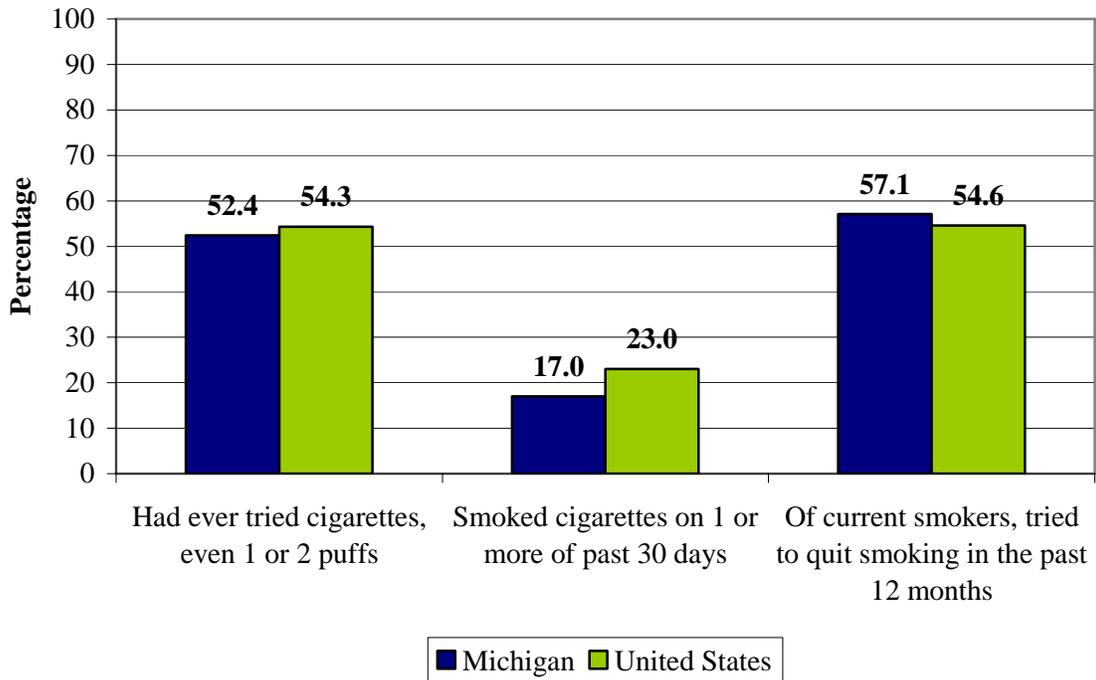
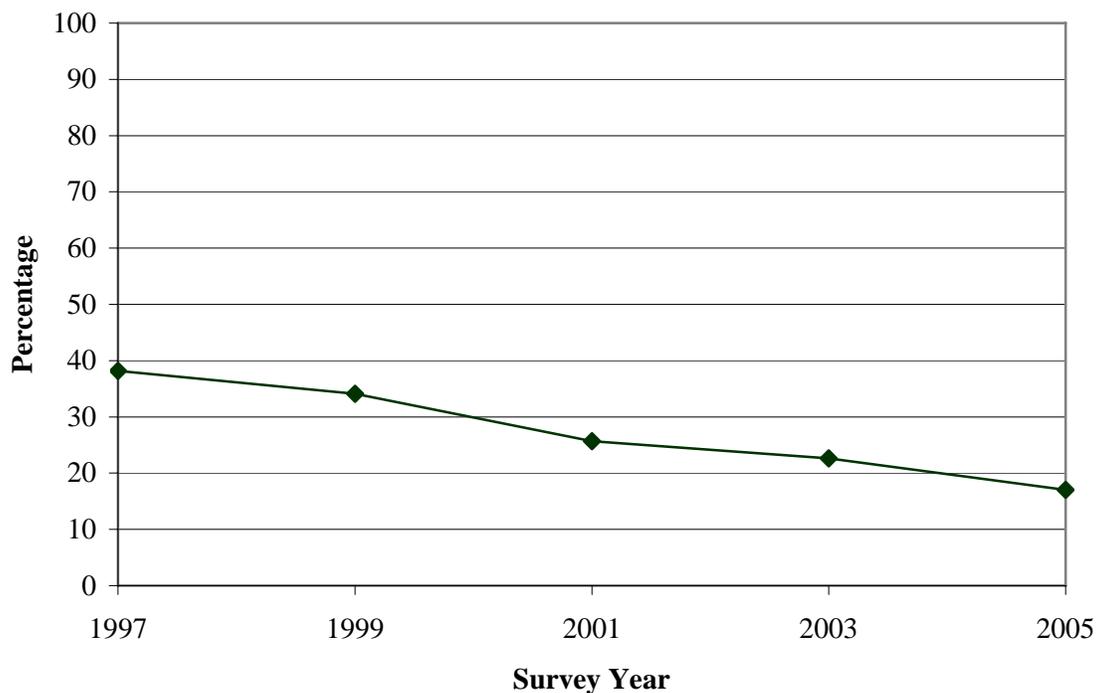


Figure 16.

Comparison Across Survey Years of the Percentage of Michigan Youth Grades 9-12 Who Are Current Smokers



Year	Current Smokers* (%)
1997	38.2
1999	34.1
2001	25.7
2003	22.6
2005	17.0

*Current smoking defined as having smoked cigarettes on one or more days in the past 30 days

Figure 17.

Current Smokers Age 40+ Years Whose Doctor Advised Them of Smoking Cessation Programs and Resources by Population Group, 2004 SCBRFS

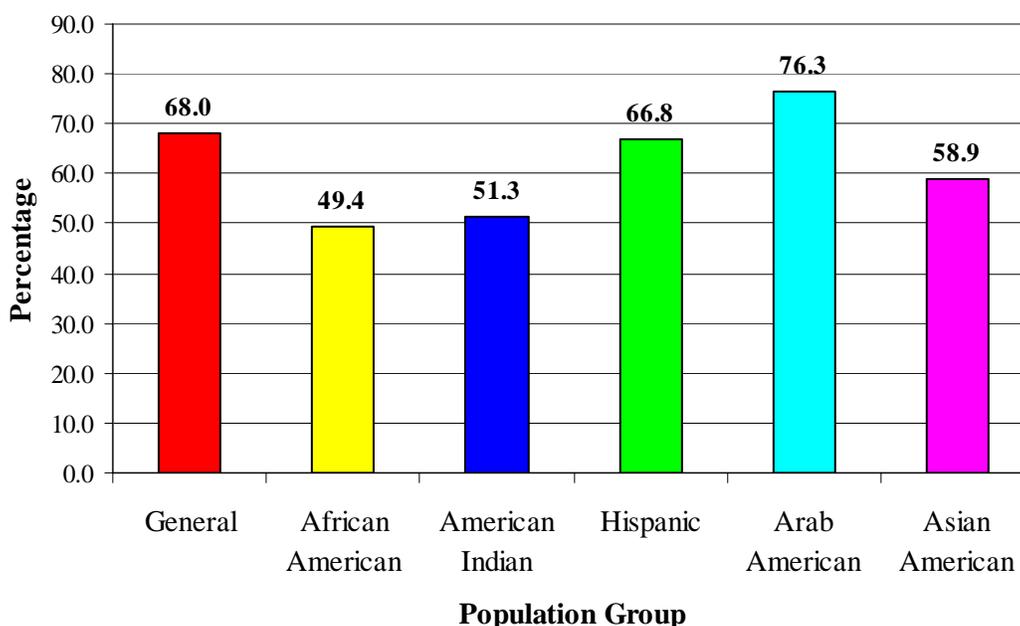


Table 6.

Current and Recent Quitters Age 18+ Seen in the Past Year by a Physician and Advised on Smoking Cessation, HEDIS® 2003-2005

	2003	2004	2005
Advised to Quit	72.55%	73.43%	74.02%
Advised on Cessation Medications	-	-	41.17%
Discussed Cessation Strategies	-	-	39.75%

Figure 18.

Percentage of Michigan Men Aged 40 Years or Older Who Ever Had a Prostate Specific Antigen (PSA) Test by Population Group, 2004

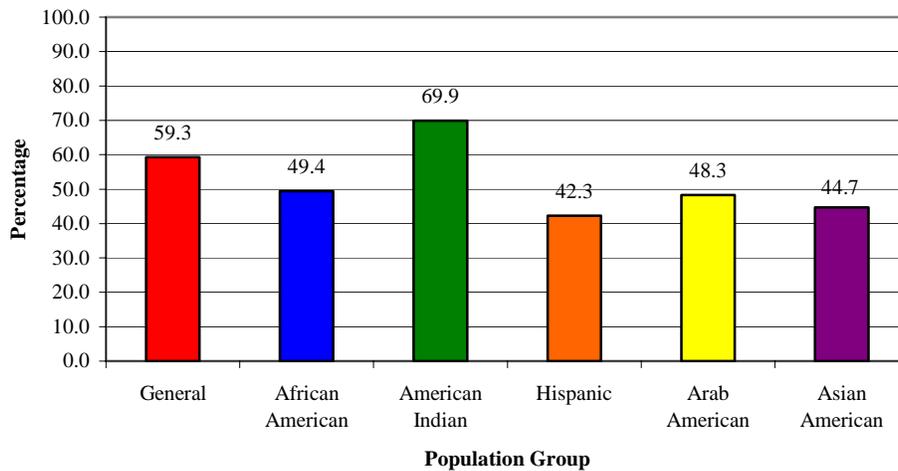
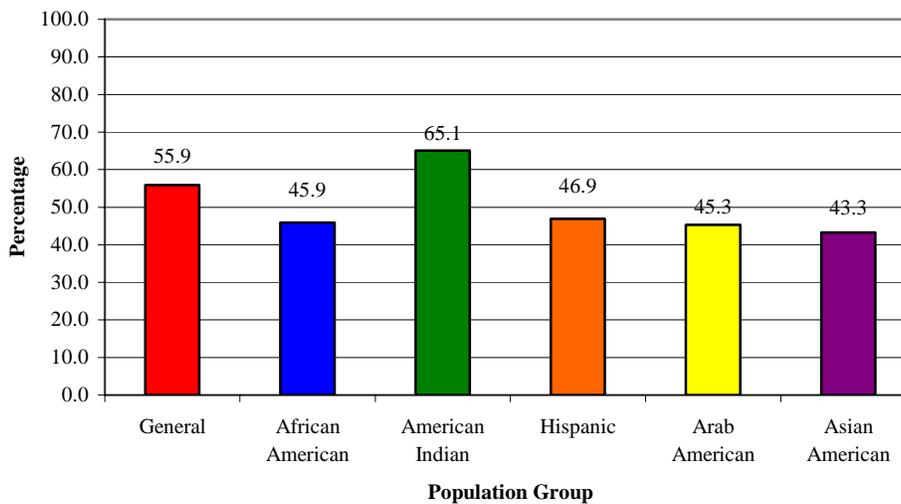


Figure 19.

Percentage of Michigan Men Aged 40 Years or Older Who Discussed Prostate Specific Antigen (PSA) Testing with Their Doctor by Population Group, 2004



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Human Cost

Mortality and survival rates give a partial picture of the burden of cancer deaths in a population. Years of life lost (YLL) due to premature death from cancer were calculated to provide an additional dimension to the description of the burden of disease.¹ SEER AYLL estimates for 2003 are produced using United States Life Tables, 2003; National Vital Statistics Reports from the Centers for Disease Control and Prevention. Person-years of life lost (PYLL) were calculated for this report as follows: For each of the individuals who died of a particular cancer, it was possible to obtain the number of additional years they were expected to live, based on their gender and race, had they not died of cancer and conditional on their surviving to the age at which they died of cancer. Life expectancy data were obtained from the National Center for Health Statistics (NCHS).² One-year intervals were used in the calculations.³ The number of deaths at each age was multiplied by the average years of life remaining for a person of that sex, race and age to estimate the number of years of life lost for all people of that age dying of the particular cancer.⁴ These years of life lost were summed across ages for each of the sites to get the estimate of PYLL.¹

Also presented is the average years of life lost (AYLL), calculated by dividing the PYLL by the total number of deaths.¹ Average years of life lost are compared between blacks and whites for each cancer site, and SEER estimates of AYLL for the United States are compared to estimates of Michigan's AYLL.

Summary

Figure 1 shows the total number of person-years of life lost by cancer site in Michigan in 2004. The greatest number of person-years of life lost was due to lung cancer deaths; the total number of person-years lost was 92,272. Breast cancer was responsible for the next greatest number of person-years of life to be lost, costing 27,365 total person-years. This was followed by colorectal cancer, which caused 26,846 person-years of life lost. Prostate cancer cost 9,495 total years of life, and cervical cancer was responsible for 2,899 person-years of life lost. Figure 2 traces the total number of person-years of life lost by cancer site over time from 1990 to 2004.

Looking at the total person-years of life lost is one measure of the impact of various cancers on the population as a whole. Alternatively, the average years of life lost per death due to cancer at each of the selected sites reveals an aspect of the burden of cancer on individuals. Figure 3 shows the average years of life lost by cancer site over time from 1990 to 2004. In Figure 4, average years of life lost by Michigan residents in 2004 by cancer site are shown next to the average years of life lost nationally in 2003. Although cervical cancer caused the fewest person-

¹ Ries LAG, Harkins D, Krapcho M, Mariotto A, Miller BA, Feuer EJ, Clegg L, Eisner MP, Horner MJ, Howlader N, Hayat M, Hankey BF, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2003*, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2003/, based on November 2005 SEER data submission, posted to the SEER web site, 2006.

² United States Life Tables, 1985-2003; National Vital Statistics Reports from the Centers for Disease Control and Prevention.

³ The Life Tables for years 1997-2003 show expected years of life remaining for ages zero to 100, but Life Tables for years 1985-1996 show expected years of life remaining only for ages zero to 85. In order to calculate years of life lost for people dying of cancer after age 86 in years prior to 1997, the years remaining in the 1997 Life Table for ages 86 to 100 years were used to fill in these values for the 1985-1996 calculations. Because the 2002 Life Tables are the most recent year available, they were used in calculating the person-years of life lost in 2003.

⁴ Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Vital Records and Data Development Section.

years of life to be lost in the total population cumulatively, of the five sites it has the greatest average number of years of life lost in Michigan, with an average of 24.6 years lost per person with this disease. Breast cancer had the next highest average cost in years of life lost of the five sites, causing an average loss of 19.3 years per death. Years of life lost due to lung cancer averaged 15.8 per death, and those dying of colorectal cancer lost an average of 14.3 years of life. Prostate cancer deaths caused an average loss of 9.8 years per person with the disease.

The estimated average numbers of years of life lost due to the five selected cancer sites for Michigan in 2004 were similar to that of the U.S. SEER estimates for 2003.

In Figure 5, average years of life lost due to cancer at each of the five sites is shown by race. Averaging years of life lost per death, blacks lost more years of life than whites from breast cancer (23.0 and 18.3 years per person), colorectal cancer (15.2 and 14.0 years per person), lung cancer (16.8 and 15.5 years per person), and prostate cancer (10.5 and 9.4 years per person). On the other hand, whites lost more years of life than whites from cervical cancer (24.6 and 23.8 years per person).

Other than years of life lost, estimates of the human costs of cancer are scant. Morbidity indicators for the cancer patient such as loss of work or school time, and periods of restricted activity due to the disease are difficult to measure. In addition, there are significant human and financial costs to family members and other caregivers who give up activities, opportunities, and income to provide assistance to cancer patients. To date, no such data have been identified for the cancers of interest here.

Although the human cost of cancer has not been investigated at length there have been attempts made to put a value on indirect costs, such as patient time associated with cancer care. A recent study conducted by Yabroff et al.⁵ attempted to estimate patient time associated with cancer care as a monetary measure. Linked Surveillance Epidemiology and End Results (SEER)-Medicare data was utilized and frequency of services was calculated using Medicare claims data. Estimated national time costs for the initial phase of care in 2005 were \$2.3 billion dollars. Lung cancer followed by colorectal, breast, and prostate cancer had the highest estimated patient time costs of \$7.5 million, \$6.4 million, \$2.4 million, and \$2 million respectively.

⁵ Yabroff KR, Davis WW, Lamont EB, Fahey A, Topor M, Brown ML, and Warren JL. Patient Time Costs Associated With Cancer Care. *Journal of the National Cancer Institute* 2007; 99(1): 14-23.

Figure 1.

Total Person-Years of Life Lost Due to Cancer by Cancer Site, Michigan 2004

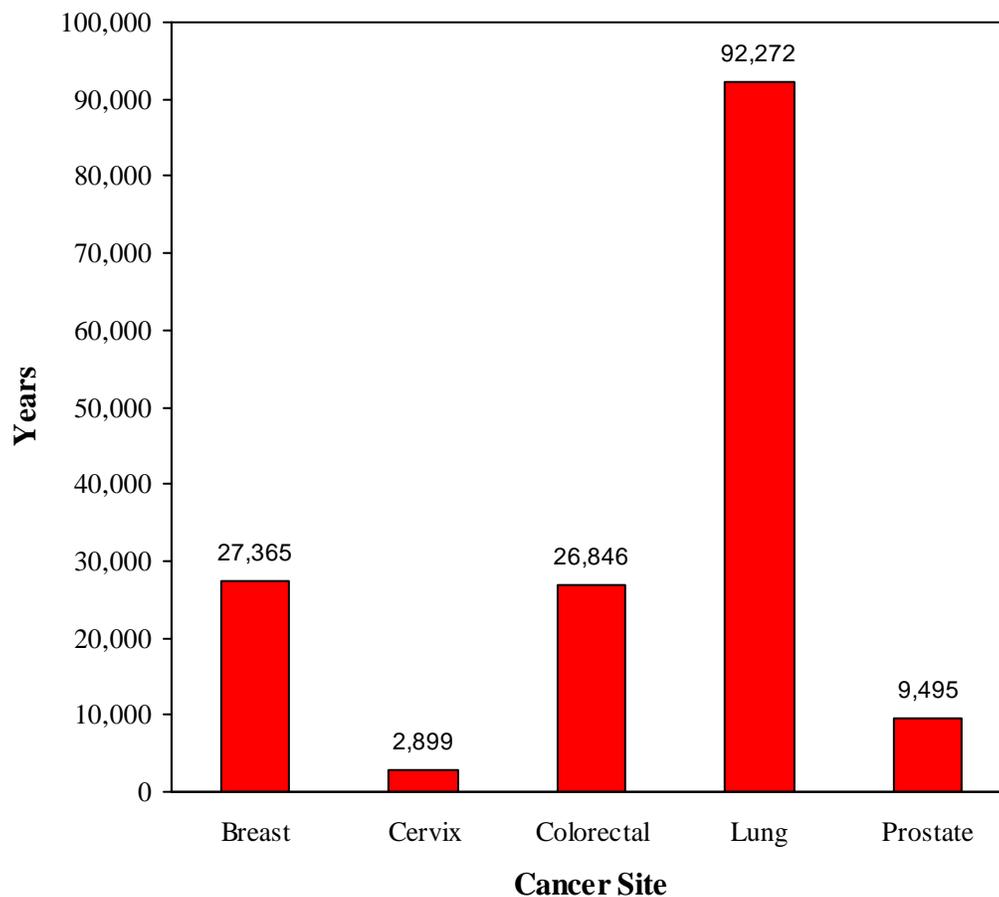


Figure 2.

Total Person-Years of Life Lost Due to Cancer, Michigan 1990-2004

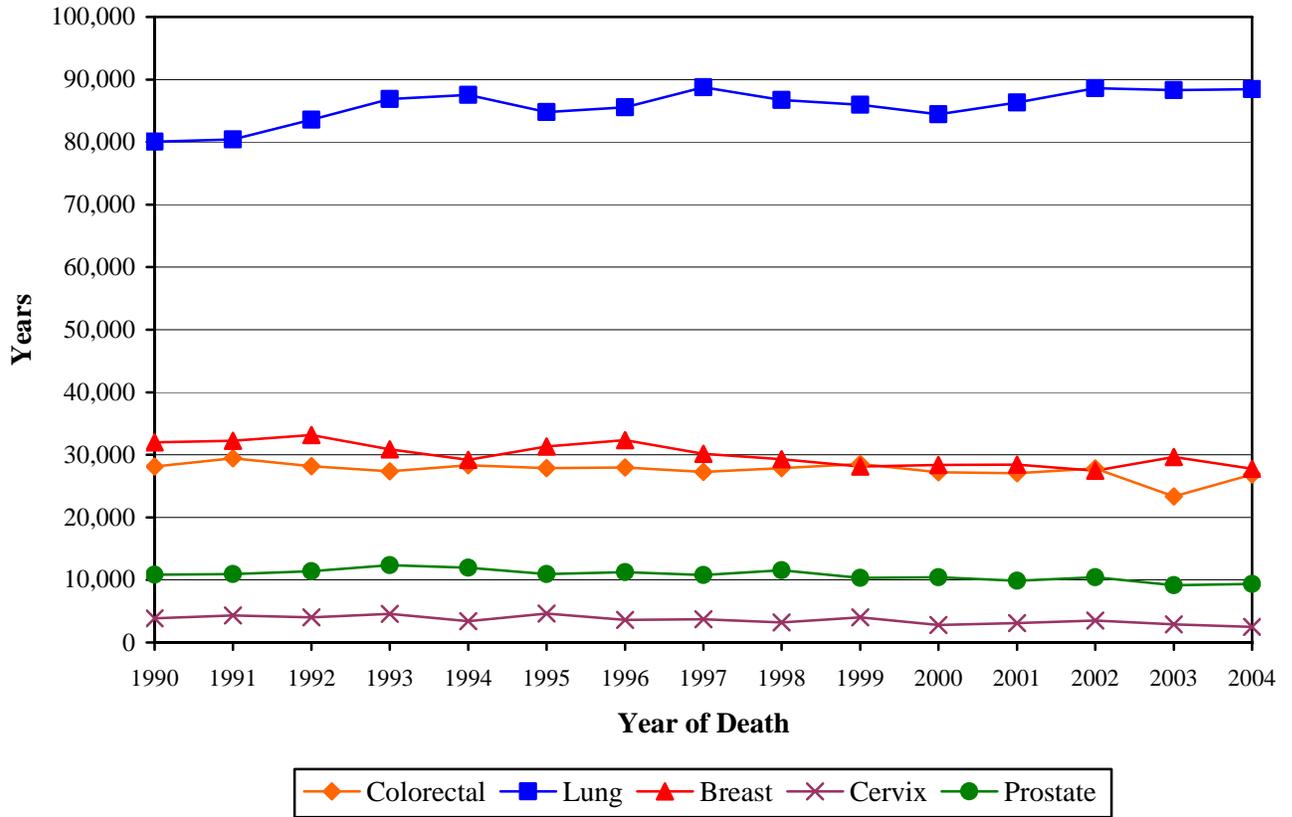


Figure 3.

Average Years of Life Lost Due to Cancer, Michigan 1990-2004

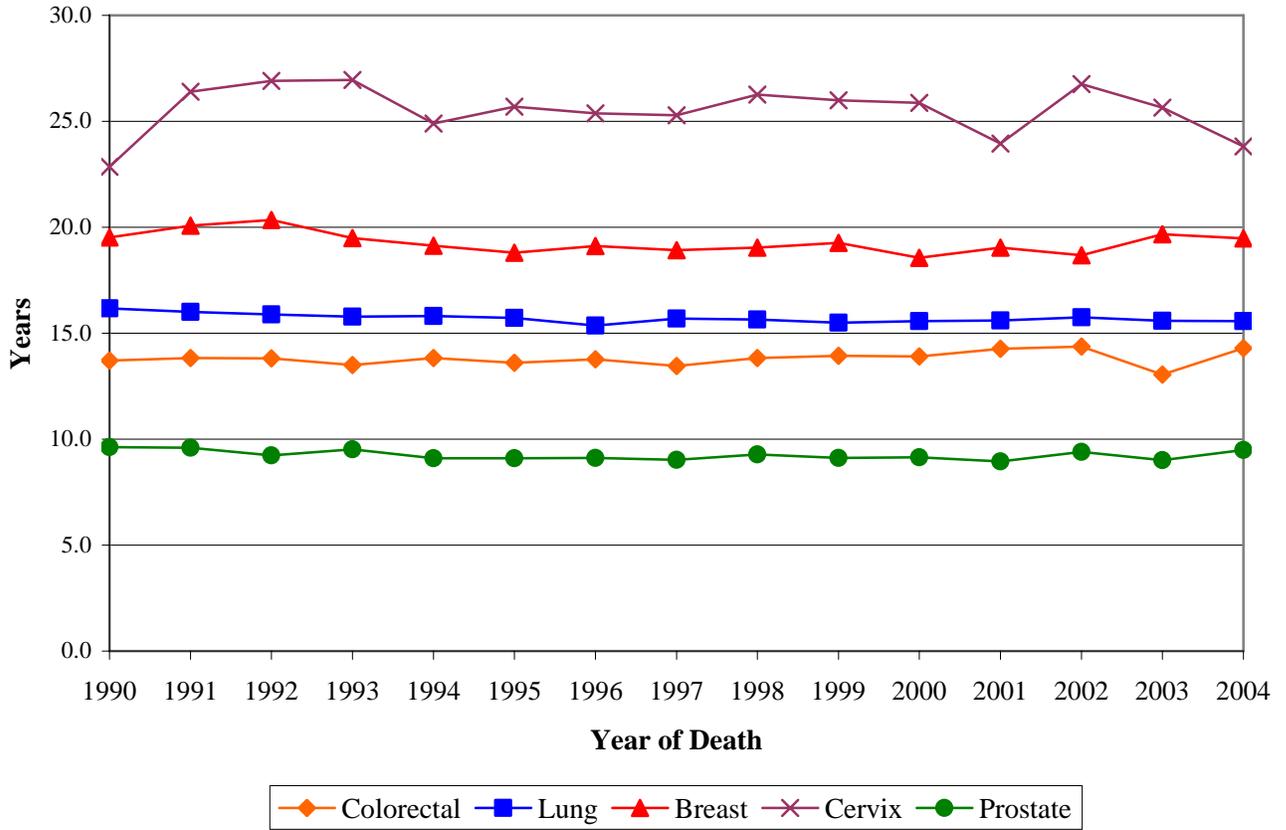


Figure 4.

Average Years of Life Lost by Cancer Site, Michigan 2004 and US 2003

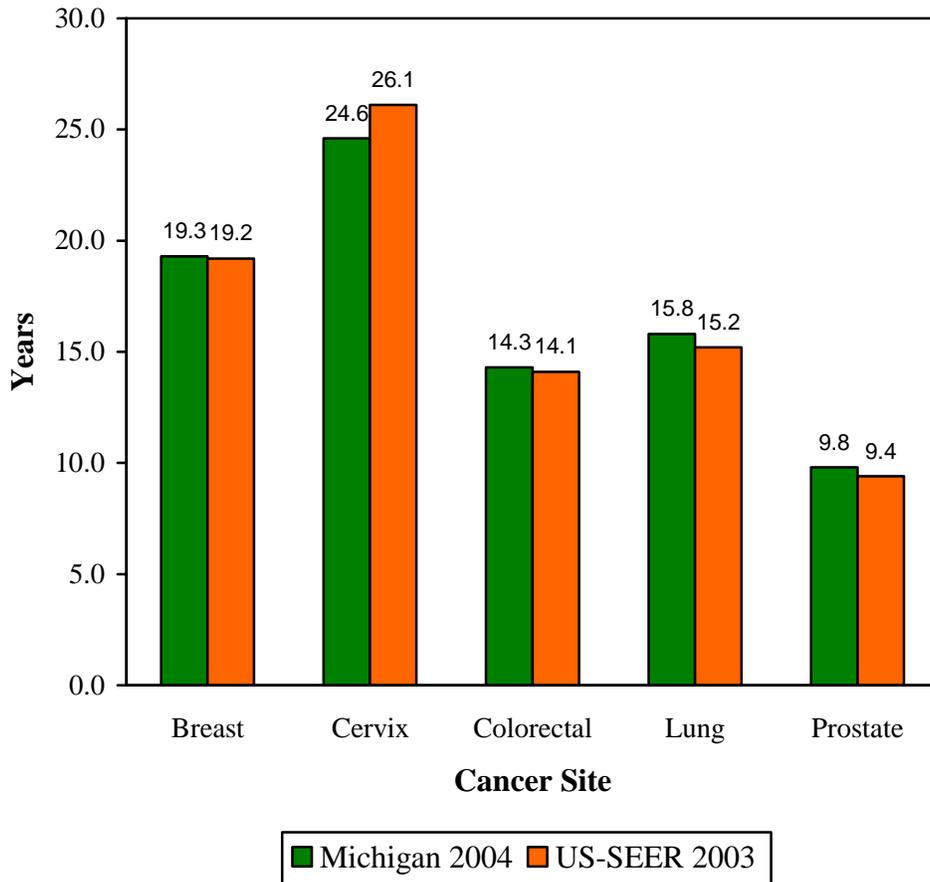
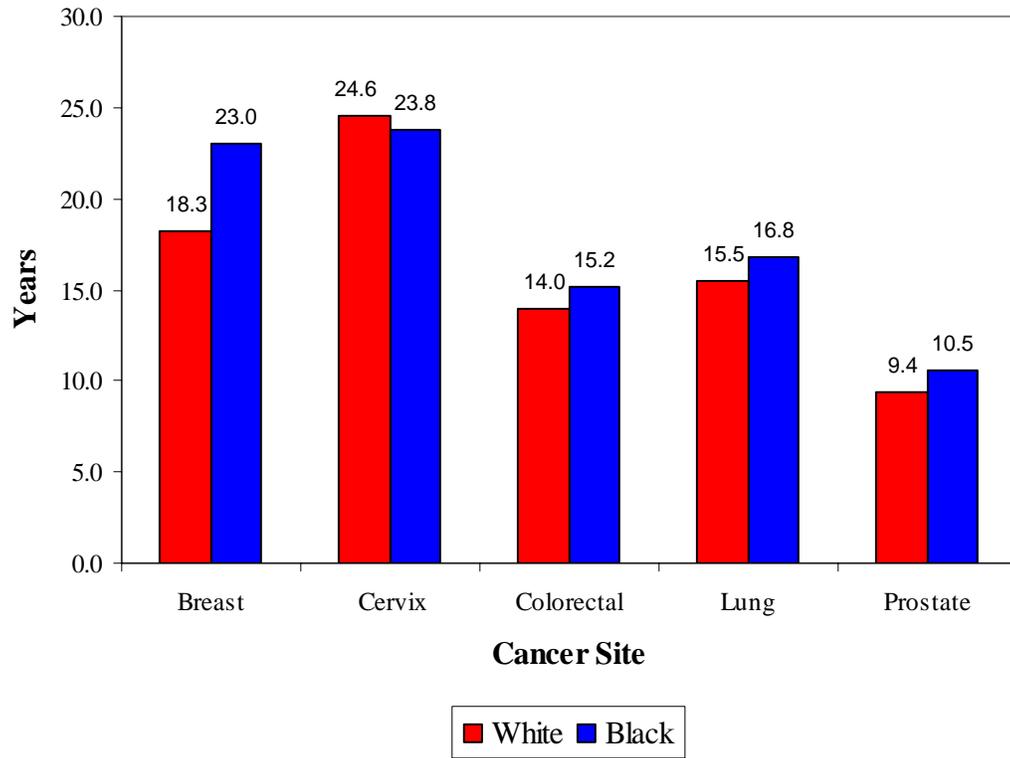


Figure 5.

Average Years of Life Lost by Cancer Site and Race, Michigan 2004



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Figure 21: Hospital Average Length of Stay for Medicare Part A Recipients by Cancer Site 2003 126

Figure 22: Hospital Days of Care for Medicare Part A Recipients by Cancer Site 2003 127

Financial Cost

An update of reported paid medical claims associated with the existing cases of five selected cancers in Michigan is contained within this section of the report. The financial data reflect treatment costs incurred annually for as many as thirteen successive years, regardless of when the cancers were diagnosed. The data contain costs associated with a range of treatments for patients at various stages in the course of their disease for inpatient and outpatient care as well as for professional services. This report does not include costs borne by patients and their families for deductibles, medications, home health care assistance and other non-medical expenses.

Medical costs are presented for each selected cancer site: breast, cervical, colorectal, lung and prostate. Medical costs are the direct costs incurred to secure medical treatment or costs that accrue to the health system. These costs include physician office visits, screening, counseling, diagnostic testing, hospitalization, and prescription drugs. Cost data associated with claims paid for self-insured and fee-for-service plans for the years 1996-2003 was made available by Blue Cross Blue Shield of Michigan¹ (BCBSM). Cost data associated with claims for the managed care plan was made available by Blue Care Network (BCN), for 1999-2003 as well. Payment data for Medicare Part A (inpatient) and Medicare Part B (outpatient) were obtained from the Michigan Peer Review Organization and the Wisconsin Physician Service² respectively.

Ideally, medical costs reflect the true economic costs for goods and services. The true economic costs are equivalent to the value of foregone opportunities, otherwise described as opportunity costs. In the healthcare market, the terms medical costs and medical charges are often used interchangeably. However, medical charges typically do not represent the true economic costs of goods and services. The size and financial power of government and other large third-party payers greatly influence reimbursement to health systems for medical services. The ability of these entities to negotiate and pay discounted prices, accounts for significant discrepancies between costs and charges. The expenditures reported in this analysis reflect discounted medical costs or medical charges.

Reported medical charges were collected for a period of several years. To ensure that all charges are comparable, it is necessary to standardize all of the charges to the same year. The medical care component of the Consumer Price Index³ was used to adjust subsequent years to a specified base year. Based on the average value of 1982-84 as 100, the relative annual value for each year was used to adjust dollars to the 1996 base year.

Selected cancer hospitalization data was received from the statewide hospital discharge database at the Michigan Department of Community Health⁴. Hospital admissions data for BCN, BCBSM and Medicare patients were also received from Blue Care Network, Blue Cross Blue Shield of Michigan and the Michigan Peer Review Organization, respectively. In-situ cases are included in the BCN, BCBSM, Medicare, and hospitalization datasets. Analyses of hospital

¹ Blue Cross Blue Shield of Michigan, Center for Healthcare Quality; and Blue Care Network of Michigan.

² Wisconsin Physician Service, Medicare Central Data Unit.

³ US Department of Labor, Bureau of Labor Statistics, *Bureau of Labor Statistics Data 1994-2004*.

⁴ Michigan Resident Hospitalizations Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

admissions, number and rates of days of care, average length of hospital stays, and number and rates of hospital discharges are reported for the years 1991-2003.

Summary

BCBSM and BCN combined plans paid inpatient, outpatient, and professional claims charges totaling over \$225 million for the five cancer sites in Michigan during 2003. Paid charges during this year were 11% higher than paid charges the previous year, while the number of hospital admissions was relatively unchanged. The BCBSM self-insured and fee-for-service plans posted a 15% increase in combined outpatient and professional claims paid charges from 2002 to 2003. Paid charges for BCN managed care plan remained flat over that period.

Michigan Medicare inpatient paid charges for breast, cervical, colorectal, lung, and prostate cancers totaled more than \$77 million in 2003, a 9% reduction from 2002. Medicare outpatient paid charges increased 18% from 2002 to 2003 for the 5 cancer sites in the state.

The average length of hospital stay associated with the five cancer sites continued a gradual downward trend in Michigan from 1991 through 2003. The rates of hospital days of care (patient days per 10,000 population) followed this same pattern during these years.

Breast Cancer

Breast cancer accounted for the highest level of BCBSM outpatient and professional service paid charges among the five reported cancers. Professional services associated with the fee-for-service and self-insured BCBSM plans more than doubled from 1996 to 2003 in terms of paid charges and number of patients served. BCBSM inpatient per case average charges decreased 2% from 2002 to 2003, the fourth consecutive annual decline.

The number of Medicare patients receiving inpatient treatment for breast cancer in Michigan decreased 15% from 2001 to 2002 and again from 2002 to 2003. However, the Medicare inpatient per case average and the average length of hospital stay for these patients both increased 5%.

Cervical Cancer

From 1996 to 2003, BCBSM inpatient per case average charges for cervical cancer treatment decreased 18%. The number of inpatient admissions also decreased by 14% over these years. Combined BCBSM and BCN outpatient and professional claims decreased 31% and 36% respectively, over the period 1996 to 2003.

Medicare inpatient services associated with cervical cancer incurred a 12% decrease in per case average paid charges and a 10% decrease in average length of hospital stay from 1996 to 2003.

Colorectal Cancer

BCBSM colorectal cancer per case average charges for inpatient treatment decreased 14% from 1996 to 2003 while the number of hospital admissions among these patients over that timeframe increased 33%.

The downward trend in Medicare colorectal inpatient per case average charges continued. These charges decreased 16% from 1996 to 2003.

Lung Cancer

BCBSM per case average charges associated with inpatient treatment for lung cancer decreased 21% from 1996 to 2003. This trend coincided with a 16% decrease in the number of hospital admissions and a 17% increase in the average length of hospital stay. BCBSM also realized a 7% decrease in per case average charges for professional services attributable to lung cancer treatment from 1996 to 2003 while the number of patients receiving these services nearly tripled from 3,861 in 1996 to 10,695 in 2003. Lung cancer outpatient per case average charges for this plan type rose 25% over the 8-year period. BCN inpatient per case average charges rose significantly (36%) over 2002 as the number of hospital admissions decreased 7% during that year.

Medicare inpatient per case average charges and average length of hospital stay for lung cancer treatment declined 19% and 10% respectively, from 1996 to 2003. However, the number of hospital admissions attributable to Michigan Medicare lung cancer patients increased 14% from 1996 to 2003.

Prostate Cancer

From 1996 to 2003, the number of BCBSM inpatient admissions increased 31% while the per case average charges and average length of hospital stay associated with prostate cancer treatment decreased 31% and 28%, respectively. The number of patients receiving BCBSM outpatient services increased 94% from 1996 to 2003. Outpatient per case average charges increased 41% over the same period for this cancer site.

Medicare prostate cancer inpatient per case average charges and average length of hospital stay, decreased 19% and 25% respectively, from 1996 to 2003. The number of Medicare patients receiving inpatient services for the treatment of prostate cancer in Michigan decreased for the third consecutive year from 2,040 in 2002 to 1,738 patients in 2003, a 15% decrease.

Per case average charges for Medicare inpatient prostate claims fluctuated between \$4,376 and \$4,541 during the years 2000 to 2003.

Figure 1.

Percent of Total BCBSM Inpatient Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2003

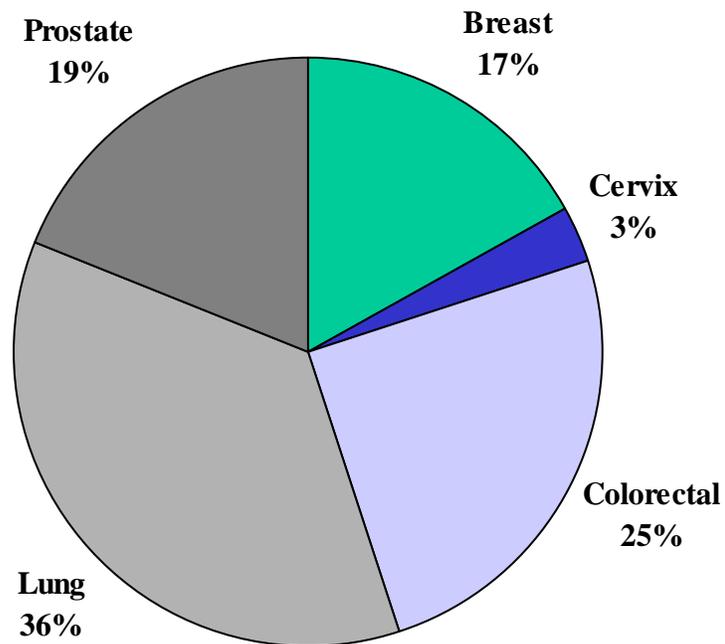


Figure 2.

Percent of Total BCBSM Professional Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2003

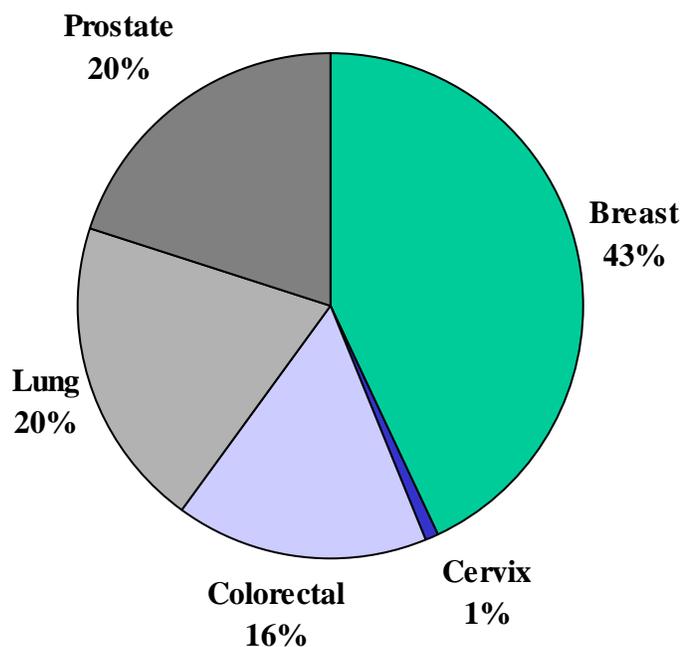


Figure 3.

Percent of Total BCBSM Outpatient Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2003

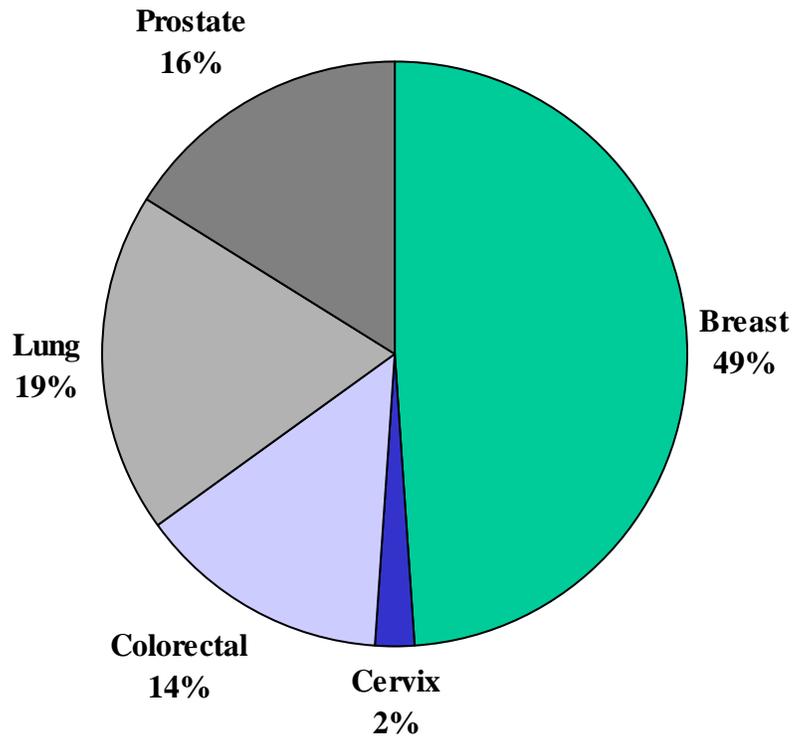


Figure 4.

Percent of Total Medicare Part A Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2003

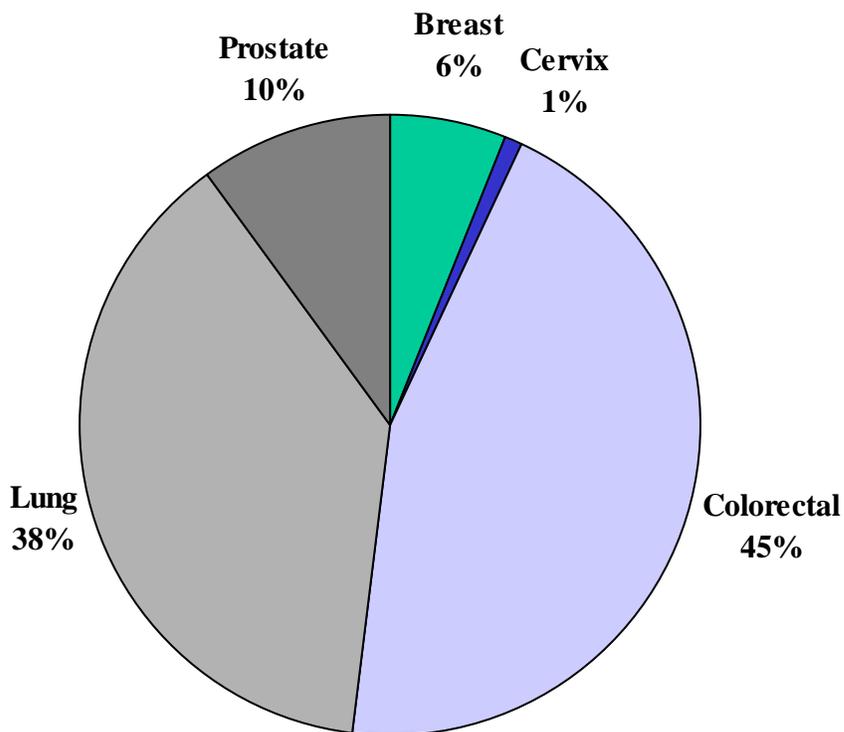


Figure 5.

Percent of Total Medicare Part B Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2003

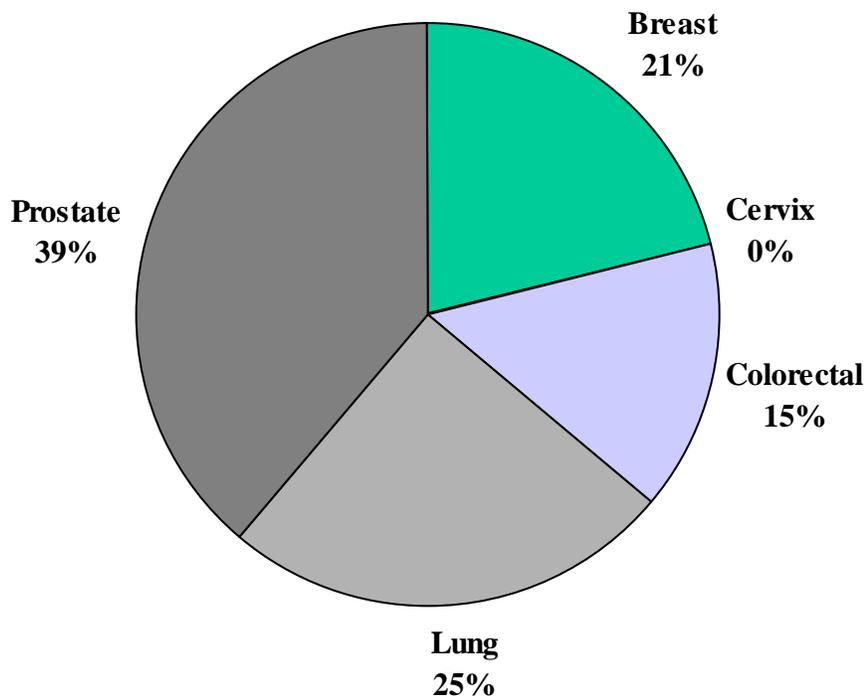


Figure 6.

Hospital Average Length of Stay by Cancer Site, Michigan 1991-2003

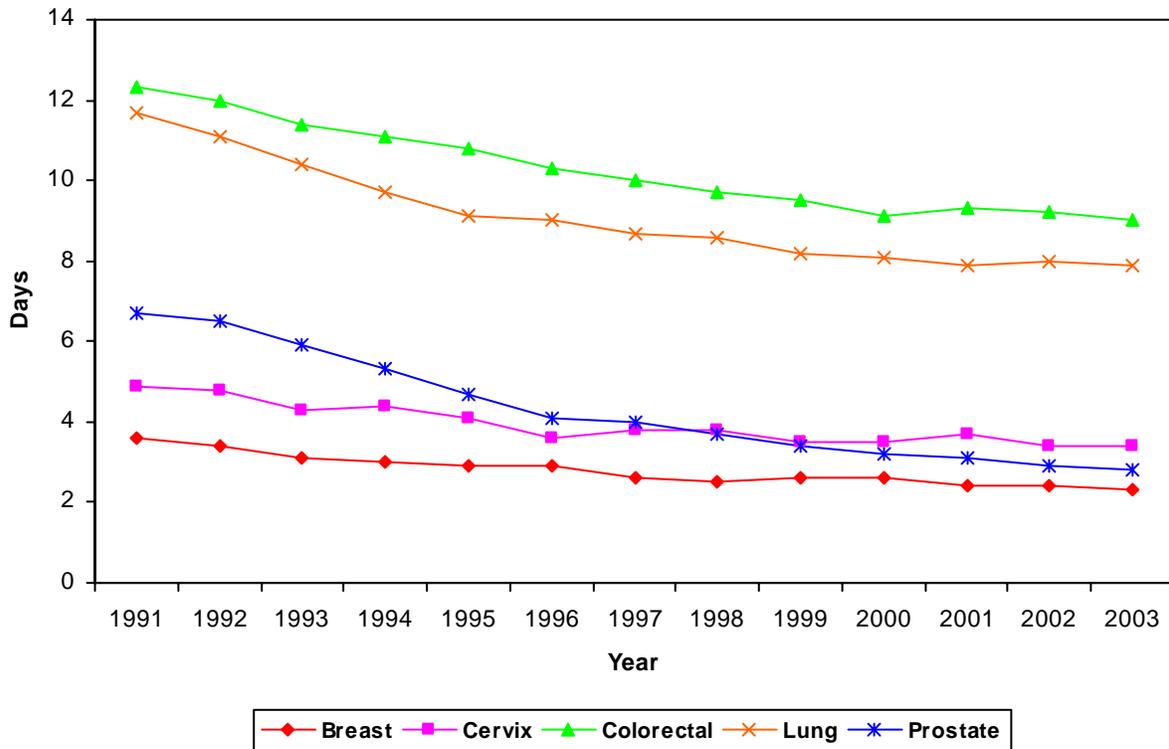


Figure 7.

Total Hospital Days of Care by Cancer Site, Michigan 1991-2003

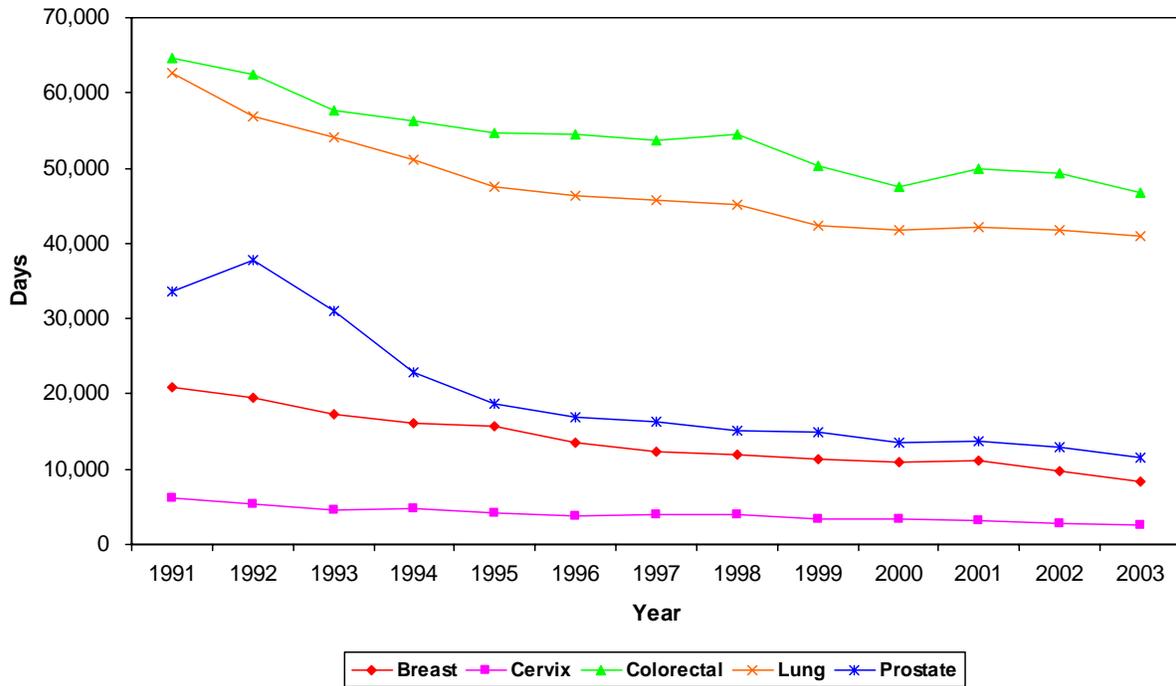


Figure 8.

Hospital Discharges by Cancer Site, Michigan 2003

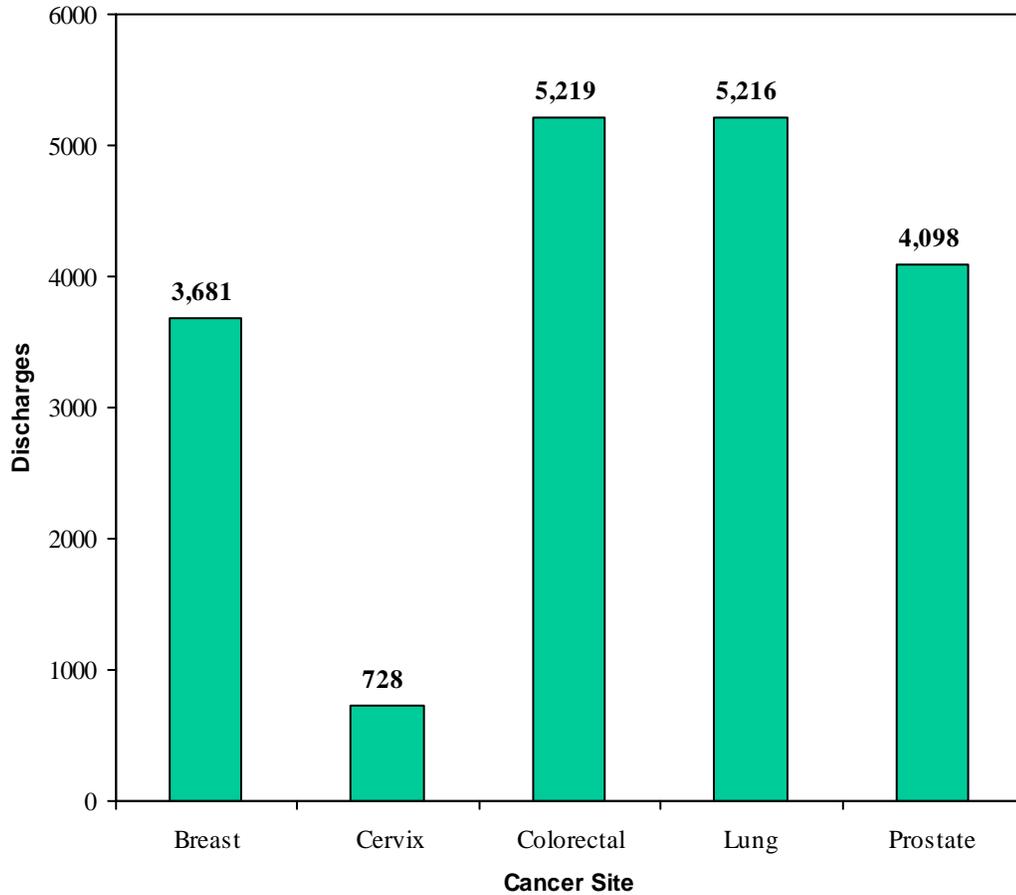
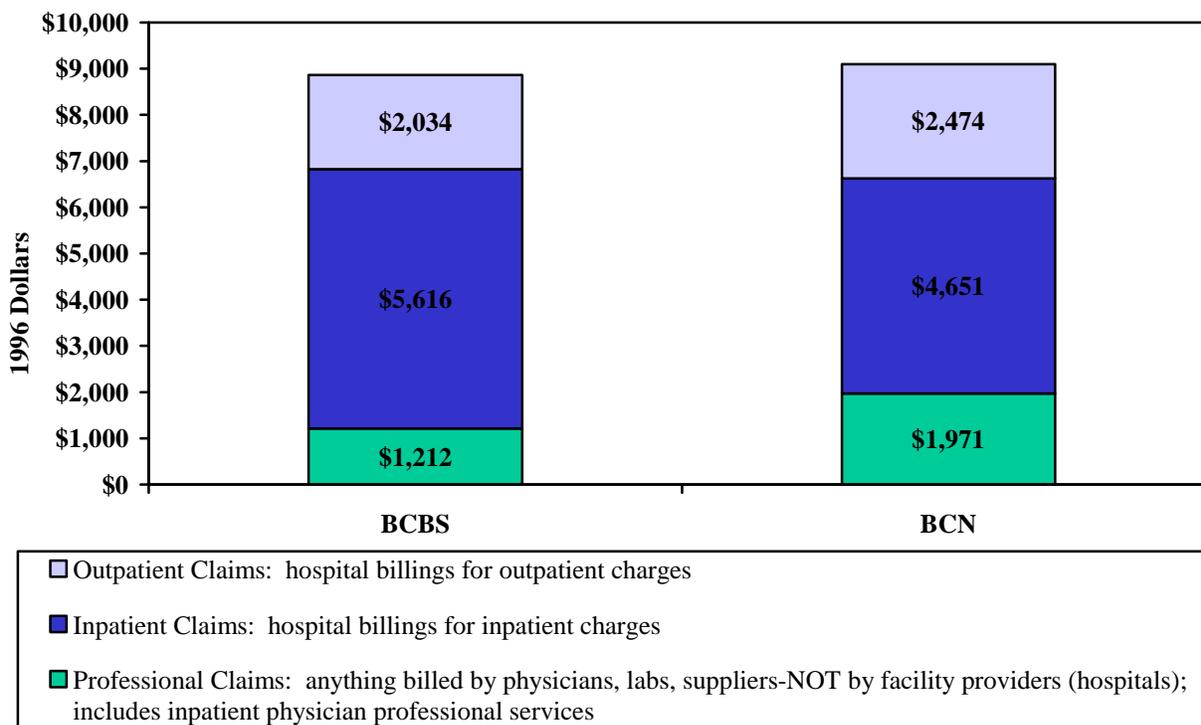


Figure 9.

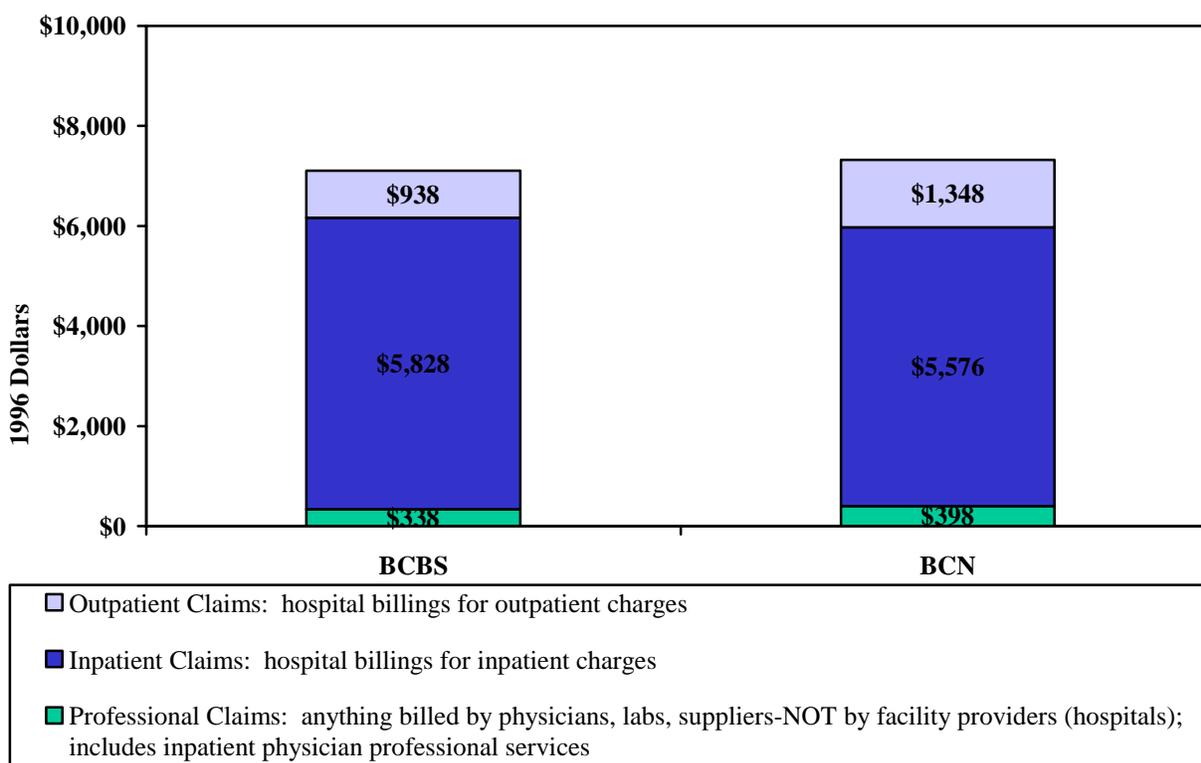
Breast Cancer 2003 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
BCN: managed care plan

Figure 10.

Cervical Cancer 2003 Per Case Average BCBSM Payments by Type of Claim

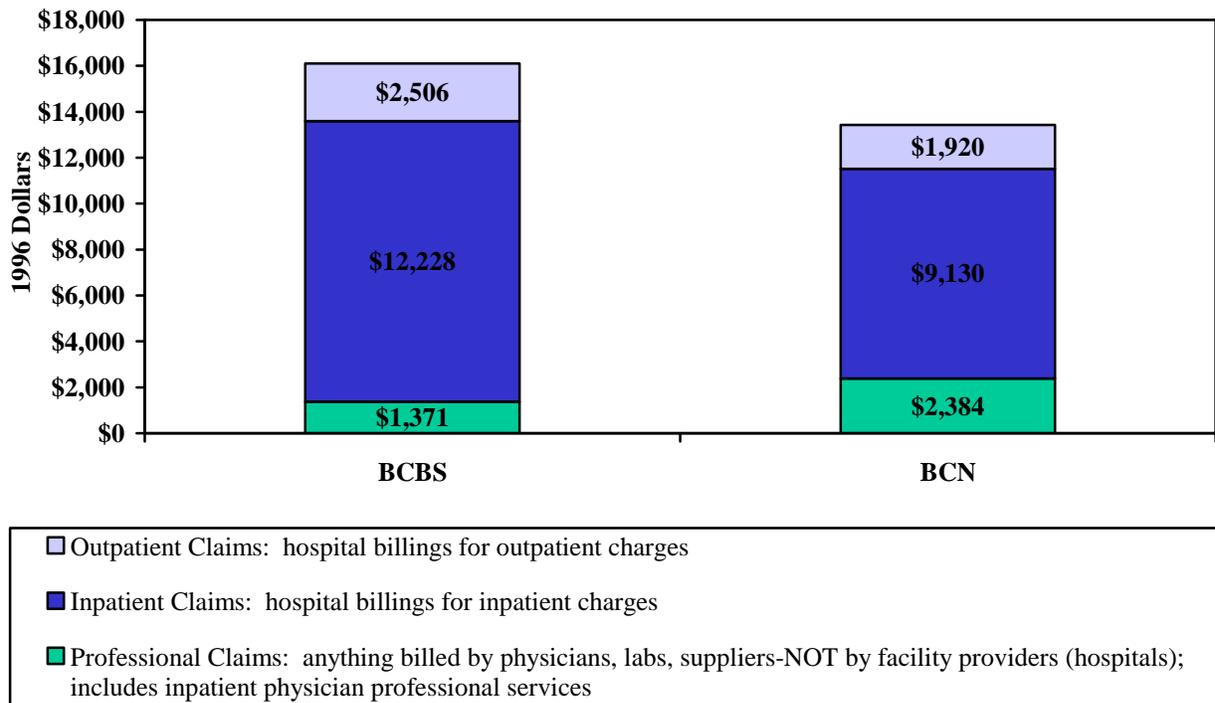


BCBS: fee-for-service and self-insured plans

BCN: managed care plan

Figure 11.

Colorectal Cancer 2003 Per Case Average BCBSM Payments by Type of Claim

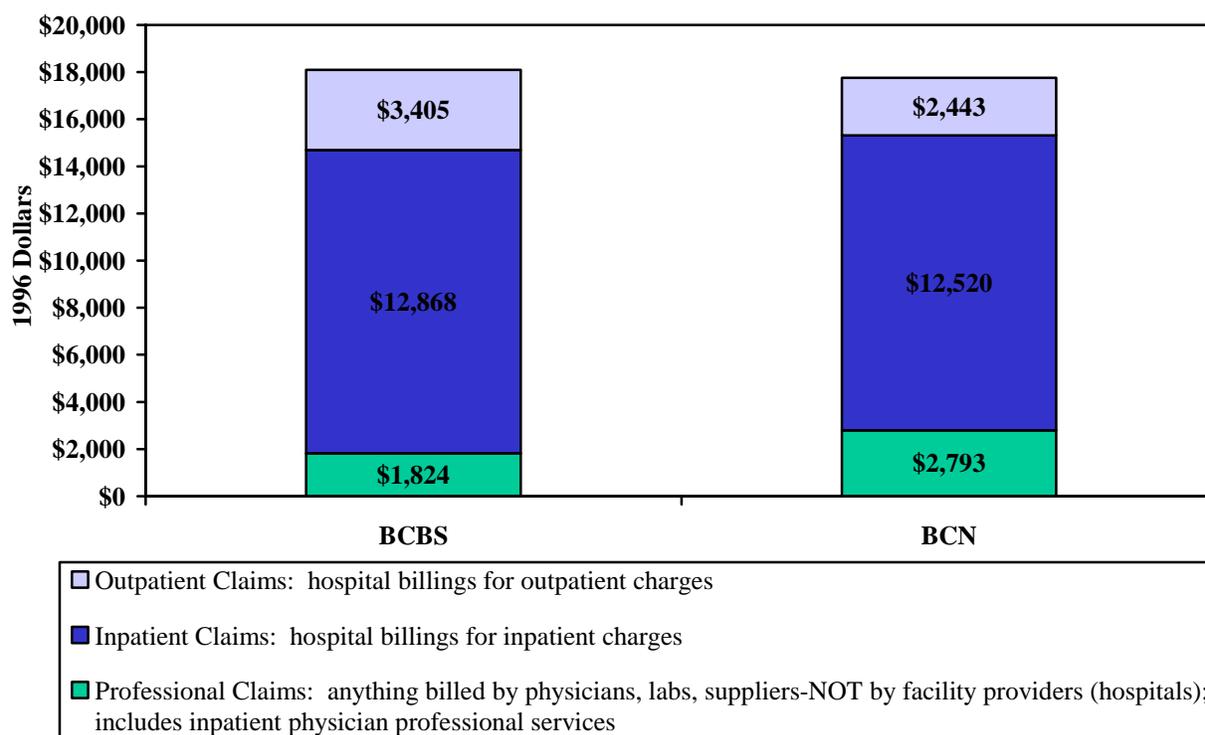


BCBS: fee-for-service and self-insured plans

BCN: managed care plan

Figure 12.

Lung Cancer 2003 Per Case Average BCBSM Payments by Type of Claim

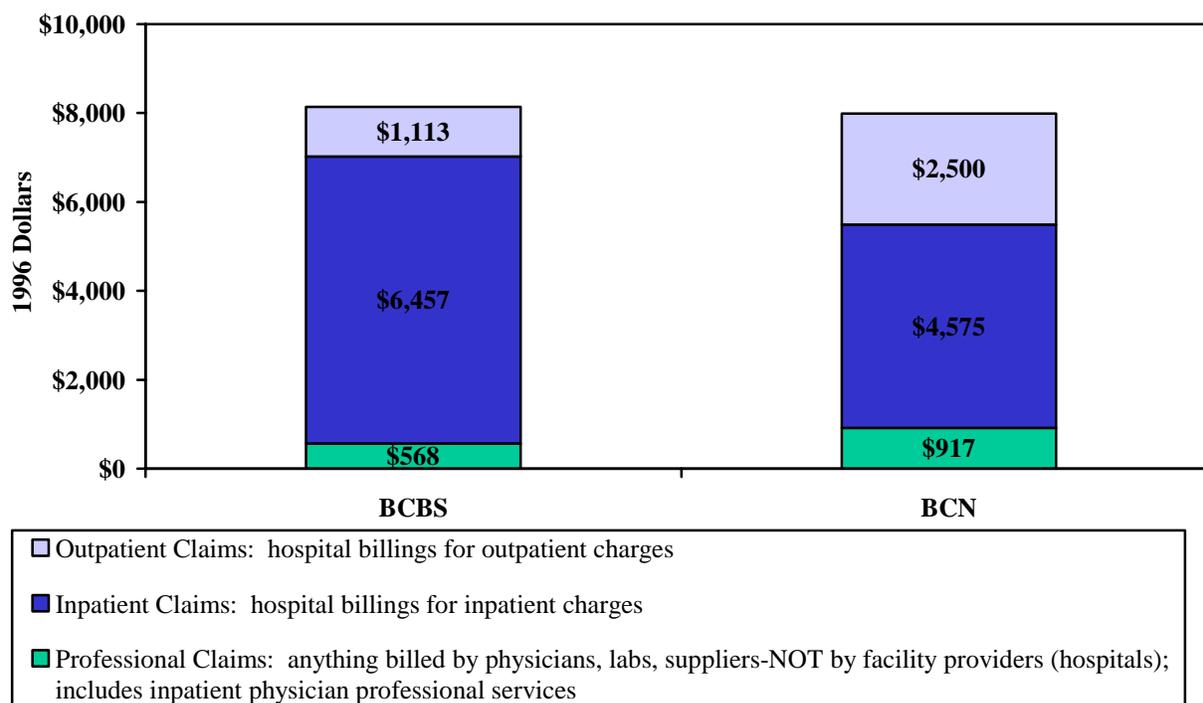


BCBS: fee-for-service and self-insured plans

BCN: managed care plan

Figure 13.

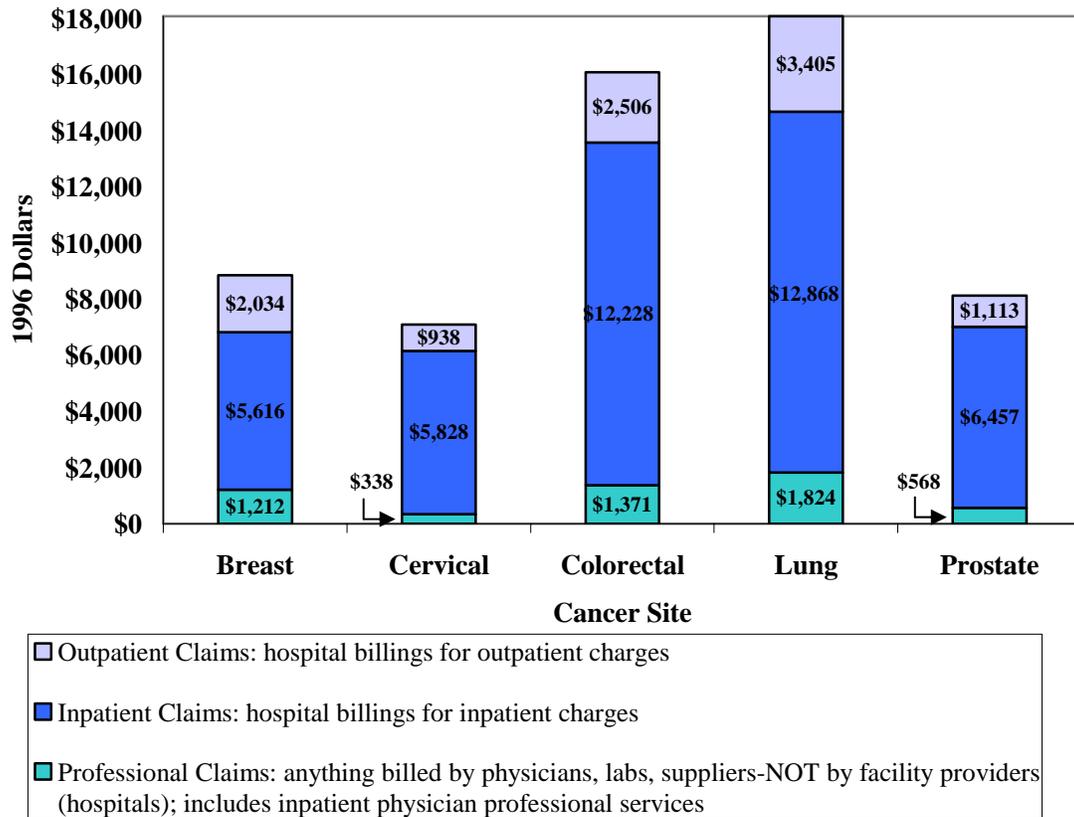
Prostate Cancer 2003 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
 BCN: managed care plan

Figure 14.

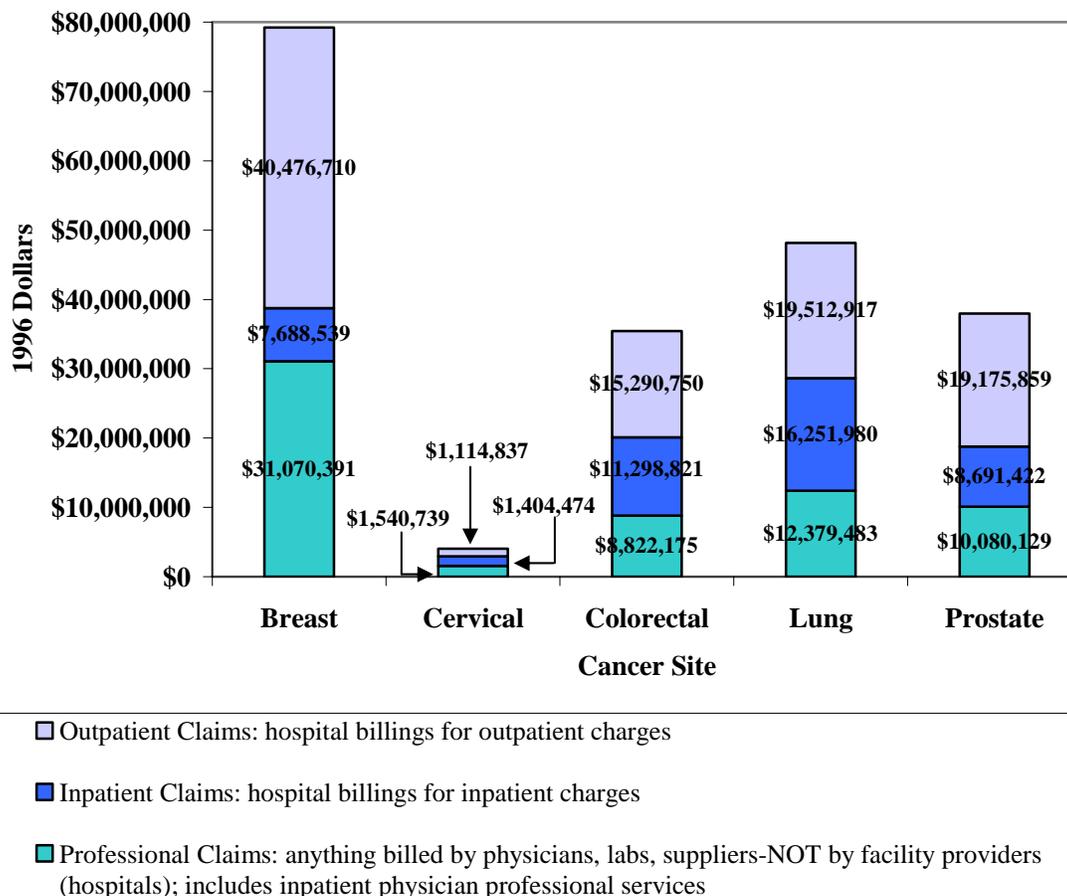
Per Case Average BCBSM* Payments by Type of Claim and Cancer Site (2003)



*Excludes managed care plan.

Figure 15.

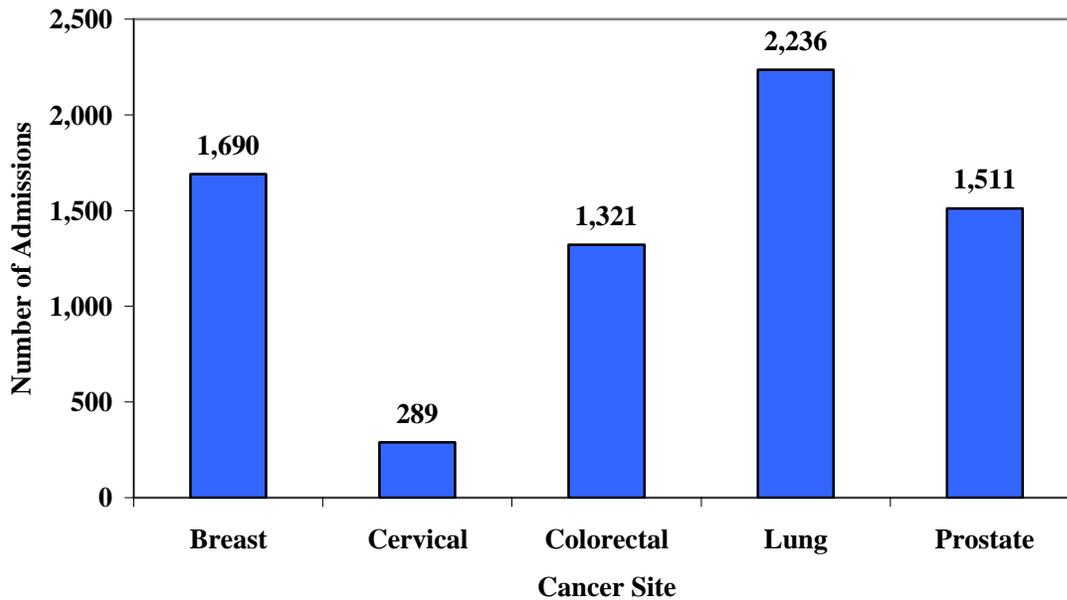
Total BCBSM* Payments by Type of Claim and Cancer Site (2003)



*Excludes managed care plan.

Figure 16.

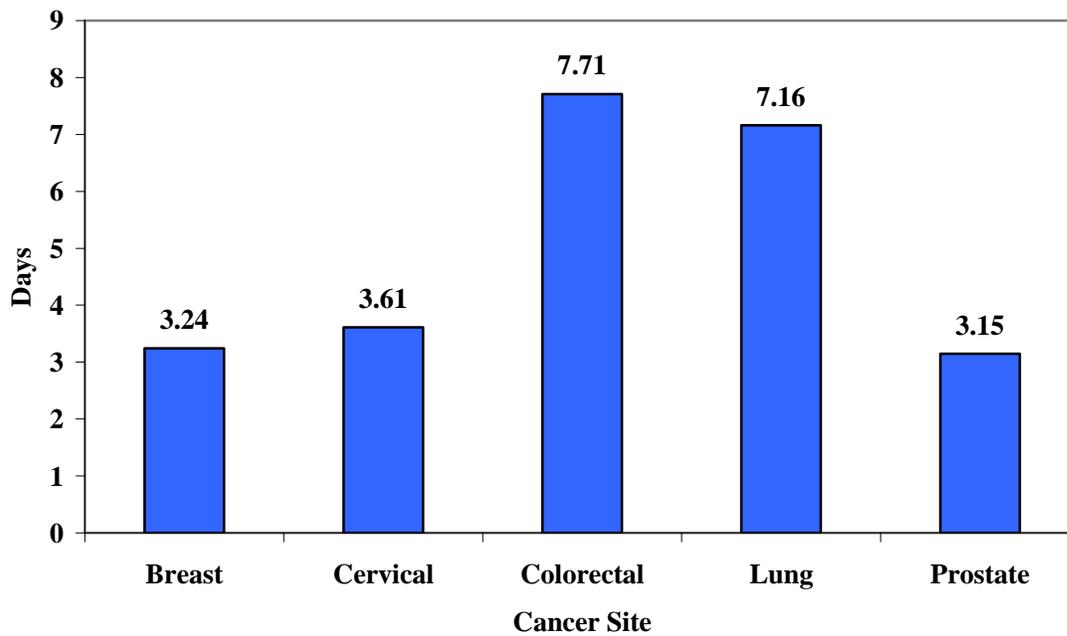
Number of Hospital Admissions for BCBSM* Inpatient Coverage Recipients by Cancer Site (2003)



*Excludes managed care plan.

Figure 17.

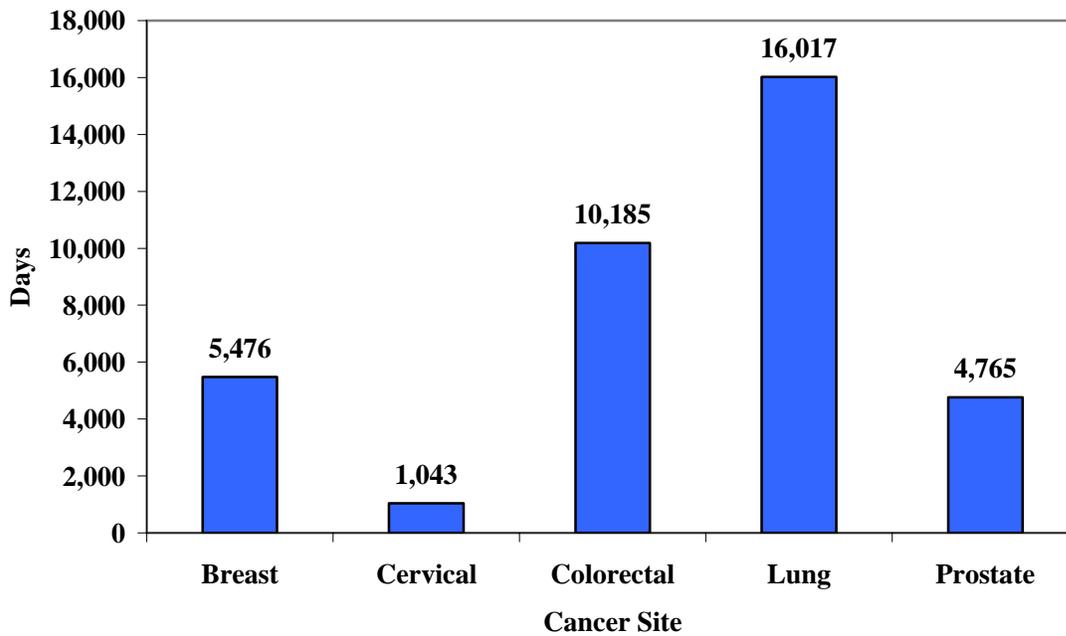
Hospital Average Length of Stay for BCBSM* Inpatient Coverage Recipients by Cancer Site (2003)



*Excludes managed care plan.

Figure 18.

Total Hospital Days of Care for BCBSM* Inpatient Coverage Recipients by Cancer Site (2003)



*Excludes managed care plan.

Figure 19.

Per Case Average Medicare Part A Payments by Cancer Site (2003)

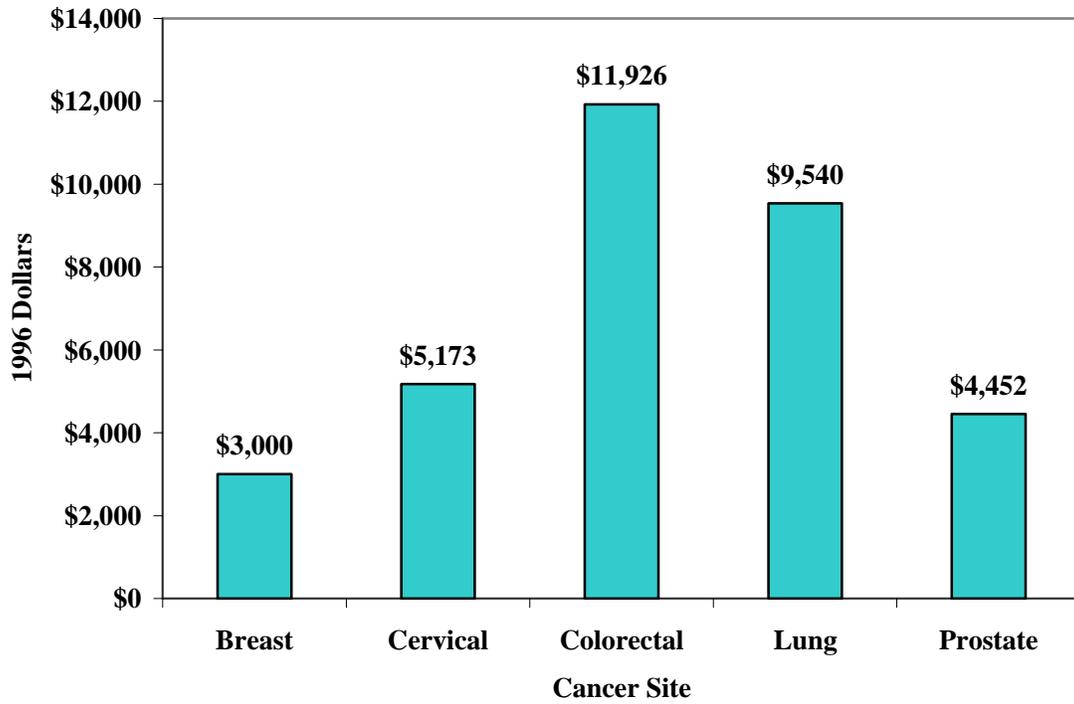


Figure 20.

Total Medicare Part A Payments by Cancer Site (2003)

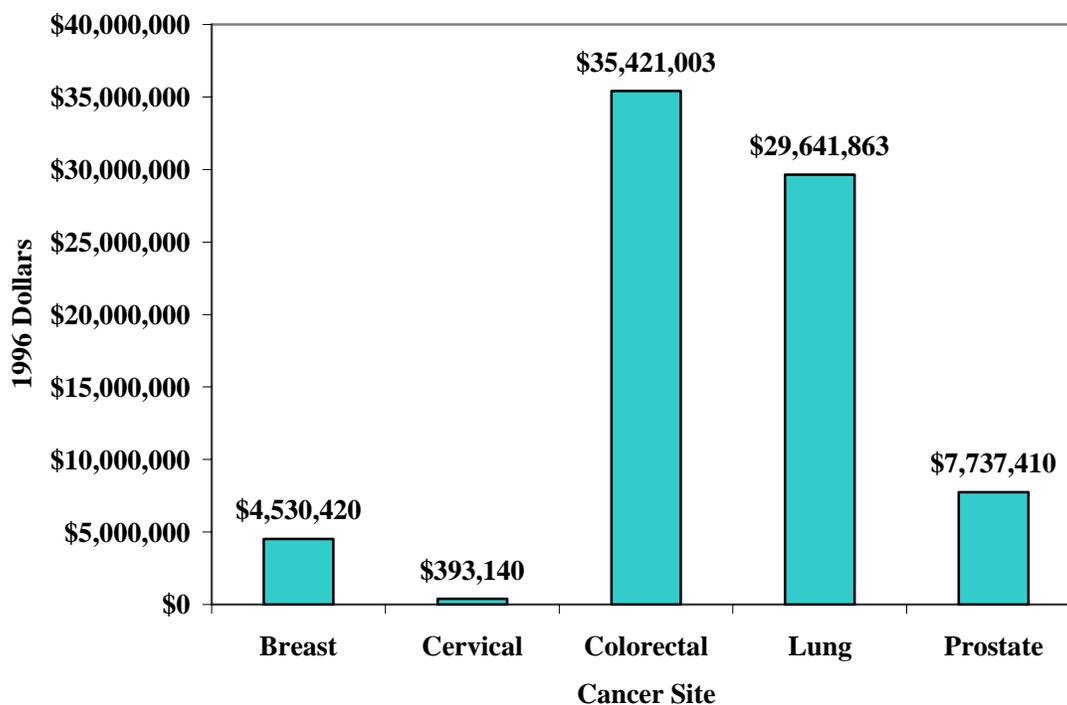


Figure 21.

Hospital Average Length of Stay for Medicare Part A Recipients by Cancer Site (2003)

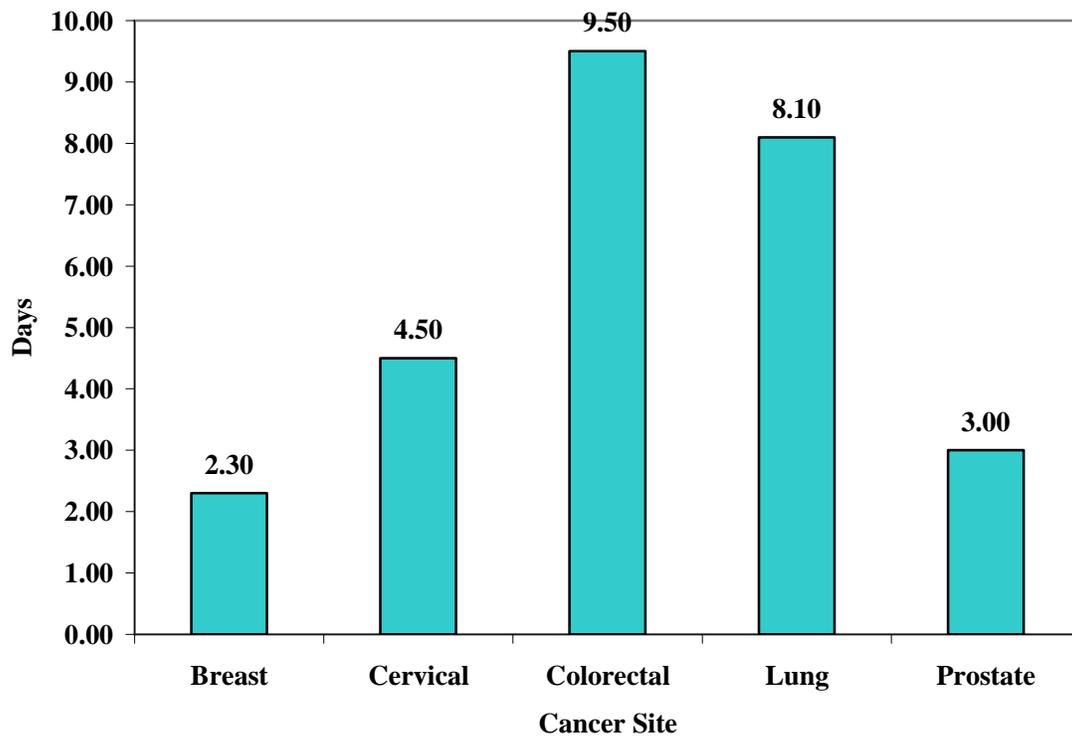
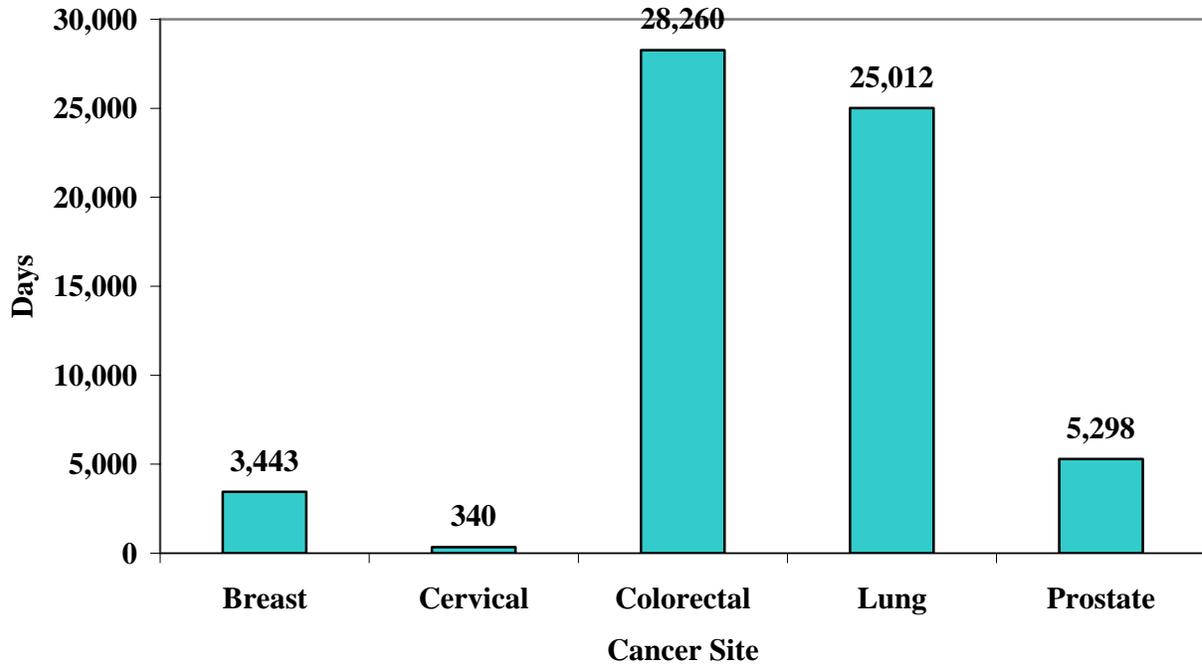


Figure 22.

Hospital Days of Care for Medicare Part A Recipients by Cancer Site (2003)



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Figure 4: Locations of Radiation Therapy Facilities by Total Population and County	133

Mammography and Radiation Facility Distribution in Michigan

The numbers of mammography and radiation therapy facilities per county are presented within this section. Facility information was received from the Michigan Department of Community Health, Radiation Safety Section.¹ Mammography and radiation therapy facilities were geocoded by Zip codes using Geographic Information System (GIS) software, and their locations throughout the state are shown.² Distance analysis was performed to calculate the proportion of women in Michigan that are farther than 30 miles from any mammography facility and the proportion of the total population that is farther than 45 miles from any radiation therapy facility.³ Population data from U.S. Census 2000 are presented to illustrate potential demand for mammography and radiation therapy facilities in counties.⁴

Summary

The MCC priority related to breast cancer screening includes an objective stating that all women should have access to clinical breast examination and mammography within 30 miles or 30 minutes of their home. Figures 1 through 4 present mammography facility and radiation therapy facility locations throughout the state and female and total population sizes by county. Analyses of mammography facility locations found that 99.8% of the female population in Michigan is within 30 miles of a mammography facility. Analysis also included radiation therapy facility locations and found 4.9% of the total Michigan population is farther than 45 miles from any radiation therapy facility. Direct distances between points are analyzed rather than actual road distance traveled. This analysis does not describe factors affecting the ease of accessibility to facilities such as the availability of public transportation, nor does it describe the utilization of the facilities.

¹ Michigan Department of Community Health, Radiation Safety Section; "Mammography Facility Status in Michigan" and "Therapy Accelerator Facilities in Michigan", September 21st, 2006.

² ESRI's ArcView GIS was used for mapping locations of facilities. When Zip codes provided by the Michigan Department of Community of Health were not matched with Zip codes in the ArcView data for geocoding, the Zip Code Lookup on the US Postal Service website was used to find Zip codes according to street addresses.

³ Distance analyses were performed using an Equidistant Conic Projection for the Contiguous United States. Distances from the center points of Zip code areas to the center of census block groups were calculated, and the populations of block groups in 1990 were used to determine the approximate proportions of population subgroups that are within a specified distance from a facility.

⁴ U.S.Census Bureau, Census 2000, Summary File 4.

Figure 1.

Number of Mammography Facilities by County, 2006

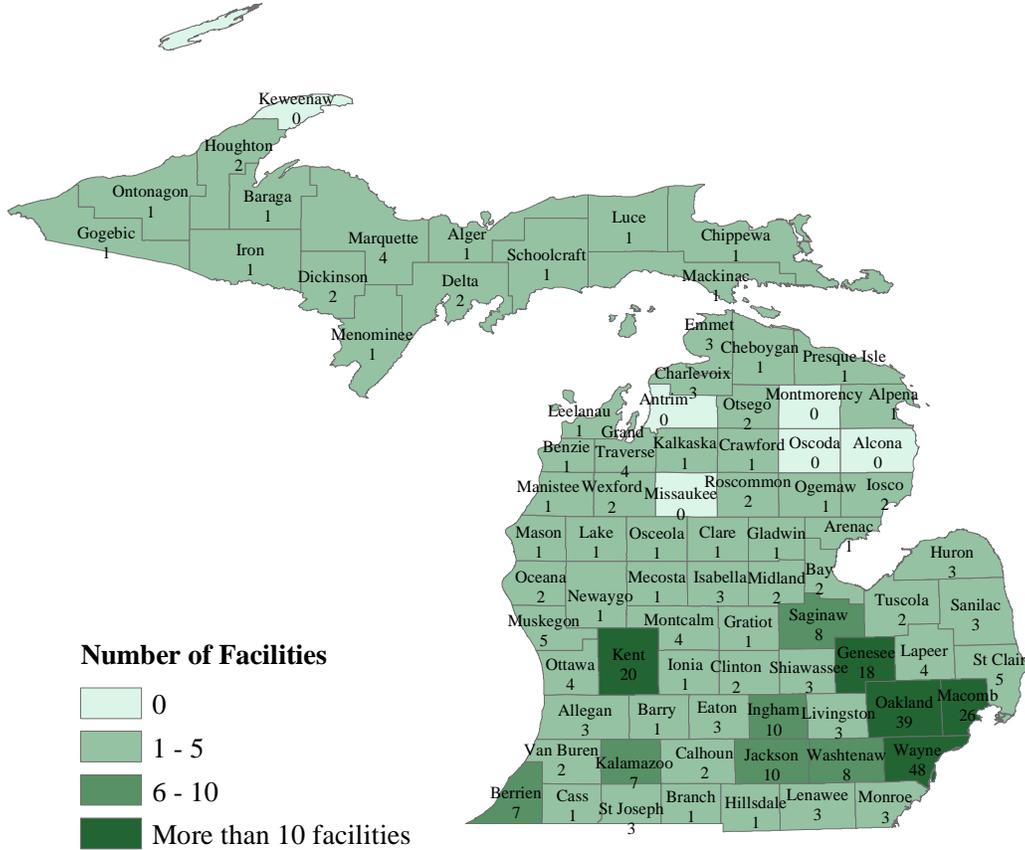


Figure 2.

Locations of Mammography Facilities

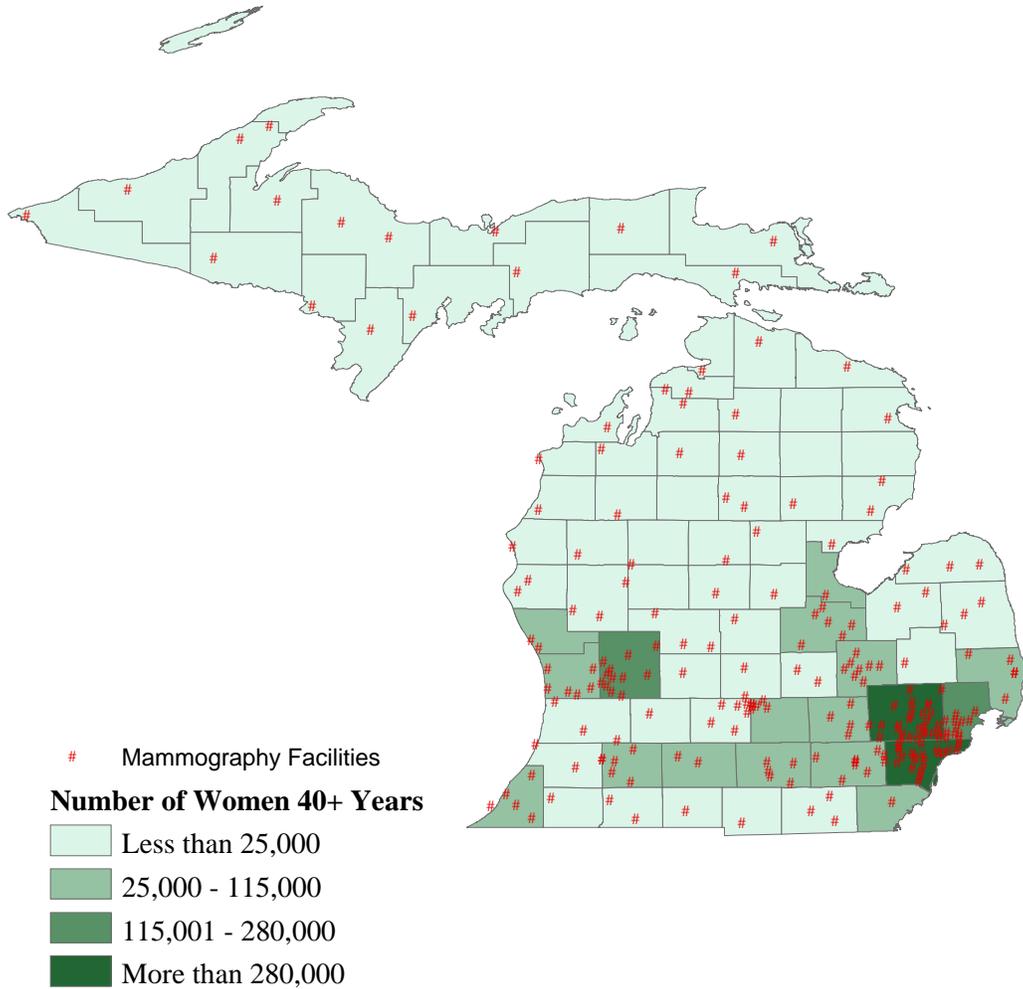


Figure 3.

Number of Radiation Therapy Facilities by County, 2006

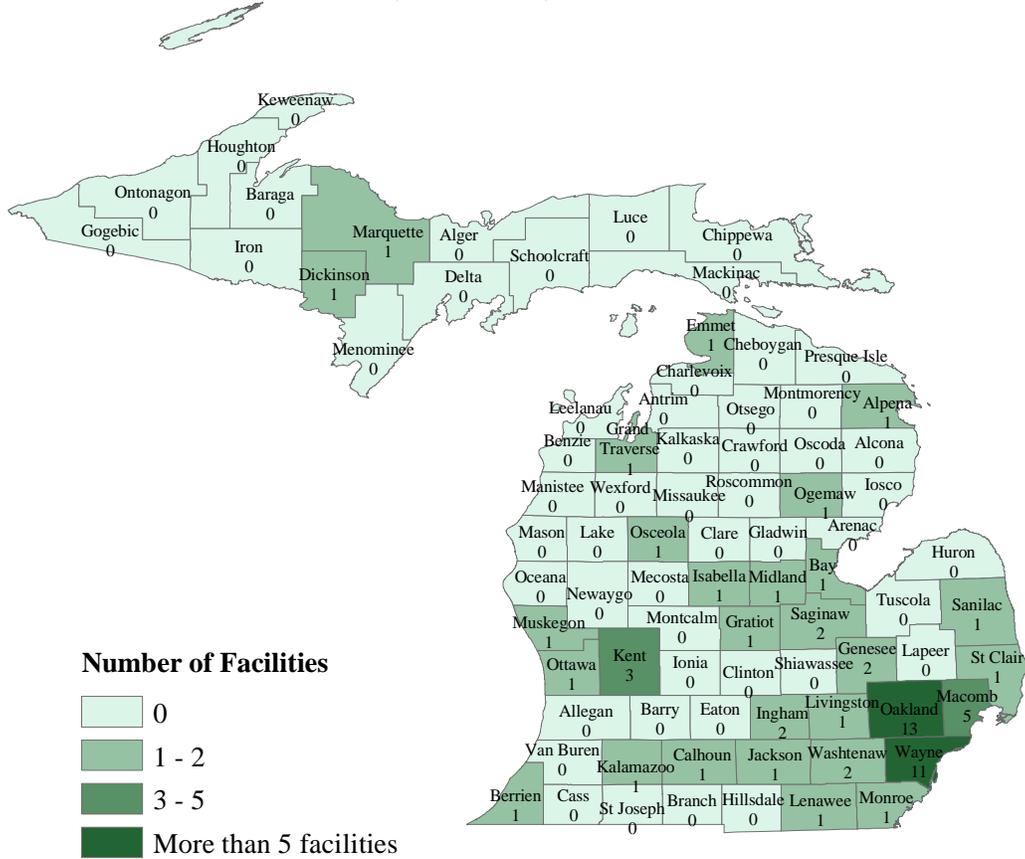
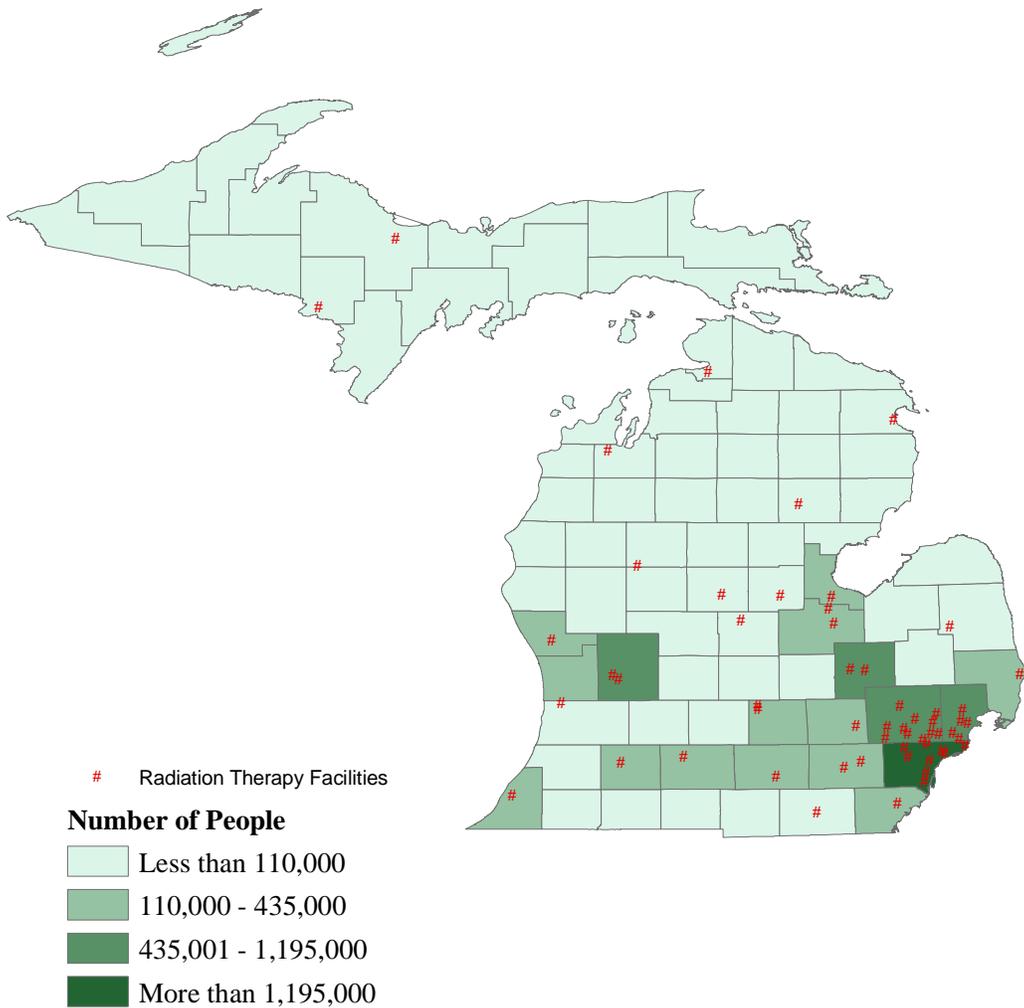


Figure 4.

Locations of Radiation Therapy Facilities by Total Population and County



Appendix

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Table 1.

Breast, Cervical, Colorectal, Lung and Prostate Cancer Mortality Rates by County, Michigan 1995-2004

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical	Colorectal	Lung	Prostate
Alcona	28.8 ± 12.1	1.6 ± 3.1	19.0 ± 6.0	66.3 ± 10.6	29.5 ± 8.4
Alger	20.6 ± 10.3	0.0 ± 0.0	13.9 ± 5.9	60.2 ± 13.0	40.9 ± 15.4
Allegan	24.5 ± 3.9	2.3 ± 1.3	20.2 ± 2.5	54.8 ± 4.4	35.2 ± 4.3
Alpena	25.7 ± 6.9	2.0 ± 2.0	20.6 ± 4.3	54.1 ± 7.0	35.1 ± 6.8
Antrim	31.2 ± 8.6	2.7 ± 2.5	17.8 ± 4.2	58.1 ± 8.3	43.8 ± 8.4
Arenac	23.9 ± 9.3	5.9 ± 5.3	18.4 ± 5.0	63.4 ± 10.2	32.7 ± 9.0
Baraga	17.2 ± 8.5	1.5 ± 2.9	17.6 ± 6.5	59.9 ± 13.5	35.2 ± 9.4
Barry	29.3 ± 5.9	1.3 ± 1.3	17.8 ± 3.1	52.5 ± 5.7	30.5 ± 5.4
Bay	23.0 ± 3.4	1.9 ± 1.1	18.7 ± 2.2	61.6 ± 4.2	29.3 ± 3.6
Benzie	24.5 ± 8.8	1.1 ± 2.2	17.1 ± 4.7	55.2 ± 9.6	26.0 ± 7.0
Berrien	26.7 ± 3.1	3.9 ± 1.3	20.0 ± 1.9	60.0 ± 3.5	27.9 ± 3.1
Branch	24.2 ± 5.5	2.5 ± 2.0	19.3 ± 3.6	60.7 ± 6.7	22.6 ± 5.6
Calhoun	30.1 ± 3.5	2.3 ± 1.0	20.9 ± 2.1	59.7 ± 3.8	31.1 ± 3.6
Cass	26.5 ± 5.3	1.9 ± 1.7	23.2 ± 3.6	64.2 ± 6.3	28.1 ± 5.7
Charlevoix	19.3 ± 6.8	2.7 ± 2.7	14.4 ± 3.8	57.1 ± 8.2	38.7 ± 8.7
Cheboygan	27.9 ± 7.4	5.4 ± 4.0	17.0 ± 4.0	63.5 ± 7.9	30.1 ± 6.9
Chippewa	19.9 ± 5.6	2.7 ± 2.4	23.3 ± 4.4	57.3 ± 7.3	17.7 ± 5.5
Clare	24.2 ± 6.7	0.9 ± 1.3	22.5 ± 4.1	80.5 ± 8.4	29.2 ± 6.1
Clinton	22.3 ± 5.0	0.6 ± 0.7	24.7 ± 3.7	45.3 ± 5.4	30.2 ± 6.0
Crawford	27.7 ± 10.2	2.4 ± 3.3	24.2 ± 6.6	67.2 ± 11.6	25.9 ± 9.5
Delta	32.2 ± 6.8	3.0 ± 2.4	19.5 ± 3.5	61.5 ± 6.7	28.1 ± 6.0
Dickinson	23.9 ± 6.9	2.3 ± 2.3	20.8 ± 4.3	47.8 ± 7.0	25.6 ± 6.4
Eaton	25.0 ± 4.0	1.5 ± 1.1	18.1 ± 2.4	49.2 ± 4.3	29.0 ± 4.4
Emmet	23.1 ± 6.6	1.7 ± 1.9	17.7 ± 4.1	56.1 ± 7.5	17.4 ± 6.3
Genesee	29.9 ± 2.1	3.1 ± 0.7	22.1 ± 1.3	65.3 ± 2.4	33.2 ± 2.3
Gladwin	26.2 ± 7.6	2.9 ± 2.9	17.2 ± 3.7	71.1 ± 8.4	23.5 ± 5.6
Gogebic	25.8 ± 7.9	3.5 ± 4.2	17.3 ± 4.4	55.3 ± 8.4	39.4 ± 8.0
Grand Traverse	20.5 ± 4.1	0.5 ± 0.7	15.4 ± 2.5	53.0 ± 4.8	38.0 ± 5.1
Gratiot	21.9 ± 5.8	4.0 ± 2.6	20.5 ± 3.9	48.3 ± 6.4	35.3 ± 6.8
Hillsdale	28.0 ± 6.0	1.6 ± 1.6	24.6 ± 3.8	56.8 ± 6.2	26.5 ± 5.4
Houghton	23.8 ± 6.5	3.7 ± 2.9	19.6 ± 3.6	45.8 ± 6.4	35.8 ± 5.7
Huron	26.0 ± 6.1	1.5 ± 1.8	24.5 ± 3.9	51.7 ± 6.0	30.6 ± 5.5
Ingham	25.7 ± 2.6	2.0 ± 0.7	16.9 ± 1.5	49.7 ± 2.9	28.5 ± 2.9
Ionia	24.8 ± 5.4	1.4 ± 1.4	19.0 ± 3.3	54.5 ± 6.0	27.3 ± 6.0
Iosco	25.2 ± 7.0	4.1 ± 3.4	18.5 ± 3.8	69.7 ± 7.6	31.6 ± 6.3
Iron	31.2 ± 11.1	0.0 ± 0.0	15.6 ± 4.7	62.0 ± 10.1	19.9 ± 5.7
Isabella	24.6 ± 6.0	2.8 ± 2.0	16.8 ± 3.4	60.9 ± 6.8	29.7 ± 6.4
Jackson	29.0 ± 3.4	3.4 ± 1.2	20.5 ± 1.9	65.4 ± 3.8	34.8 ± 3.6
Kalamazoo	28.8 ± 12.1	1.6 ± 3.1	19.0 ± 6.0	66.3 ± 10.6	29.5 ± 8.4
Kalkaska	20.6 ± 10.3	0.0 ± 0.0	13.9 ± 5.9	60.2 ± 13.0	40.9 ± 15.4

*Rates are computed by gender for breast, cervical and prostate cancer.

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical	Colorectal	Lung	Prostate
Kent	25.2 ± 2.7	2.5 ± 0.9	18.5 ± 1.6	54.9 ± 3.0	30.2 ± 2.9
Keweenaw	19.9 ± 5.9	1.2 ± 2.4	26.3 ± 6.4	67.0 ± 11.1	30.6 ± 7.6
Lake	25.8 ± 1.8	1.6 ± 0.5	18.4 ± 1.1	48.1 ± 1.9	29.5 ± 2.0
Lapeer	22.0 ± 19.8	0.0 ± 0.0	9.2 ± 7.2	43.2 ± 17.0	12.9 ± 9.7
Leelanau	34.8 ± 13.5	3.1 ± 4.6	30.7 ± 6.9	62.7 ± 11.7	30.9 ± 9.8
Lenawee	25.6 ± 4.7	2.5 ± 1.4	20.6 ± 2.9	56.1 ± 5.3	35.8 ± 5.8
Livingston	24.7 ± 8.4	1.3 ± 0.0	15.0 ± 3.9	39.8 ± 7.4	23.2 ± 7.0
Luce	24.3 ± 3.9	2.8 ± 1.4	20.7 ± 2.5	54.9 ± 4.4	32.4 ± 4.6
Mackinac	25.0 ± 3.5	1.9 ± 1.0	21.2 ± 2.5	54.8 ± 4.1	36.0 ± 4.3
Macomb	12.9 ± 11.5	2.2 ± 4.4	25.5 ± 10.1	62.1 ± 16.7	39.4 ± 12.3
Manistee	41.6 ± 13.6	3.9 ± 4.6	21.7 ± 6.5	71.4 ± 12.6	29.3 ± 11.2
Marquette	29.9 ± 1.5	2.1 ± 0.4	21.1 ± 0.9	58.4 ± 1.6	29.9 ± 1.5
Mason	25.4 ± 7.4	2.5 ± 2.6	26.9 ± 5.0	56.2 ± 7.7	33.0 ± 7.7
Mecosta	25.5 ± 5.0	1.4 ± 1.2	16.2 ± 2.7	58.1 ± 5.5	25.6 ± 4.7
Menominee	29.0 ± 7.2	1.1 ± 1.5	20.9 ± 4.2	59.2 ± 7.6	27.6 ± 5.9
Midland	23.0 ± 6.1	2.2 ± 2.2	23.4 ± 4.1	62.3 ± 7.4	29.3 ± 6.1
Missaukee	19.9 ± 6.3	0.7 ± 1.4	17.3 ± 4.0	47.6 ± 7.3	26.4 ± 7.0
Monroe	25.8 ± 4.5	2.2 ± 1.2	19.9 ± 2.9	53.9 ± 4.9	19.9 ± 3.9
Montcalm	21.4 ± 8.8	4.3 ± 4.9	22.1 ± 5.9	61.0 ± 11.4	23.7 ± 7.2
Montmorency	26.3 ± 3.5	2.8 ± 1.2	21.5 ± 2.3	58.3 ± 3.9	31.4 ± 4.1
Muskegon	21.6 ± 4.8	3.6 ± 2.1	22.5 ± 3.3	59.9 ± 5.9	33.8 ± 5.7
Newaygo	31.6 ± 13.3	3.9 ± 4.6	18.7 ± 6.2	70.0 ± 12.2	26.6 ± 7.9
Oakland	29.0 ± 3.3	2.2 ± 0.9	18.5 ± 1.8	59.1 ± 3.5	25.7 ± 3.0
Oceana	25.0 ± 5.5	2.1 ± 1.8	18.1 ± 3.2	67.5 ± 6.9	25.3 ± 5.6
Ogemaw	26.2 ± 1.2	1.9 ± 0.3	18.1 ± 0.7	51.4 ± 1.3	29.7 ± 1.3
Ontonagon	21.4 ± 6.4	2.8 ± 2.8	18.5 ± 4.8	47.9 ± 7.7	21.0 ± 6.0
Osceola	27.0 ± 7.5	4.6 ± 3.9	21.7 ± 4.9	67.7 ± 8.9	24.8 ± 6.2
Oscoda	24.6 ± 12.9	4.4 ± 6.1	20.0 ± 7.0	58.5 ± 13.0	27.6 ± 9.3
Otsego	20.6 ± 7.3	3.5 ± 3.4	19.2 ± 4.8	66.0 ± 9.5	0.1 ± 8.5
Ottawa	29.9 ± 11.4	0.0 ± 0.0	17.4 ± 7.2	65.6 ± 13.1	30.8 ± 11.2
Presque Isle	19.7 ± 6.8	3.1 ± 2.8	20.6 ± 4.7	51.6 ± 8.5	28.9 ± 6.6
Roscommon	24.3 ± 2.7	0.6 ± 0.4	16.3 ± 1.6	37.0 ± 2.6	28.7 ± 3.0
Saginaw	24.2 ± 9.4	1.4 ± 2.0	17.5 ± 4.6	57.2 ± 9.8	25.7 ± 7.5
St. Clair	20.0 ± 6.5	1.2 ± 2.4	19.2 ± 4.0	74.0 ± 8.0	27.6 ± 5.0
St. Joseph	25.3 ± 2.7	3.3 ± 1.0	21.0 ± 1.7	61.0 ± 3.2	32.2 ± 3.1
Sanilac	29.1 ± 3.3	3.0 ± 1.1	22.8 ± 2.1	64.4 ± 3.7	30.1 ± 3.2
Schoolcraft	24.0 ± 4.9	2.9 ± 1.9	24.9 ± 3.5	64.4 ± 6.0	30.3 ± 5.3
Shiawassee	21.4 ± 5.5	4.6 ± 2.7	20.5 ± 3.5	57.1 ± 6.1	36.0 ± 5.6
Tuscola	25.4 ± 12.3	1.4 ± 2.7	26.3 ± 8.3	69.6 ± 14.3	31.7 ± 9.5
Van Buren	24.7 ± 4.7	3.4 ± 1.9	20.8 ± 3.1	54.5 ± 5.2	24.7 ± 4.9
Washtenaw	28.7 ± 5.5	1.6 ± 1.4	24.2 ± 3.7	53.6 ± 5.6	33.8 ± 5.3
Wayne	22.7 ± 4.4	1.8 ± 1.3	21.7 ± 3.0	54.2 ± 5.0	33.4 ± 5.0
Wexford	26.1 ± 2.6	1.6 ± 0.6	20.0 ± 1.7	51.3 ± 2.9	31.9 ± 2.9
Michigan	31.8 ± 1.0	3.1 ± 0.3	22.6 ± 0.6	63.2 ± 1.1	36.8 ± 1.1

*Rates are computed by gender for breast, cervical and prostate cancer.

Table 2.

Breast, Cervical, Colorectal, Lung and Prostate Cancer Incidence Rates by County, Michigan 1994-2003

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical (in situ and invasive)	Colorectal	Lung	Prostate
Alcona	138.7 ± 25.0	55.2 ± 23.1	51.3 ± 9.8	90.3 ± 13.1	138.7 ± 21.1
Alger	122.2 ± 27.3	35.6 ± 18.9	55.7 ± 11.9	64.0 ± 14.0	135.8 ± 27.4
Allegan	121.9 ± 9.3	38.6 ± 5.4	55.7 ± 4.4	64.0 ± 4.9	133.6 ± 10.3
Alpena	135.4 ± 16.1	89.9 ± 15.8	65.1 ± 7.5	76.8 ± 8.4	165.2 ± 17.9
Antrim	129.8 ± 19.0	75.1 ± 17.5	51.9 ± 7.9	75.0 ± 9.6	222.6 ± 22.7
Arenac	116.8 ± 21.0	51.4 ± 16.5	67.5 ± 10.5	91.3 ± 12.4	162.1 ± 23.1
Baraga	109.0 ± 28.9	37.6 ± 20.7	49.5 ± 12.6	76.7 ± 15.8	127.9 ± 29.7
Barry	107.5 ± 11.6	36.7 ± 7.3	42.8 ± 5.0	52.4 ± 5.9	149.0 ± 13.9
Bay	116.8 ± 8.2	56.6 ± 6.3	53.6 ± 3.8	81.6 ± 4.9	196.6 ± 11.1
Benzie	123.6 ± 22.1	106.0 ± 24.5	58.2 ± 9.3	74.6 ± 11.6	226.3 ± 28.4
Berrien	143.8 ± 7.6	51.4 ± 4.9	61.7 ± 3.4	81.3 ± 4.1	199.9 ± 9.3
Branch	104.0 ± 12.6	32.7 ± 7.6	48.6 ± 5.8	73.4 ± 7.5	132.1 ± 14.3
Calhoun	126.3 ± 7.7	52.7 ± 5.4	55.5 ± 3.5	80.8 ± 4.4	139.6 ± 8.5
Cass	108.4 ± 11.6	43.4 ± 8.3	46.3 ± 5.4	69.3 ± 6.7	127.9 ± 13.1
Charlevoix	138.2 ± 18.7	53.8 ± 13.0	50.0 ± 7.7	64.9 ± 9.1	168.6 ± 20.8
Cheboygan	129.3 ± 17.3	54.1 ± 13.7	47.6 ± 7.0	76.0 ± 8.9	206.6 ± 21.1
Chippewa	122.8 ± 15.6	23.8 ± 7.6	61.8 ± 7.5	70.7 ± 8.2	132.1 ± 16.2
Clare	116.6 ± 15.3	46.5 ± 11.5	59.1 ± 7.1	99.0 ± 9.5	194.4 ± 18.5
Clinton	95.5 ± 10.5	25.9 ± 5.6	45.9 ± 5.2	45.2 ± 5.4	150.3 ± 14.3
Crawford	109.1 ± 22.0	50.0 ± 17.7	42.5 ± 9.4	76.0 ± 12.5	160.4 ± 25.4
Delta	141.7 ± 15.0	39.1 ± 9.0	59.0 ± 6.4	76.1 ± 7.6	177.6 ± 16.7
Dickinson	120.8 ± 16.7	41.3 ± 11.2	52.2 ± 7.3	61.4 ± 8.0	132.9 ± 17.3
Eaton	116.4 ± 9.0	37.7 ± 5.3	42.9 ± 3.9	50.5 ± 4.4	152.0 ± 11.3
Emmet	149.7 ± 17.9	56.5 ± 12.3	48.4 ± 7.1	80.5 ± 9.3	164.8 ± 20.2
Genesee	133.9 ± 4.6	81.5 ± 3.7	57.7 ± 2.2	83.8 ± 2.7	229.7 ± 6.8
Gladwin	119.4 ± 16.8	42.4 ± 12.0	54.5 ± 7.2	94.7 ± 10.0	183.6 ± 18.7
Gogebic	120.3 ± 19.8	64.3 ± 18.8	49.4 ± 7.9	68.0 ± 9.8	164.6 ± 20.7
Grand Traverse	163.9 ± 12.2	114.4 ± 10.9	58.1 ± 5.1	80.4 ± 6.1	289.4 ± 17.1
Gratiot	131.6 ± 14.9	38.6 ± 8.7	55.4 ± 6.6	61.5 ± 7.4	176.4 ± 17.9
Hillsdale	115.3 ± 13.0	28.2 ± 7.0	50.9 ± 5.8	65.5 ± 6.9	129.0 ± 13.6
Houghton	116.5 ± 15.4	39.8 ± 10.4	52.7 ± 6.4	52.0 ± 6.8	139.3 ± 15.2
Huron	131.1 ± 15.0	49.8 ± 11.3	58.5 ± 6.3	60.3 ± 6.7	184.5 ± 16.5
Ingham	151.4 ± 6.7	38.0 ± 3.1	59.5 ± 3.0	70.4 ± 3.4	195.3 ± 8.3
Ionia	117.0 ± 12.2	46.0 ± 7.8	48.0 ± 5.4	62.8 ± 6.5	156.3 ± 15.1
Iosco	131.7 ± 16.9	35.8 ± 11.3	54.3 ± 7.0	92.4 ± 9.3	180.4 ± 17.8
Iron	108.2 ± 21.1	29.8 ± 15.2	56.4 ± 9.9	83.6 ± 12.1	117.4 ± 20.3
Isabella	123.1 ± 13.7	16.3 ± 4.8	55.4 ± 6.5	70.6 ± 7.5	160.4 ± 16.8
Jackson	117.1 ± 7.1	46.9 ± 4.9	55.2 ± 3.3	79.1 ± 4.2	136.8 ± 8.1

*Rates are computed by gender for breast, cervical and prostate cancer.

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical (in-situ and invasive)	Colorectal	Lung	Prostate
Kalamazoo	127.2 ± 6.3	58.6 ± 4.2	47.9 ± 2.8	69.0 ± 13.4	165.0 ± 7.9
Kalkaska	108.9 ± 21.0	79.0 ± 20.3	49.3 ± 9.6	73.2 ± 12.3	183.8 ± 27.5
Kent	134.4 ± 4.3	41.2 ± 2.3	49.0 ± 1.8	58.2 ± 2.1	172.0 ± 5.4
Keweenaw	121.2 ± 54.0	5.0 ± 9.8	46.4 ± 18.4	38.5 ± 16.3	75.5 ± 36.6
Lake	134.7 ± 27.6	54.8 ± 22.4	62.4 ± 11.3	79.5 ± 13.8	191.5 ± 28.3
Lapeer	118.9 ± 10.2	89.5 ± 9.0	55.2 ± 5.1	73.1 ± 6.1	185.4 ± 14.2
Leelanau	127.8 ± 19.8	66.7 ± 17.7	41.4 ± 7.4	43.8 ± 7.7	247.1 ± 26.1
Lenawee	125.5 ± 9.3	37.7 ± 5.5	52.1 ± 4.2	67.8 ± 5.0	182.7 ± 12.1
Livingston	124.8 ± 8.2	41.3 ± 4.7	49.4 ± 3.9	59.0 ± 4.3	151.5 ± 10.2
Luce	148.5 ± 37.8	70.2 ± 33.2	65.6 ± 15.9	77.8 ± 19.2	171.3 ± 39.5
Mackinac	116.0 ± 24.4	51.0 ± 20.5	57.0 ± 11.1	84.7 ± 14.0	171.7 ± 28.3
Macomb	132.9 ± 3.3	86.6 ± 2.8	59.6 ± 1.5	81.4 ± 1.9	193.6 ± 4.3
Manistee	125.0 ± 17.8	56.4 ± 14.8	57.1 ± 7.7	70.4 ± 8.8	187.5 ± 20.7
Marquette	147.7 ± 12.6	30.9 ± 6.1	49.2 ± 5.0	75.3 ± 6.4	157.6 ± 13.2
Mason	129.8 ± 16.5	44.8 ± 11.7	54.6 ± 7.2	74.1 ± 8.6	177.9 ± 18.7
Mecosta	117.4 ± 14.8	37.4 ± 9.0	45.6 ± 6.3	72.7 ± 8.1	141.9 ± 16.1
Menominee	121.7 ± 17.5	33.5 ± 10.6	45.6 ± 6.9	59.6 ± 8.3	161.2 ± 18.7
Midland	130.2 ± 10.5	20.5 ± 4.3	54.0 ± 4.9	66.1 ± 5.5	181.0 ± 13.7
Missaukee	134.0 ± 24.8	63.8 ± 19.2	48.3 ± 10.0	67.6 ± 12.2	150.9 ± 25.4
Monroe	109.0 ± 7.3	46.9 ± 5.0	55.9 ± 3.8	77.3 ± 4.6	157.8 ± 9.6
Montcalm	120.3 ± 12.0	46.6 ± 7.9	59.2 ± 5.8	75.8 ± 6.7	179.9 ± 14.9
Montmorency	147.8 ± 28.7	77.9 ± 28.7	54.1 ± 11.4	105.3 ± 15.1	210.0 ± 29.3
Muskegon	143.2 ± 7.6	83.1 ± 6.3	54.4 ± 3.3	72.7 ± 3.9	213.1 ± 9.8
Newaygo	112.7 ± 13.0	51.9 ± 9.7	52.8 ± 6.0	74.9 ± 7.4	165.1 ± 15.5
Oakland	148.3 ± 2.9	83.7 ± 2.3	57.0 ± 1.3	73.1 ± 1.5	227.8 ± 4.0
Oceana	131.7 ± 18.3	65.2 ± 14.7	50.4 ± 7.7	68.7 ± 9.5	184.1 ± 21.7
Ogemaw	117.1 ± 17.9	29.5 ± 10.8	53.3 ± 8.0	77.7 ± 9.8	162.8 ± 19.7
Ontonagon	128.6 ± 29.1	76.2 ± 31.0	58.1 ± 12.8	69.7 ± 14.6	155.2 ± 29.6
Osceola	133.9 ± 19.6	51.4 ± 13.7	70.5 ± 9.9	83.3 ± 10.9	195.4 ± 23.6
Oscoda	123.5 ± 26.6	27.2 ± 16.6	46.7 ± 11.1	69.2 ± 13.5	128.0 ± 25.0
Otsego	119.0 ± 18.9	71.4 ± 16.1	57.6 ± 8.8	70.6 ± 10.2	262.8 ± 26.9
Ottawa	137.6 ± 6.9	26.1 ± 2.9	50.5 ± 3.0	43.7 ± 2.9	165.3 ± 8.2
Presque Isle	121.6 ± 21.1	63.0 ± 19.8	50.2 ± 8.7	65.6 ± 10.7	172.3 ± 23.7
Roscommon	136.0 ± 17.1	42.6 ± 13.4	54.3 ± 6.8	100.4 ± 9.8	202.8 ± 18.4
Saginaw	127.3 ± 6.3	67.6 ± 4.9	56.1 ± 2.9	77.3 ± 3.6	222.0 ± 9.0
St. Clair	139.4 ± 7.7	85.0 ± 6.4	66.7 ± 3.7	86.8 ± 4.4	171.1 ± 9.1
St. Joseph	117.5 ± 11.3	69.5 ± 9.5	59.5 ± 5.6	79.0 ± 6.6	132.2 ± 12.6
Sanilac	112.4 ± 12.8	89.1 ± 13.1	56.8 ± 6.1	68.4 ± 6.8	159.6 ± 15.1
Schoolcraft	128.9 ± 29.6	55.6 ± 24.8	58.7 ± 12.5	87.1 ± 16.3	187.4 ± 34.2
Shiawassee	140.4 ± 11.6	56.2 ± 7.8	56.3 ± 5.3	76.2 ± 6.2	202.7 ± 15.0
Tuscola	124.8 ± 12.1	53.6 ± 8.7	64.9 ± 6.1	63.2 ± 6.2	191.4 ± 15.3
Van Buren	121.2 ± 10.4	53.3 ± 7.5	48.5 ± 4.6	67.8 ± 5.6	160.1 ± 12.4
Washtenaw	143.5 ± 6.4	39.9 ± 3.0	53.5 ± 2.9	63.3 ± 3.2	181.0 ± 8.1
Wayne	127.0 ± 2.0	85.7 ± 1.7	62.0 ± 1.0	88.1 ± 1.2	227.6 ± 3.0
Wexford	130.4 ± 17.1	67.1 ± 13.4	63.7 ± 8.1	76.0 ± 9.2	200.3 ± 21.5
Michigan	131.6 ± 1.0	65.6 ± 0.7	56.6 ± 0.4	75.6 ± 0.5	195.5 ± 1.3

*Rates are computed by gender for breast, cervical and prostate cancer.

Table 3.

Percentage of Breast Cancer Cases Localized at Diagnosis by County, 1991-1993 and 2001-2003

County	Localized at Diagnosis	
	1991-1993	2001-2003
Alcona	77.8%	72.5%
Alger	68.2%	52.2%
Allegan	53.5%	62.8%
Alpena	67.6%	73.2%
Antrim	47.3%	68.7%
Arenac	40.0%	63.9%
Baraga	52.4%	61.9%
Barry	34.7%	68.1%
Bay	24.3%	63.6%
Benzie	71.4%	71.4%
Berrien	58.4%	59.1%
Branch	39.2%	72.5%
Calhoun	60.8%	55.6%
Cass	45.0%	55.8%
Charlevoix	53.7%	61.5%
Cheboygan	63.2%	72.6%
Chippewa	56.6%	44.6%
Clare	63.3%	74.6%
Clinton	64.2%	55.7%
Crawford	36.7%	74.1%
Delta	67.7%	60.7%
Dickinson	40.8%	61.8%
Eaton	59.3%	61.9%
Emmet	69.5%	68.9%
Genesee	53.0%	57.5%
Gladwin	43.5%	73.8%
Gogebic	56.6%	51.1%
Grand Traverse	59.9%	64.6%
Gratiot	72.9%	70.9%
Hillsdale	65.3%	63.4%
Houghton	69.9%	61.2%
Huron	19.7%	57.4%
Ingham	62.7%	65.0%
Ionia	50.0%	53.7%
Iosco	42.5%	58.4%
Iron	40.0%	71.0%
Isabella	75.9%	58.8%
Jackson	69.3%	67.5%
Kalamazoo	65.3%	57.9%
Kalkaska	65.5%	68.0%

Appendix
Breast Cancer Cases Localized at Diagnosis by County

County	Localized at Diagnosis	
	1991-1993	2001-2003
Kent	65.5%	58.8%
Keweenaw	71.4%	62.5%
Lake	34.4%	64.7%
Lapeer	57.3%	61.3%
Leelanau	50.0%	56.5%
Lenawee	64.0%	65.2%
Livingston	53.1%	67.4%
Luce	47.1%	60.0%
Mackinac	75.0%	62.5%
Macomb	60.2%	60.5%
Manistee	51.4%	53.6%
Marquette	61.9%	61.3%
Mason	27.3%	74.2%
Mecosta	60.7%	66.7%
Menominee	54.8%	60.9%
Midland	62.2%	71.0%
Missaukee	35.7%	74.2%
Monroe	47.4%	64.8%
Montcalm	63.6%	59.7%
Montmorency	62.5%	61.5%
Muskegon	58.0%	63.1%
Newaygo	67.1%	54.4%
Oakland	61.7%	58.8%
Oceana	42.3%	67.2%
Ogemaw	40.0%	69.5%
Ontonagon	55.0%	60.0%
Osceola	47.5%	67.2%
Oscoda	35.0%	47.6%
Otsego	43.9%	72.1%
Ottawa	65.1%	54.4%
Presque Isle	82.6%	60.5%
Roscommon	37.5%	70.0%
Saginaw	47.7%	63.5%
St. Clair	60.1%	60.8%
St. Joseph	64.3%	59.7%
Sanilac	50.0%	67.4%
Schoolcraft	52.4%	46.7%
Shiawassee	45.4%	62.0%
Tuscola	36.9%	70.9%
Van Buren	60.4%	65.0%
Washtenaw	67.4%	68.8%
Wayne	55.8%	57.4%
Wexford	30.5%	65.5%
Michigan	57.7%	60.7%

Table 4.

Percentage of Cervical Cancer Cases In-situ at Diagnosis by County, 1991-1993 and 2001-2003

County	In-situ at Diagnosis	
	1991-1993	2001-2003
Alcona	82.4%	63.6%
Alger	72.7%	50.0%
Allegan	85.3%	90.7%
Alpena	84.4%	89.7%
Antrim	80.0%	90.3%
Arenac	77.8%	68.8%
Baraga	71.4%	No cases reported
Barry	89.5%	87.5%
Bay	66.7%	87.3%
Benzie	78.6%	96.7%
Berrien	54.8%	86.9%
Branch	74.1%	84.0%
Calhoun	79.2%	90.1%
Cass	73.9%	90.0%
Charlevoix	56.3%	78.3%
Cheboygan	81.8%	90.9%
Chippewa	77.8%	33.3%
Clare	82.4%	77.8%
Clinton	64.7%	72.7%
Crawford	75.0%	100.0%
Delta	53.8%	70.4%
Dickinson	71.4%	91.7%
Eaton	76.3%	87.9%
Emmet	75.0%	75.0%
Genesee	74.3%	86.3%
Gladwin	66.7%	70.0%
Gogebic	100.0%	0.0%
Grand Traverse	80.6%	94.1%
Gratiot	62.5%	66.7%
Hillsdale	68.8%	86.2%
Houghton	50.0%	66.7%
Huron	72.2%	81.3%
Ingham	83.9%	79.7%
Ionia	72.9%	81.3%
Iosco	74.3%	75.0%
Iron	40.0%	0.0%
Isabella	81.6%	46.7%
Jackson	70.4%	85.0%
Kalamazoo	86.8%	94.7%
Kalkaska	60.0%	81.8%

Appendix
Cervical Cancer Cases In-situ at Diagnosis by County

County	In-situ at Diagnosis	
	1991-1993	2001-2003
Kent	82.9%	83.2%
Keweenaw	100.0%	No cases reported
Lake	63.6%	85.7%
Lapeer	82.9%	94.5%
Leelanau	90.0%	100.0%
Lenawee	81.7%	86.4%
Livingston	88.4%	89.8%
Luce	75.0%	66.7%
Mackinac	40.0%	71.4%
Macomb	90.3%	92.0%
Manistee	75.0%	91.7%
Marquette	82.1%	60.0%
Mason	57.7%	64.3%
Mecosta	75.0%	61.5%
Menominee	52.4%	33.3%
Midland	77.3%	61.9%
Missaukee	30.0%	73.3%
Monroe	82.5%	87.9%
Montcalm	84.8%	55.6%
Montmorency	75.0%	100.0%
Muskegon	79.5%	92.4%
Newaygo	77.5%	95.7%
Oakland	87.1%	90.3%
Oceana	72.7%	91.4%
Ogemaw	75.0%	75.0%
Ontonagon	57.1%	No cases reported
Osceola	72.7%	71.4%
Oscoda	66.7%	50.0%
Otsego	81.8%	82.1%
Ottawa	89.5%	75.2%
Presque Isle	100.0%	50.0%
Roscommon	69.2%	62.5%
Saginaw	58.9%	86.1%
St. Clair	87.8%	89.9%
St. Joseph	81.1%	88.2%
Sanilac	63.6%	84.1%
Schoolcraft	63.6%	33.3%
Shiawassee	80.0%	85.5%
Tuscola	90.9%	86.7%
Van Buren	84.3%	87.9%
Washtenaw	72.5%	84.6%
Wayne	84.2%	87.1%
Wexford	84.6%	94.4%
Michigan	82.3%	87.6%

Table 5.

Percentage of Colorectal Cancer Cases Localized at Diagnosis by County, 1991-1993 and 2001-2003

County	Localized at Diagnosis	
	1991-1993	2001-2003
Alcona	38.6%	45.9%
Alger	31.8%	45.0%
Allegan	27.2%	36.4%
Alpena	35.7%	44.4%
Antrim	30.0%	37.0%
Arenac	21.3%	39.6%
Baraga	18.2%	23.5%
Barry	10.7%	39.8%
Bay	11.2%	34.9%
Benzie	26.7%	26.8%
Berrien	28.5%	32.5%
Branch	26.9%	33.3%
Calhoun	27.3%	34.7%
Cass	20.8%	22.2%
Charlevoix	14.6%	59.3%
Cheboygan	43.1%	40.0%
Chippewa	33.3%	40.9%
Clare	48.3%	48.6%
Clinton	45.1%	33.3%
Crawford	16.7%	27.8%
Delta	57.0%	38.4%
Dickinson	26.6%	40.5%
Eaton	27.6%	43.6%
Emmet	32.4%	45.2%
Genesee	27.1%	39.5%
Gladwin	25.0%	35.0%
Gogebic	31.5%	31.3%
Grand Traverse	34.1%	36.4%
Gratiot	40.7%	34.7%
Hillsdale	38.2%	34.4%
Houghton	37.5%	24.1%
Huron	8.8%	35.3%
Ingham	43.9%	42.5%
Ionia	25.0%	32.5%
Iosco	40.9%	17.8%
Iron	23.3%	34.2%
Isabella	64.7%	34.1%
Jackson	47.8%	37.7%
Kalamazoo	26.2%	32.9%
Kalkaska	33.3%	22.2%

Appendix
Colorectal Cancer Cases Localized at Diagnosis by County

County	Localized at Diagnosis	
	1991-1993	2001-2003
Kent	27.2%	30.3%
Keweenaw	30.0%	12.5%
Lake	15.4%	29.4%
Lapeer	34.9%	36.4%
Leelanau	30.0%	39.5%
Lenawee	37.4%	33.6%
Livingston	36.6%	35.1%
Luce	36.4%	35.0%
Mackinac	27.5%	40.7%
Macomb	33.1%	39.2%
Manistee	58.2%	28.6%
Marquette	32.1%	42.6%
Mason	20.6%	40.0%
Mecosta	36.8%	31.6%
Menominee	37.5%	20.5%
Midland	26.4%	35.7%
Missaukee	13.6%	28.0%
Monroe	26.4%	27.6%
Montcalm	33.1%	37.6%
Montmorency	32.4%	55.6%
Muskegon	24.7%	38.0%
Newaygo	31.2%	33.7%
Oakland	35.2%	42.0%
Oceana	20.0%	41.8%
Ogemaw	40.4%	22.4%
Ontonagon	32.0%	26.3%
Osceola	13.6%	39.6%
Oscoda	34.5%	62.5%
Otsego	35.0%	34.7%
Ottawa	35.3%	38.4%
Presque Isle	21.9%	48.3%
Roscommon	30.6%	37.5%
Saginaw	38.2%	31.4%
St. Clair	32.8%	37.5%
St. Joseph	41.5%	50.0%
Sanilac	27.7%	44.8%
Schoolcraft	42.9%	42.9%
Shiawassee	20.5%	38.6%
Tuscola	29.4%	39.5%
Van Buren	31.0%	27.1%
Washtenaw	43.2%	34.6%
Wayne	30.3%	37.9%
Wexford	8.2%	37.7%
Michigan	33.7%	39.1%

Table 6.

Breast, Cervical and Colorectal Cancer Age-adjusted Rates of Late Stage Cases at Diagnosis by County, 1988-1995 and 1996-2003

County	Breast 1988-1995 (n)	Breast 1996-2003 (n)	Cervical 1988-1995 (n)	Cervical 1996-2003 (n)	Colorectal 1988-1995 (n)	Colorectal 1996-2003 (n)
Alcona	22.7 (16)	40.6 (28)	2.2 (1)	2.7 (1)	25.7 (37)	28.6 (46)
Alger	49.5 (24)	35.7 (21)	4.4 (2)	--- (---)	37.5 (32)	31.4 (32)
Allegan	28.5 (120)	26.0 (131)	0.7 (3)	1.6 (8)	23.5 (156)	29.6 (232)
Alpena	35.0 (54)	29.6 (56)	2.3 (3)	1.0 (2)	31.3 (86)	36.4 (113)
Antrim	32.6 (39)	40.2 (53)	--- (---)	1.0 (1)	24.7 (43)	25.9 (60)
Arenac	30.0 (26)	27.0 (25)	2.7 (2)	5.8 (5)	28.5 (41)	30.0 (51)
Baraga	35.5 (12)	31.7 (18)	5.9 (2)	3.2 (1)	26.4 (23)	27.1 (23)
Barry	15.5 (37)	23.6 (67)	0.9 (2)	1.1 (3)	16.5 (63)	19.6 (88)
Bay	47.9 (249)	31.8 (197)	4.0 (19)	1.9 (11)	38.4 (347)	26.4 (261)
Benzie	19.6 (16)	30.0 (29)	5.7 (4)	1.2 (1)	30.3 (38)	26.5 (45)
Berrien	36.5 (272)	36.7 (330)	4.4 (31)	2.6 (22)	30.7 (408)	35.2 (507)
Branch	49.5 (97)	24.2 (57)	3.3 (6)	3.7 (8)	32.4 (106)	25.2 (96)
Calhoun	37.0 (234)	31.4 (245)	2.9 (17)	2.4 (18)	33.2 (366)	31.0 (372)
Cass	25.1 (58)	25.0 (70)	3.2 (7)	2.7 (7)	15.2 (61)	21.2 (93)
Charlevoix	23.1 (27)	34.9 (48)	5.6 (6)	2.5 (4)	32.8 (61)	19.2 (46)
Cheboygan	28.1 (36)	24.4 (39)	2.6 (3)	0.9 (1)	22.9 (50)	23.1 (63)
Chippewa	33.0 (49)	44.4 (80)	2.3 (3)	2.4 (4)	34.9 (94)	30.4 (94)
Clare	21.0 (34)	22.3 (42)	3.1 (5)	3.2 (4)	22.7 (60)	22.8 (71)
Clinton	18.2 (47)	23.9 (74)	0.8 (2)	1.3 (4)	20.3 (78)	21.2 (98)

Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases

County	Breast 1988-1995 (n)	Breast 1996-2003 (n)	Cervical 1988-1995 (n)	Cervical 1996-2003 (n)	Colorectal 1988-1995 (n)	Colorectal 1996-2003 (n)
Crawford	22.3 (15)	20.8 (17)	1.9 (1)	--- (---)	12.5 (15)	16.9 (24)
Delta	20.9 (39)	24.5 (57)	2.7 (5)	2.6 (5)	18.0 (61)	21.3 (83)
Dickinson	16.1 (22)	18.2 (31)	3.3 (4)	2.0 (3)	14.3 (39)	18.1 (51)
Eaton	27.6 (119)	23.4 (120)	1.2 (5)	1.4 (7)	23.9 (150)	17.3 (132)
Emmet	31.3 (45)	35.5 (58)	2.5 (3)	0.5 (1)	37.2 (83)	22.8 (63)
Genesee	47.5 (873)	33.8 (758)	4.6 (84)	3.1 (71)	35.2 (1017)	30.4 (979)
Gladwin	31.0 (41)	27.5 (41)	6.2 (7)	2.8 (4)	32.1 (75)	31.3 (88)
Gogebic	38.2 (42)	35.0 (47)	4.0 (4)	2.1 (2)	26.2 (63)	30.4 (68)
Grand Traverse	39.6 (134)	46.0 (178)	1.2 (4)	1.4 (6)	30.6 (151)	30.9 (196)
Gratiot	28.7 (50)	31.6 (67)	2.2 (4)	2.9 (6)	23.9 (77)	27.5 (98)
Hillsdale	29.5 (61)	31.5 (79)	2.1 (4)	1.9 (4)	23.9 (86)	26.5 (106)
Houghton	28.4 (48)	22.2 (47)	2.7 (4)	3.2 (5)	23.3 (85)	25.7 (88)
Huron	44.8 (88)	31.1 (67)	4.9 (8)	2.6 (4)	27.0 (101)	28.6 (116)
Ingham	41.3 (423)	33.1 (408)	2.0 (21)	1.6 (21)	30.6 (484)	24.4 (430)
Ionia	29.4 (69)	30.1 (86)	2.1 (5)	1.1 (3)	26.2 (103)	18.1 (80)
Iosco	40.1 (65)	31.1 (54)	1.3 (1)	4.5 (6)	26.9 (71)	29.6 (95)
Iron	45.0 (37)	29.9 (30)	7.2 (3)	3.5 (2)	35.4 (65)	25.9 (45)
Isabella	24.4 (48)	27.1 (64)	1.0 (2)	2.2 (5)	21.6 (65)	19.2 (69)
Jackson	24.9 (168)	17.5 (142)	2.6 (16)	1.6 (13)	18.1 (209)	19.5 (252)
Kalamazoo	35.6 (339)	33.4 (380)	2.3 (22)	1.8 (20)	33.4 (502)	29.4 (504)

Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases

County	Breast 1988-1995 (n)	Breast 1996-2003 (n)	Cervical 1988-1995 (n)	Cervical 1996-2003 (n)	Colorectal 1988-1995 (n)	Colorectal 1996-2003 (n)
Kalkaska	19.8 (14)	27.5 (22)	1.6 (1)	1.3 (1)	20.5 (23)	30.8 (42)
Kent	37.9 (826)	32.7 (850)	2.0 (43)	1.1 (29)	36.4 (1252)	26.1 (1027)
Keweenaw	27.9 (5)	29.7 (6)	--- (---)	--- (---)	46.7 (11)	22.1 (7)
Lake	25.3 (15)	32.7 (23)	3.8 (2)	1.0 (1)	28.3 (29)	30.7 (42)
Lapeer	26.1 (87)	32.2 (129)	1.5 (5)	1.9 (8)	27.0 (120)	28.2 (160)
Leelanau	23.4 (23)	41.1 (47)	--- (---)	1.0 (1)	16.7 (25)	20.4 (42)
Lenawee	33.4 (143)	33.5 (173)	3.9 (16)	1.2 (6)	26.6 (181)	24.2 (193)
Livingston	29.9 (171)	25.2 (170)	1.3 (7)	1.9 (13)	22.7 (153)	22.9 (217)
Luce	40.5 (13)	32.6 (12)	8.4 (2)	6.0 (2)	20.1 (11)	30.5 (20)
Mackinac	21.0 (14)	29.6 (21)	11.1 (7)	3.4 (2)	43.6 (49)	28.4 (36)
Macomb	35.2 (1294)	27.4 (1215)	2.8 (101)	1.9 (81)	37.1 (2054)	28.0 (1854)
Manistee	26.9 (33)	37.0 (54)	3.7 (5)	1.5 (2)	23.6 (52)	27.4 (74)
Marquette	41.9 (115)	36.6 (121)	1.9 (5)	2.5 (8)	28.3 (140)	24.5 (131)
Mason	31.8 (49)	20.3 (34)	8.5 (11)	1.8 (4)	22.6 (56)	26.7 (79)
Mecosta	20.5 (33)	20.3 (39)	2.5 (4)	1.5 (3)	25.5 (65)	17.5 (56)
Menominee	33.3 (46)	28.4 (42)	3.3 (3)	4.6 (6)	18.2 (46)	16.8 (43)
Midland	33.4 (115)	25.1 (105)	2.6 (9)	1.0 (4)	32.0 (160)	30.8 (191)
Missaukee	27.4 (17)	19.7 (15)	2.9 (2)	5.5 (4)	6.9 (7)	19.9 (26)
Monroe	20.2 (121)	27.1 (196)	1.7 (10)	3.3 (24)	24.5 (218)	34.0 (364)
Montcalm	29.3 (73)	32.5 (97)	3.0 (7)	2.1 (6)	31.0 (129)	23.3 (114)

Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases

County	Breast 1988-1995 (n)	Breast 1996-2003 (n)	Cervical 1988-1995 (n)	Cervical 1996-2003 (n)	Colorectal 1988-1995 (n)	Colorectal 1996-2003 (n)
Montmorency	46.0 (26)	28.1 (19)	1.7 (1)	2.2 (1)	33.5 (41)	29.3 (38)
Muskegon	32.5 (235)	35.3 (310)	2.6 (19)	1.9 (16)	22.9 (290)	27.9 (387)
Newaygo	23.2 (47)	20.7 (50)	1.1 (2)	1.7 (4)	25.4 (83)	23.8 (95)
Oakland	33.7 (1724)	28.5 (1776)	2.4 (122)	2.1 (132)	32.5 (2493)	25.5 (2278)
Oceana	33.2 (38)	26.6 (37)	2.7 (3)	3.2 (4)	25.9 (48)	24.2 (55)
Ogemaw	32.6 (40)	25.7 (39)	--- (---)	3.5 (5)	28.4 (55)	35.3 (83)
Ontonagon	41.5 (19)	27.7 (16)	5.5 (2)	2.6 (2)	22.7 (23)	28.7 (27)
Osceola	19.9 (20)	24.4 (30)	--- (---)	2.4 (3)	16.8 (30)	30.8 (62)
Oscoda	20.8 (11)	39.3 (22)	3.6 (1)	5.9 (3)	18.5 (18)	23.2 (25)
Otsego	43.7 (46)	22.1 (26)	--- (---)	2.5 (3)	31.7 (48)	25.5 (51)
Ottawa	26.3 (228)	34.8 (357)	1.1 (10)	0.7 (7)	29.1 (353)	22.1 (349)
Presque Isle	22.1 (18)	29.4 (28)	2.5 (2)	1.5 (2)	29.8 (46)	24.2 (45)
Roscommon	21.1 (32)	31.8 (59)	0.5 (1)	0.4 (1)	17.3 (46)	22.4 (75)
Saginaw	28.7 (265)	28.8 (333)	2.7 (24)	2.7 (30)	16.6 (267)	26.2 (455)
St. Clair	41.9 (296)	31.3 (265)	4.1 (29)	1.8 (15)	37.2 (425)	33.1 (432)
St. Joseph	33.5 (90)	34.6 (115)	2.9 (7)	2.9 (9)	29.2 (137)	28.7 (148)
Sanilac	28.8 (61)	27.1 (66)	8.6 (16)	2.9 (7)	26.3 (96)	25.7 (108)
Schoolcraft	58.1 (28)	27.9 (16)	5.6 (2)	--- (---)	25.9 (24)	31.4 (32)
Shiawassee	30.1 (92)	31.9 (119)	2.3 (7)	1.7 (6)	25.8 (129)	27.0 (151)
Tuscola	40.8 (102)	28.1 (86)	1.2 (3)	2.0 (6)	25.0 (104)	34.6 (165)

Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases

County	Breast 1988-1995 (n)	Breast 1996-2003 (n)	Cervical 1988-1995 (n)	Cervical 1996-2003 (n)	Colorectal 1988-1995 (n)	Colorectal 1996-2003 (n)
Van Buren	28.3 (93)	26.4 (105)	2.8 (9)	1.3 (5)	25.3 (142)	28.3 (175)
Washtenaw	39.5 (428)	29.3 (380)	3.3 (36)	1.2 (16)	32.4 (466)	26.8 (484)
Wayne	44.0 (3952)	28.8 (3232)	5.2 (456)	3.1 (343)	37.1 (5959)	30.0 (4832)
Wexford	26.8 (36)	26.3 (44)	3.1 (4)	1.5 (3)	12.0 (28)	27.7 (74)
Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases						