

# The Burden of Cancer in Missouri

A comprehensive **analysis**  
and **plan**  
2010-2015



## ***Report Information***

***Title:*** The Burden of Cancer in Missouri: A comprehensive analysis and plan, 2010-2015

***Description:*** This report provides information about cancer incidence, prevalence, and mortality (deaths) as well as health care utilization, by individuals with cancer in Missouri. The report also focuses on national recommendations and what is being done to address cancer in Missouri.

***Audience:*** This report is intended for use by the general public as well as state and local policy makers, researchers, local public health agencies, health care personnel, voluntary organizations and others interested in the prevention and control of cancer in Missouri.

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## ***Grant support***

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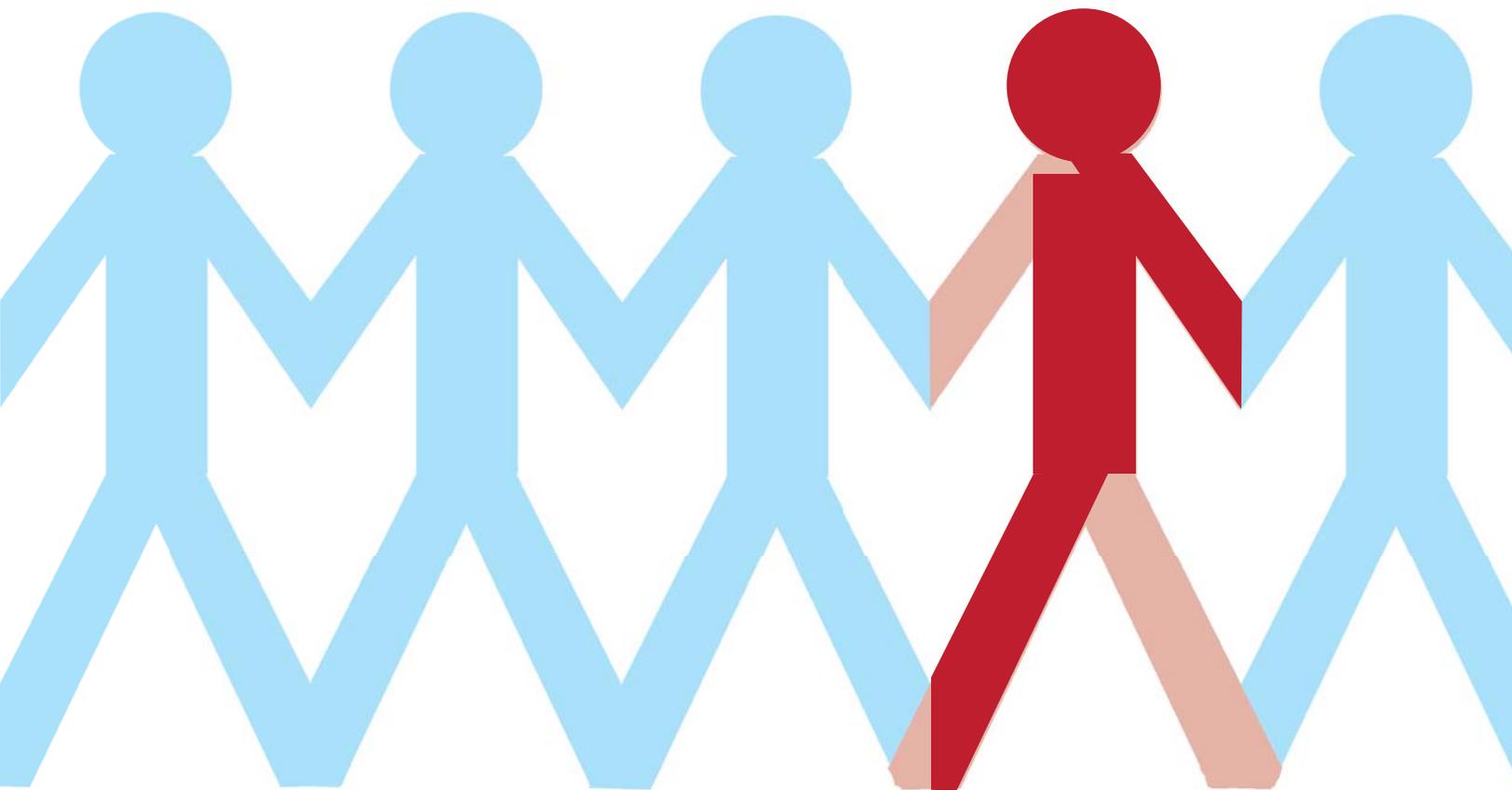
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## *Acknowledgements*

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This document represents a comprehensive analysis of cancer in Missouri as well as a strategic plan to address the burden of cancer over the next five years. The interventions in the plan are designed to decrease the suffering, death and health-care costs caused by cancer. These interventions include evidence-based prevention, early detection, and treatment activities that will improve the quality of life of cancer survivors.

Sincerely,  
Maryann Coletti, RN,  
Chair, Missouri Cancer Consortium



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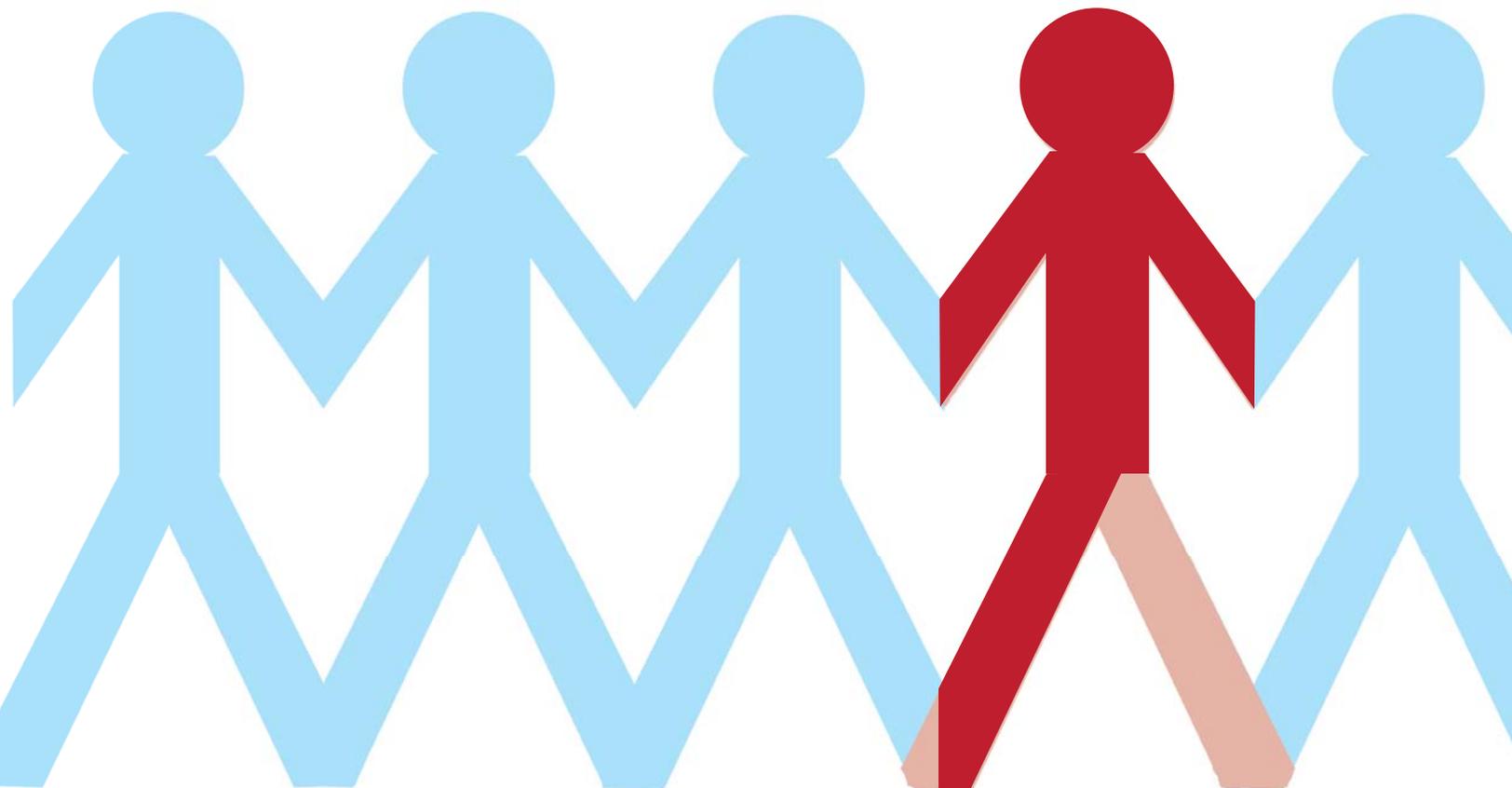
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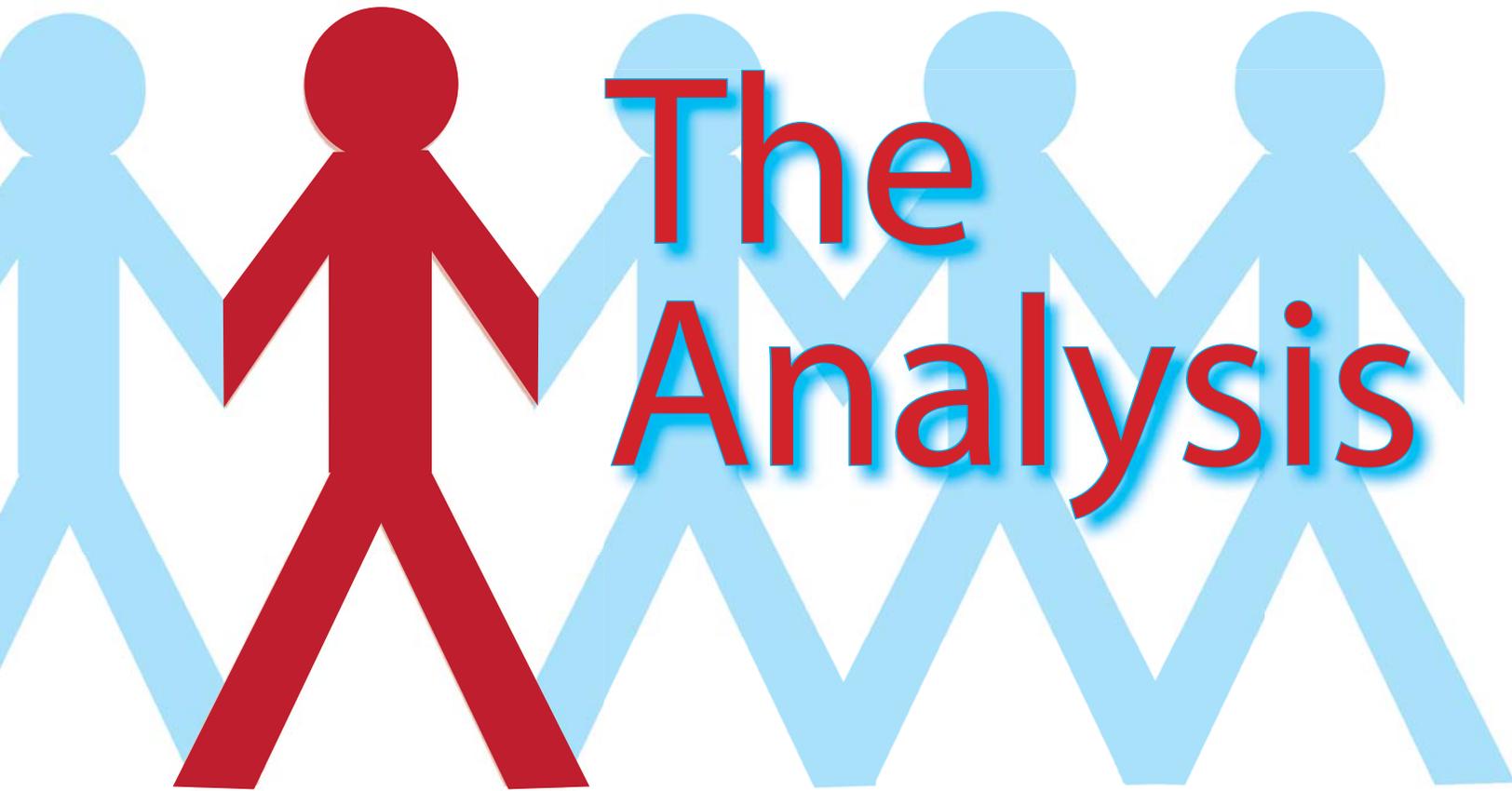
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# The Analysis

## Introduction

### *The Challenge*

Decreasing cancer-related morbidity and mortality requires continued focus on the cancer continuum. Increased opportunities for education and awareness about high-risk behaviors and their impact on new cancer cases are needed to reach populations. The challenge is for everyone to be bold and daring by taking a proactive approach to assure the greatest number of Missourians will be offered appropriate, timely, and much-needed information. Cancer is a condition that brings not only challenges but also hope.



# *What is Comprehensive Cancer Control?*

The cancer control continuum is used to describe cancer prevention, early detection, diagnosis, treatment, survivorship and end of life. The cancer control continuum is the framework on which this plan was developed. The framework helps identify research gaps, where collaboration with others can have an impact, and where more resources may be needed.

The Centers for Disease Control and Prevention (CDC) helped to develop and clarify the concept of a comprehensive approach to cancer control. Through this process, Missouri joins more than 50 other states and U.S. territories in developing a plan to address the cancer continuum.

Comprehensive cancer control is based on the following principles:

Scientific data and research are used systematically to identify priorities and inform decision making.

- The full scope of cancer care is addressed, ranging from primary prevention to early detection and treatment to survivorship and end of life issues.
- Many stakeholders are engaged in cancer control, including but not limited to not only the medical and public health communities but also volunteer agencies, insurers, businesses, survivors, government, academia, and advocates.
- All cancer programs and activities are coordinated, thereby creating integrated activities. The integrated activities include many disciplines such as administration, basic and applied research, evaluation, health education, program development, public policy, surveillance, clinical services, and health communications.



## ***Prevention***

Choosing healthy behaviors and preventing exposure to certain chemicals may help prevent cancers before they can start. Scientists estimate that as many as 50 percent to 75 percent of cancer deaths in the United States are caused by human behaviors such as smoking, physical inactivity, and poor dietary choices. Modifying behaviors can help prevent cancer. Smoking causes about 30 percent of all U.S. deaths from cancer. Avoiding tobacco use is the single most important step Americans can take to reduce the cancer burden in this country.

## ***Early Detection/Screening***

Participating in some cancer early detection tests, such as colorectal, can prevent the cancer from developing and detect it at the earliest possible stage. Five-year relative survival rates for common cancers, such as breast, colorectal, cervical and melanoma of the skin, are 90 percent to 100 percent, if they are discovered and treated before spreading beyond the organ where the cancer began.

The following screening tests have been found to detect cancers accurately and to decrease the chances of dying from cancer:

- Mammography / Clinical breast examination (for breast cancer)
- Pap smear (for cervical cancer)
- Sigmoidoscopy or Colonoscopy (for colorectal cancer)
- PSA / Digital rectal examinations (for prostate)

## ***Treatment***

Cancer treatment is improving, saving lives and extending survival for people with cancers at many sites, including the breast and colon, and for people with leukemias, lymphomas, and pediatric cancers. Clinical trials are the major avenue for discovering, developing and evaluating new therapies. The ultimate measure of success against cancer is how far the death rate from this group of diseases can be lowered.

## ***Survivorship/Quality of Life***

The National Cancer Institute states, “An individual is considered a cancer survivor from the time of diagnosis, through the balance of his/her life.” Family members, friends and caregivers are also impacted by the survivorship experience. Key to addressing needs of survivors is gaining understanding of unique needs and concerns through the diagnosis/screening, treatment and recovery phases of the cancer experience.

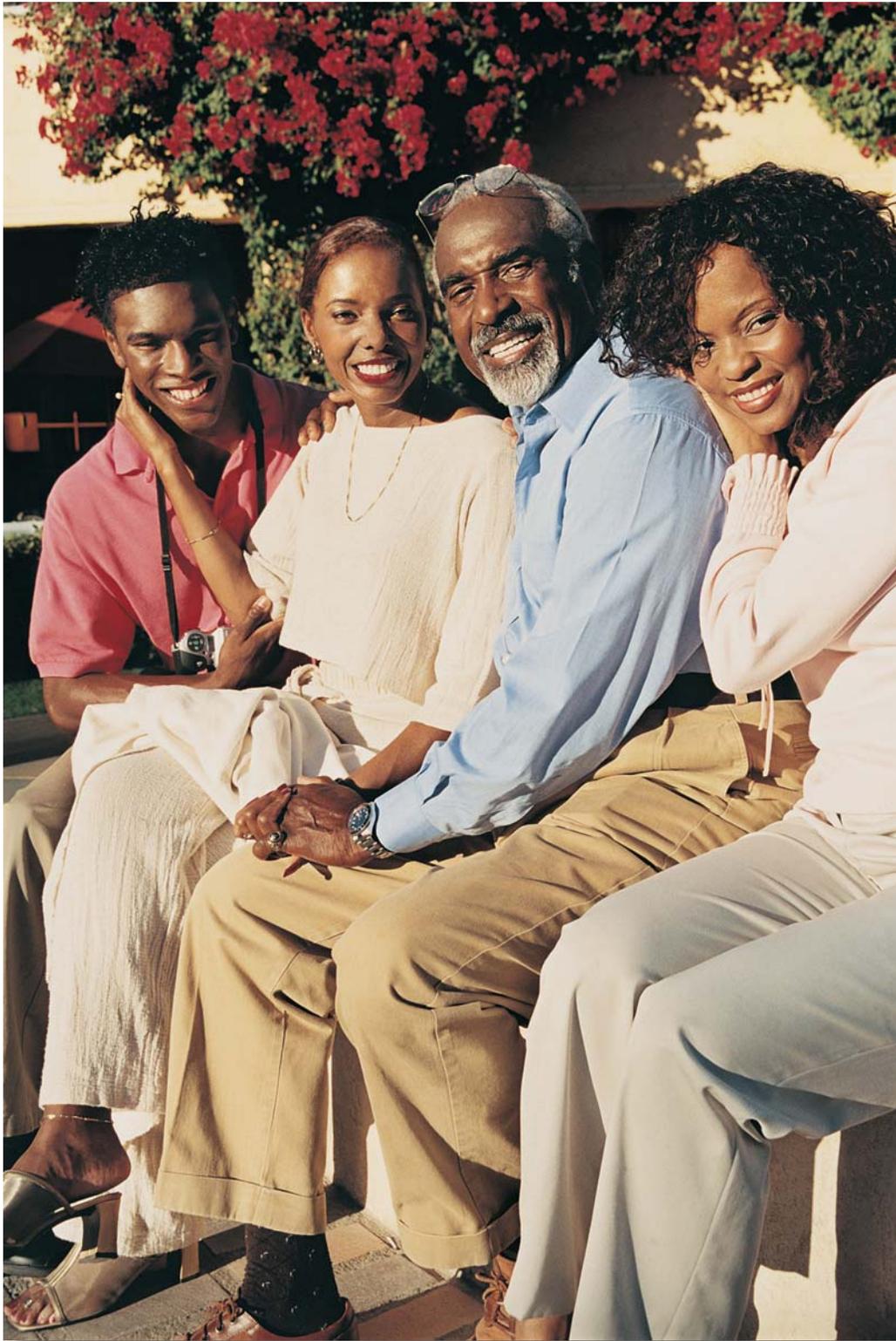
These needs and concerns span the physical, psychological, social, emotional and spiritual domains. Examples of survival issues include concern regarding late-term and long-term effects of cancer treatment, re-employability, insurability, and fear of recurrence.

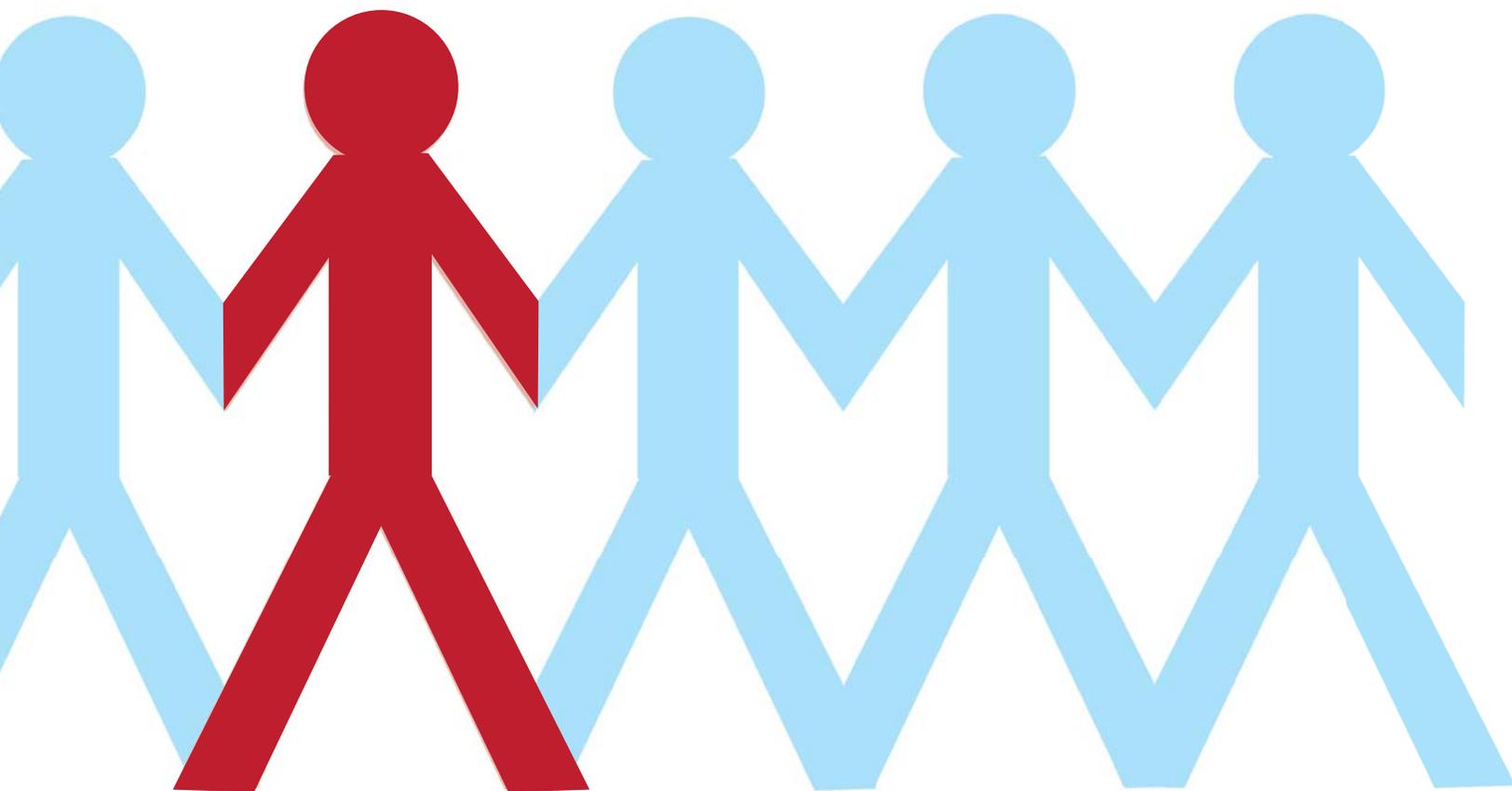
## ***End of Life***

End of life or palliative care is defined as “care that goes beyond the traditional definition of providing comfort to the dying.” Palliative care begins at the diagnosis of cancer or any other chronic or potentially life-threatening disease and includes improving the quality of life of patients and their families during the entire course of an illness. Most recently, the definition has also been expanded to include the emotional, spiritual, and practical needs of patients and their families.



*“An individual is considered a cancer survivor from the time of diagnosis, through the balance of his/her life.”*





# Cancer: Definition and Causes

## *What is cancer?*

For some, cancer statistics are just numbers. For others, the word “cancer” evokes fear and the inability to cope. Many people do not contemplate the impact of the disease until it confronts them or their own family or friends. Maybe the disease is too frightening to think about, even though many people recover, survive, and live long lives.

Cancer is not just one disease but a group of diseases characterized by uncontrolled growth and spread of abnormal cells. All cancers cause cells in the body to change and grow out of control. Many types of cancers form a lump or mass called a tumor. The tumor can invade and destroy healthy tissues. Cells from the tumor can break off and go to other parts of the body where they can continue to grow. This spreading process is called metastasis. If the spread is not controlled, it may result in death.<sup>1,2,3</sup>



When cancer spreads, it is still named after the part of the body where it started. If lung cancer spreads to the brain, it is still lung cancer, not brain cancer. Some cancers, such as leukemia and lymphoma, do not form a tumor.

## ***What causes cancer?***

Cancer may be caused by many different things. Some kinds of cancer are caused by behaviors – things people do. For example, smoking can cause cancer of the lungs, mouth, throat, bladder, kidneys and some other organs, as well as heart disease and stroke. While not everyone who smokes will get cancer, smoking increases a person’s chance of getting the disease. Drinking large amounts of alcohol has also been shown to increase a person’s chance of getting cancer of the mouth, throat and some other organs. This is especially true if the person drinks and smokes.<sup>4</sup>

Although sunlight is the main source of ultraviolet (UV) radiation, this radiation may also come from other sources such as tanning booths. Too much exposure to sunlight without any protection can cause skin cancer.<sup>4</sup> Individuals with lighter-toned skin are more susceptible to UV damage, although people of all races and ethnicities can be at risk for skin cancer. Those who have a family history of skin cancer, multiple moles or freckles, or a history of severe sunburns early in life are at a higher risk of skin cancer. To minimize the harmful effects of excessive and unprotected sun exposure, protection from intense UV radiation should be a life-long practice for everyone.<sup>5,6,7</sup>

Certain types of cancer are more common in some families. This can be caused by a number of factors. Often, family members have certain risk factors in common, such as smoking, which can cause many types of cancer. But in some cases the cancer is caused by an abnormal gene that is being passed along from generation to generation. Although this is often referred to as inherited cancer, what is inherited is the abnormal gene that can lead to cancer, not the cancer itself. Only about 5 percent to 10 percent of all cancers are related to family genetics.<sup>8</sup>



In most cases, the exact cause of cancer remains a mystery. It is known that certain changes in our cells (mutations) during the course of our life can cause cancer to start, which causes most cases of cancer, but it is not yet known exactly how this happens.



## *Who is at risk of developing cancer?*

Physicians and researchers often cannot explain why one person develops cancer and another does not. Some people will develop cancers that have no known risk factors. But research shows that certain factors increase the chance that a person will develop cancer. These are the most common risk factors for cancer:<sup>4,9,10,11</sup>

- Growing older
- Tobacco use
- Sunlight
- Ionizing radiation
- Certain chemicals and other substances
- Some viruses and bacteria
- Certain hormones
- Family history of cancer
- Alcohol use
- Poor diet, lack of physical activity, or being overweight.



Although cancer may strike at any age, it is more commonly a disease of middle and older age. In 2007, about 78 percent of all cancers in Missouri were diagnosed at age 55 or older. However, it is recognized that certain groups of people are at increased risk of dying from cancer, especially those with limited options for primary prevention (e.g., lack of healthy foods, particularly fresh fruits and vegetables, and lack of exercise) and secondary prevention services (e.g., screening), and those underserved by virtue of their income, race, ethnicity, disability or sexual orientation. Many risk factors can be avoided. Others, such as age and family history, cannot be avoided or changed. People can help protect themselves by staying away from known risk factors whenever possible. People who think they may be at risk for cancer, you should discuss this concern with their doctors. They may want to ask about reducing their risk and about a schedule for routine checkups and screenings.

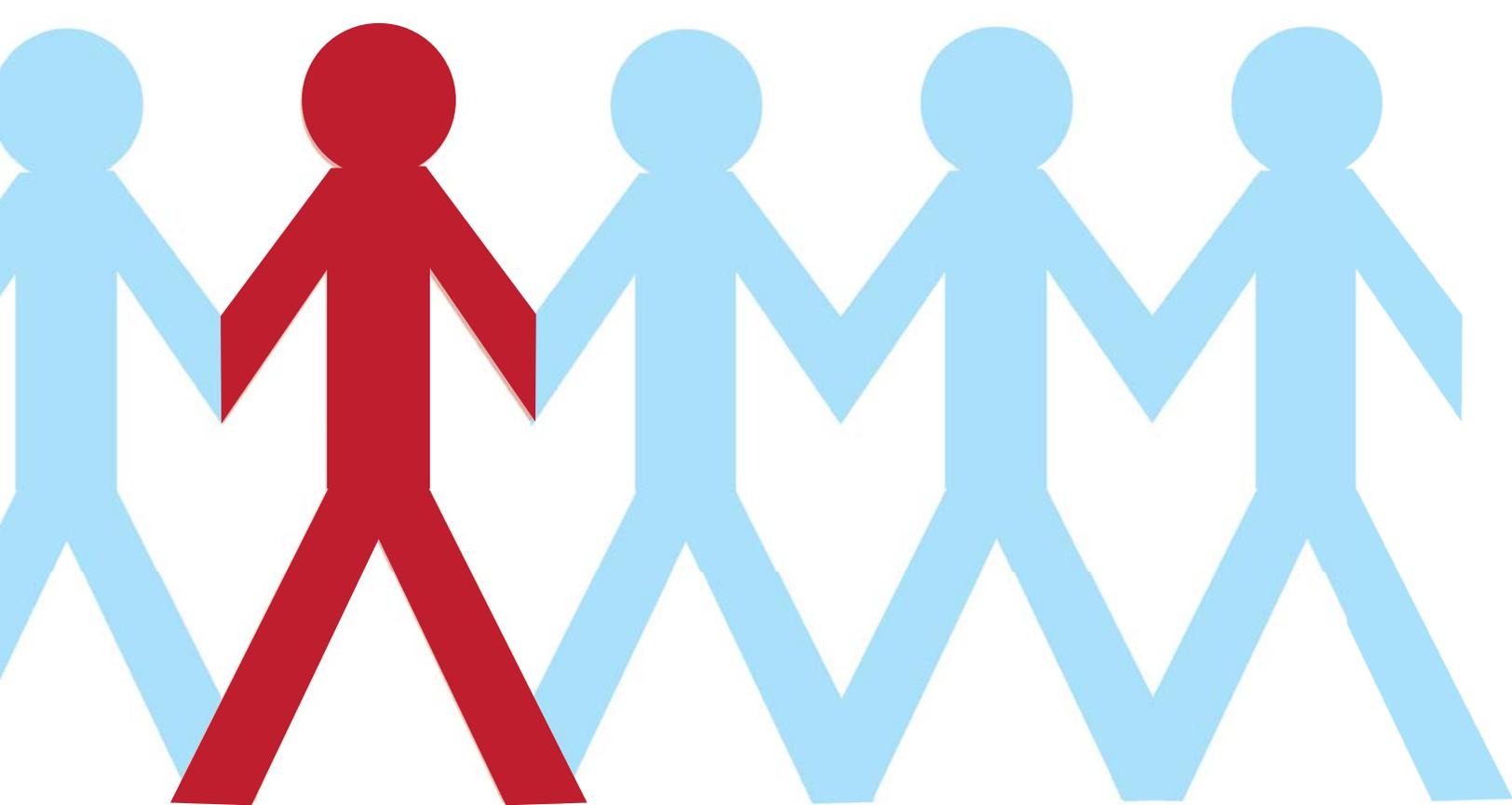


Over time, several factors may act together to cause normal cells to become cancerous. The following are things to keep in mind when considering a person's risk for cancer:

- Not everything causes cancer.
- Cancer is not caused by an injury, such as a bump or bruise.
- Cancer is not contagious. Although being infected with certain viruses or bacteria may increase the risk of some types of cancer, no one can “catch” cancer from another person.
- Having one or more risk factors does not mean that you will get cancer. Most people who have risk factors never develop cancer.
- Some people are more sensitive than others to known risk factors.

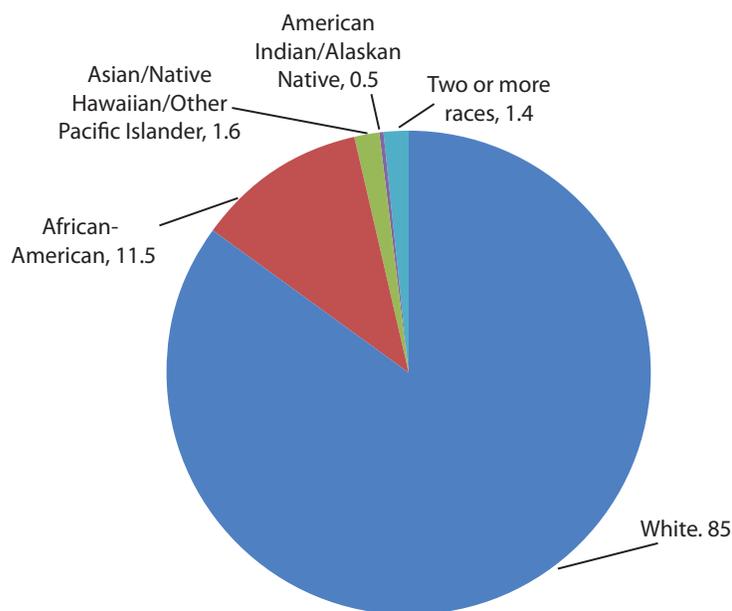
The sections that follow have more detailed information about the most common risk factors for cancer. Another resource is the National Cancer Institute (NCI) booklet *Cancer and the Environment*.<sup>10</sup>





# Cancer: By the Numbers in Missouri

Figure 1. Population estimates, percentage by race in Missouri, 2008



## *Missouri population by race and ethnicity, 2008*

In Missouri, according to 2008 estimates from U.S. Census Bureau files, there are approximately 5.9 million people, 85.0 percent white, 11.5 percent African-American, 1.6 percent Asian, Native Hawaiian or Other Pacific Islander and 0.5 percent American Indian or Alaskan Native (Figure 1).<sup>13</sup> The Hispanic or Latino population in Missouri is 3.2 percent. Although minorities only comprise 15 percent of Missouri's total population, many are disproportionately impacted by cancer.

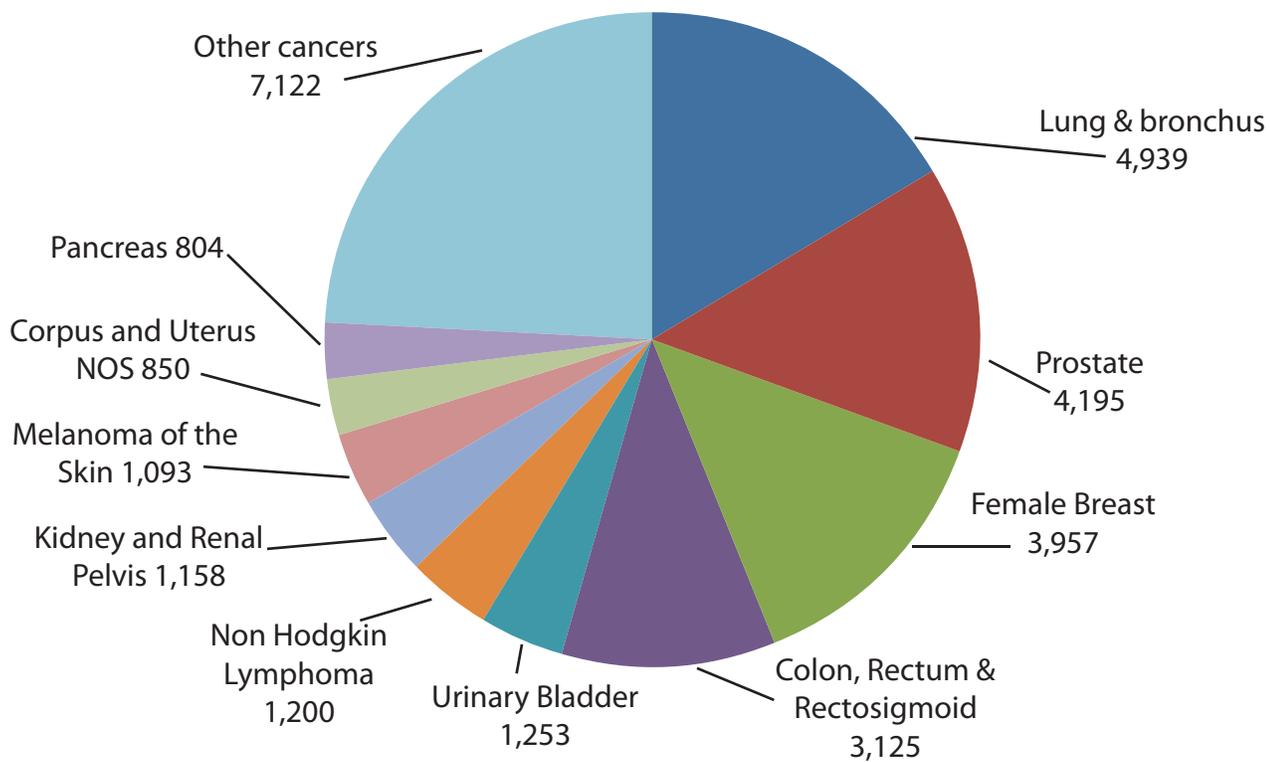
Source: Missouri Census Data Center. Population Estimates for Missouri, April 1, 2000 and July 1, 2008. <http://medc2.missouri.edu>



## Leading types of new invasive cancers in Missouri

In 2007, according to the Missouri Cancer Registry (MCR), 29,695 of Missouri's residents were diagnosed with invasive cancer.<sup>12</sup> This amounted to more than three new cases of cancer, diagnosed every hour of every day in Missouri. The five leading invasive cancers in 2007 were lung and bronchus; prostate; female breast; colon, rectum and rectosigmoid; and urinary bladder (Figure 2).

**Figure 2. Ten leading types of new invasive cancers, Missouri, 2007**



Source: Missouri Department of Health and Senior Services, Cancer Registry MICA, [www.dhss.mo.gov/data/mica/mica/cancer\\_19sites.php](http://www.dhss.mo.gov/data/mica/mica/cancer_19sites.php)



Figure 3. Ten leading types of new invasive cancers, by gender, Missouri, 2007\*

Female	Male
Breast 3,957 (28%)	Prostate 4,195 (27%)
Lung & bronchus 2,189 (15%)	Lung & bronchus 2,749 (18%)
Colon, rectum & rectosigmoid 1,485 (10%)	Colon, rectum & rectosigmoid 1,640 (11%)
Corpus and Uterus, NOS 850 (6%)	Urinary bladder 946 (6%)
Non-Hodgkin lymphoma 592 (4%)	Kidney and Renal Pelvis 733 (5%)
Thyroid 494 (3%)	Melanoma of the skin 615 (4%)
Melanoma of the skin 478 (3%)	Non-Hodgkin lymphoma 608 (4%)
Kidney and Renal Pelvis 425 (3%)	Oral cavity and pharynx 555 (4%)
Pancreas 414 (3%)	Pancreas 390 (3%)
Ovary 403 (3%)	Leukemias 384 (2%)
Other cancers 2,899 (20%)	Other cancers 2,694 (17%)
All sites 14,186 (100%)	All sites 15,509 (100%)

\*Excludes basal and squamous cell skin cancers and in situ cancer except urinary bladder. Percentages may not total 100 percent due to rounding.

Source: Missouri Department of Health and Senior Services. Cancer Registry MICA, [www.dhss.mo.gov/data/mica/mica/cancer\\_19sites.php](http://www.dhss.mo.gov/data/mica/mica/cancer_19sites.php)

Among females, the five leading cancers were breast; lung and bronchus; colon, rectum and rectosigmoid; corpus and uterus not otherwise specified (NOS); and non-Hodgkin lymphoma (Figure 3). These five sites accounted for 64.0 percent of all new cancer cases among women.

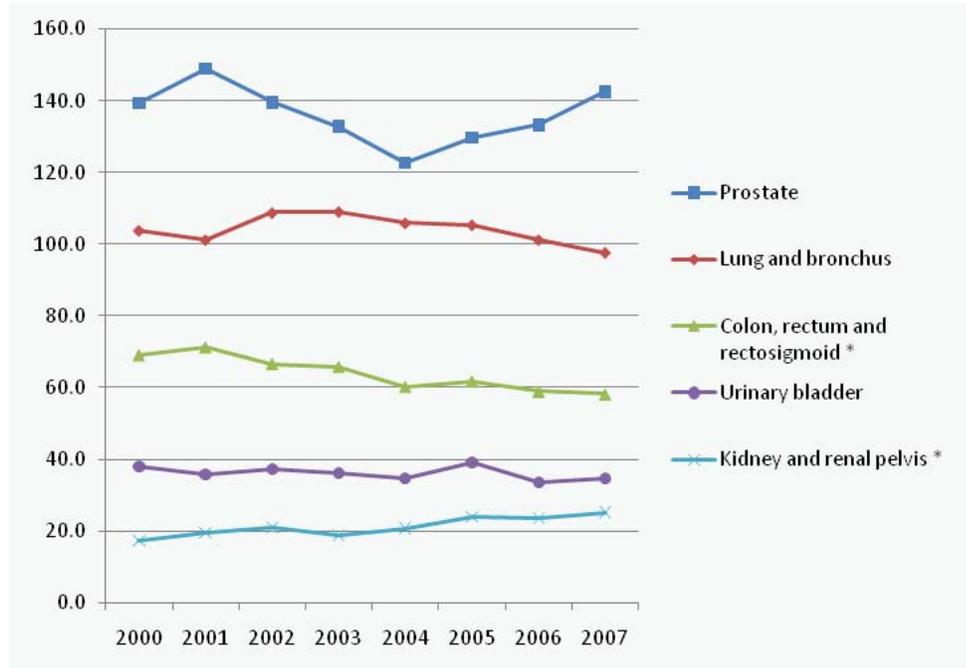
Among males, the five leading cancers were prostate; lung and bronchus; colon, rectum and rectosigmoid; urinary bladder; and kidney and renal pelvis (Figure 3). These five sites accounted for 66.2 percent of all new cancer cases among men.



## Eight-year trends in age-adjusted incidence rates of selected cancer sites

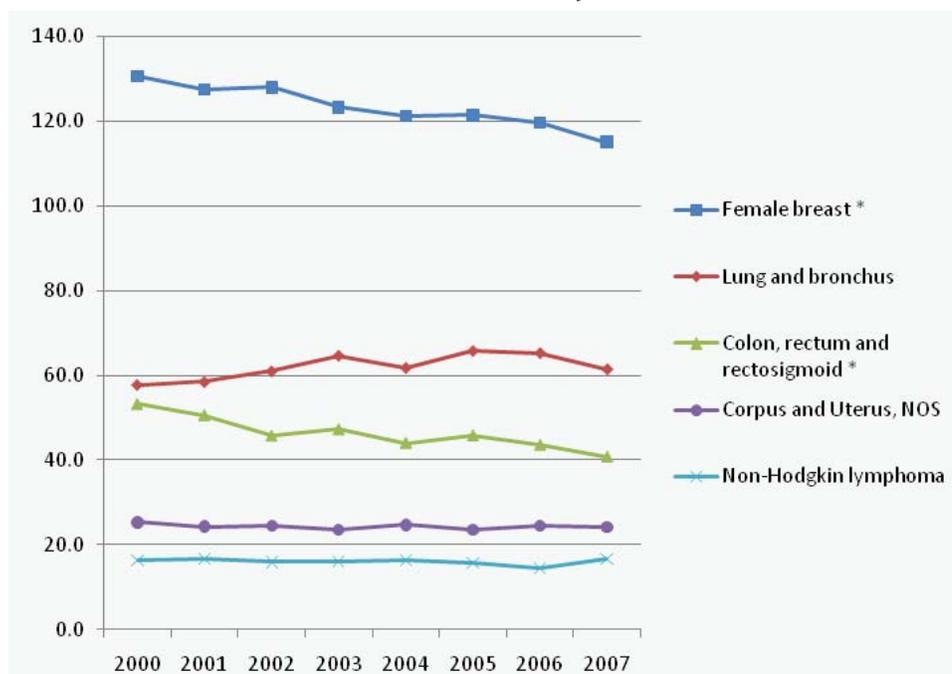
Figures 4 and 5 display the eight-year trends in incidence rates for the five leading cancer sites for men and women.<sup>12</sup> Generally, trends have been flat, or have decreased slightly. Significant changes were observed in four subcategories over the eight-year period. Colorectal cancer has decreased among men and women since 2000, as has female breast cancer. Male cancer of the kidney and renal pelvis has increased significantly since 2000. Most notable is the obvious increase in prostate cancer since 2004, which is the result of continuing efforts to improve reporting for this widely underreported disease (Figure 4).

**Figure 4. Eight-year trend in age-adjusted incidence rates of five invasive cancers in males, by cancer site, 2000-2007**



\* Indicates significant trend, at  $p < 0.01$

**Figure 5. Eight-year trend in age-adjusted incidence rates of invasive cancer in females, by cancer site, 2000-2007**



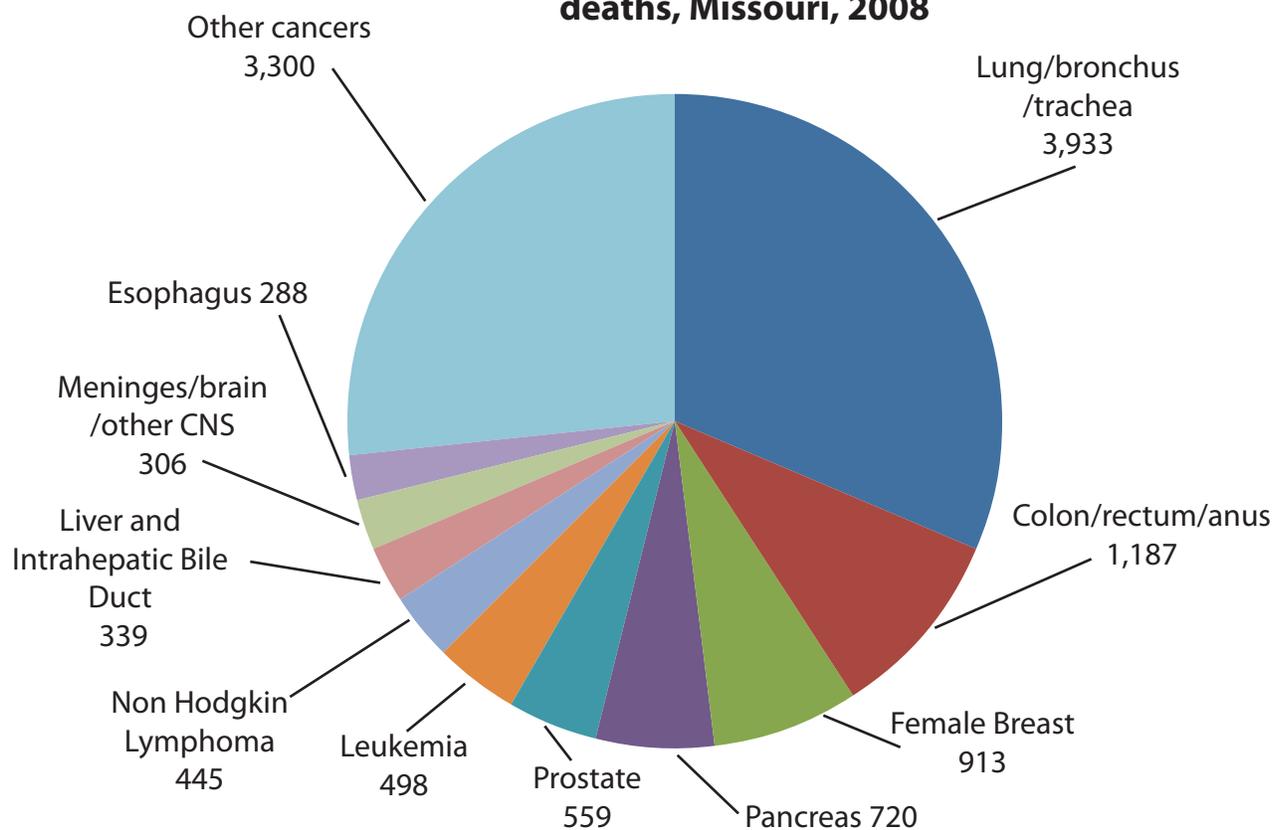
\* Indicates significant trend, at  $p < 0.01$



## Leading causes of cancer deaths in Missouri

In 2008, 12,497 Missouri residents died from cancer, accounting for 22.2 percent of all deaths in Missouri.<sup>14</sup> Cancer is second only to heart disease, as a leading cause of death in Missouri.<sup>15</sup> In 2008, the five leading causes of cancer deaths in Missouri were: lung, bronchus, and trachea; colon, rectum, and anus; female breast; pancreas; and prostate (Figure 6). The five leading causes of cancer deaths among both females and males have not changed from the period of 1996-2000 to 2008. Similarly, the four leading causes of cancer death for both men and women have not changed, but pancreatic cancer surpassed prostate cancer as the fifth leading cause of cancer deaths in 2008. In Missouri, the second leading new invasive cancer for both females and males - lung and bronchus - turned out to be the leading cause of cancer deaths for both (Figure 7). The third leading new invasive cancer - colon, rectum and rectosigmoid - remained the third leading cause of cancer deaths for females, but is the second leading cause of cancer death among men.

**Figure 6. Ten leading causes of cancer deaths, Missouri, 2008**



For incidence, lung and bronchus are combined, and for deaths, lung, bronchus and trachea are combined. For incidence, colon, rectum and rectosigmoid are combined, and for deaths colon, rectum and anus are combined.

Source: Missouri Department of Health and Senior Services, Cancer MICA, [www.dhss.mo.gov/data/mica/DeathMICA](http://www.dhss.mo.gov/data/mica/DeathMICA)



**Figure 7. Ten leading types of cancer deaths, by gender, Missouri, 2008\***

Female		Male	
Lung/bronchus/trachea	1,680 (28%)	Lung/bronchus/trachea	2,253 (35%)
Breast	913 (15%)	Colon/rectum/anus	603 (9%)
Colon/rectum/anus	584 (10%)	Prostate	559 (9%)
Pancreas	359 (6%)	Pancreas	361 (6%)
Ovary	258 (4%)	Leukemia	290 (4%)
Corpus and Uterus, NOS	258 (4%)	Non-Hodgkin lymphoma	227 (3%)
Non-Hodgkin lymphoma	218 (4%)	Liver and Intra-hepatic Bile Duct	226 (3%)
Leukemia	208 (3%)	Esophagus	219 (3%)
Meninges/Brain and Other Parts of Central Nervous System	151 (3%)	Urinary Bladder	198 (3%)
Liver and Intra-hepatic Bile Duct	113(2%)	Kidney and Renal Pelvis	180 (3%)
Other cancers	1,261 (21%)	Other cancers	1,378 (21%)
All sites	6,003 (100%)	All sites	6,494 (100%)

\* Excludes basal and squamous cell skin cancer and in situ cancer except urinary bladder. Percentages may not total 100 percent due to rounding.

Source: Missouri Department of Health and Senior Services, Death MICA  
<http://www.dhss.mo.gov/DeathMICA/index.html>

Among females, the five leading causes of cancer deaths were: lung, bronchus and trachea; breast; colon, rectum and anus; pancreas; and ovarian. These five categories of cancers represented 63.2 percent of all cancer deaths among women.

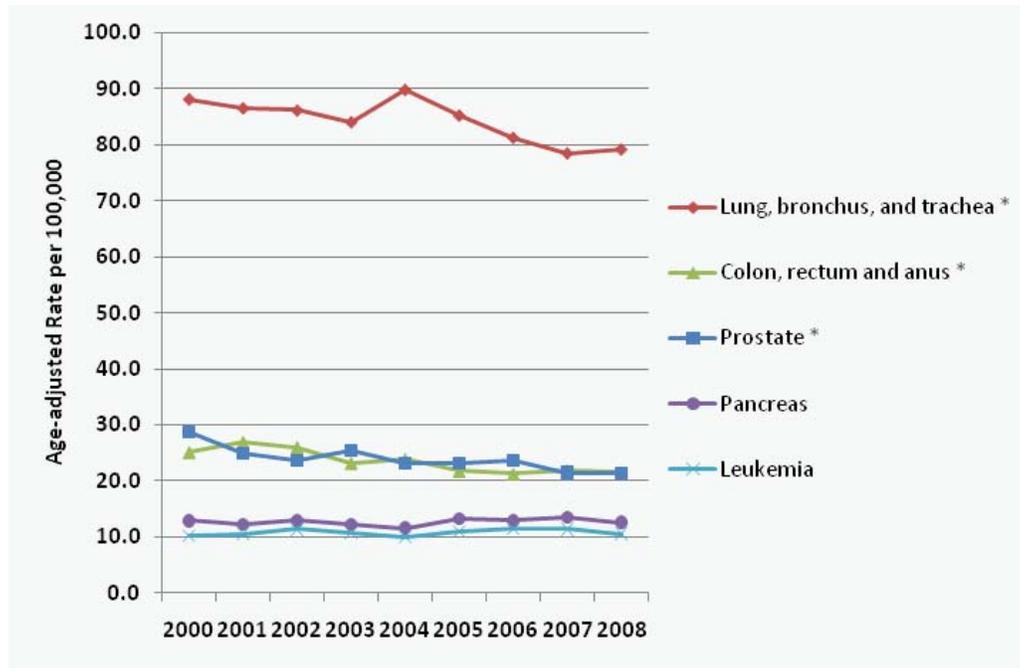
Among males, the five leading causes of cancer deaths were: lung, bronchus and trachea; colon, rectum and anus; prostate; pancreas; and leukemia. These five cancers represented 62.6 percent of the cancer deaths among men.



## Nine-year trend in age-adjusted death rates of selected cancer sites

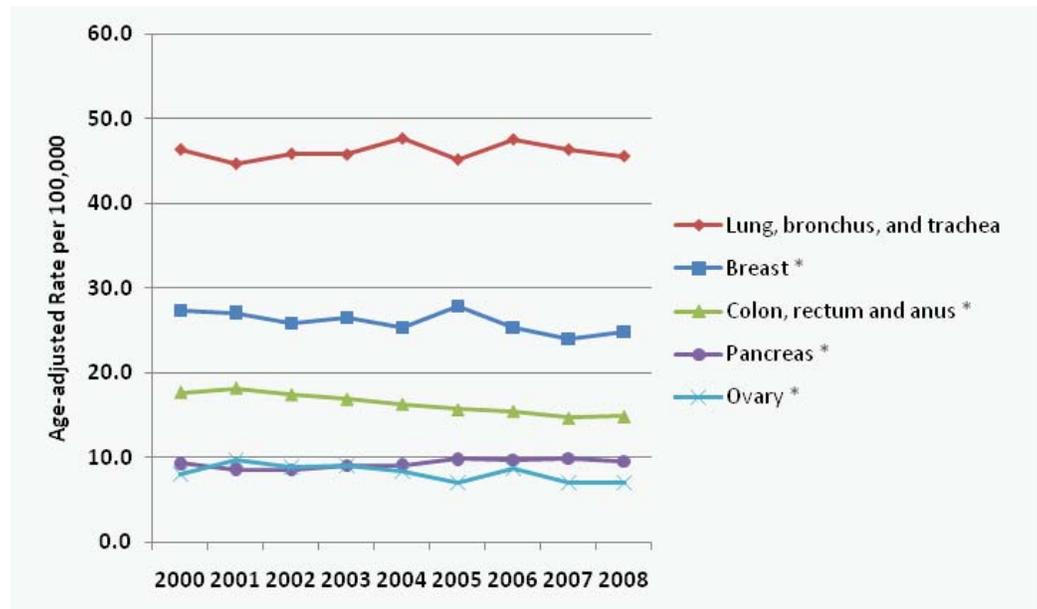
Figures 8 and 9 display the nine-year trend in death rates for the five leading cancer sites for men and women.<sup>14</sup> Generally, trends have been flat, or have decreased, with the exception of pancreatic cancer among women, which has increased. Significant changes were observed in four other subcategories. Deaths from colorectal cancer have decreased among men and women since 2000, as have cancer deaths from lung, bronchus and trachea among men. Prostate cancer deaths among men and ovarian cancer deaths among women have also shown significant declines during this period (Figure 8).

**Figure 8. Nine-year trend in age-adjusted death rates\* of five invasive cancers in males, by cancer site, 2000-2008**



\* Indicates significant trend, at  $p < 0.05$

**Figure 9. Nine-year trend in age-adjusted death rates\* of five invasive cancers in females, by cancer site, 2000-2008**



\* Indicates significant trend, at  $p < 0.05$



## *Estimated number of new invasive cancer cases and mortality for 2009*

The most current data on the number of new cancer cases in Missouri are the 2007 MCR data and the 2008 Missouri death records data, as shown in Figures 2 through 9, respectively. In 2010, the American Cancer Society (ACS) estimated approximately 31,160 Missourians would be diagnosed with cancer and about 12,620 would die of cancer (Table 1).<sup>1</sup>

Table 1. Estimated number of new cancer cases and mortality for selected cancer sites, Missouri, 2010

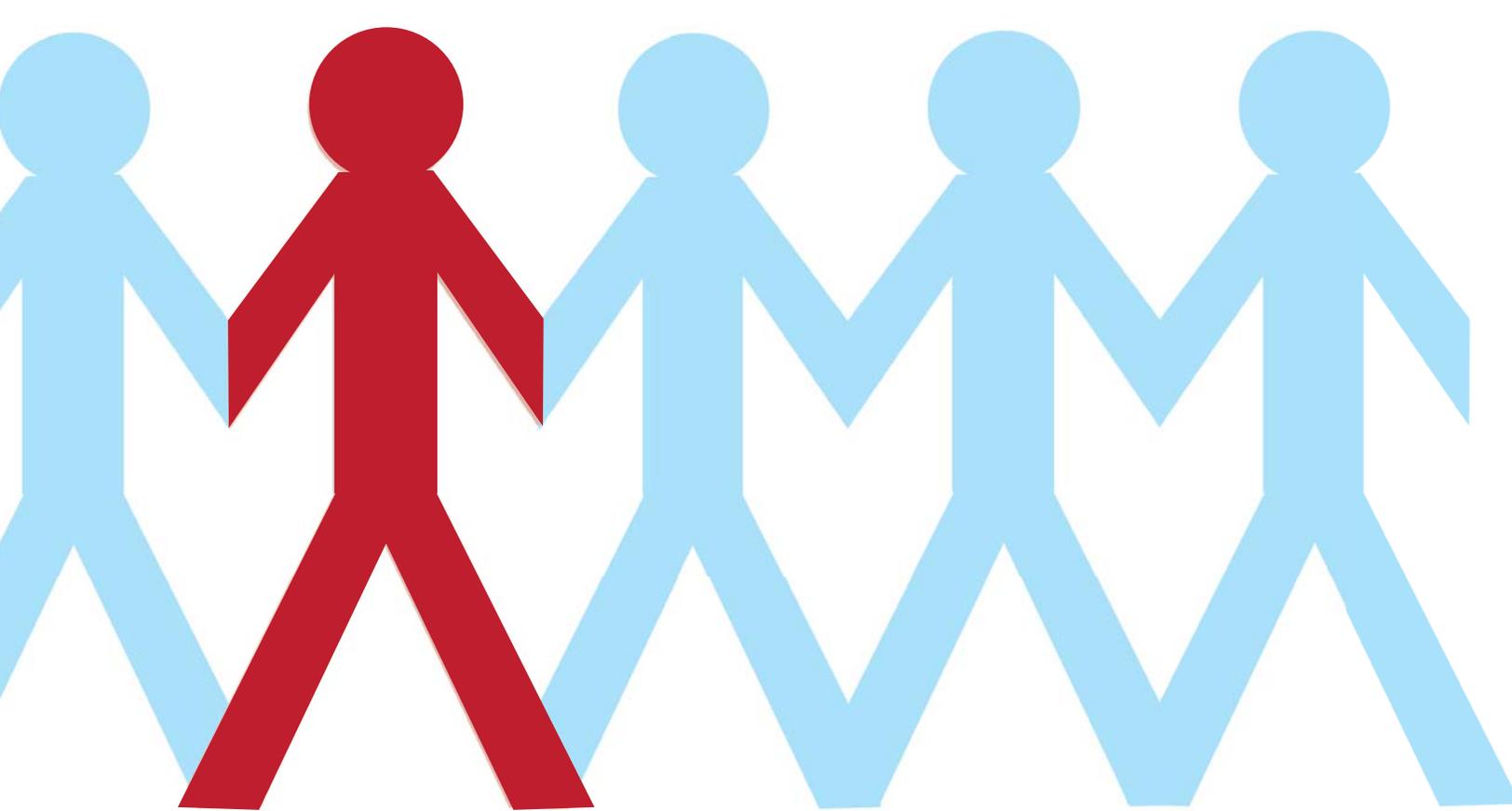
<b>Cancer Site</b>	<b>New Cases*</b>	<b>Percent</b>	<b>Mortality*</b>	<b>Percent</b>
Lung and Bronchus	5,360	17.2	3,950	31.3
Breast (Female)	3,880	12.5	860	6.8
Prostate	3,600	11.6	710	5.6
Colon and Rectum	3,080	9.9	1,120	8.9
Urinary Bladder	1,360	4.4	†	NA
Melanoma of the skin	1,320	4.2	†	NA
Non-Hodgkin Lymphoma	1,260	4.0	450	3.6
Leukemia	870	2.8	540	4.3
Uterine Cervix	210	0.7	†	NA
All sites	31,160	100.0	12,620	100.0

\*Rounded to the nearest 10 † Estimate not provided NA - Not applicable

Note: These estimates are offered as a rough guide and should be interpreted with caution. Percentages may not total 100 percent due to rounding.

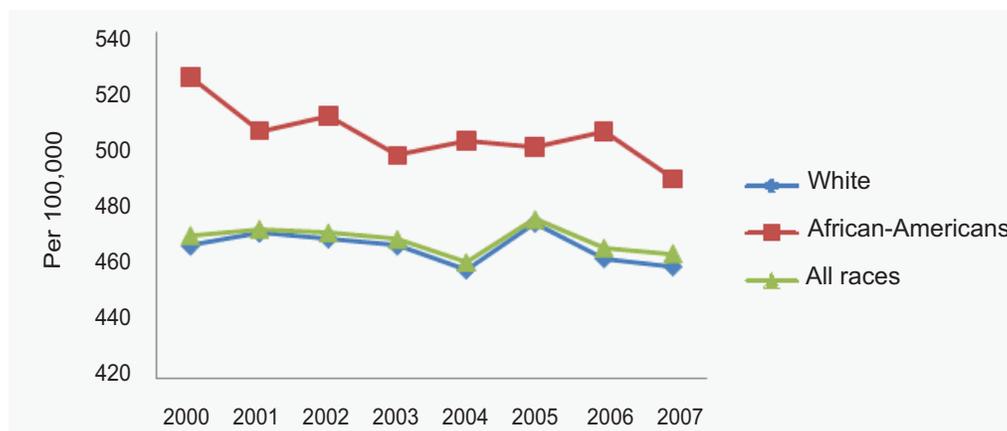
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# Cancer Disparities in Missouri

Figure 10. Age-adjusted invasive cancer incidence rates\* in Missouri, by race, 2000-2007



Research has shown that after adjusting for individual risk factors, there are neighborhood differences in cancer screening, incidence, treatment and survival. It is the relationship between place, race and poverty that can lead to the greatest disparities. Reducing such disparities requires action at several levels to

maximize impact.

Individuals need to be equipped with the knowledge, skills and motivation to make changes. Community institutions such as health-care facilities, work places, schools and faith-based organizations are ideal venues for reaching individuals. They also offer systems of social support that increase the likelihood of maintaining healthier behaviors.

\*Rates per 100,000 population age-adjusted using 2000 U.S. standard population.

Source: Missouri Department of Health and Senior Services, Cancer MICA, [www.dhss.mo.gov/data/mica/mica/cancer\\_19sites.php](http://www.dhss.mo.gov/data/mica/mica/cancer_19sites.php)



Focusing only on individual responsibility for lifestyle changes ignores larger environmental and policy factors that can work against the educational message.

In addition to shaping behavior, the environment also has a direct influence on cancer development. The physical environment tends to be worse in areas in which the population is low-income. There may be toxic sites and other hazards concentrated in areas where low-income and minority populations reside.

Elimination of financial and access barriers to screening improves screening rates. For example, through the use of health insurance coverage, reduced cost sharing, and the availability of free screening at public clinics, screening rates increase.

Consistent with the national pattern, African-Americans in Missouri are more likely to develop

cancer and more likely to die from cancer than whites. From 2000 to 2007, the age-adjusted invasive cancer incidence rate for all sites combined was significantly higher among African-Americans than among whites (Figure 10), although the racial disparities have been decreasing over time.<sup>12</sup> Among six selected cancer sites, African-Americans have significantly higher incidence rates for prostate and colon, rectum and recto-sigmoid cancers than whites; whereas whites have a significantly higher rate for urinary bladder than African-Americans (Table 2).

Table 2. Age-adjusted invasive cancer incidence rates\* and confidence intervals for selected cancer sites by race, Missouri, 2007

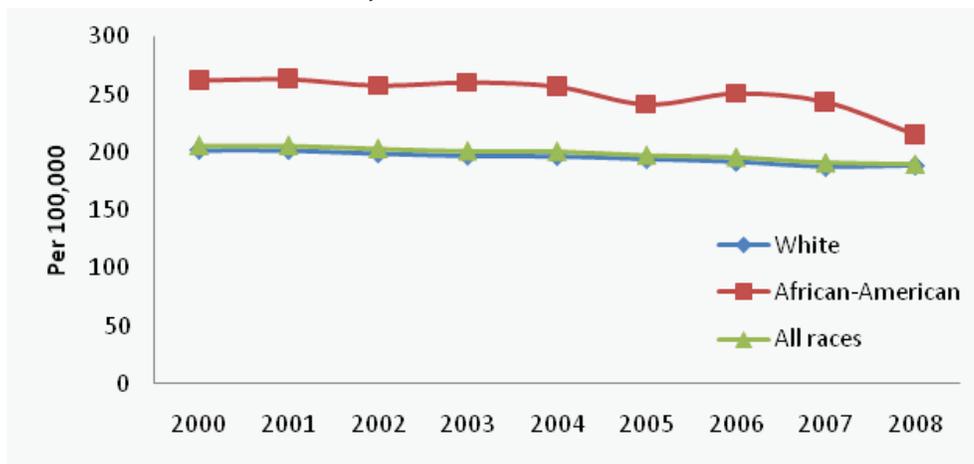
Cancer site	African-American		White	
	Rate	95% Confidence interval	Rate	95% Confidence interval
Lung & bronchus	82.2	74.5 - 90.5	76.6	74.4 - 78.9
Female breast	113.0	101.8 - 125.2	115.2	111.4 - 119.2
Prostate*	190.6	172.5 - 210.0	135.0	130.6 - 139.5
Colon, rectum and recto-sigmoid*	58.3	51.9 - 65.3	47.2	45.5 - 49.0
Urinary bladder	15.4	12.0 - 19.3	19.8	18.7 - 21.0
Corpus and Uterus, NOS	20.9	16.2 - 26.6	24.2	22.5 - 26.0
All cancers*	489.2	470.6 - 508.4	459.0	453.5 - 464.7

\*Rates are statistically significantly different. Rates per 100,000 population. Rates for other cancers not presented due to small number of cases. Age-adjustment using the 2000 US standard population. Confidence Interval for rates by the Inverse Gamma Method



Similarly, Figure 11 shows, for the period of 2000 to 2008, the age-adjusted cancer death rates among African-Americans remained significantly higher than among whites, although racial disparities have been declining during this time period.<sup>14</sup> For individual cancers, the age-adjusted cancer deaths rates were significantly higher among African-Americans than among whites for female breast; pancreas; prostate; and liver and intra-hepatic bile ducts in 2008. There were no significant differences in cancer deaths between African-Americans and whites for trachea, bronchus and lung; colon, rectum and anus; leukemia; non-Hodgkin lymphoma; kidney and renal pelvis; and esophageal cancers (Table 3).

Figure 11. Age-adjusted cancer death rates in Missouri, by race, 2000-2008



Rates per 100,000 population  
 Age-adjusted using 2000 U.S. standard population  
 Source: Missouri Department of Health and Senior Services, Cancer MICA,  
[www.dhss.mo.gov/data/mica/DeathMICA](http://www.dhss.mo.gov/data/mica/DeathMICA)

Before January 1, 1999, causes of death in the United States were selected and classified using the Ninth Revision of the International Classification of Diseases (ICD-9), since then ICD-10 has been used. Comparisons to years prior to 1999 should be done cautiously.

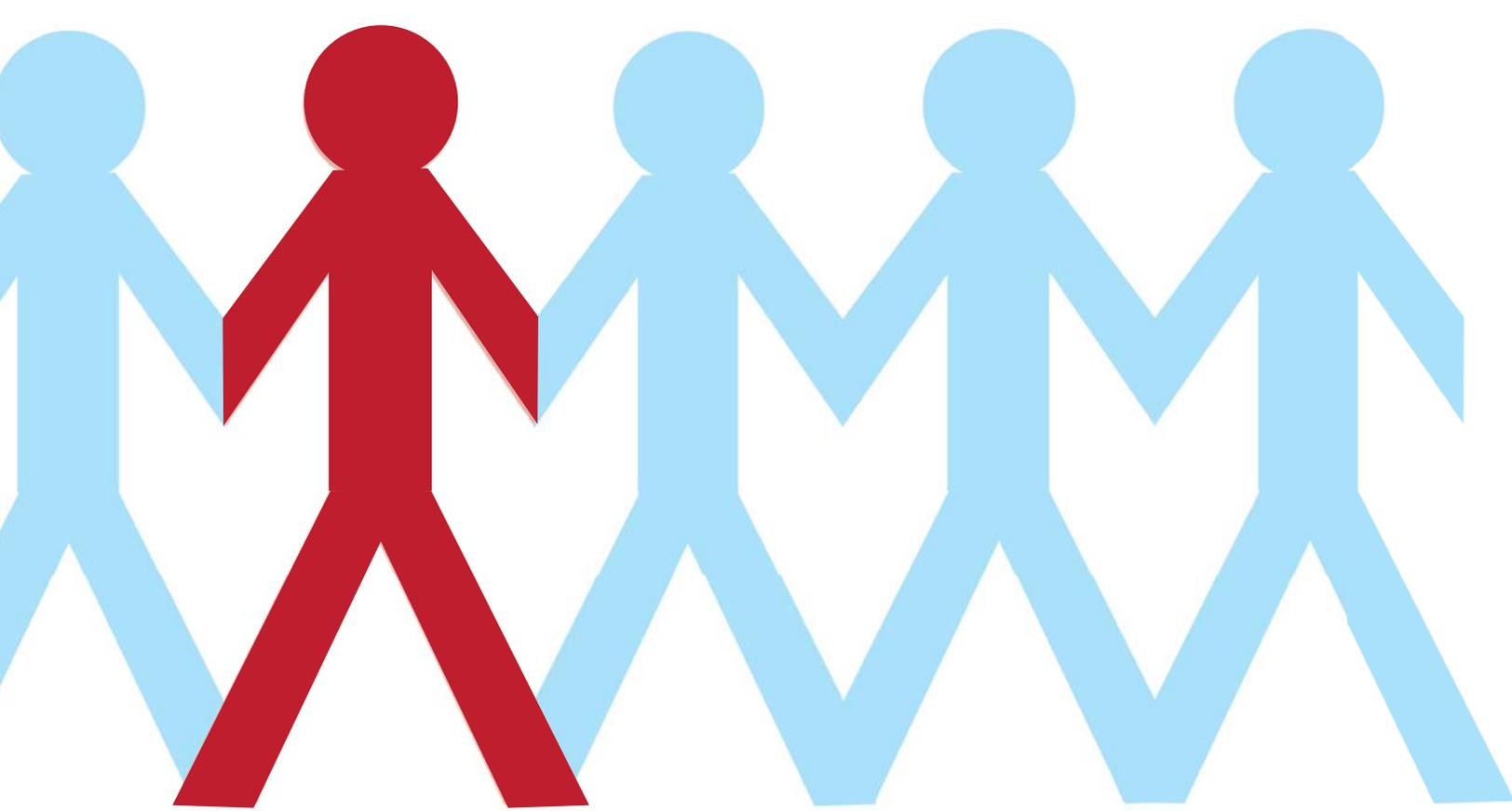


Table 3. Age-adjusted cancer deaths rates\* and confidence intervals for 12 leading causes of cancer deaths by race, Missouri, 2008

Cancer site	African-American		White	
	Rate	95% Confidence interval	Rate	95% Confidence interval
Trachea/bronchus/lung	58.6	52.1 - 65.6	60.0	58.1 - 62.0
Breast (female)*	33.7	27.7 - 40.7	23.9	22.2 - 25.6
Colon/rectum/anus	22.1	18.2 - 26.7	17.5	16.5 - 18.6
Pancreas*	15.0	11.9 - 18.7	10.5	9.7 - 11.4
Prostate*	42.9	33.0 - 54.9	20.4	18.6 - 22.3
Liver and intra-hepatic bile ducts*	10.4	7.9 - 13.5	4.4	3.9 - 5.0
Leukemia	5.2	3.4 - 7.5	7.9	7.2 - 8.6
Kidney and renal pelvis	5.1	3.3 - 7.5	4.2	3.7 - 4.7
Non-Hodgkin lymphoma	4.9	3.2 - 7.3	7.0	6.3 - 7.7
Esophagus	4.8	3.1 - 7.1	4.4	3.8 - 4.9
Bladder	3.0@	@ - @	4.4	3.9 - 5.0
Meninges/brain/other CNS	2.1@	@ - @	5.0	4.4 - 5.6

\*Rates are statistically significantly different. Rates per 100,000 population. Rates of other cancers not presented due to small number of cases. Age-adjustment using the 2000 US standard population. Confidence Interval for rates by the Inverse Gamma Method. @ Rate is unstable; numerator less than 20.

Source: Missouri Department of Health and Senior Services Cancer MICA, [www.dhss.mo.gov/data/mica/mica/death.php](http://www.dhss.mo.gov/data/mica/mica/death.php)



# Cancer in Missouri Counties, 2003-2007

Figures 12-17 show age-adjusted incidence rates and mortality rates for the four leading types of cancer in Missouri from 2003 to 2007 by gender.<sup>12, 14</sup> Incidence or mortality rates in counties with fewer than 20 cases are not considered statistically reliable and are shown as having insufficient data for analysis.

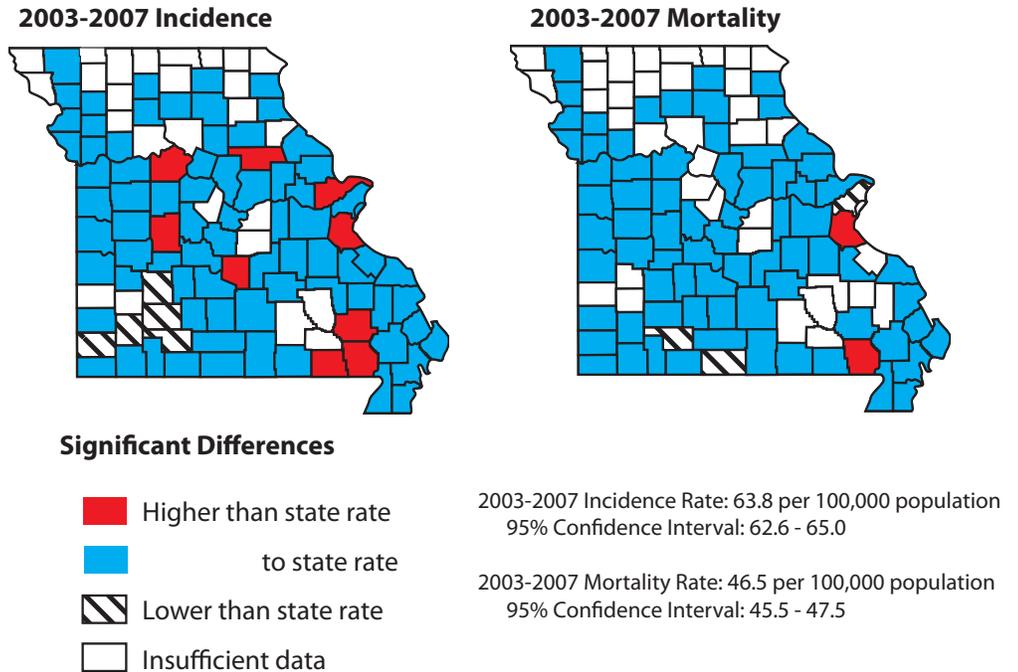
Of particular interest are counties in which incidence rates are significantly lower than the state rate and mortality rates are significantly higher, suggesting that both detection and treatment may need to be improved. Conversely, some counties have incidence rates significantly higher than the state, but significantly lower mortality rates, which suggests that detection and treatment may be more effective than for the state in general. However, other explanations are also possible.



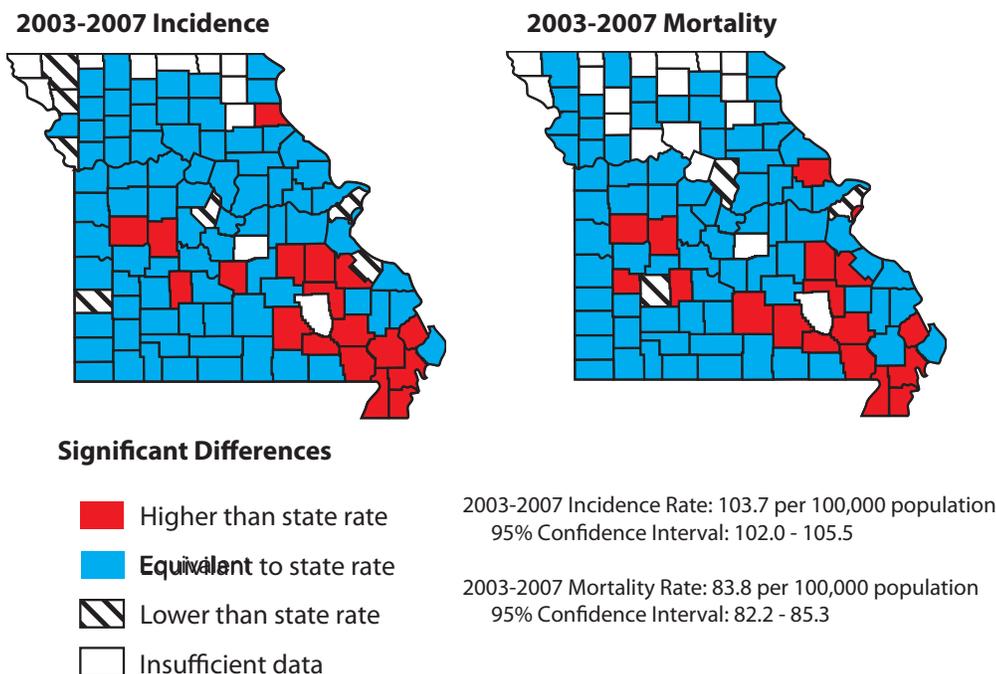
# Lung Cancer

Among Missouri females, nine counties had incidence rates significantly higher than the state. Five counties had lower incidence rates than the state (Figure 12). Among Missouri males, 18 counties, mostly in southeastern Missouri, had incidence rates higher than the state and seven had lower rates (Figure 13). The patterns are similar for mortality, although among males, St. Louis City had a higher mortality rate than the state, its incidence rate was not significantly different from the state.

**Figure 12. Comparison of Missouri county age-adjusted incidence and mortality rates of female invasive lung cancer, 2003-2007\***



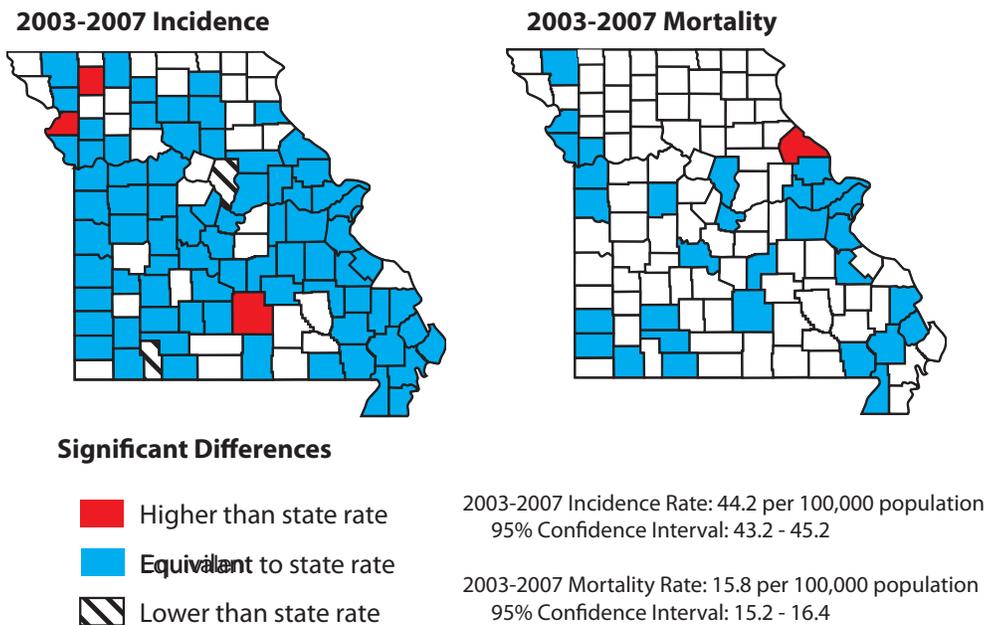
**Figure 13. Comparison of Missouri county age-adjusted incidence and mortality rates of male invasive lung cancer, 2003-2007\***



\*Incidence includes cancer of the lung and bronchus. Mortality includes cancer of the lung, bronchus and trachea.

## Colorectal Cancer

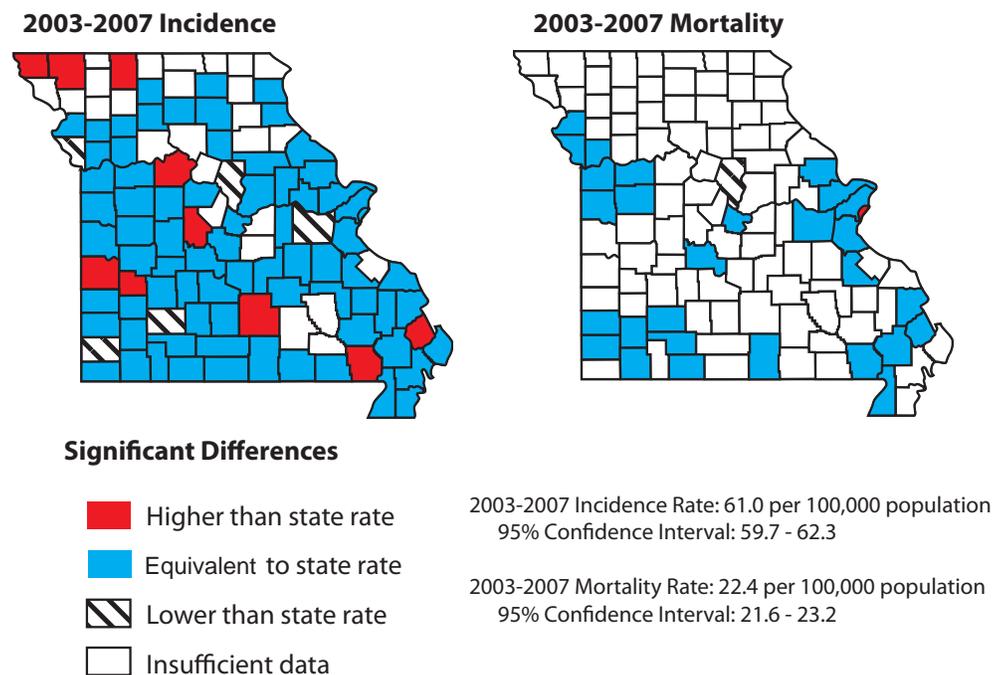
**Figure 14. Comparison of Missouri county age-adjusted incidence and mortality rates of female invasive colorectal cancer, 2003-2007\***



Among females, three counties had significantly higher age-adjusted incidence rates of colorectal cancer than the state during 2003-2007 (Figure 14). Boone and Stone counties had significantly lower incidence rates than the state. Only Pike County had a significantly higher mortality rate than the state (Figure 15). The incidence rate for Pike County was not significantly different from the state incidence rate.

Among Missouri males, only Boone County had lower rates than the state for both incidence and mortality (Figure 15). Nine counties – Atchison, Nodaway, Harrison, Saline, Morgan, Vernon, Cedar, Butler, and Scott – had incidence rates higher than the state. Only St. Louis City had a significantly higher mortality rate than the state, although it should be noted that most counties had numbers too small to calculate stable rates.

**Figure 15. Comparison of Missouri county age-adjusted incidence and mortality rates of male invasive colorectal cancer, 2003-2007\***



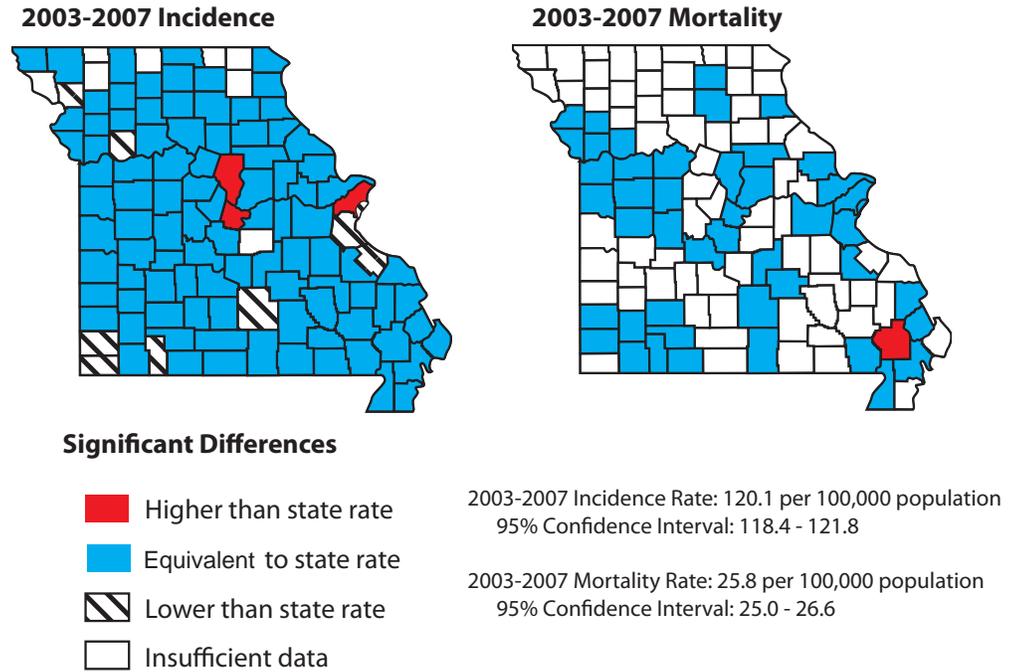
\*Incidence includes cancer of the colon, rectum and rectosigmoid. Mortality includes cancer of the colon, rectum and anus.



## Female Breast Cancer

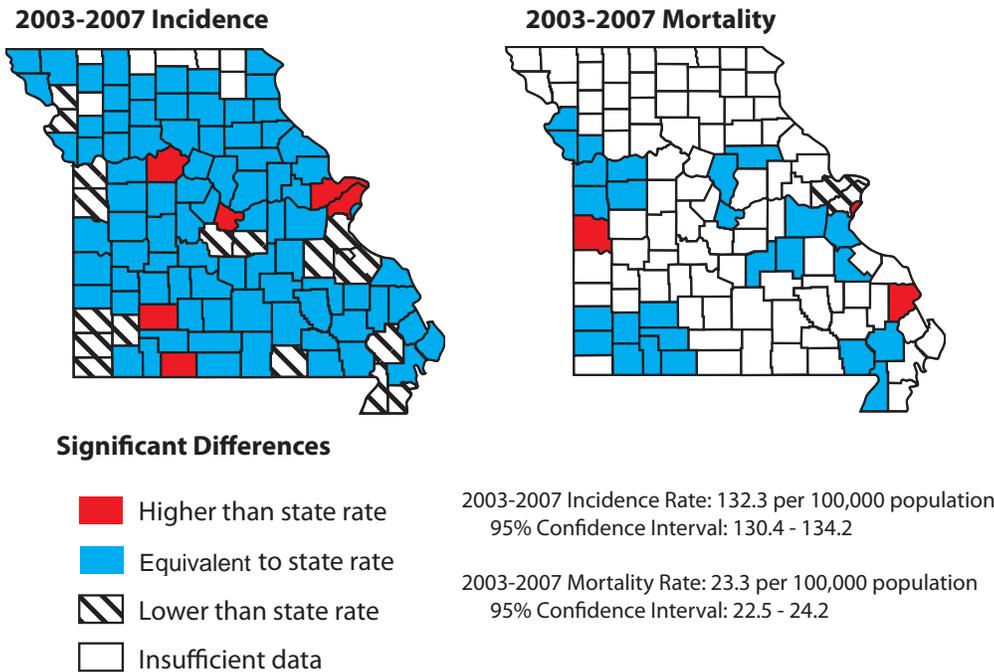
Figure 16 shows age-adjusted incidence and mortality rates for female breast cancer during 2003-2007. Three counties (Boone, Cole and St. Louis) had significantly higher incidence rates than the state rate of 120.1 per 100,000 population. Eight counties and St. Louis City had incidence rates significantly lower than the state rate. Stoddard County was the only county to have a mortality rate significantly higher than the state rate of 25.8 per 100,000 population, although its incidence rate was not significantly different than the state.

**Figure 16. Comparison of Missouri county age-adjusted incidence and mortality rates of female invasive breast cancer, 2003-2007**



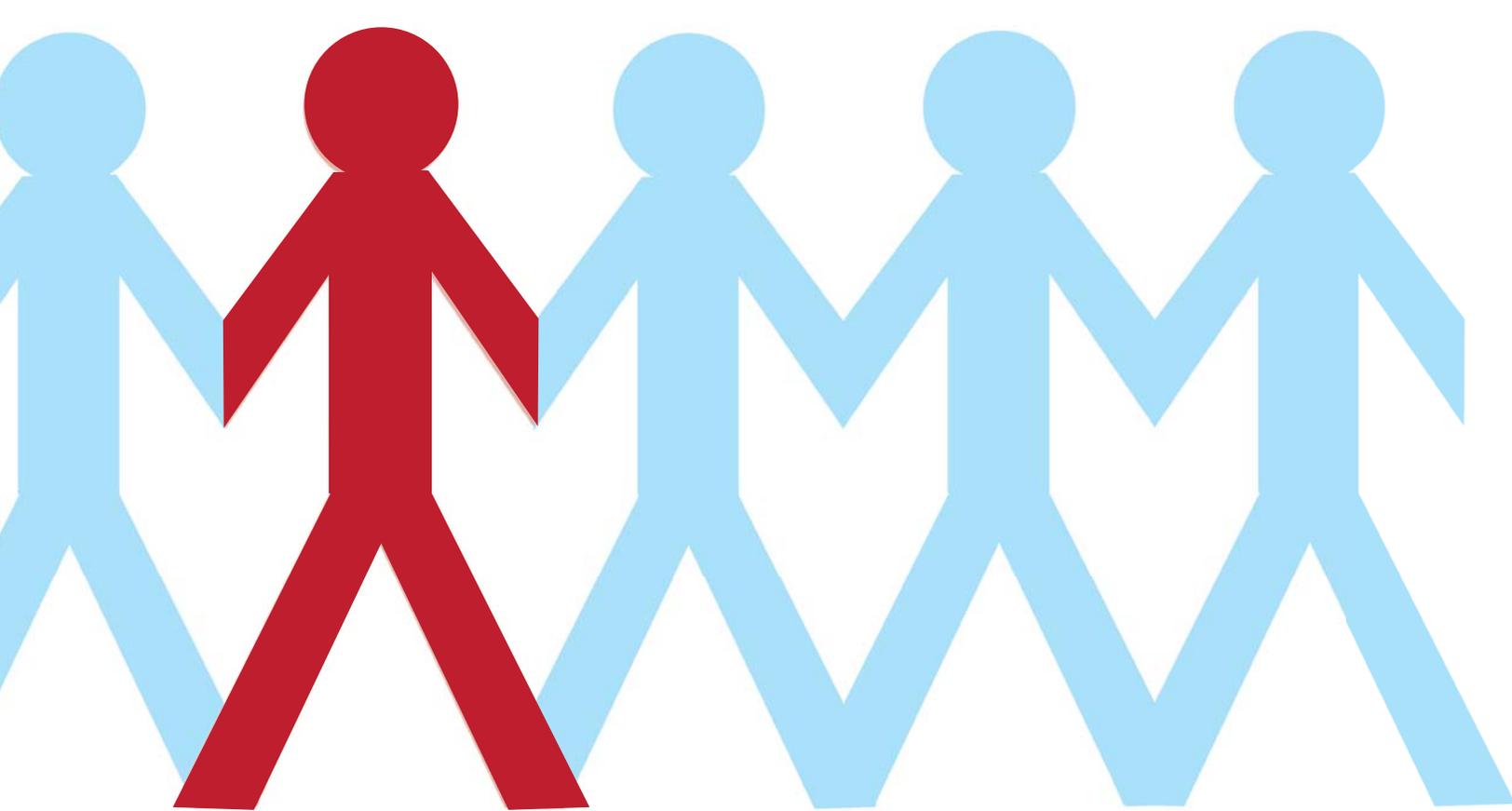
## Prostate Cancer

**Figure 17. Comparison of Missouri county age-adjusted incidence and mortality rates of invasive prostate cancer, 2003-2007**



Eighteen counties had lower age-adjusted incidence rates of prostate cancer than the state for 2003-2007 (Figure 17). Six counties had higher incidence rates than the state. St. Louis City, Bates and Cape Girardeau counties were significantly above the state rate for prostate cancer mortality, although the incidence rates in those counties were not significantly different from that for the state. In contrast, St. Charles and St. Louis counties had significantly higher incidence rates, but lower mortality rates than the state.





# Risk Factors for Cancer

According to the ACS, smoking and heavy alcohol consumption increase the risk for some people to get certain types of cancer.<sup>16,17</sup> Skin exposure to the sun's rays and indoor tanning are linked to more than one million skin cancers diagnosed every year. Although the exact links between what we eat (or don't eat) and some types of cancers are not yet clear, about one-third of the cancer deaths every year are related to poor nutrition, overweight or obesity, and physical inactivity and could possibly be prevented. Exercise has been shown to prevent several health problems, including cancer.<sup>18</sup> Table 4 shows high proportions of adult Missourians have modifiable risk factors, and the proportions have not changed significantly from 2005 to 2008.<sup>19</sup>



Table 4. Prevalence of risk factors among adult Missourians, 2005-2009

<b>Risk factor</b>	<b>2005 %</b>	<b>2006 %</b>	<b>2007 %</b>	<b>2008 %</b>	<b>2009 %</b>
Current smoker	23.4	23.2	24.5	25.0	23.1
Obesity	26.9	27.2	28.2	29.1	30.6
Physical inactivity	25.4	23.2	25.6	27.6	26.7
Did not consume 5 or more servings of fruits and vegetables per day	77.4	†	79.8	†	80.1
Heavy alcohol use					
• Men	5.1	7.6	5.6	5.5	4.7
• Women	4.9	4.9	3.6	5.3	3.7

Current smokers: Individuals who have smoked at least 100 cigarettes in lifetime and now smoke everyday or some days

Obesity: BMI  $\geq$  30

Physical inactivity: No physical activity during the past 30 days

Heavy alcohol use: More than two drinks for men and more than one drink for women per day in the past 30 days

† Data collected every other year.

*Sources:*

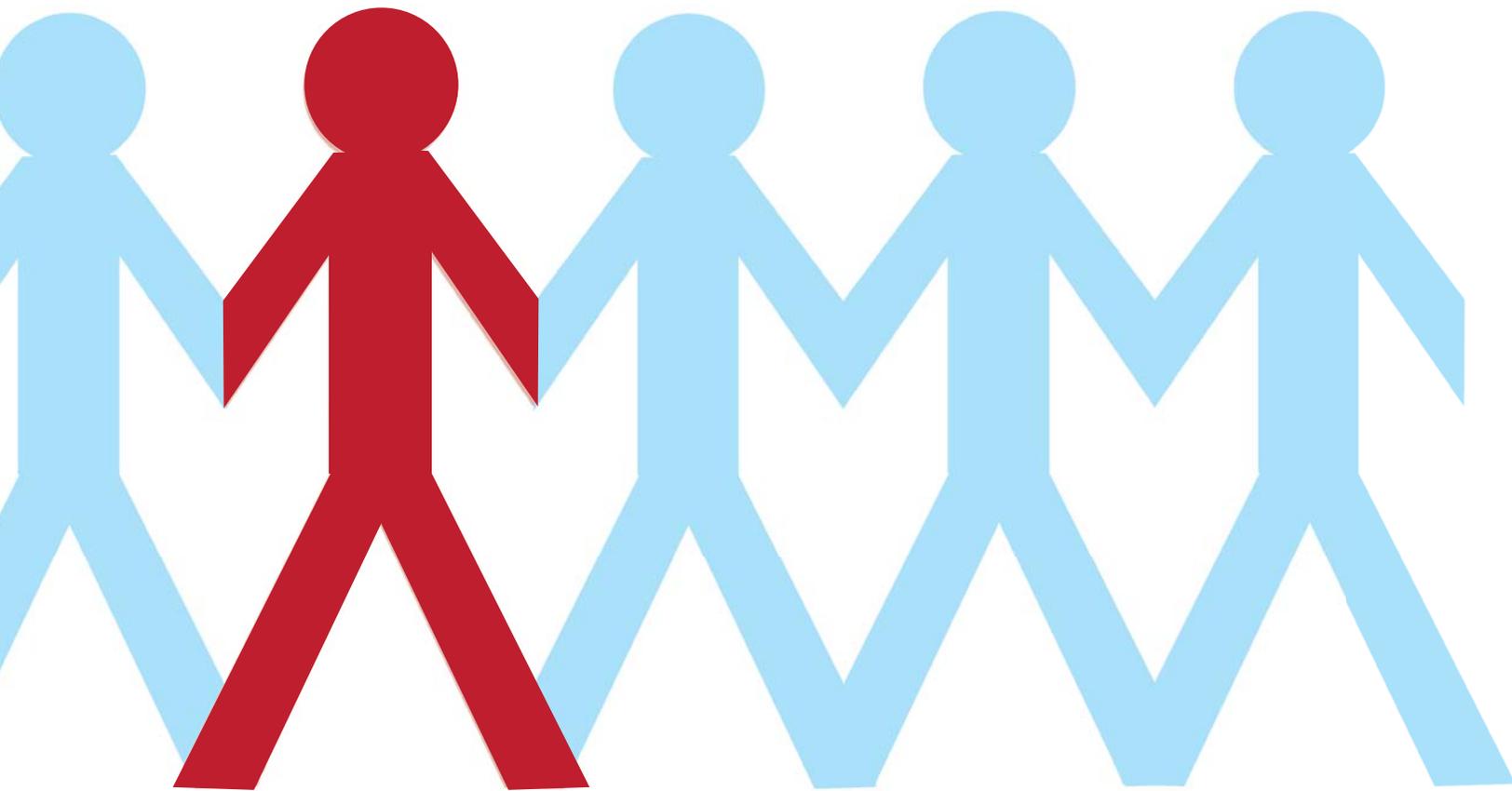
[www.dhss.mo.gov/data/brfss/2005AnnualReport\\_000.pdf](http://www.dhss.mo.gov/data/brfss/2005AnnualReport_000.pdf)

[www.dhss.mo.gov/data/brfss/2006AnnualReport.pdf](http://www.dhss.mo.gov/data/brfss/2006AnnualReport.pdf)

[www.dhss.mo.gov/data/brfss/2007DataReport.pdf](http://www.dhss.mo.gov/data/brfss/2007DataReport.pdf)

[www.dhss.mo.gov/data/brfss/2009\\_BRFSS\\_Key\\_Findings\\_Report.pdf](http://www.dhss.mo.gov/data/brfss/2009_BRFSS_Key_Findings_Report.pdf)





# Social and Economic Burden of Cancer in Missouri

*Years of potential life lost and productivity losses*

Although the most important cost of cancer is the loss of precious lives, there is a huge social and economic cost of cancer that cannot be ignored. This includes, but is not limited to, the financial cost of cancer treatment, years of potential life lost (YPLL) and productivity loss (PL) from cancer deaths.

The financial costs of cancer treatment are often a burden to people diagnosed with cancer, their families, and society as a whole. According to the National Cancer Institute, cancer treatment cost more than \$72 billion in 2004, just below 5 percent of the total U.S. spending for medical treatment.

The concept of YPLL involves estimating the average years a person would have lived had he or she not died prematurely.<sup>20</sup> It can, therefore, be considered a measure of premature death. PL is a cost borne by a society whose individuals are either prevented or deterred from producing goods and services in



the market place, the public sector and/or household due to premature death.<sup>21, 22, 23</sup>

In Missouri, for 2002-2006, the annual average productivity loss due to cancer deaths was more than \$2.0 billion, with 64.9 percent of the loss from males and 35.1 percent from females. In addition, the top five leading causes of cancer deaths contributed 51.6 percent of all productivity loss due to cancer deaths during the period (Figure 18).

Figure 18. Annual productivity loss due to cancer deaths for all cancer sites and selected cancer sites, Missouri, 2002 - 2006 (in millions of dollars)

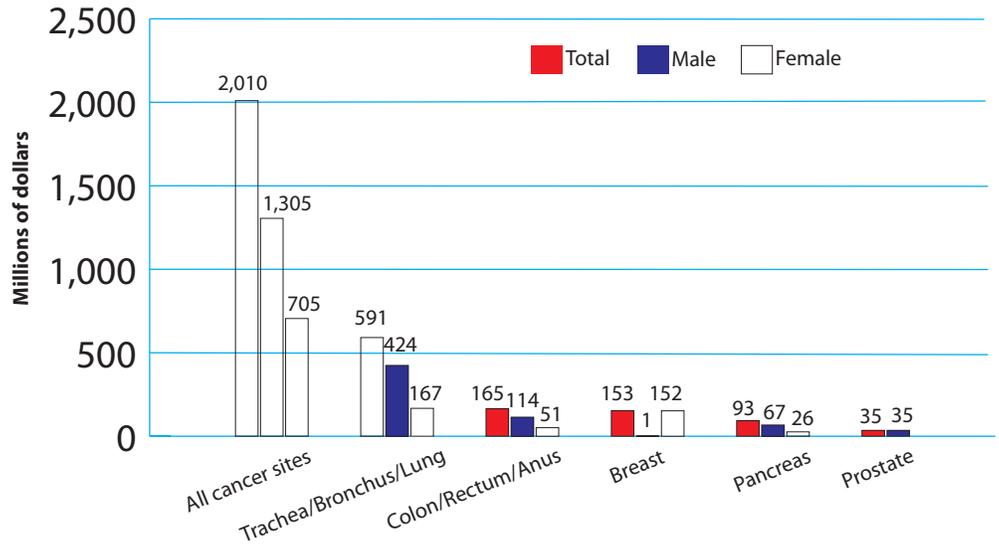
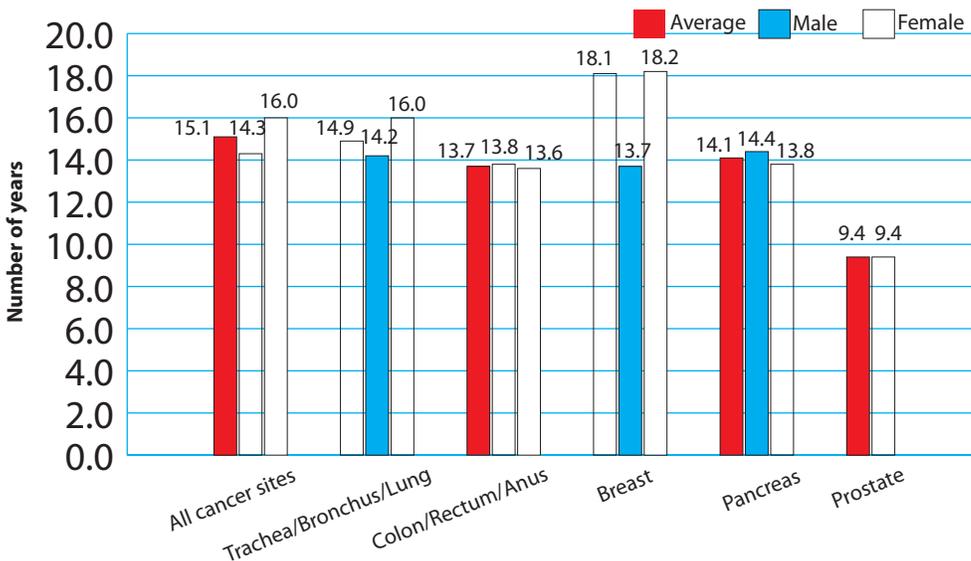


Figure 19. Annual average number of years of potential life lost per cancer death for all cancer sites and five selected cancer sites, Missouri, 2002-2006



In Missouri, for 2002-2006, the life span of a Missourian who died of cancer was shortened an average of more than 15 years. The highest annual average loss was from female breast cancer deaths (18.2), followed by female trachea/bronchus/lung cancers deaths (16.0) (Figure 19).

# Inpatient hospitalizations and hospital charges, 2007

In 2008, there were 24,374 hospitalizations with cancer as the principal diagnosis (Table 5), resulting in 944 million dollars of hospital charges.<sup>24</sup>

- More than half (483 million dollars) were to Medicare
- More than 100 million dollars to Medicaid (MO HealthNet)
- Lung and bronchus cancer has the highest number of hospitalizations (3,341), followed by colorectal cancer (3,176)

Table 5. Inpatient hospitalizations and hospital charges for the 10 leading new invasive cancers Missouri, 2008

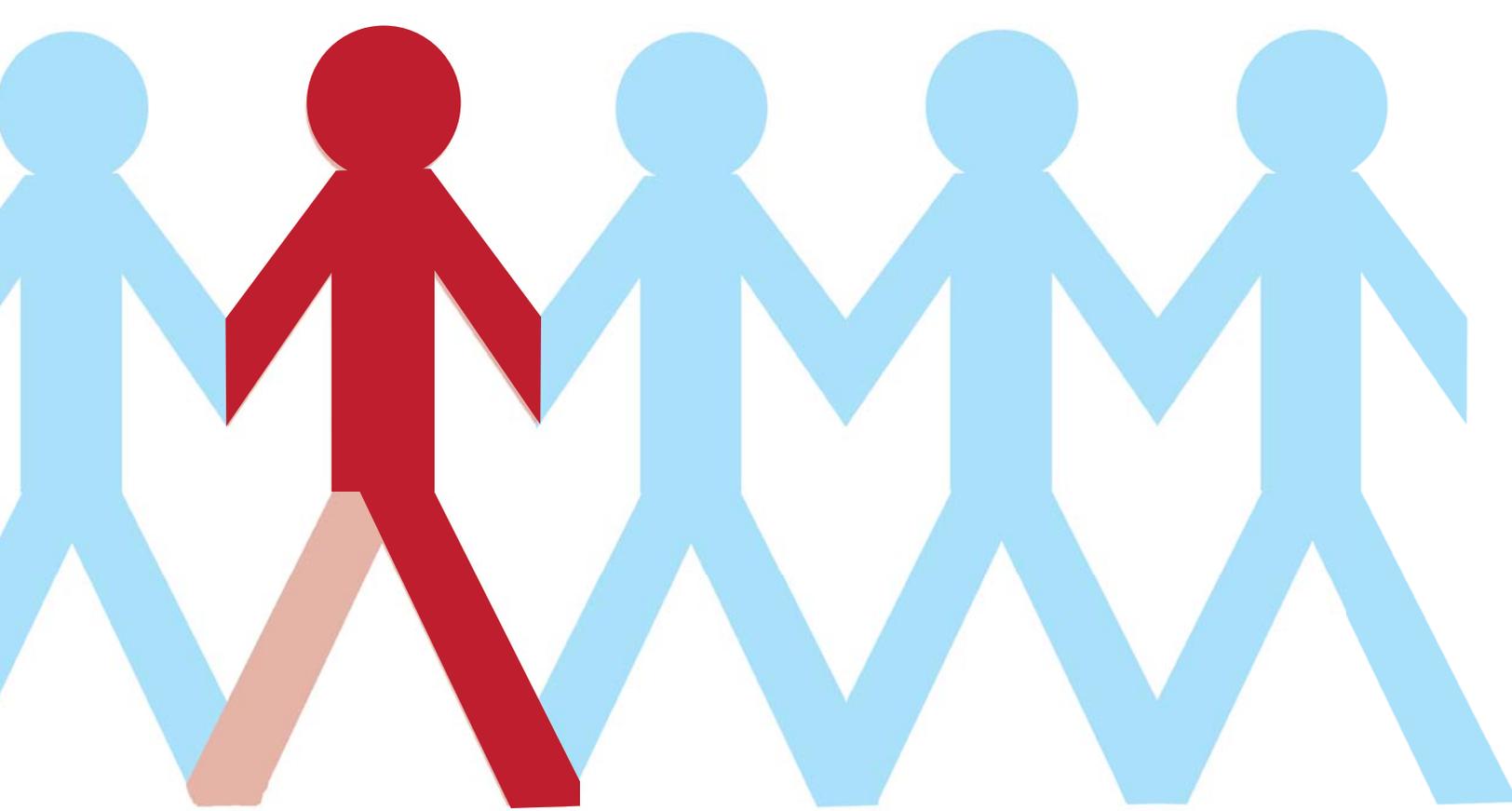
Principal Diagnosis	Number of Discharges	All Pay Sources	Hospital Charges*	
			Medicare	Medicaid
All cancer	24,374	944.8	483.5	107.2
Lung and bronchus	3,341	133.0	82.0	14.6
Colorectal	3,176	143.3	94.0	8.5
Prostate	1,904	43.6	19.1	1.0
Male & female breast	1,361	26.8	11.4	2.6
Corpus of uterus and cervix	1,266	33.8	13.0	5.6
Kidney and renal pelvis	995	37.3	18.3	3.1
Non-Hodgkin lymphoma	694	42.7	18.8	3.6
Urinary bladder	689	25.4	20.0	1.8
Pancreas	714	28.2	6.7	2.9
Melanoma of the skin	50	1.0	0.5	0.1

\*Figures are in millions of dollars.

Source: Missouri Department of Health and Senior Services, Hospital discharges, charges & days of care MICA, [www.dhss.mo.gov/data/mica/D\\_C\\_DofCMICA/](http://www.dhss.mo.gov/data/mica/D_C_DofCMICA/)







# Healthy People 2020 Objectives

The Healthy People (HP) 2020 objectives were recently released and provide a framework to address risk factors and health determinants for the next decade.<sup>25</sup> HP 2020 contains 20 objectives related to cancer with the goal of reducing the number of new cancer cases, as well as the illness, disability and death caused by cancer. Table 6 shows selected HP 2020 objectives for cancer incidence and deaths and current Missouri data.



Table 6. Selected Healthy People 2020 objectives for cancer incidence and deaths

Healthy People 2020 Objective*	Missouri 2007 Incidence and 2008 Death rates**	United States 2007***	2020 Target
Reduce the overall cancer death rate	188.4	178.4	160.6
Reduce the lung cancer death rate	59.4	50.6	45.5
Reduce the female breast cancer death rate	24.7	22.9	20.6
Reduce the death rate from cancer of the uterine and cervix	2.6	2.4	2.2
Reduce the colorectal cancer death rate	17.8	17.0	14.5
Reduce the oropharyngeal cancer death rate	2.2	2.5	2.3
Reduce the prostate cancer death rate	21.7	23.5	21.2
Reduce the melanoma cancer death rate	2.9	2.7	2.4
Reduce invasive colorectal cancer	48.5	45.4	38.6
Reduce invasive uterine cervical cancer	9.3	7.9	7.1
Reduce late-stage female breast cancer	43.9	43.2	41.0

\*Rates per 100,000 - Age adjustment uses 2000 standard population.

Sources:

\*U.S. Department of Health and Human Services, *Healthy People 2020*, [www.healthypeople.gov/hp2020/Objectives/TopicArea.aspx?id=14&TopicArea=Cancer](http://www.healthypeople.gov/hp2020/Objectives/TopicArea.aspx?id=14&TopicArea=Cancer) and *Healthy People 2010* <http://www.healthypeople.gov/data/>

\*\*Missouri Department of Health and Senior Services *Death MICA*, [www.dhss.mo.gov/data/mica/mica/death.php](http://www.dhss.mo.gov/data/mica/mica/death.php) and *Missouri Cancer Registry*, [www.dhss.mo.gov/data/mica/CancerMICA](http://www.dhss.mo.gov/data/mica/CancerMICA)

\*\*\*HealthyPeople.gov



Table 7 shows selected Healthy People 2020 objectives related to cancer screening and current Missouri and U.S. data. Missouri is similar to the U.S. in the prevalence of cervical cancer screening but is lower in colorectal and female breast cancer screenings.<sup>26</sup>

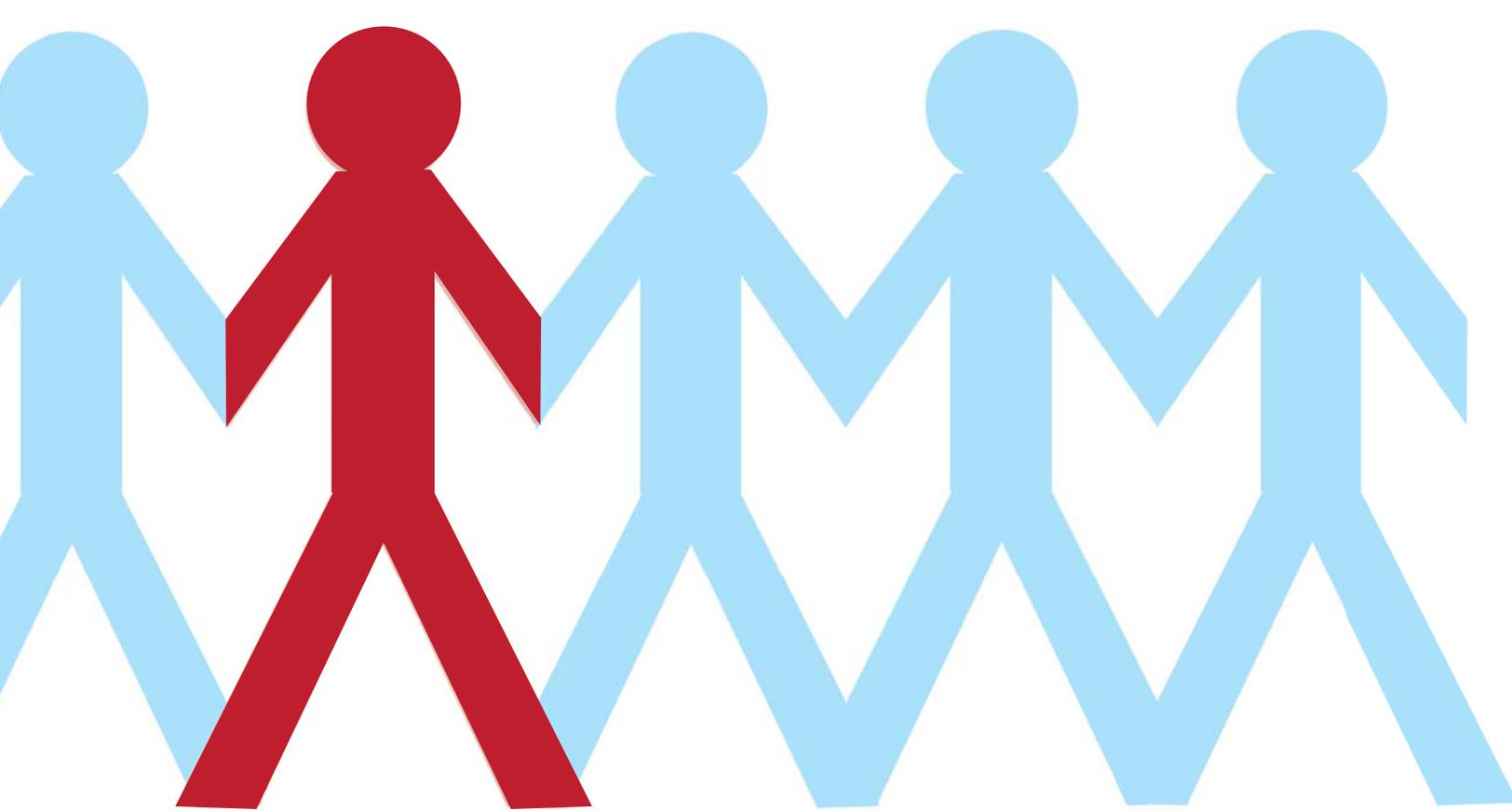
Table 7. Comparison of selected Healthy People 2020 cancer screening objectives for Missouri and the United States, 2008

Objective	Missouri BRFSS* Prevalence (%)	U.S. BRFSS* Median prevalence (%)
Increase the proportion of women aged 18 years and older who receive a cervical cancer screening based on the most recent guidelines	82.9	82.9
Increase the proportion of adults (50 and older) who receive a colorectal cancer screening based on the most recent guidelines		
• Fecal occult blood test (FOBT)	12.0	15.3
• FOBT or sigmoidoscopy / colonoscopy	47.1	52.0
• Sigmoidoscopy / Colonoscopy	38.1	42.3
Increase the proportion of women aged 40 years and older who have received a breast cancer screening based on the most recent guideline	73.5	76.0

Cervical Cancer Screening - Pap smear in the previous three years for women who have not had a hysterectomy  
 FOBT within the previous year  
 FOBT within the previous year or sigmoidoscopy / colonoscopy within the preceding five years  
 Sigmoidoscopy / Colonoscopy within previous five years  
 Breast cancer screening – Mammography within the preceding two years

Source: \*Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System and Chronic Disease Indicators, <http://apps.nccd.cdc.gov/cdi/>





# Surviving Cancer in Missouri

## *Could more people be saved from cancer?*

There are number of steps that can be taken to reduce one's chance of developing certain types of cancer, such as not smoking to reduce the risk of lung cancer. For other cancers, the primary links are not as clear. Nevertheless, the number of new cancer cases can be reduced, and many cancer deaths can be prevented.<sup>27</sup> Research shows that screening for cervical and colorectal cancers as recommended helps prevent these diseases by finding precancerous lesions so they can be treated before they become cancerous. Screening for cervical, colorectal, and breast cancers also helps find these diseases at an early, often highly treatable stage.

A person's cancer risk can be reduced in other ways by receiving regular medical care, avoiding tobacco,



limiting alcohol use, avoiding excessive exposure to ultraviolet rays from the sun and tanning beds, eating a diet rich in fruits and vegetables, maintaining a healthy weight, and being physically active.

Vaccines also help reduce cancer risk. The human papillomavirus (HPV) vaccine helps prevent most cervical cancers and some vaginal and vulvar cancers, and the hepatitis B vaccine can help reduce liver cancer risk. Making cancer screening, information and referral services available and accessible to all Americans can reduce cancer incidence and deaths.

### *Evidence-based interventions*

According to the Task Force on Community Preventive Services (TFCPS), more people could be saved from cancers such as breast, cervical and colorectal cancers.<sup>28</sup> The TFCPS recommends interventions using client reminders, based on evidence of their effectiveness in increasing screening of breast cancer by mammography, cervical cancer by Pap test, and colorectal cancer by fecal occult blood test (FOBT), sigmoidoscopy or colonoscopy.

The TFCPS recommends reminders, such as sending letters, postcards, or making phone calls, to alert clients that it is time for their cancer screening, including facts about the screening and offering to help set up an appointment. The TFCPS also recommends the use of small media as means to inform and motivate people to be screened for breast, cervical and colorectal cancers. Small media include videos and printed materials, such as letters, brochures and newsletters, which can be used to inform and motivate people to be screened for cancer. The materials can provide information tailored to specific individuals or targeted to larger audiences.

Other evidence-based interventions shown to be effective in increasing cancer screening are: one-on-one education for breast and cervical cancer screenings, reduction of structural barriers for breast and colorectal cancer screenings, and reduction of out-of-pocket costs for breast cancer.

One-on-one education is provided in person or by telephone to encourage individuals to be screened for cancer. Health care providers can deliver one-on-one education in clinical settings, at home or in local

gathering places. Brochures, informational letters or reminders may also be used. The information can be general or tailored to the specific needs of each person. Barriers, such as distance from screening location, limited hours of operation, lack of daycare for children, and language and cultural factors, can make it difficult for people to seek screening for cancer. Removal of such structural barriers increases breast and colorectal cancer screenings.

Reducing out-of-pocket costs by reducing the costs of screening tests, providing vouchers, reimbursing clients or clinics, and/or reducing health insurance costs are recommended to increase breast cancer screening.

For further information on evidenced-based colorectal cancer interventions and strategies visit <http://www.dhss.mo.gov/InterventionMICA/ColorectalCancer>.





***Cancer survivorship in Missouri***

Five-year relative survival rates for common cancers such as breast, prostate, colorectal, cervical and melanoma of the skin are 90 percent to 100 percent, if they are discovered and treated before spreading beyond the site where the cancer began.

*Prevalence of cancers in Missouri*

In 2005, approximately 7.7 percent of adult Missourians reported having ever been told by a doctor that they had cancer (Table 8). Table 9 shows that a significantly larger proportion of females than males (9.5 percent versus 5.7 percent) and those with less than a high school education compared to those with education beyond high school (11.0 percent versus 6.3 percent) reported a previous diagnosis of cancer. Individuals with household incomes below \$15,000 (14.4 percent) were significantly more likely to report a cancer diagnosis compared to those with incomes of \$25,000 or greater. Breast cancer (1.4 percent) and skin cancer (1.4 percent) had the highest reported prevalence.

Table 8. Estimated percentage of Missouri adults living with selected types of cancer in Missouri, 2005

<b>Cancer</b>	<b>Prevalence %</b>	<b>Confidence interval (95%)</b>
All cancers combined	7.7	6.7 - 8.6
Lung	0.3	0.1 - 0.4
Melanoma of the skin	1.0	0.7 - 1.3
Breast	1.4	1.0 - 1.9
Ovarian or uterine	0.7	0.5 - 1.0
Prostate	0.8	0.5 - 1.0
Colon or rectal	0.6	0.4 - 0.8
Bladder	0.2	0.0 - 0.4

Source: Missouri Department of Health and Senior Services, [www.dhss.mo.gov/data/brfss/2005AnnualReport\\_000.pdf](http://www.dhss.mo.gov/data/brfss/2005AnnualReport_000.pdf)

Table 9. Estimated percentage of Missouri adults living with cancers by gender, race, education and household income, Missouri, 2005

	Prevalence %	95% Confidence interval
<b>Overall</b>	7.7	6.7 - 8.6
<b>Gender</b>		
Female	9.5	7.9 - 11.0
Male	5.7	4.6 - 6.8
<b>Race</b>		
Black	4.0	0.8 - 7.2
Other	10.5	4.5 - 16.6
White	7.7	6.8 - 8.7
<b>Education</b>		
Less than High School	11.0	8.2 - 13.8
High School	8.9	7.2 - 10.5
Greater than High School	6.3	5.0 - 7.6
<b>Household Income</b>		
Less than \$15,000	14.4	9.5 - 19.2
\$15,000 - 24,999	8.8	6.5 - 11.1
\$25,000 - 34,999	7.3	5.2 - 9.4
\$35,000 - 49,999	7.1	4.9 - 9.4
\$50,000 - 74,999	4.7	2.9 - 6.4
\$75,000+	5.0	2.8 - 7.2

Source: Missouri Department of Health and Senior Services, [www.dhss.mo.gov/data/brfss/2005AnnualReport\\_000.pdf](http://www.dhss.mo.gov/data/brfss/2005AnnualReport_000.pdf)





# Prevention

The risk of getting cancer can be reduced in a variety of ways, including keeping a healthy weight, avoiding tobacco, limiting the amount of alcohol you drink, and protecting your skin from the sun.

Research has shown that being overweight or obese substantially raises a person's risk of getting endometrial (uterine), breast, prostate and colorectal cancers. Overweight is defined as a body mass index (BMI) of 25 to 29, and obesity is defined as a BMI of 30 or higher.

Lung cancer is the leading cause of cancer death, and cigarette smoking causes almost all cases. Compared to nonsmokers, men who smoke are about 23 times more likely to develop lung cancer and women who smoke are about 13 times more likely. Smoking causes about 90 percent of lung cancer deaths in men and almost 80 percent in women. Smoking can also cause cancer of the voicebox (larynx), mouth and

throat, esophagus, bladder, kidney, pancreas, cervix, and stomach and causes acute myeloid leukemia.

Adults who are exposed to secondhand smoke at home or at work increase their risk of developing lung cancer. Concentrations of many cancer-causing and toxic chemicals are higher in secondhand smoke than in the smoke inhaled by smokers.

Skin cancer is the most common form of cancer in the United States. Exposure to the sun's ultraviolet (UV) rays appears to be the most important environmental factor involved with developing skin cancer. To help prevent skin cancer while still having fun outdoors, protect yourself by seeking shade, applying sunscreen, and wearing sun-protective clothing, a hat, and sunglasses.



## ***GOAL - Reduce preventable cancer incidence in Missouri by promoting healthy lifestyles and reducing environmental hazards that cause cancer***

### **Objective 1: In collaboration with the Missouri Comprehensive Tobacco Control Program and Tobacco Free Missouri, decrease the percentage of Missourians who smoke cigarettes**

**Measure:** Adults - 23.1% in 2009 to 20.0% by 2015 (BRFSS)

Youth in grades 6-8 - 5.7% in 2009 to 4.0% by 2015 (YTS)

Youth in grades 9-12 - 19.4% in 2009 to 15.0% by 2015 (YTS)

Number of smoke free policies 9 in 2009 - 25 in 2015 (tobacco free Missouri)

**Target Audience:** Youth and adult Missourians who smoke

#### **Strategies:**

1. Advocate for legislation for a tobacco-free Missouri
2. Increase the number of Missouri communities who implement comprehensive (100%) smoke-free policies for all workplaces
3. Advocate for funding for the Missouri Tobacco Quitline and local cessation efforts
4. Encourage local coalitions to promote the Quitline and local cessation efforts
5. Support an increase in core state funding for Comprehensive Tobacco Control programs from \$0 (\$1.2 million one-time funding in 2009-10) to \$73.2 million (CDC's recommended levels)
6. Increase awareness among education and community officials of the benefits of creating tobacco-free environments for youth
7. Monitor state legislation for attempts to pre-empt community efforts to prohibit sales of tobacco products to minors through stronger ordinances and enforcement
8. Advocate for legislation for licensing and regulating all tobacco products
9. Advocate for legislation to prevent youth under age 18 from selling tobacco products
10. Actively communicate program activities, outcomes and successes to relevant constituencies (e.g., media, policymakers, health departments, public)
11. Identify state and local leaders who can communicate the value of the program to the public, the media and policymakers
12. Disseminate tobacco prevention, cessation and control research findings when available



## ***GOAL - Reduce preventable cancer incidence in Missouri by promoting healthy lifestyles and reducing environmental hazards that cause cancer (continued)***

### **Objective 2: In collaboration with the Missouri Comprehensive Tobacco Control Program and Tobacco Free Missouri, decrease the number of Missourians who are exposed to secondhand smoke**

**Measure:** A comprehensive statewide smoke-free law covering all workplaces, including restaurants and bars by 2015

**Target Audience:** All Missourians

#### **Strategies:**

1. Advocate for legislation for a tobacco-free Missouri
2. Increase the number of Missouri communities who implement comprehensive (100%) smoke free policies for all workplaces
3. Support an increase in core state funding for Comprehensive Tobacco Control programs from \$0 (\$1.2 million one-time funding in 2009-10) to \$73.2 million (CDC's recommended levels)
4. Increase awareness among education and community officials of the benefits of creating tobacco-free environments for youth
5. Advocate for legislation to prohibit smoking in vehicles when children are present
6. Advocate for legislation to prohibit smoking in all forms of public transportation (e.g., cabs, buses)
7. Advocate for expanded legislation to prohibit smoking in childcare facilities, grounds and vehicles at all times
8. Advocate for licensing requirements to provide "smoke-free" environments for all children in state custody
9. Advocate for stronger enforceable state and local clean indoor air laws and ordinances
10. Advocate for tobacco-free correctional facilities
11. Advocate for tobacco-free higher education campuses and vehicles
12. Actively communicate program activities, outcomes and successes to relevant constituencies (e.g., media, policymakers, health departments, public)
13. Identify state and local leaders who can communicate the value of the program to the public, the media and policymakers
14. Identify partnerships to implement the Missouri Comprehensive Tobacco Control Program
15. Disseminate tobacco prevention, cessation and control research findings when available

### **Objective 3: In collaboration with the Missouri Council for Activity and Nutrition, decrease obesity in Missourians**

**Measure:** Adults - 30.6% in 2009 to 25% in 2015 (BRFSS)  
High school youth – 14.4% in 2009 to 10% in 2015 (YRBS)  
Number of Missourians who report eating 5 or more fruits and vegetables per day – 19.9% in 2009 to 25% in 2015

**Target Audience:** Families and youth



## Strategies:

1. Leverage collaborations to support evidence-based community interventions promoting diet and physical activity
2. Implement environmental change strategies to support increased levels of physical activity and dietary changes
3. Partner with churches to address disparities
4. Engage community coalitions to increase opportunities and supports for physical activity and healthy eating
5. Implement policy development efforts to improve school lunch programs and physical activity levels
6. Promote increasing state requirements for physical education and adequate recess time
7. Encourage establishing state policies for schools to decrease access to nutrient-poor, high-calorie vending and ala carte foods
8. Support restoring state funding for the Missouri Assessment Program (MAP) health and physical fitness components

## Objective 4: In collaboration with the Missouri Council on Activity and Nutrition, increase the number of students who report participating in physical activity

**Measure:** Middle school students who report being active at least 60 minutes per day- 29.8% in 2009 to 32% in 2015 (YTS)

High school students who report being active for at least 60 minutes per day for at least 5 of the past 7 days – 11.6% in 2009 to 15% in 2015 (YTB)

Adults who respond that they have participated in no physical activity during the past 30 days 26.7% in 2009 to 23% in 2015 (BRFSS)

**Target Audience:** All Missourians

## Strategies:

1. Leverage collaborations to support evidence-based community interventions promoting diet and physical activity
2. Implement environmental change strategies to support increased levels of physical activity and dietary changes
3. Partner with churches to address disparities
4. Engage community coalitions to increase opportunities and supports for physical activity and healthy eating
5. Implement policy development efforts to improve school lunch programs and physical activity levels
6. Promote increasing state requirements for physical education and adequate recess time
7. Support restoring state funding for the Missouri Assessment Program (MAP) health and physical fitness components



***GOAL - Reduce preventable cancer incidence in Missouri by promoting healthy lifestyles and reducing environmental hazards that cause cancer (continued)***

**Objective 5: Increase the percentage of people who practice protective sun safety behaviors**

**Measure:** Baseline to be established

**Target Audience:** All Missourians

**Strategies:**

1. Identify funding to ask BRFSS questions regarding sun safety behavior
2. Promote evidence-based policy change at both the state and local level
3. Identify evidence-based sun safety programs and promote locally
4. Support cancer registry efforts to assure proper reporting of skin cancer
5. Implement policy development activities to support sun safety in child care facilities
6. Implement community-based interventions, focusing on children and adolescents that: 1) increase awareness that sunburn is a risk factor for skin cancer, and 2) implement policy changes to help reduce overexposure to the sun
7. Implement a social marketing campaign to educate Missouri youth regarding the risks associated with excessive exposure to ultraviolet rays from artificial tanning devices

**Objective 6: Increase awareness of cancer causing chemicals such as radon in air, soil and water**

**Measure:** Number of radon detectors sent to the public = 2009 - 5,433 test kits  
Number of radon mitigation systems installed = 2009 - 1,452 systems  
Number of schools were tested for radon = 2009 - 125 schools

**Target Audience:** All Missourians

**Strategies:**

1. Increase public knowledge of the effect of environmental factors on increased risk of cancer
2. Encourage environmental testing in areas of increased cancer incidence rates
3. Support legislation that requires labeling of carcinogens on consumer products
4. Promote the use of non-carcinogenic materials in indoor air spaces
5. Promote system and regulatory interventions that will ensure the reduction of environmental pollutants
6. Promote awareness of and compliance with the federal and state hazard communication laws to promote worksite safety
7. Support research on the etiology of environmental cancers



**Objective7:** Increase public education regarding the newest prevention methods that are proven effective at reducing cancer rates

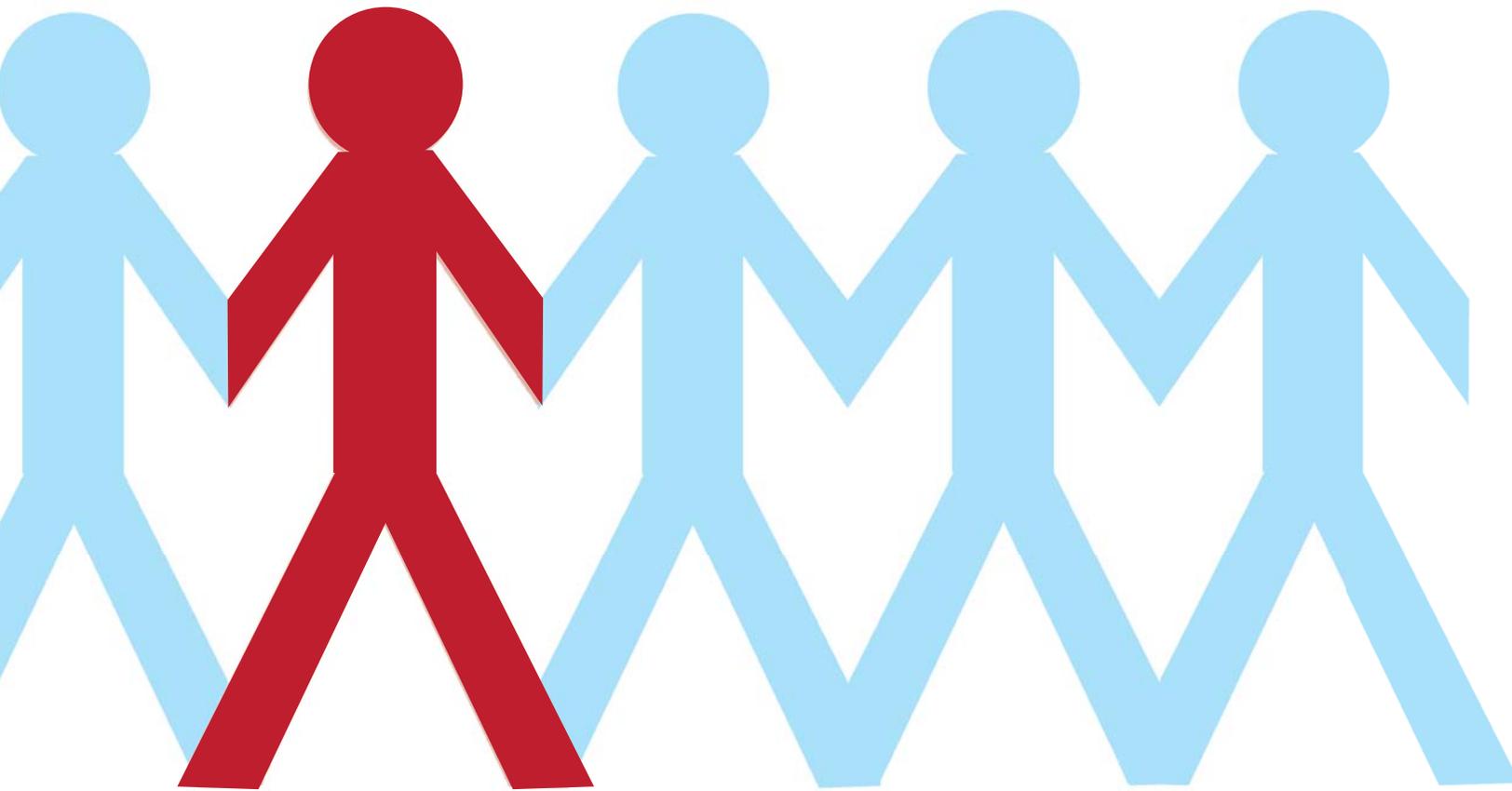
**Measure:** Number who receive at least one dose of the HPV Vaccine - 31.6% in 2008 to 35% (CDC's National Immunization Survey)

**Target Audience:** All Missourians

**Strategies:**

1. Review literature to determine the effectiveness of emerging prevention methods
2. Educate providers on the newest prevention methods and encourage them to discuss with their patients
3. Collaborate with other agencies to provide consistent, culturally sensitive education material
4. Advocate for research into new prevention methods





# Early Detection/ Screening

Screening means checking your body for cancer before you have symptoms. Getting screening tests regularly may find breast, cervical and colorectal (colon) cancers early when treatment is likely to work best.

## ***Breast Cancer***

Currently, the best way to find breast cancer is with a mammogram. Mammograms are the best method to detect breast cancer early when it is easier to treat. For more information, visit [www.cdc.gov/cancer/colorectal/basic\\_info/screening/tests.htm](http://www.cdc.gov/cancer/colorectal/basic_info/screening/tests.htm).

## ***Cervical Cancer***

The Pap test can find abnormal cells in the cervix which may turn into cancer. Pap tests can also find cervical cancer early, when the chance of being cured

is very high. For more information, visit [www.cdc.gov/cancer/breast\\_info/screening.htm](http://www.cdc.gov/cancer/breast_info/screening.htm).

## ***Colorectal (Colon) Cancer***

Colorectal cancer almost always develops from precancerous polyps (abnormal growths) in the colon or rectum. Screening tests can find precancerous polyps, so that they can be removed before they turn into cancer. Screening tests can also find colorectal cancer early, when treatment works best. For more information, visit [www.cdc.gov/cancer/cervical/basic\\_info/screening.htm](http://www.cdc.gov/cancer/cervical/basic_info/screening.htm).



Screening for lung, ovarian, prostate, and skin cancers has not been shown to reduce deaths from those cancers.

***GOAL: Increase early detection and appropriate screening for the cancer using evidence-based guidelines***

**Objective 1: Increase the percentage of women who receive regular breast cancer screenings**

**Measure:** Women over 50 who receive a screening mammogram in the past one or two years from 83.9% in 2008 to 90% in 2015 (BRFSS)

**Target Audience:** Missouri women ages 40 and over

**Strategies:**

1. Promote evidence-based interventions and recommended screening/early detection exams according to the American Cancer Society (ACS) guidelines
2. Disseminate information about Show Me Healthy Women and other breast and cervical screening services to all Missourians
3. Promote statewide and local media campaigns about the need for recommended breast and cervical cancer screening exams according to ACS
4. Increase health care providers' awareness of current cancer screening guidelines and follow-up recommendations
5. Analyze health insurance coverage for cancer screening/early detection exams to determine coverage needs in legislative process
6. Disseminate culturally sensitive information related to cancer screening/early detection
7. Identify geographic disparities to increase utilization

**Objective 2: Increase the percentage of women who receive cervical cancer screenings**

**Measure:** Women 18 and over who received a pap test within the last three years from 80.8% in 2008 to 85% in 2015 (BRFSS)

**Target Audience:** Missouri women ages 18 and over

**Strategies:**

1. Promote evidence-based interventions and recommended screening/early detection exams according to the American Cancer Society (ACS) guidelines
2. Disseminate information about Show Me Healthy Women and other breast and cervical screening services to all Missourians
3. Promote statewide and local media campaigns about the need for recommended breast and cervical cancer screening exams according to ACS
4. Increase health care providers' awareness of current cancer screening guidelines and follow-up recommendations
5. Analyze health insurance coverage for cancer screening/early detection exams to determine coverage needs in legislative process
6. Disseminate culturally sensitive information related to cancer screening/early detection



7. Identify geographic disparities to increase utilization

***GOAL: Increase early detection and appropriate screening for the cancer using evidence-based guidelines (continued)***

**Objective 3: Increase the percentage of Missourians who receive colorectal cancer screening**

**Measure:** Missourians 50 and older who ever had a blood stool test – 39.7% in 2008 to 43% in 2015 (BRFSS)  
Missourians 50 and older who ever had a flexible sigmoidoscopy or colonoscopy – 61.4% in 2008 to 65% in 2015 (BRFSS)

**Target Audience:** Missourians ages 50 and older, and special populations at increased risk

**Strategies:**

1. Increase colorectal cancer screening capacity
2. Promote statewide evidence-based media campaigns about colorectal cancer risk and the benefits of screening and early detection
3. Increase health care providers' awareness of current cancer screening guidelines and follow-up recommendations
4. Analyze health insurance coverage for cancer screening/early detection exams to determine coverage needs via the legislative process
5. Disseminate culturally sensitive information related to cancer early detection
6. Identify geographic disparities to increase utilization

**Objective 4: Increase the number of high risk men who receive prostate cancer screening**

**Measure:** Missourians who receive a PSA test – 65.4% in 2008 to 70% in 2015 (BRFSS)  
Missourians who receive a digital rectal exam – 73.7% in 2008 to 80% in 2015 (BRFSS)

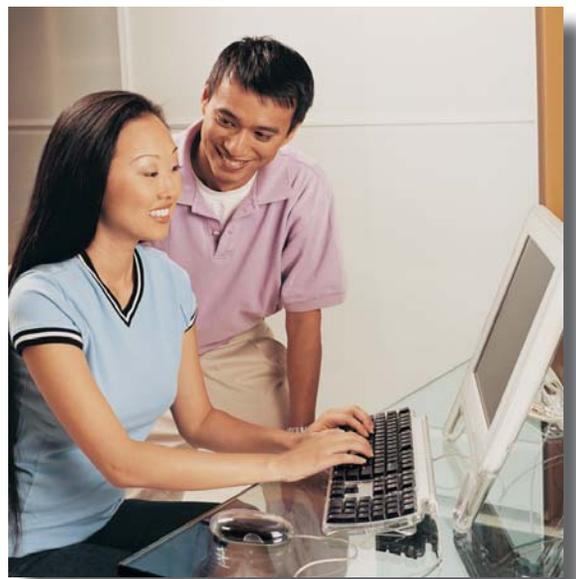
**Target Audience:** Men ages 40 and over and special populations at increased risk

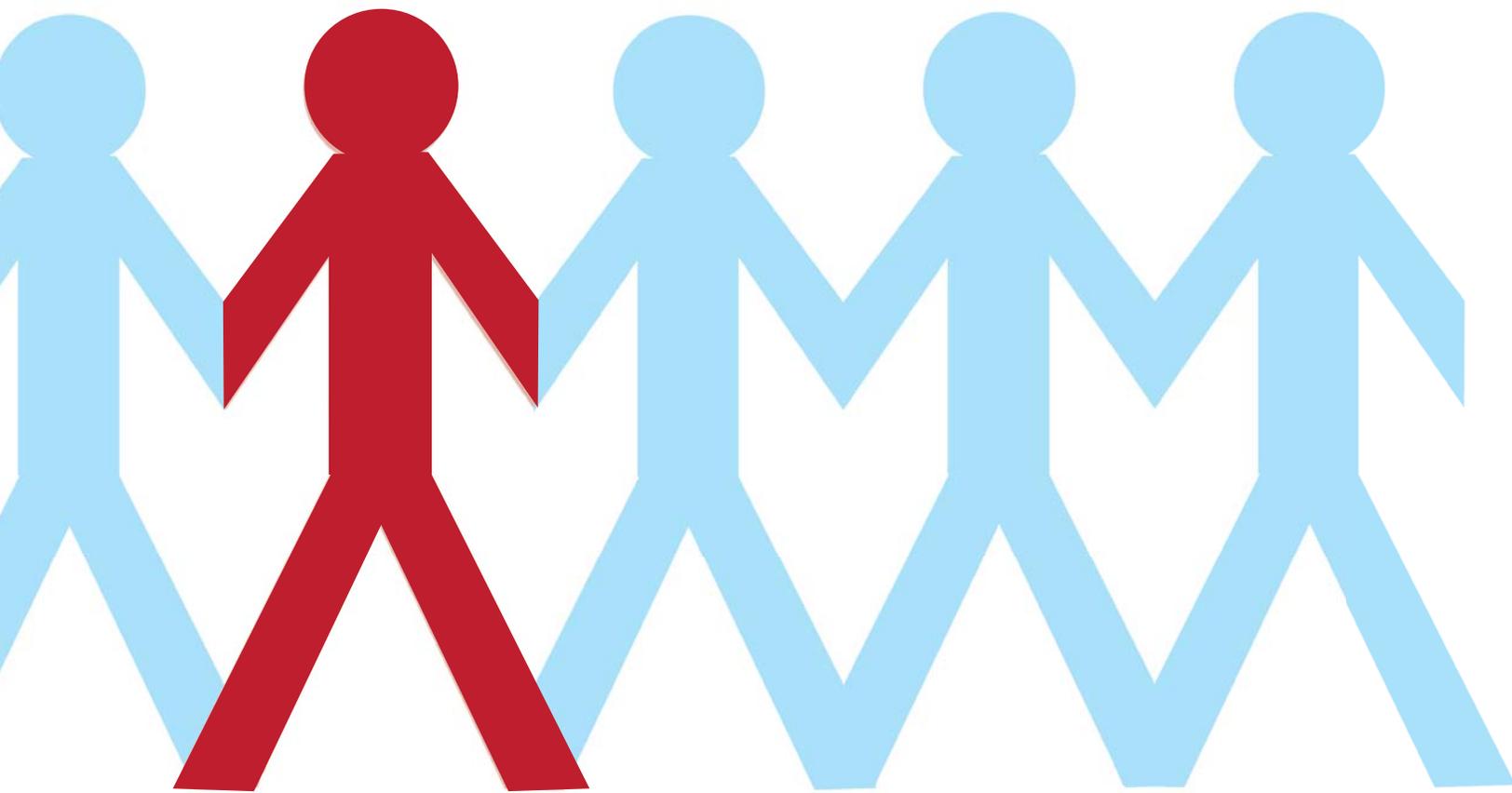
**Strategies:**

1. Promote informed decision-making regarding prostate cancer early detection
2. Offer culturally sensitive education to the public regarding prostate cancer
3. Increase health care providers' awareness of current cancer screening guidelines and follow-up recommendations
4. Analyze health insurance coverage for cancer screening/early detection and determine gaps and need in coverage via the legislative activities
5. Identify geographic disparities to increase utilization



***NOTES:***





# Treatment

Access to quality cancer care and clinical trials needs to be expanded to ensure that everyone is provided the same care and access to state-of-the-art technology that patients in major care centers receive.

Cancer treatment is improving – saving lives and extending survival for people with cancers at many sites, including the breast and colon, and for people with leukemias, lymphomas, and pediatric cancers. Clinical trials are the major avenue for discovering, developing and evaluating new therapies. The ultimate measure of success against cancer is how far the death rate from this group of diseases can be lowered.

However, only about 3 percent of all adult cancer patients participated in clinical trials sponsored by the National Cancer Institute in 1999. It is important to increase physician and patient awareness and participation in clinical trials to test new treatments more rapidly, find more effective treatments and

broaden the options available to patients. Studies also show that older individuals and members of racial-ethnic minority groups are less likely to receive treatments or participate in clinical trials.



***GOAL: Healthier Missourians through evidence based treatment of cancer that is accessible to everyone***

**Objective 1: Eliminate barriers and increase access to evidence based treatment services and appropriate follow-up**

**Measure:** Reduce the number of Missourians who are uninsured – 16.4% in 2009 to 10% in 2015 (BRFSS)  
Decrease the percentage of survivors who report that they did not have health insurance that paid for all or part of their cancer treatment – baseline to be established (BRFSS)

**Target Audience:** All Missourians

**Strategies:**

1. Support legislation to expand access to cancer treatment for uninsured and underserved patients
2. Assist patient and family members to better navigate the health care system by encouraging treatment facilities to utilize patient navigators
3. Promote informed decision making and utilization of appropriate cancer treatment
4. Support federal and state policies/legislation to enhance access to cancer treatment
5. Promote opportunities for health care providers to increase their skills in culturally sensitive communications with patients of diverse population

**Objective 2: Increase participation in Clinical Trials**

**Measure:** Increase number of Missourians that participate in clinical trials (baseline to be established)

**Target Audience:** All Missourians diagnosed with cancer

**Strategies:**

1. Develop method to assess hospitals' patient participation in clinical trials
2. Support legislation that will improve cancer insurance coverage of routine care costs for patients who participate in cancer clinical trials
3. Ensure public awareness about purposes, benefits and enrollment to clinical trial especially among minority and underserved populations
4. Encourage health care providers to suggest clinical trials as a means of receiving treatment for patients newly diagnosed with cancer



***GOAL: Healthier Missourians through evidence based treatment of cancer that is accessible to everyone (continued)***

**Objective 3: Increase the percentage of patients with cancer who receive evidence-based treatment and follow-up based on acceptable standards of care**

**Measure:** Decrease the length of time between cancer diagnosis and treatment. Establish a baseline with the Missouri Cancer Registry  
The number of facilities that are certified cancer centers through the Commission on Cancer – from 32 in 2009 to 38 in 2015

**Target Audience:** Missourians diagnosed with cancer

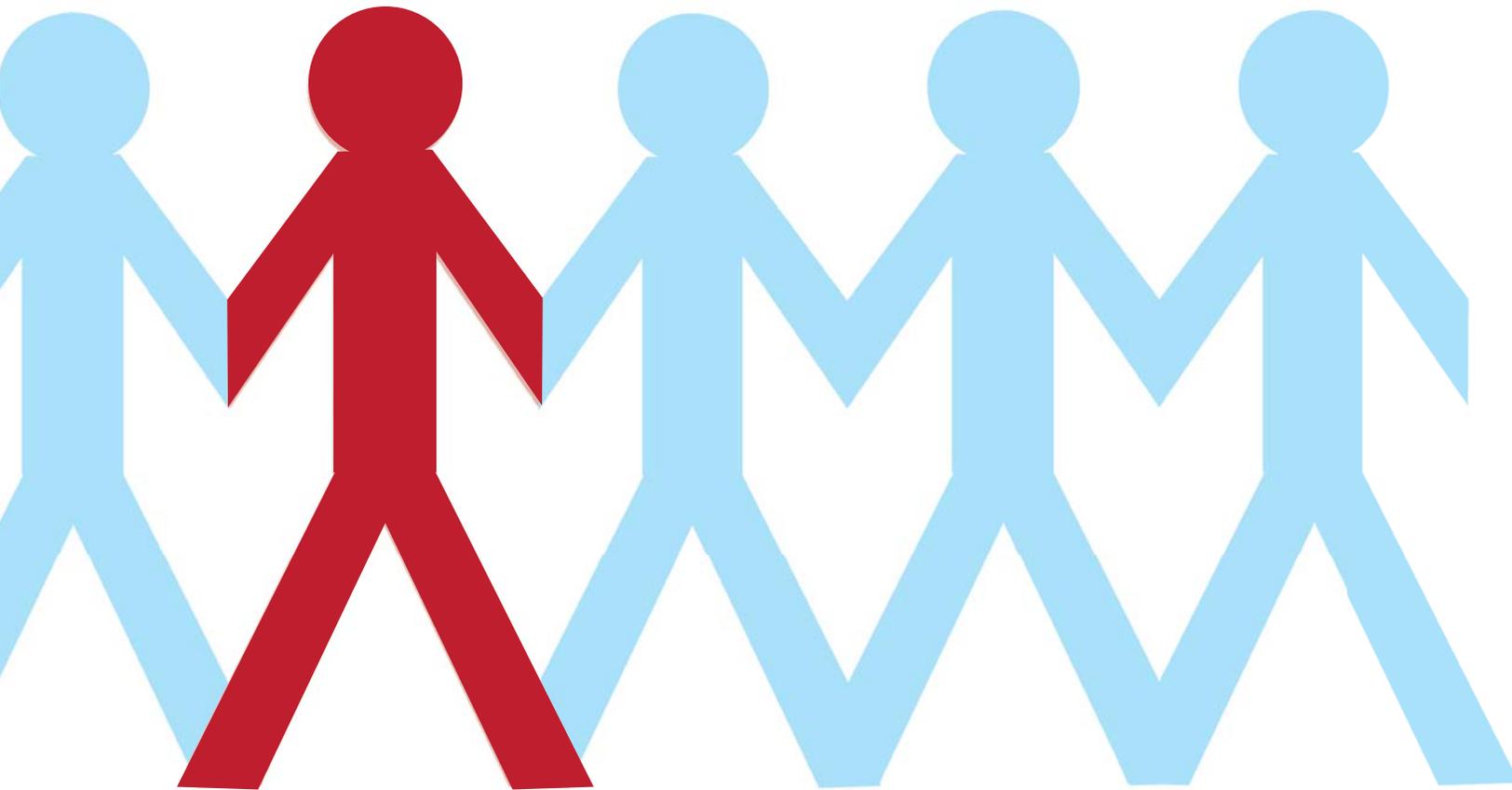
**Strategies:**

1. Identify ongoing resources to assure complete, high-quality data on cancer incidence, including treatment and survival
2. Support the improved accessibility and utility of cancer registry data to ensure diagnosis and treatment data is captured
3. Promote development and use of culturally and linguistically appropriate materials for cancer treatment and education to reach minority and medically underserved communities
4. Support efforts to link underserved areas and certified cancer centers to promote utilization of timely, evidence-based treatment options
5. Promote nationally recognized, evidence-based treatment services among health care providers



**NOTES:**





# Survivorship

Due to advances in the early detection and treatment of cancer, people are living many years after a diagnosis. However, disparities in health care impact survival. Low-income men and women who have inadequate or no health insurance coverage are more likely to be diagnosed with cancer at later stages, when survival times are shorter.

Cancer survivors may face physical, emotional, social, spiritual and financial challenges as a result of their cancer diagnosis and treatment. Public health professionals strive to address survivorship and quality of life issues, such as the coordination of care, patient-provider communication, palliative care, pain management, and fertility preservation. In light of these concerns, public health initiatives aimed at understanding and preventing secondary disease, recurrence and the long-term effects of treatment are essential.



## ***GOAL: Improve the quality of life for cancer survivors and their families***

### **Objective 1: Increase education and awareness of survivorship issues and resources**

**Measure:** Survey of cancer survivor's resource agencies– baseline to be established  
Calls to survivorship resource agencies - 14,193 in 2008

**Target Audience:** General public, cancer survivors, health care professionals and policymakers

#### **Strategies:**

1. Develop a survey that is administered to organizations that meet the needs of cancer survivors
2. Identify or develop educational resources about cancer survivorship for survivors, the general public, health care professionals and policy makers
3. Enhance and disseminate educational materials and programs on survivorship to promote knowledge and understanding of survivorship issues
4. Provide professional education and training on survivorship to ensure health care professional awareness and knowledge of survivorship issues (ACS in services)
5. Promote local and statewide survivorship events
6. Promote opportunities which enhance policy makers' understanding of their unique role in addressing the quality of life needs and issues of cancer survivors and their families

### **Objective 2: Increase the availability of effective services, programs and policies addressing cancer survivorship**

**Measure:** Decrease the number of people who report having physical pain caused by cancer or cancer treatment – baseline to be established (BRFSS)

**Target Audience:** Cancer survivors

#### **Strategies:**

1. Develop an annual survey of Missouri Cancer Consortium members and other stakeholders to determine the number and effectiveness of survivorship services and resources available in Missouri and any unmet needs identified through contact with these survivors
2. Through the surveys, identify and evaluate gaps in existing programs and policies
3. Identify or develop and promote comprehensive programs and policies that address the gaps in areas of survivorship
4. Support policies that promote program implementation and infrastructure development



***GOAL: Improve the quality of life for cancer survivors and their families  
(continued)***

**Objective 3: Increase access to quality care and services for cancer survivors in Missouri**

**Measure:** Decrease the percentage of survivors who report that they did not have health insurance that paid for all or part of their cancer treatment – baseline to be established (BRFSS)  
Decrease the percentage of survivors who report that they were EVER denied health insurance or life insurance coverage because of cancer – baselines to be established (BRFSS)

**Target Audience:** Cancer survivors

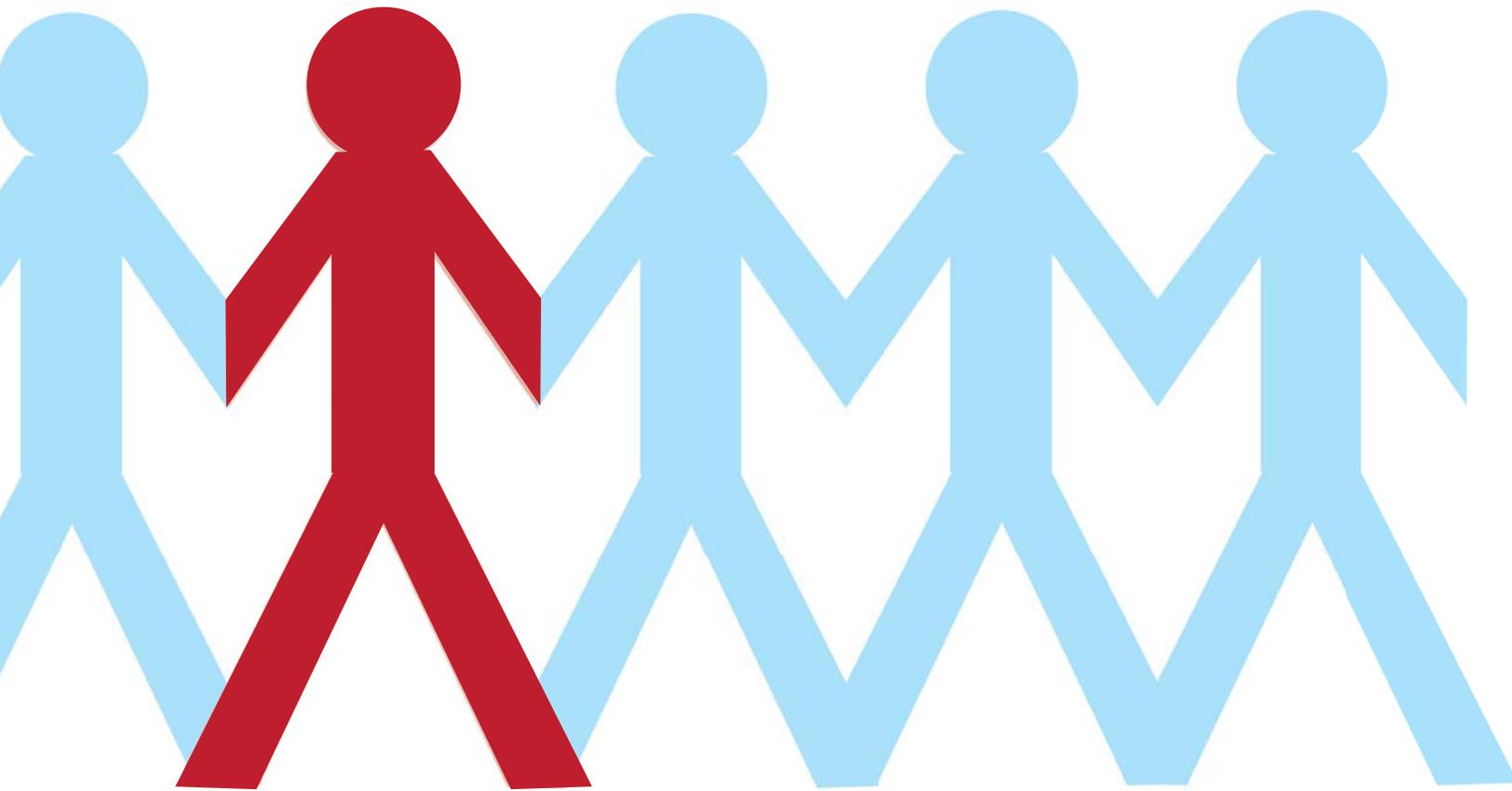
**Strategies:**

1. Identify and reduce barriers to ensure equal access to quality care and services
2. Identify and promote patient navigation systems and pathways based on best practices to ensure optimum care for cancer survivors
3. Increase information and awareness to survivors, health care providers and policy makers about quality of life issues and service needs of people of various ages and ethnic, racial and economic backgrounds during each stage of survivorship
4. Support and promote policies and programs to reduce the financial burden on cancer survivors and their families



***NOTES:***





# What Can You Do to Fight Cancer in Missouri?

The Missouri Cancer Plan identifies broad goals to reduce the burden of cancer. To accomplish these goals, everyone needs to be involved. What can you do? Listed on the following pages are examples that each of us can begin to do right now toward the mission of making cancer history for all Missourians.



## *What you can do if you are a:*

### *...Hospital*

#### *You can:*

- Assure that your cancer cases are reported in a timely manner
- Provide meeting space for cancer support groups
- Collaborate to sponsor community screening and education programs
- Maintain American College of Surgeons membership

### *...Local Public Health Department*

#### *You can:*

- Provide cancer awareness information and data to citizens and groups
- Collaborate in community-based coalitions
- Work with physicians to promote screening programs and case reporting
- Provide space for community survivor support groups
- Access community needs and implement policy and environmental changes to reduce cancer risks
- Assure access to care for uninsured and underinsured

### *...Community-Based Organization*

#### *You can:*

- Provide cancer awareness information to constituents
- Promote cancer screening among clients
- Encourage participation in clinical trials
- Collaborate to provide community prevention programs

### *...Professional Organization*

#### *You can:*

- Provide continuing education credits on cancer topics
- Include clinical trials information in meeting agendas
- Form speakers' bureaus to provide cancer education
- Train facilitators for survivor support groups



## *What you can do if you are a(n):*

### *...Employer*

#### *You can:*

- Establish a smoke-free work place policy
- Provide healthy foods in vending machines and cafeterias
- Encourage employees to increase physical activity
- Collaborate with hospitals to host screening events
- Provide health insurance coverage

### *...School or University*

#### *You can:*

- Include cancer prevention messages in health classes
- Provide healthy foods in vending machines and cafeterias
- Increase physical education requirements
- Make your entire campus a smoke-free environment

### *...Faith-based Organization*

#### *You can:*

- Provide cancer prevention information to members
- Collaborate with other community-based groups
- Learn how to provide healthy potlucks and meeting meals
- Open your building for walking clubs in cold weather
- Encourage members to get cancer screening tests on time

### *...Physician*

#### *You can:*

- Make sure patients get appropriate cancer screening tests
- Refer patients to smoking cessation classes and nutrition programs
- Be sure your cancer cases are reported in a timely manner
- Find out how to enroll patients in clinical trials
- Make earlier referrals to hospice for end of life care

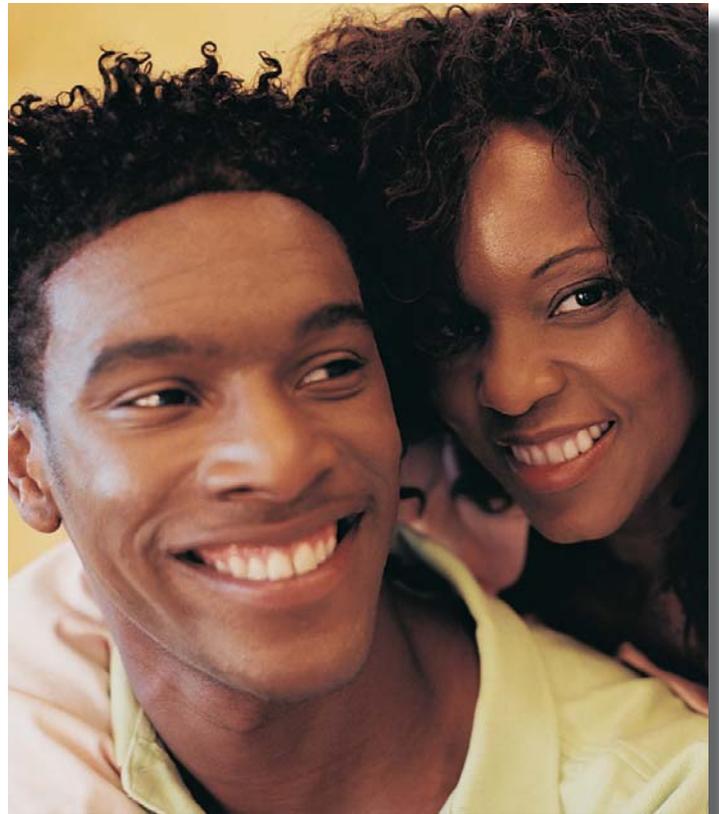


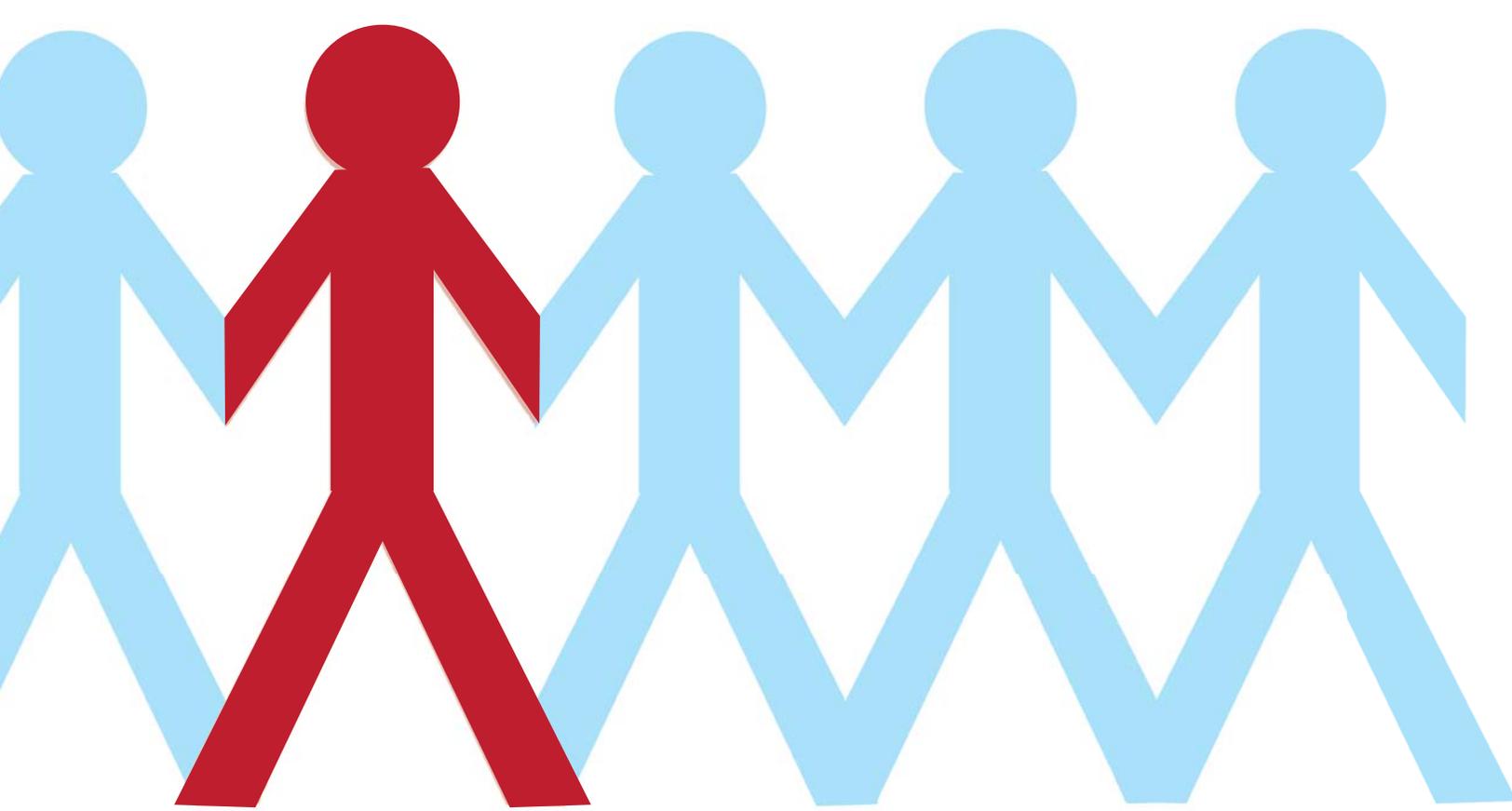
# *What you can do if you are a:*

## *...Missourian*

### *You can:*

- Avoid all tobacco and secondhand smoke
- Eat a nutritious and balanced diet and maintain a healthy weight
- Increase your daily physical activity
- Know when to be screened and obtain screenings on schedule
- Support smoke-free environments
- If diagnosed, consider enrolling in a clinical trial
- Show your support and care for those who are diagnosed
- Volunteer with your hospital, health department, faith community or local groups who support cancer control efforts





# Addressing the Burden of Cancer in Missouri

The State of Missouri addresses the burden of cancer through the following programs.

## ***Regional Coalitions***

Comprehensive cancer control in Missouri also includes a regional approach from local coalitions. Coalitions in Missouri are defined as “a broad-based, multi-organizational, community partnership that may bring together the public, private and nonprofit sectors in an effort to reduce morbidity and mortality and improve quality of life.” Coalitions work to develop goals and objectives that meet the needs of their own communities.

Coalition members represent community organizations, such as public health departments; voluntary organizations; community-based agencies; professional associations; cancer patients, survivors,



and their support systems; community and private hospitals and clinics; managed care organizations; health-care providers; social services; public and private schools; religious organizations; recreational organizations; local businesses; pharmaceutical companies; local media; and elected officials.

### ***Show Me Healthy Women***

This program addresses the burden of cancer in Missouri by providing free breast and cervical cancer screenings to age- and income-eligible women. For more information, go to [www.dhss.mo.gov/living/healthcondiseases/chronic/showmehealthywomen/index.php](http://www.dhss.mo.gov/living/healthcondiseases/chronic/showmehealthywomen/index.php).

### ***Well-Integrated Screening and Evaluation for Women Across the Nation (WISEWOMAN) Lifestyle Interventions program.***

WISEWOMAN is a CDC-funded program that helps underinsured, low-income women gain access to health screenings and lifestyle education that can reduce the risk of heart disease and stroke. WISEWOMAN is an expansion of the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), known in Missouri as the Show Me Healthy Women program.

### ***Missouri Cancer Registry***

MCR, located at the University of Missouri, Columbia, Department of Health Management and Informatics:

- Collects cancer incidence data and provides annual reports on cancer incidence and mortality in Missouri
- Monitors cancer incidence and mortality trends
- Responds to requests from individuals and organizations for cancer data and analysis
- Fosters and participates in research on cancer etiology, prevention, treatment and survivorship

### ***Comprehensive Cancer Control Program***

The Comprehensive Cancer Control Program

addresses the burden of cancer in Missouri by:

- Using scientific data and research to systematically identify priorities and inform decision making
- Addressing the full scope of cancer care, ranging from primary prevention to early detection and treatment to survivorship and end of life issues
- Engaging many stakeholders in cancer prevention and control, including and not limited to medical and public health communities, volunteer agencies, insurers, businesses, survivors, government, academia, and advocates
- Coordinating all cancer-related programs and activities, thereby creating integrated activities and fostering leadership
- Integrating activities of many disciplines, such as administration, basic and applied research, evaluation, health education, program development, public policy, surveillance, clinical services, and health communications

### ***State Cancer Plan***

Missouri's comprehensive Cancer Plan reflects the burden of cancer in Missouri and the strategic interventions to address this burden during the next five years. The interventions include promoting healthy lifestyles and reducing environmental hazards that cause cancer; increasing early detection and appropriate screening for cancer using evidence-based guidelines; making evidenced-based treatment of cancer accessible to everyone; and improving the quality of life for cancer survivors and their families.

### ***Missouri Tobacco Quit line***

The Quitline provides free help to Missourians who want to quit smoking. Tobacco users can call 1-800-QUIT-NOW (1-800-784-8669) to talk with a trained "quit coach" who will help them develop a plan to quit smoking. Callers will also receive information about other resources, including nicotine replacement therapy, to assist them in quitting tobacco.

### ***Obesity and Nutrition***

Support for obesity and nutrition is provided to local health departments to work with communities to increase the availability of nutritional food while making physical activity a priority.



## Glossary

The definitions in this glossary are a combination of resources including the Centers for Disease Control and Prevention online glossary<sup>29</sup>, other Missouri Department of Health and Senior Services source documents and staff descriptions.

**Age Distribution:** Numbers of people in specified age categories and the proportions of those categories in the population. Example: The 2000 U.S. Standard Population is based on the proportions of the U.S. population in specific age groups (< 1 year, 1–4 years, 5–9 years, 10–14 years, 15–19 years, ..., ≥ 85 years), as measured in the 2000 U.S. Census.

**Age-adjusted Rate:** A rate, such as incidence or mortality, adjusted to the age distribution of a specified standard population, to permit comparison among populations having different age distributions. Rates are usually age-adjusted to the 2000 U.S. Standard Population

**CDC:** U.S. Centers for Disease Control and Prevention.

**Confidence Interval (CI):** A range of values, calculated from the sample observations, that include the true value. For an incidence rate, the 95% CI will include the true rate 95% of the time, if the samples and calculations are repeated many times. The end points of the CI are called the Confidence Limits.

**Crude Rate:** Absolute number of cases or deaths in a specified population during a specified time frame, divided by the population in the specified geographic area. There are no adjustments made for proportions by age, sex, race, and so on, when a crude rate is presented.

**Ethnicity:** A self-identified, self-reported sociocultural classification indicating Spanish (Hispanic) cultural heritage or national origin. The U.S. Census defines Hispanics (or Latinos) as people of Mexican, Mexican-American, Chicano, Puerto Rican, Cuban or other South or Central American Spanish linguistic or cultural heritage, regardless of race. The Office of Management and Budget's Directive 15 states that the ethnicity category represents a social-political construct designed for collecting data on the race and ethnicity of broad population groups in this country and is not anthropologically or scientifically based.

**In Situ Cancer:** An early cancer that is present only in the layer of cells in which it began.

**Incidence Rate:** Number of new cases of a disease during a specified time period in a population at risk for developing the disease:

$$(\text{new cancer cases} \div \text{population at risk in one year}) \times 100,000$$

**Invasive Cancer:** Cancer that has spread beyond the layer of tissue in which it originated and is growing into surrounding, healthy tissues.

**MICA:** Missouri Information for Community Assessment. A public, web-based, interactive data portal developed and maintained by the Missouri Department of Health and Senior Services, Bureau of Health Informatics.

**Mortality Rate:** Number of deaths in a specified population over a specified time period in a specified geographic area:

$$(\text{cancer deaths in 1 year} \div \text{population at midyear}) \times 100,000$$



**NCHS:** National Center for Health Statistics. Part of U.S. Centers for Disease Control and Prevention.

**NCI:** National Cancer Institute. Part of U.S. National Institutes of Health (NIH).

**Population:** The number of inhabitants (either total or grouped by age, race, sex, etc.) of a specified geographic area. In statistics, a population is the entire universe of items from which samples can be drawn, such as “all female citizens of Missouri.” The true statistical population is rarely known and population figures are usually treated as estimates, for analytical purposes.

**Primary Site:** The location or organ (site) in the body where the cancer first occurred.

**Race:** A self-identified, self-reported sociocultural classification, based on U.S. Census categories defined by cultural, ancestral or national origin. The Office of Management and Budget’s Directive 15 states that the race categories represent a social-political construct designed for collecting data on the race and ethnicity of broad population groups in this country and are not anthropologically or scientifically based.

**Rate:** A proportion over a specified time period, such as the number of new cancer cases in one year (see Incidence Rate and Mortality Rate).

**SEER:** Surveillance, Epidemiology and End Results Program, of the National Cancer Institute. Part of the U.S. National Institutes of Health (NIH).

**Significant:** A result is considered statistically significant if it is unlikely to have occurred by chance alone, at or above the probability level specified by the p-value or Confidence Interval (CI). The most commonly selected level is 95% (or  $p = .05$ ) and is the level used throughout this report, unless otherwise stated. That is, where p-values are shown, significance was determined at  $p \leq .05$ , or for CI’s, when the 95% confidence intervals for paired estimates did not overlap (Note that CI’s may overlap and still be significantly different. The standard used here is therefore a conservative determination).

**Stage (of cancer):** A measure of disease progression, detailing the degree to which the cancer has advanced. Staging is usually based on the size of the tumor, whether lymph nodes contain cancer, and whether the cancer has spread from the original site to other parts of the body.



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American Cancer Society, High Plains Division

American College of Surgeons, Missouri Chapter

American Lung Association of the Central States

Audrain Medical Center

Butler County Health Department

Cancer Agencies Network of Greater St. Louis

Coalition of Hispanic Women Against Cancer

Columbia/Boone County Health Department

Ellis Fischel Cancer Center

Hannibal Clinic

Jefferson County Health Department

Susan G Komen for the Cure, Greater Kansas City Affiliate, Mid Missouri Affiliate and St. Louis Affiliate

Lane Tabernacle CME

Leukemia & Lymphoma Society

Marion County Health Department

Missouri Association of Local Public Health Agencies

Missouri Cancer Registry

Missouri Department of Health and Senior Services (DHSS), Cancer and Chronic Disease Control

DHSS Comprehensive Cancer Control Program

DHSS Missouri Tobacco Control Program

Missouri Hospice and Palliative Care Association

Missouri Nurses Association

Missouri Pain Initiative

Missouri State Medical Association

Missouri Women's Council

National Cancer Institute – Cancer Information Services

Nodaway County Crusade Against Cancer

Pettis County Health Dept.

RA Bloch Cancer Foundation

Scott County Health Department

Southeast Missouri Cancer Control Coalition

Missouri Nurses Association

South Central Cancer Coalition

St. Louis University Cancer Center

The Hope Light Foundation

The Wellness Community of Greater St. Louis

University of Missouri, Smokebusters

Washington University, George Warren Brown School of Social Work, Cancer Prevention and Control



## *Websites for Information on Cancer-Related Topics*

[www.cancerquest.org](http://www.cancerquest.org)

[www.cdc.gov/cancer](http://www.cdc.gov/cancer)

[www.cancer.gov](http://www.cancer.gov)

[www.cancer.org](http://www.cancer.org)

[www.dhss.mo.gov](http://www.dhss.mo.gov)

[www.blochcancer.org](http://www.blochcancer.org)

[www.asco.org](http://www.asco.org)

[www.siteman.wustl.edu](http://www.siteman.wustl.edu)

[www.kccancer.com](http://www.kccancer.com)

[www.arhp.org](http://www.arhp.org)

[www.trialcheck.org/cancertrialshelp/cancertrialshelp.aspx](http://www.trialcheck.org/cancertrialshelp/cancertrialshelp.aspx)

[www.thecommunityguide.org](http://www.thecommunityguide.org)

<http://cancercontrolplanet.cancer.gov>

[www.lls.org](http://www.lls.org)

[www.cancer-pain.org](http://www.cancer-pain.org)

[www.missouripain.org](http://www.missouripain.org)

[www.lungusa.org/](http://www.lungusa.org/)

[www.ttac.org](http://www.ttac.org)

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