



HIDI HealthStats

Statistics and Analysis From the Hospital Industry Data Institute

SEPTEMBER 2014 ■ CANCER INCIDENCE AND HOT SPOTS IN MISSOURI



Key Findings

- With more than 200,000 unique cases, nearly 34 out of every 1,000 Missourians were diagnosed in a hospital with cancer in 2013.
- Among all Missouri cancer patients in 2013, more than one in four were diagnosed with breast cancer.
- The rate of unique cancer cases for Missouri ZIP codes varied from 2.4 to 140 per thousand during 2013.
- 93 Missouri ZIP codes (10 percent) were identified as statistical cancer hot spots during 2013 ($G_i^* > 1.96$, $P < 0.05$).
- 79 Missouri counties fall in the national “Cancer Belt”—spatially-clustered counties with excess rates of age-adjusted cancer mortality.

HIDI
HOSPITAL INDUSTRY DATA INSTITUTE
The Data Company of the Missouri Hospital Association

Background

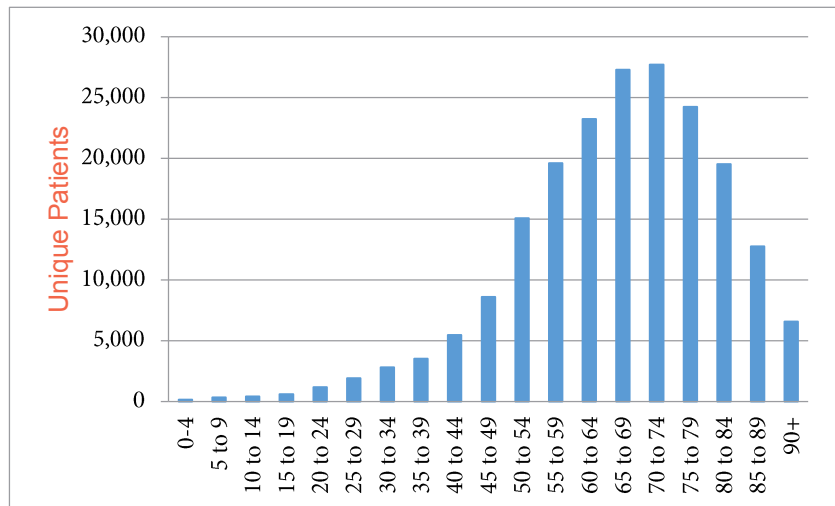
September is the nationally-designated awareness month for several types of cancer: childhood, gynecologic, lymphoma, ovarian, prostate, thyroid and leukemia.ⁱ Cancer is the general term given to more than 100 individual diseases that are caused by abnormal cell growth and mutation in localized parts of the body. The abnormal and rapidly-growing cancerous cells can metastasize, or spread to other parts of the body through the bloodstream or lymph vessels. Cancer often manifests in the form of a tumor, or a mass of cancerous cells. The risk of developing cancer can be inherited genetically or acquired by environmental exposure to carcinogens or by certain risk behaviors such as tobacco use or prolonged sun exposure.ⁱⁱ

Hospital-based Cancer Diagnoses for Missourians in 2013

More than 200,000 unique patients were diagnosed with cancer at a Missouri hospital during fiscal year 2013.ⁱⁱⁱ The average age of Missouri patients diagnosed with cancer in a hospital last year was 66.2 and 58 percent were female. Patients between the ages of 60 and 79 accounted for more than half of all unique Missouri cancer patients during 2013 (Figure 1).

More than 88 percent of hospital-based cancer diagnoses were for white patients, 8.2 percent of patients were African American and 3 percent were another race. Adjusting for age and race revealed that white Missourians between the ages of 20 and 39 and 80 or older have higher rates of cancer than the non-white

Figure 1. Age Distribution of Unique Cancer Patients in Missouri in 2013



population. Non-white Missourians had higher rates of cancer for all other age groups. The highest age and race-adjusted cancer rate disparity for non-white patients was the population between the ages of 60 and 79 with 116 unique cases per 1,000 population, compared to 108 per thousand for white patients in the same age range. For all Missourians during 2013, the rate of hospital-based cancer diagnosis for unique patients was 33.55 per 1,000 residents (Table 1).

More than one-quarter (26 percent) of all Missouri cancer patients diagnosed in a hospital during 2013 were diagnosed with breast cancer. Other prevalent types of cancer were secondary malignancies, skin cancer and male genital cancers, which accounted for 11 to 15 percent of cancer cases for Missouri patients during 2013 (Figure 2).

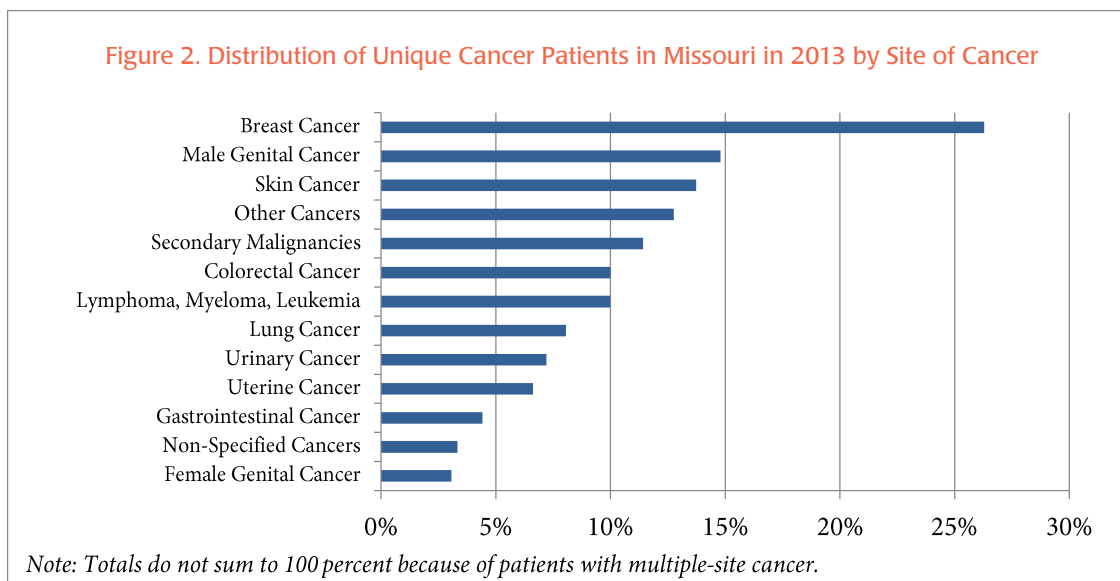
Table 1: Age and Race-adjusted Cancer Incidence in Missouri in 2013

		Age 0 to 19	Age 20 to 39	Age 40 to 59	Age 60 to 79	Age 80+	All Ages
White	Population	1,270,853	1,281,167	1,427,413	843,713	215,261	5,038,407
	Unique Patients	1,178	8,000	41,694	91,381	36,045	178,298
	Rate per 1,000	0.93	6.24	29.21	108.31	167.45	35.39
Non-White	Population	330,558	275,659	231,690	95,341	17,272	950,520
	Unique Patients	327	1,434	7,034	11,055	2,800	22,650
	Rate per 1,000	0.99	5.20	30.36	115.95	162.11	23.83
All Races	Population	1,601,411	1,556,826	1,659,103	939,054	232,533	5,988,927
	Unique Patients	1,505	9,434	48,728	102,436	38,845	200,948
	Rate per 1,000	0.94	6.06	29.37	109.08	167.05	33.55

Cancer Hot Spots in Missouri in 2013

To identify geographic clustering of unique cases, cancer rates per 1,000 total population were calculated at the ZIP code level for unique patients diagnosed with cancer in a Missouri hospital during 2013. The rates were calculated for all ZIP codes with at least 100 residents in 2013.^{iv} The rates of cancer diagnosis in Missouri ZIP codes ranged from 2.4 to 140 per 1,000 residents. The rates also were calculated for individual types of cancer that are prevalent in Missouri: breast cancer, lung cancer, colorectal cancer and lymphatic cancers — lymphoma, myeloma and leukemia.

The cancer rates are expressed in Figure 3 as hot spots using Getis-Ord Z-Scores.¹ The Getis-Ord statistic is designed to identify where high and low rates cluster spatially. Of the 955 Missouri ZIP codes for which a rate was calculated for all types of



¹ Actual rates per 1,000 are not reported to protect anonymity. The Getis-Ord Gi* statistics also are reported as Z-scores and aggregated into statistically-significant groupings to ensure protected health information retain confidentiality.

cancer, 11 percent were statistical cold spots with 99 percent confidence ($G_i^* < -2.58, P < 0.001$) and 15 percent were statistical cold spots with 95 percent confidence ($G_i^* < -1.96, P < 0.05$).

The majority of the cold spot clusters occurred along the state border, which may signal a limitation of the data with respect to missing information for patients diagnosed in non-Missouri hospitals.²

Ten percent of ZIP codes (93) were classified as statistical cancer hot spots with 95 percent confidence ($G_i^* > 1.96, P < 0.05$). Fifty-five of these (6 percent) were identified as hot spots with 99 percent confidence ($G_i^* > 2.58, P < 0.001$).

The Getis-Ord statistic accounts not only for the cancer rates in the individual ZIP code, but also the rates observed in neighboring areas. Therefore, statistically significant hot spots indicate clusters of ZIP codes with higher than expected cancer rates that are too large to be explained by random chance. Conversely,

statistically significant cold spots identify spatial clusters of geographically-contiguous ZIP codes with cancer rates that are too small to be attributed to randomness.^v

The Pervasiveness of Cancer in the U.S.

The United States has the sixth-highest overall rate of cancer and the second highest rate of cancer among females in the world.^{vi} The National Cancer Institute of the National Institutes of Health is a global leader in cancer research. NCI coordinates all federally-supported cancer-related research, training, health information dissemination and other efforts intended to illuminate the causes, diagnosis, treatment and prevention of cancer.^{vii}

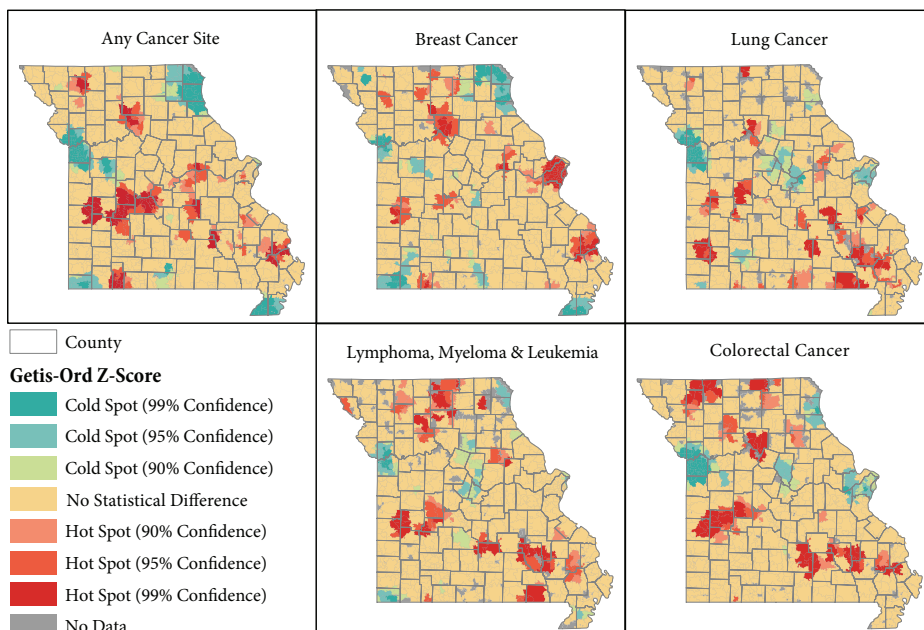
According to NCI, the largest age-adjusted mortality rate for people diagnosed with cancer is among African American males at 276.6 cancer deaths per 100,000 between 2006 and 2010. This was 30 percent higher than

the same rate for white males at 213.1 per 100,000 in the U.S. The age-adjusted mortality rate for female cancer patients in the U.S. was 149.7 during the same period. This was 44 percent lower than the mortality rate for males with cancer. African American females with cancer had an age-adjusted mortality rate of 171.2 per 100,000 total population. This was 14 percent higher than the mortality rate for white females.

Large disparities also are present in the health outcomes of cancer patients from varied socioeconomic strata. Health care professionals often refer to poverty as a carcinogen in its own right.^{viii} Counties with 20 percent or more of the population living below the poverty level have cancer-based mortality rates 13 percent higher for men and 3 percent higher for women compared to counties with fewer than 10 percent of residents living below poverty.^{ix} Other studies have found that women and men with less than a high-school education are, respectively, two and three times more likely to develop lung cancer than individuals with a college education. The same study found that lower socioeconomic status was a statistically-significant determinant of late-stage breast cancer in women and late-stage prostate cancer among men.^x

Overall, the cancer death rate in the U.S. has been decreasing an average of 1.5 percent annually since 2001 while the rate of new cancer cases has decreased an average 0.7 percent per year.^{xi} Despite these public health gains, cancer is still the second leading cause of death in the U.S.^{xii} To identify counties with excessive cancer mortality rates in the U.S., another hotspot analysis was also conducted using county-level age-adjusted cancer death rate data

Figure 3. Missouri Cancer Hot spots in 2013



2 HIDI databases do include records for Missouri patients treated at hospitals in other states that participate in the non-resident data exchange program, however these records typically do not include a unique patient identifier.

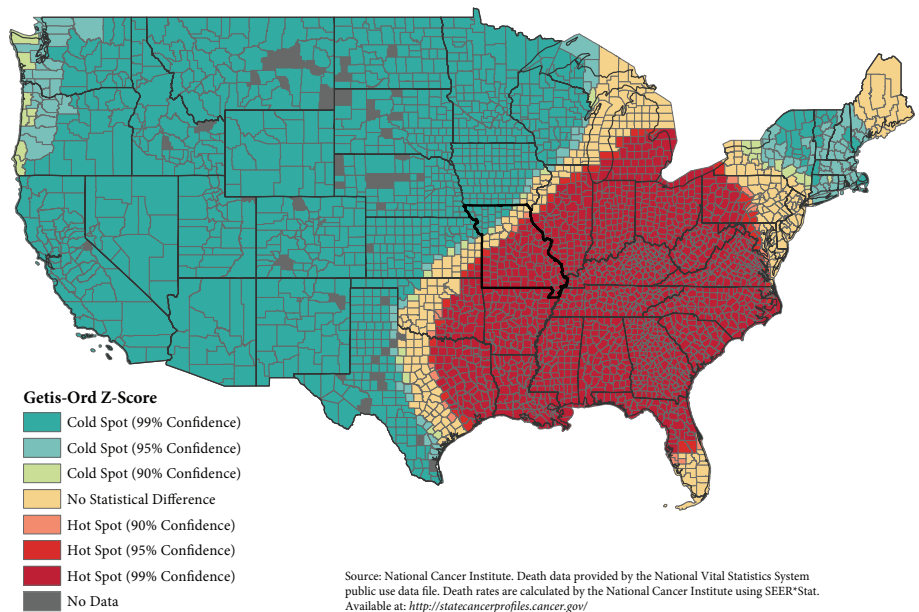
Cancer by the Numbers

- More than 1.6 million Americans will be diagnosed with cancer for the first time in 2014 – 50.6 new cases per 10,000.
- 585,720 Americans will die from cancer in 2014 – 18.5 deaths per 10,000.
- 13.4 million people are living with cancer in the U.S – 4.2 percent of the total population.
- 41 percent of Americans will be diagnosed with some form of cancer during their lifetime.
- Between 2004 and 2010, two-thirds (66.1 percent) of Americans living with cancer survived more than five years.
- Between 1992 and 2010, the rate of new cancer cases in the U.S. fell by 10 percent and the rate of cancer deaths decreased by 20 percent.
- The top three types of new cancer diagnosed in the U.S. are prostate, breast and lung/bronchus cancer.

Source: National Institutes of Health, National Cancer Institute.

from NCI.^{xi} The data reveal that 79 Missouri counties (69 percent) were statistically significant hot spots for cancer deaths between 2006 and 2010 (Figure 4). At the national level, cancer deaths were overwhelmingly clustered in a geographic “cancer belt” covering a third of the country including much of the Midwest, South and Mid-Atlantic states. According to Behavioral Risk Factor Surveillance System data, the average adult rate of smoking in states with a county-level cancer death hotspot was 22.3 percent in 2012. For states without a cancer death hotspot, the rate was 18.1 percent for adults — a relative difference that is 19 percent lower than states with a cancer death hotspot.^{xiii}

Figure 4. Age-adjusted Cancer Death Rates in the Continental U.S.: Hot Spots by County, 2006 - 2010



Source: National Cancer Institute. Death data provided by the National Vital Statistics System public use data file. Death rates are calculated by the National Cancer Institute using SEER*Stat. Available at: <http://statecancerprofiles.cancer.gov/>

An Ounce of Prevention

Many types of cancer can be prevented by individual decision making and lifestyle behavioral patterns. According to the U.S. Centers for Disease Control and Prevention, the simplest way to drastically reduce your risk of developing lung cancer is to avoid tobacco smoking. Lung cancer is the leading cause of death among all cancers and cigarette smoking causes virtually all cases of lung cancer. Men and women who smoke are respectively 23 and 13 times more likely to develop lung cancer than non-smokers.^{xiv} Only 16.8 percent of patients diagnosed with lung cancer survive for five years.^{xv}

Other lifestyle choices that greatly reduce the risk of developing certain types of cancer include eating a healthy diet, maintaining a healthy weight, exercising, protecting your skin from the sun and other sources of ultraviolet rays such as tanning beds, practicing safe sex and seeking routine preventive and maintenance care from your doctor.^{xvi}

It also is important to be screened at the recommended intervals for certain types of cancer such as breast, cervical and prostate cancer to ensure early detection and improve the likelihood of survival. Being vaccinated against Hepatitis B and human papillomavirus, or HPV, also greatly reduces the risk of being diagnosed with certain types of cancer.^{xiv}

Suggested Citation

Reidhead, M. *HIDI HealthStats, September 2014: Cancer Incidence and Hot spots in Missouri. Missouri Hospital Association, Hospital Industry Data Institute. Available at MHAnet.com.*

- ⁱ American Cancer Society (2014). Available at: <http://www.cancer.org/aboutus/whoweare/cancer-awareness-calendar>
- ⁱⁱ American Cancer Society (2014). Available at: <http://www.cancer.org/cancer/cancerbasics/what-is-cancer>
- ⁱⁱⁱ All hospital discharge source data are from the Missouri Hospital Association, Hospital Industry Data Institute Fiscal Year 2013 Inpatient and Outpatient databases and are limited to Missouri residents. Fiscal year 2013 spans Oct. 1, 2012, to Sept. 30, 2013.
- ^{iv} Population data were drawn from the 2013 Nielsen-Claritas ZIP code level Pop-Facts Premier 2013.1 file.
- ^v Esri Corporation, Redlands CA. *How Hot Spot Analysis (Getis-Ord Gi*) Works*. Available at: http://resources.arcgis.com/en/help/main/10.1/index.html#/How_Hot_Spot_Analysis_Getis_Ord_Gi_works/005p00000011000000/
- ^{vi} Ferlay J., Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray, F. GLOBOCAN 2012 v1.0, *Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11* [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available at: http://www.wcrf.org/cancer_statistics/cancer_frequency.php
- ^{vii} NIH, National Cancer Institute (2014). Available at: <http://www.cancer.gov/aboutnci/overview/mission>
- ^{viii} Siteman Cancer Center (2014). Available at: <http://www.siteman.wustl.edu/ContentPage.aspx?id=4544>
- ^{ix} Ward E., Jemal A., Cokkinides V., Singh G.K., Cardinez C., Ghafoor A., Thun M. *Cancer disparities by race/ethnicity and socioeconomic status. CA Cancer J Clin. 2004 Mar-Apr; 54(2):78-93.*
- ^x Clegg LX, et al. *Impact of socioeconomic status on cancer incidence and stage at diagnosis: selected findings from the surveillance, epidemiology, and end results: National Longitudinal Mortality Study. Cancer Causes Control. 2009 May;20(4):417-35.*
- ^{xi} National Institutes of Health, National Cancer Institute (2014). *SEER Cancer Statistics Factsheets: All Cancer Sites*. National Cancer Institute. Bethesda, MD. Available at: <http://seer.cancer.gov/statfacts/html/all.html>
- ^{xii} U.S. Centers for Disease Control and Prevention. *FastStats: Leading Causes of Death*. Available at: <http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm>
- ^{xiii} U.S. Centers for Disease Control and Prevention. *BRFSS (2012). Prevalence and Trends Data: Tobacco use, Adults who are current smokers*. Available at: <http://apps.nccd.cdc.gov/brfss/list.asp?cat=TU&yr=2012&qkey=8161&state=All>
- ^{xiv} U.S. Centers for Disease Control and Prevention. *Cancer Prevention and Control: Other Ways to Reduce Cancer Risk (2014)*. Available at: <http://www.cdc.gov/cancer/dpc/prevention/other.htm>
- ^{xv} National Institutes of Health, National Cancer Institute (2014). *SEER Cancer Statistics Factsheets: Lung and Bronchus Cancer*. National Cancer Institute. Bethesda, MD. Available at: <http://seer.cancer.gov/statfacts/html/lungb.html>
- ^{xvi} Mayo Clinic (2014). *Cancer prevention: 7 tips to reduce your risk*. Available at: <http://www.mayoclinic.org/healthy-living/adult-health/in-depth/cancer-prevention/art-20044816?pg=1>

