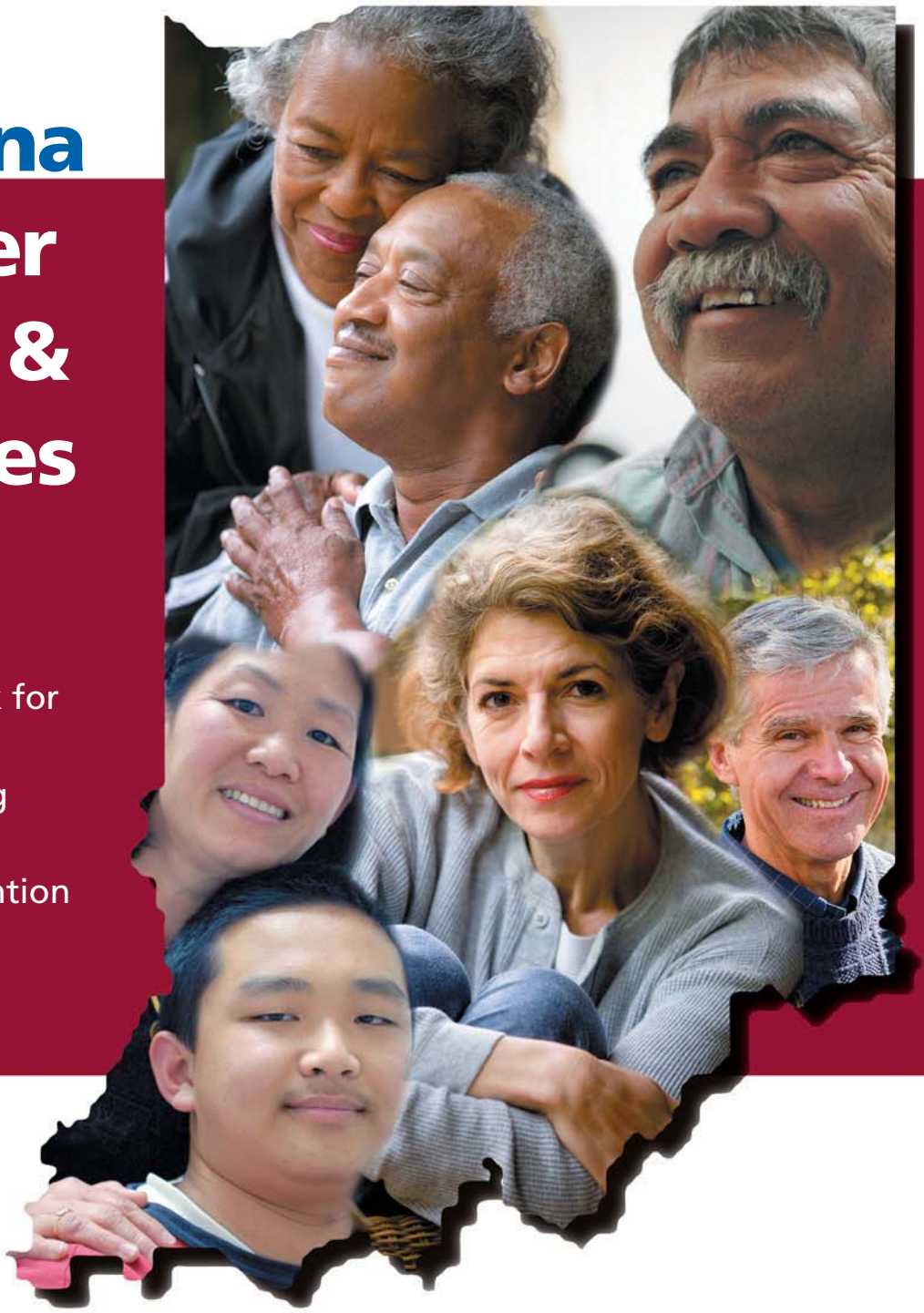
Indiana Cancer Facts & Figures 2006

A sourcebook for planning and implementing programs for cancer prevention and control



American Cancer Society®

Indiana State Department of Health

Indiana Cancer Consortium

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Acknowledgements

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Dear Reader,

The Indiana Cancer Consortium (ICC) is pleased to present the second edition of Indiana's only comprehensive report on the cancer problem in our state — *Indiana Cancer Facts and Figures 2006*.

The ICC is a statewide network of public and private partnerships whose mission is to reduce the cancer burden in Indiana through the development, implementation, and evaluation of a comprehensive plan that addresses cancers across the continuum from prevention through palliation.

Born from the vision of the American Cancer Society, Great Lakes Division, Inc., the Indiana State Department of Health, the Indiana University Cancer Center, and the Indiana University School of Medicine's Department of Public Health, the ICC was launched in October 2001. The ICC provides statewide coordination of public and private cancer control efforts that span the entire cancer spectrum from prevention and diagnosis through end of life care. Today, 73 member organizations participate in the work of the consortium.

Indiana Cancer Facts and Figures 2006 contains the most up-to-date cancer information available and helps us to better understand how the disease is affecting the people of Indiana. The report accurately identifies current cancer trends and their projected impact on our future. It is a task no one organization can accomplish alone.

The collaboration that defines both ICC and the publication of *Indiana Cancer Facts and Figures 2006* is an exemplary application of public health practice. The sharing of knowledge, resources, and expertise among the many participating organizations is truly a landmark achievement that will have lasting impact.

To all individuals and organizations that have made a commitment to the ICC, we thank you for your participation. To those with an interest in our mission who have not yet joined us, we invite you to become members of the ICC. And to the 6.3 million people who work and live in Indiana, we promise the implementation of the *Indiana Cancer Control Plan 2005-2008* to improve the health of Hoosiers for decades to come.

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Common Questions About Cancer

What is cancer?

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. The cancer cells form tumors that destroy normal tissue. If cancer cells break away from a tumor, they can travel through the blood stream or the lymph system to other areas of the body, where they may form new tumors (metastases). If this growth is not controlled, cancer may be fatal.

Are all growths and tumors cancerous?

Not all irregular growths of abnormal cells lead to cancer. A tumor can be either benign (non-cancerous) or malignant (cancerous). Benign tumors do not metastasize and, with very rare exceptions, are not life threatening. Benign tumors usually grow slowly, remain localized, and do not destroy surrounding normal tissue.

What causes cancer?

Cancer is caused by both external factors (tobacco, diet, alcohol, chemicals, sunlight, radiation, and infectious organisms) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism). They may act together or in sequence to initiate or promote carcinogenesis. Ten or more years often pass between exposures or mutations and detectable cancer.

All cancers involve the damage or mutation of genes that control cell growth and division. About 5% to 10% of cancers are hereditary and caused by an inherited mutated gene that predisposes a person to a very high risk of certain cancers. Other cancers result from gene mutations caused by exposure to either internal or external factors.

Who gets cancer?

Anyone can get cancer at any age. However, middle and old age people are more likely to develop cancer. Statewide and nationally, about 76% of all cancers are diagnosed in people 55 or older.

Also, individuals who have been exposed to certain external and internal risk factors have an increased relative risk or chance of developing cancer. For example, male smokers have a 20-fold relative risk of developing lung cancer compared with nonsmokers. This means that they are about 20 times more likely to develop lung cancer than nonsmokers. Most relative risks are not this large.

For example, women who have a first-degree (mother, sister or daughter) family history of breast cancer have about a 2-fold increased risk of developing breast cancer compared with women who do not have a family history.

How is cancer staged?

Staging is the process of describing the extent or spread of the disease from the site of origin. A cancer's stage is based on the primary tumor's size and location in the body and whether it has spread to other areas of the body. A number of different staging systems are used to classify tumors.

The ***TNM staging system*** assesses tumors in three ways: extent of the primary tumor (T), absence or presence of regional lymph node involvement (N), and absence or presence of distant metastases (M). Once the T, N, and M are determined, a "stage" of I, II, III, or IV is assigned, with stage I being early stage and IV being advanced.

Summary staging is useful for descriptive and statistical analysis of tumor registry data. An **in situ** tumor is at the earliest stage when it has not invaded surrounding tissue; it can only be diagnosed by microscopic examination. A **localized** tumor has not spread beyond the primary organ. A **regional** tumor has spread beyond the primary organ to surrounding organs, tissues, or lymph nodes. A **distant** tumor has spread to other parts of the body, or metastasized, either through the blood or lymph node systems. With an **unstaged/unknown** tumor, there is insufficient information available to determine the stage of the disease.

How is cancer treated?

Treatment depends on the cancer, specific diagnosis, and the type and stage of growth. Cancer is treated by one or more of the following therapies:

- **Surgery** removes the tumor by cutting the cancerous mass; it is mostly used for localized tumors.
- **Chemotherapy** uses either intravenous or oral drugs to destroy cancer cells. It is used with the intention of curing or inducing remission in poorly differentiated carcinoma.
- **Hormone therapy** may be given to block the body's natural hormones and to slow or stop the growth of certain cancers.
- **Immunotherapy or biologic therapy** is used to stimulate and strengthen one's own immune system to destroy the cancer cells.
- **Radiation or radiotherapy** uses high-energy rays to destroy or slow the growth of cancer cells. It can be used with the intention of curing some cancers that have not spread too far from their site of origin, or to relieve symptoms.

Can cancer be cured?

Many cancers can be cured if detected and promptly treated. For most types of cancer, if a person's cancer has been in remission (all signs and symptoms of the disease are absent) for 5 years, the cancer is considered cured. However, the length of remission at which a person is considered cured differs by cancer type. Certain skin cancers are considered cured as soon as the lesion is removed. With other cancers, 8 to 10 years must pass before the person is considered to be cured.

What is the impact of stage at diagnosis on survival?

Staging is essential in determining the choice of therapy and assessing prognosis. It is a strong predictor of survival; generally, the earlier the stage, the better the prognosis. Locally and nationally, about half of newly diagnosed cases are either in situ or localized (Figure 1).

Can cancer be prevented?

Many cancers can be prevented by modifying external factors and lifestyle changes, such as eliminating tobacco use, improving dietary habits, losing weight, obtaining early detection cancer screenings and avoiding sun and infectious exposures.

- All cancers caused by use of tobacco products could be prevented. ***The Harvard Report on Cancer Prevention*** estimates that 30% of cancer deaths are caused by tobacco use. In 2006, an estimated 3,600 Hoosier lives will be lost to cancer due to tobacco use.
- Scientific evidence also suggests that it may be possible to reduce cancer deaths by about one-third by improving nutrition and maintaining a recommended body weight. In particular, diets low in animal fat and high in fruits and vegetables could help prevent certain cancers.
- Early diagnosis through regular screening examinations saves lives by identifying cancers when they are most curable and treatment is more successful. Cancers that can be detected by screening account for about half of all new cancer cases and include breast, colon, rectum, cervix, prostate, testis, oral cavity, and skin. The 5-year relative survival rate for these cancers is about 86% but would increase to about 95% if all of these cancers were diagnosed at a localized stage through regular cancer screenings.
- The more than 1 million skin cancers that are expected to be diagnosed in the U.S. in 2006 could have been prevented by protection from the sun's rays.

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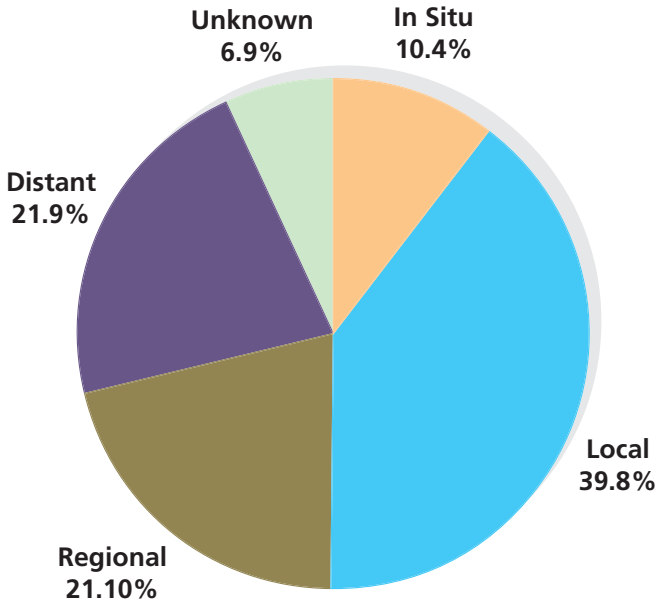
Figure 1. Average Stage at Diagnosis in Indiana, All Cancers, 2003



Source: Cancer Incidence and Mortality: Preliminary State Data 2003. May 2006.

- About 5% of cancers are related to infectious exposures, such as hepatitis B virus (HBV), human papillomavirus (HPV), human immunodeficiency virus (HIV), helicobacter, and others, and could be prevented through behavioral changes, vaccines, or antibiotics.

Table 1. Causes Of Cancer In The U.S.

Cause	Percent Rate
Tobacco	30
Adult diet/obesity	30
Sedentary lifestyle	5
Occupational factors	5
Family history of cancer	5
Viruses/other biologic agents	5
Perinatal factors/growth	5
Reproductive factors	3
Alcohol	3
Socioeconomic status	3
Environmental pollution	2
Ionizing/ultraviolet radiation	2
Prescription drugs/medical procedures	1
Salt/other food additives/contaminants	1

Source: Harvard Report on Cancer Prevention, (1996). Harvard Center for Cancer Prevention, Harvard School of Public Health.

What are the most common cancers?

The most common cancers for both the state and the nation are the same. Breast and prostate are the most prevalent cancers in women and men, respectively. Lung, bronchus and colon cancers are the next most common cancers in both sexes (Table 2).

Table 2. Cancer Incidence In Indiana, 2003

Site	New Cases
Lung and Bronchus	4,987
Female Breast	3,819
Prostate	3,673
Colon	3,342
All Sites	28,775

Source: Indiana State Department of Health - Indiana State Cancer Registry.

How many people alive today will get cancer?

About 2.5 million or 2 in 5 Hoosiers now living will eventually develop cancer. Nationally, men have slightly less than a 1 in 2 chance of developing cancer in their lifetime; women's lifetime risk of developing cancer is slightly more than 1 in 3.

How many people alive today have ever had cancer?

The National Cancer Institute estimates that approximately 10.1 million Americans with a history of cancer were alive in January 2002. Some of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment.

How many new cases of cancer are expected to occur this year?

The American Cancer Society estimates that approximately 32,710 Indiana residents will be diagnosed with cancer in 2006. This amounts to almost four new cases of cancer diagnosed every hour of every day. This estimate does not include non-melanoma skin cancer and carcinoma in situ (for sites other than urinary bladder).

How many people are expected to die this year?

Cancer is the second leading cause of death of adults in Indiana following heart disease. Cancer is the second leading cause of death in children between ages 5 and 14 following accidental death. In 2006, about 13,200 Hoosiers are expected to die of the disease, which is approximately 36 people every day or almost two people every hour.

How does incidence and mortality in Indiana compare with the rest of the U.S.?

Indiana's incidence rate for cancer in 2003 was 456.8 per 100,000 (Figure 2), or about the same as the national rate of 459.6/100,000. However, the state's mortality rate during the same year was about 11% higher than the national rate, or 205.7 vs. 184.6 per 100,000 (Figure 3). However, there are exceptions when comparing rates for various cancers. Both state incidence and mortality rates for lung and bronchus cancer and kidney and renal pelvis cancer were notably higher than national rates in 2003, while the state incidence rates of prostate cancer and melanoma of the skin and the mortality rate from stomach cancer were lower than US rates during the same year.

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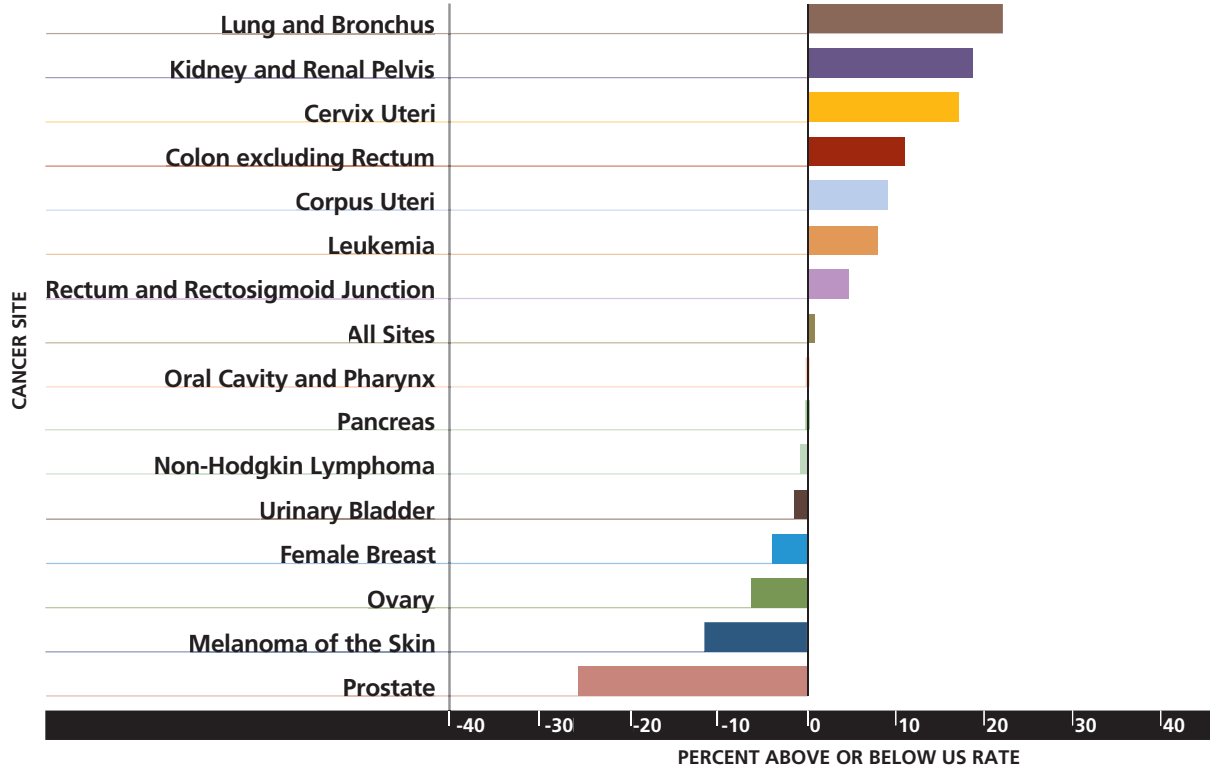
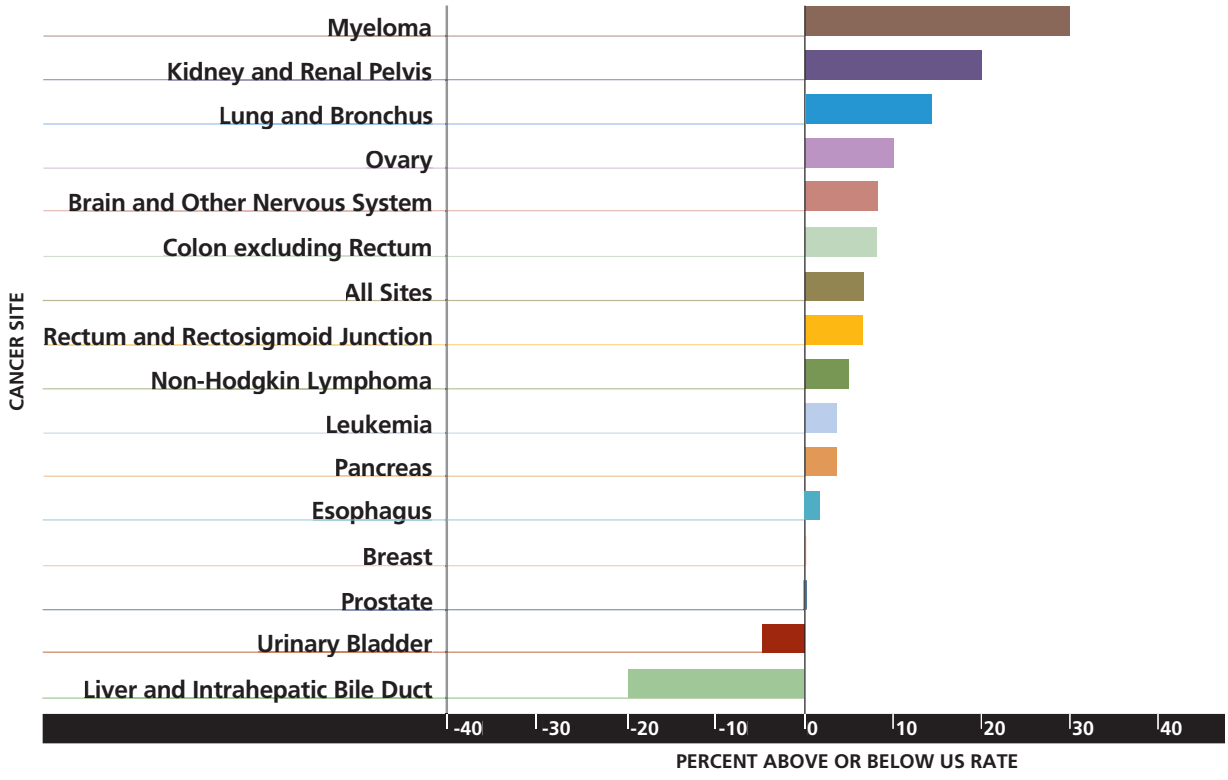
Figure 2. How Do Indiana Cancer Incidence Rates Compare To U.S. Incidence Rates?



Source: See Figure 3

Figure 3. How Do Indiana Cancer Mortality Rates Compare To U.S. Mortality Rates?



Source: Indiana State Department of Health — Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, June 2006. National rates are from 11 registries of the Surveillance, Epidemiology and End Results (SEER) Program of the National Cancer Institute representing 14% of the U.S. population. Incidence figures exclude basal and squamous cell skin cancers and in situ carcinoma except bladder.

Is the cancer burden in Indiana lessening?

From 1996 to 2001, incidence rates in Indiana increased over 14% from 425.3 to 485.3 per 100,000. Incidence rates decreased to 481.3 in 2002 and 456.8 in 2003. Trends varied, however, for different cancer sites. Liver cancer incidence increased by over 90% from 1996 to 2003. Lung and bronchus cancer increased by 10% over that same time period. Testicular, pancreatic, and kidney and renal pelvis cancers have continued to increase through 2003 by as much as 37%. Cancers of the oral cavity and pharynx that had experienced about a 7% decline from 1996 to 1999, increased in incidence through 2002 and then decreased again in 2003. The more common cancers of the breast, and colon remained relatively stable from 1996 to 2000.

Conversely, mortality rates for all cancer sites have decreased by almost 6% from 217.3 to 205.7 per 100,000 between 1996 and 2001. Even greater declines in mortality of 17, 25 and 31% were witnessed for female breast, prostate, and cervical cancers, respectively. However, the rate for lung and bronchus cancer remained relatively constant at 65 per 100,000, the highest mortality rate among cancer sites.

These statistics indicate that progress continues to be made in the early detection of certain cancers, and that the incidence and mortality of some cancers is declining. However, a significant cancer burden still exists for Hoosiers that requires continued and more targeted cancer control programs.

How many people today survive cancer?

Nationally, the five-year survival rate for all cancers combined has increased to 65%. This means approximately 21,262 Hoosiers who get cancer in 2006 will survive five years after diagnosis. Factors such as early stage of disease at diagnosis can greatly improve the probability of survival after five years.

After adjusting for normal life expectancy (factors such as dying of heart disease, accidents, and diseases of old age), the 5-year relative survival rate represents persons who are living five years after diagnosis, whether disease free, in remission, or under treatment with evidence of cancer. While 5-year relative survival rates are useful in monitoring progress in the early detection and treatment of cancer, they do not represent the proportion of people who are cured permanently, since cancer can affect survival beyond five years after diagnosis.

Although these rates provide some indication about the average survival experience of cancer patients in a given population, they are less informative when used to predict individual prognosis and should be interpreted with caution. First, 5-year relative survival rates are based on patients who were diagnosed and treated at least five years ago and do not reflect recent advances in treatment. Second, information about detection methods, treatment protocols, additional illnesses, tumor spread at diagnosis, and behaviors that influence survival are not taken into account in the estimation of survival rates.

What are the costs of cancer?

The National Institutes of Health estimate overall costs for cancer in 2005 at $209.9 billion: $74.0 billion for direct medical costs (total of all health expenditures); $17.5 billion for indirect morbidity costs (cost of lost productivity due to illness); and, $118.4 billion for indirect mortality costs (cost of lost productivity due to premature death).

Lack of health insurance and other barriers to health care prevent many Americans from receiving optimal health care. According to 2003 National Health Interview Survey data, about 17% of Americans under age 65 have no health insurance and about 24% of persons 65 and over have only Medicare coverage. During 1999 and 2000, almost 20% of Americans aged 18 to 64 years reported not having a regular source of health care.

How does Indiana keep track of changes in cancer risk?

The Indiana State Cancer Registry was established for compiling cancer cases and other related data necessary to conduct epidemiological studies of cancer and develop appropriate preventive and control programs. The data in this registry allow measurement of progress toward reaching the state goal of reducing cancer incidence and mortality in Indiana.

Table 3. Average Indiana Cancer Incidence and Mortality, 2000-2003

INCIDENCE

BOTH SEXES	ALL RACES		WHITE		AFRICAN AMERICAN	
Site	Count	Rate	Count	Rate	Count	Rate
Colon and Rectum	13,808	56.5	12,662	55.6	1,008	67.3
Lung and Bronchus	19,554	80.2	18,040	79.6	1,362	89.8
Melanoma of the skin	3,680	15.1				

FEMALE	ALL RACES		WHITE		AFRICAN AMERICAN	
Site	Count	Rate	Count	Rate	Count	Rate
Breast	16,456	123.2	15,173	123.3	1,044	112.8
Cervix Uteri	1,098	8.7	965	8.5	108	11.0
Colon and Rectum	6,835	48.2	6,257	47.4	517	58.8
Lung and Bronchus	8,390	61.4	7,728	61.0	587	66.8
Melanoma of the skin	1,640	12.7				
Ovary	1,818	13.5	1,719	13.8	78	8.5

MALE	ALL RACES		WHITE		AFRICAN AMERICAN	
Site	Count	Rate	Count	Rate	Count	Rate
Colon and Rectum	6,973	67.6	6,405	66.6	491	79.1
Lung and Bronchus	11,163	107.0	10,312	106.0	774	122.8
Prostate	14,786	140.5	13,090	133.3	1,352	214.7
Melanoma of the skin	2,040	18.7				

MORTALITY

BOTH SEXES	ALL RACES		WHITE		AFRICAN AMERICAN	
Site	Count	Rate	Count	Rate	Count	Rate
Colon and Rectum	5,238	21.4	4,790	20.9	431	29.6
Lung and Bronchus	15,818	64.9	14,606	64.4	1,167	78.0
Melanoma of the skin	691	2.8				

FEMALE	ALL RACES		WHITE		AFRICAN AMERICAN	
Site	Count	Rate	Count	Rate	Count	Rate
Breast	3,696	26.6	3,353	26.0	324	35.8
Cervix Uteri	347	2.6	308	2.5	37	4.1
Colon & Rectum	2,574	17.5	2,371	17.3	194	22.4
Lung & Bronchus	6,600	47.7	6,084	47.3	495	56.7
Melanoma of the skin	269	2.0				
Ovary	1,330	9.5	1,274	9.8	51	5.8

MALE	ALL RACES		WHITE		AFRICAN AMERICAN	
Site	Count	Rate	Count	Rate	Count	Rate
Colon and Rectum	2,664	26.8	2,419	26.1	237	39.5
Lung and Bronchus	9,216	89.6	8,520	88.7	672	109.3
Melanoma of the skin	422	3.9				
Prostate	2,589	29.1	2,248	27.0	332	64.7

Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006
Rates are age-adjusted per 100,000 population to the 2000 U.S. Population Standard.

Table 4. Average Indiana Cancer Incidence Rates by County, 2001 - 2003

County	All Cancers		Female Breast		Colon & Rectum		Lung		Prostate	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Adams	359	353.2	58	102.0	37	35.2	49	49.2	33	76.2
Allen	4,232	446.4	688	130.5	561	59.5	648	69.6	418	104.0
Bartholomew	1,040	466.7	166	134.7	101	45.6	163	73.1	103	102.9
Benton	192	618.6	20	123.0	17	#	38	123.4	30	216.5
Blackford	315	636.2	41	157.4	41	80.2	66	131.6	34	158.0
Boone	596	424.4	102	129.8	54	38.8	78	58.4	64	106.6
Brown	143	287.9	20	73.3	9	#	26	52.5	19	#
Carroll	259	385.9	34	93.2	36	53.0	36	54.2	37	121.3
Cass	682	510.5	86	120.9	95	69.3	119	88.6	72	120.2
Clark	1,607	532.6	239	141.6	171	57.3	314	104.4	259	202.0
Clay	501	556.8	66	136.8	64	69.9	87	95.4	56	142.4
Clinton	489	442.1	66	111.4	56	49.8	73	66.3	60	128.2
Crawford	172	489.6	15	#	23	68.1	39	110.4	18	#
Daviess	399	414.0	49	93.6	58	59.8	61	62.3	41	100.4
Dearborn	566	413.2	62	81.8	79	59.3	118	88.2	68	110.7
Decatur	346	439.8	35	83.5	36	45.0	59	74.3	32	90.9
DeKalb	514	440.0	85	134.9	67	57.9	73	62.9	45	88.9
Delaware	1,791	484.4	223	113.4	213	56.2	309	82.4	224	144.3
Dubois	505	406.1	84	124.7	72	57.8	52	41.7	82	148.9
Elkhart	2,287	448.9	307	109.9	274	54.1	381	76.4	275	127.5
Fayette	444	495.5	62	129.1	46	50.0	81	88.5	63	153.5
Floyd	1,102	505.3	149	122.1	105	48.5	208	96.1	177	194.9
Fountain	332	523.8	40	117.9	46	70.7	60	92.7	47	165.6
Franklin	248	359.7	40	110.2	31	45.2	47	68.0	24	74.8
Fulton	374	519.9	56	148.4	42	57.3	59	81.4	58	179.8
Gibson	502	443.8	67	110.4	86	74.9	92	80.2	53	105.8
Grant	1,279	507.8	146	110.4	128	50.2	225	87.3	183	163.8
Greene	569	489.9	63	105.2	85	73.2	112	94.4	72	138.6
Hamilton	2,010	429.8	348	126.0	208	46.7	278	67.3	243	119.6
Hancock	846	485.1	117	120.7	97	57.5	148	86.2	90	112.7
Harrison	458	439.3	54	98.0	60	58.7	84	81.4	68	139.0
Hendricks	1,474	491.1	228	137.6	156	52.8	229	80.5	187	140.3
Henry	810	469.0	105	116.6	115	64.7	146	81.8	93	120.6
Howard	1,285	465.7	174	113.2	160	57.2	222	79.8	147	121.9
Huntington	542	432.2	88	130.2	81	61.7	90	73.8	47	88.3
Jackson	702	539.8	105	145.6	81	62.2	107	82.2	73	135.1
Jasper	493	530.6	64	127.0	49	52.8	84	90.4	79	187.0
Jay	327	441.8	48	120.2	47	62.9	51	66.8	31	94.2
Jefferson	535	522.4	83	150.3	61	59.7	105	101.3	77	168.0
Jennings	346	435.6	51	120.6	36	46.6	62	78.8	33	92.0
Johnson	1,611	473.3	240	126.2	153	45.8	253	75.4	219	148.3
Knox	673	504.8	88	121.2	99	72.8	110	81.7	69	119.3
Kosciusko	961	426.9	137	114.0	136	60.2	170	75.8	103	103.4
LaGrange	349	376.7	59	123.9	43	47	58	61.8	37	90.4
Lake	7,616	503.8	1,057	127.5	875	57.7	1,140	75.0	1,168	179.3
LaPorte	1,728	487.4	241	127.3	223	62.1	297	83.3	243	157.0

continued

Table 4. Average Indiana Cancer Incidence Rates by County, 2001 - 2003, Continued

County	All Cancers		Female Breast		Colon & Rectum		Lung		Prostate	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Lawrence	692	428.5	88	99.2	100	61.6	136	83.2	98	138.6
Madison	2,268	498.4	292	120.3	260	56.1	443	96.0	303	152.1
Marion	12,088	514.2	1,719	129.3	1,285	55.0	2,221	96.5	1,493	154.7
Marshall	711	499.9	102	133.7	94	64.7	110	77.5	95	157.9
Martin	179	508.3	24	128.7	21	59.6	24	64.7	20	116.7
Miami	574	506.1	67	110.3	54	47.3	108	94.7	69	130.8
Monroe	1,392	489.9	212	138.1	137	49.0	204	73.8	204	170.9
Montgomery	550	448.6	69	106.4	71	57.2	95	76.4	89	159.9
Morgan	1,003	521.3	136	127.5	117	62.0	170	90.7	159	186.4
Newton	217	471.5	27	110.8	30	65.0	38	82.3	22	111.1
Noble	514	399.5	76	110.4	74	58.3	87	68.6	56	106.5
Ohio	79	411.1	4	#	11	#	19	#	11	#
Orange	320	485.8	33	93.4	46	69.1	47	68.9	48	158.7
Owen	311	445.2	41	109.1	32	47.2	58	82.1	45	138.5
Parke	252	418.6	29	90.7	39	63.6	56	91.8	30	108.2
Perry	267	417.5	33	93.7	35	53.8	59	91.9	28	99.5
Pike	203	448.7	21	88.5	23	51.7	43	92.2	25	114.7
Porter	2,074	474.6	274	113.2	251	59.1	298	69.8	308	158.6
Posey	330	395.0	51	113.1	46	55.4	72	86.4	43	114.0
Pulaski	252	527.1	35	146.9	26	51.7	31	63.5	54	243.6
Putnam	530	485.1	83	147.1	60	55.4	101	91.6	66	129.5
Randolph	471	489.4	71	139.4	55	55.1	78	80.4	51	117.1
Ripley	401	472.3	48	106.3	54	62.2	85	100.5	42	103.5
Rush	266	438.5	32	98.4	36	58.8	54	88.6	30	111.1
St. Joseph	4,077	499.4	550	127.2	498	58.3	607	74.7	548	158.2
Scott	359	534.9	50	134.5	52	82.1	88	130.5	49	161.7
Shelby	630	477.7	75	103.5	73	55.3	119	90.4	76	131.3
Spencer	301	461.1	45	128.8	43	66.4	51	76.8	36	116.2
Starke	373	477.3	50	123.9	47	59.7	64	78.6	57	165.1
Steuben	470	470.7	76	142.2	58	59.7	80	81.3	37	82.1
Sullivan	366	515.2	54	148.9	45	62.5	79	110.7	48	153.6
Switzerland	121	407.9	15	#	10	#	26	91.9	23	163.1
Tippecanoe	1,677	486.8	258	137.4	193	56.5	257	76.7	227	156.9
Tipton	286	502.8	35	107.4	32	54.1	46	81.2	36	156.4
Union	91	387.5	6	#	16	#	12	#	12	#
Vanderburgh	2,436	421.7	372	116.5	301	51.0	471	80.4	258	105.8
Vermillion	308	517.8	42	133.5	30	49.6	47	77.3	44	172.0
Vigo	1,690	507.2	221	121.4	207	60.9	306	91.2	239	176.0
Wabash	517	416.5	80	118.1	86	65.8	78	62.2	59	107.8
Warren	110	388.3	22	146.7	15	#	15	#	16	#
Warrick	650	407.3	103	114.8	84	55.0	131	84.1	76	103.8
Washington	396	483.3	37	84.5	50	61.2	73	89.5	73	206.5
Wayne	1,196	480.3	155	113.5	158	61.5	249	98.4	146	132.9
Wells	365	399.0	58	117.8	53	55.9	51	55.5	42	107.0
White	415	474.3	57	121.8	48	53.3	65	73.2	63	163.1
Whitley	405	412.0	76	145.4	57	56.9	66	67.5	30	69.0

Rate suppressed if fewer than 20 cases.
Source: Indiana State Department of Health – Indiana State Cancer Registry, June 2006.
Rates are per 100,000 population age-adjusted to the 2000 U.S. Population Standard.

Table 5. Average Indiana Cancer Mortality Rates by County, 2001- 2003

County	All Cancers		Female Breast		Colon & Rectum		Lung		Prostate	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Adams	192	177.2	19	#	27	23.3	42	41.7	14	#
Allen	1,889	201.4	144	26.4	215	22.7	504	54.4	100	29.0
Bartholomew	427	196.3	31	24.4	40	18.8	114	52.2	18	#
Benton	60	183.2	2	#	6	#	22	68.6	3	#
Blackford	115	228.9	11	#	9	#	33	66.3	6	#
Boone	281	201.7	18	#	26	19.3	68	49.7	23	44.8
Brown	105	215.3	6	#	6	#	34	66.2	8	#
Carroll	114	167.7	7	#	17	#	30	45.6	6	#
Cass	314	230.0	12	#	48	34.8	100	73.8	8	#
Clark	714	238.9	47	27.6	72	24.3	252	84.3	33	30.1
Clay	217	231.3	15	#	16	#	65	71.0	12	#
Clinton	206	177.8	13	#	21	18	62	54.7	8	#
Crawford	71	205.0	5	#	8	#	22	64.4	1	#
Daviess	171	171.3	13	#	16	#	53	54.1	12	#
Dearborn	274	206.4	18	#	35	27.1	104	78.4	6	#
Decatur	162	203.5	8	#	14	#	46	58.3	10	#
DeKalb	231	198.0	20	31.9	33	27.7	56	48.6	12	#
Delaware	801	212.9	64	29.7	72	19.1	258	68.3	38	28.4
Dubois	203	160.7	24	32.9	23	18.4	49	39.3	7	#
Elkhart	943	185.8	72	25.1	72	14.1	290	58.2	41	21.4
Fayette	218	238.2	16	#	20	21.3	63	68.6	10	#
Floyd	485	222.9	29	23.3	50	23.0	166	76.3	17	#
Fountain	149	230.2	13	#	14	#	40	62.3	12	#
Franklin	121	176.0	7	#	25	36.3	30	44.2	3	#
Fulton	164	222.6	16	#	23	30.1	53	72.8	13	#
Gibson	220	189.8	16	#	39	33.0	64	55.7	11	#
Grant	539	209.9	33	23.1	46	17.7	181	69.8	34	39.8
Greene	285	239.2	12	#	34	28.2	90	75.9	18	#
Hamilton	687	168.1	43	16.5	66	16.6	201	49.9	25	15.7
Hancock	280	169.9	15	#	29	18.6	107	64.4	8	#
Harrison	221	220.9	19	#	22	22.9	74	72.2	7	#
Hendricks	550	191.6	36	22.2	58	20.6	163	56.4	17	#
Henry	361	202.4	27	27.1	33	18.0	111	61.7	15	#
Howard	591	215.0	39	24.4	64	23.3	179	64.5	21	20.6
Huntington	257	197.3	24	30.9	34	25.3	79	63.4	11	#
Jackson	297	225.6	9	#	28	21.4	88	67.0	15	#
Jasper	206	221.8	19	#	25	27.2	69	74.8	7	#
Jay	171	225.2	8	#	16	#	47	60.9	9	#
Jefferson	200	195.4	15	#	21	20.4	77	74.8	8	#
Jennings	181	235.9	9	#	24	31.2	58	74.4	12	#
Johnson	631	189.2	49	24.8	55	16.7	182	54.9	29	24.6
Knox	271	196.5	20	26.3	36	26.5	78	56.7	7	#
Kosciusko	431	192.4	34	27.8	45	19.9	117	52.5	34	37.5
LaGrange	163	179.3	9	#	22	24.2	45	48.5	12	#
Lake	3,388	223.6	282	32.8	359	23.7	932	61.4	216	37.5
LaPorte	765	213.4	53	27.1	82	22.8	235	65.7	56	41.0

continued

Table 5. Average Indiana Cancer Mortality Rates by County, 2001- 2003, Continued

County	All Cancers		Female Breast		Colon & Rectum		Lung		Prostate	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Lawrence	323	197.5	18	#	26	15.8	126	76.5	18	#
Madison	949	204.7	54	21.8	79	16.6	333	72.0	55	31.8
Marion	5,252	225.8	375	27.3	482	20.6	1,803	78.3	254	31.1
Marshall	306	210.8	29	35.7	33	22.8	79	55.3	20	39.4
Martin	69	194.3	5	#	8	#	18	#	4	#
Miami	245	217.9	21	32.7	24	21.6	76	67.5	6	#
Monroe	549	196.5	42	25.9	42	15.2	156	56.4	33	34.0
Montgomery	234	187.9	17	#	24	19.4	70	56.4	11	#
Morgan	398	217.7	26	25	39	22	139	74.6	13	#
Newton	123	271.4	7	#	11	#	43	95.5	7	#
Noble	259	203.6	22	30.9	32	25.3	78	61.4	10	#
Ohio	44	229.3	1	#	4	#	21	107.2	2	#
Orange	154	230.9	6	#	13	#	50	74.4	6	#
Owen	168	244.9	7	#	17	#	65	92.5	7	#
Parke	114	188.5	9	#	15	#	45	73.4	5	#
Perry	123	189.2	6	#	22	33.8	42	64.9	5	#
Pike	101	214.2	9	#	6	#	40	83.4	2	#
Porter	851	200.4	62	25.4	81	19.7	251	58.7	38	25.5
Posey	145	176.5	16	#	11	#	50	60.5	8	#
Pulaski	100	199.6	7	#	16	#	21	43.6	5	#
Putnam	228	211.1	18	#	20	18.6	79	73.1	9	#
Randolph	188	190.7	18	#	21	21.4	53	53.6	12	#
Ripley	163	189.3	17	#	20	23.3	45	52.7	9	#
Rush	125	204.9	9	#	9	#	47	78.0	3	#
St. Joseph	1,709	203.3	123	25.6	183	20.9	478	58.4	100	29.9
Scott	184	282.4	14	#	25	40.2	72	107.6	10	#
Shelby	286	218.2	19	#	27	20.7	98	74.9	9	#
Spencer	134	207.9	5	#	11	#	36	54.5	8	#
Starke	171	216.9	10	#	15	#	62	76.3	9	#
Steuben	208	210.7	16	#	23	23.1	63	64.4	10	#
Sullivan	176	246.1	17	#	19	#	59	82.7	5	#
Switzerland	71	247.7	3	#	7	#	27	92.5	4	#
Tippecanoe	685	200.7	36	18.8	78	22.7	208	61.9	34	28.3
Tipton	116	202.7	8	#	11	#	34	60.1	5	#
Union	36	159.9	3	#	1	#	10	#	1	#
Vanderburgh	1,281	212.6	91	26.1	127	21.1	398	66.7	47	20.7
Vermillion	157	259.0	13	#	20	32.2	39	62.7	11	#
Vigo	734	214.2	55	28.9	97	28.1	253	75.0	32	25.4
Wabash	256	199.4	20	29	32	23.5	72	56.9	13	#
Warren	64	232.6	3	#	8	#	14	#	2	#
Warrick	335	219.8	23	26.3	30	20.4	122	79.8	17	#
Washington	172	214.8	11	#	16	#	48	58.9	11	#
Wayne	528	205.7	43	29.1	41	15.8	187	73.1	31	31.6
Wells	162	171.4	12	#	17	#	38	39.6	11	#
White	170	193.8	11	#	18	#	53	59.2	13	#
Whitley	198	199.6	14	#	23	22.3	55	56.5	14	#

Rate suppressed if fewer than 20 cases.
Source: Indiana State Department of Health – Indiana State Cancer Registry, June 2006.
Rates are per 100,000 population age-adjusted to the 2000 U.S. Population Standard.

Breast Cancer

Bottom Line

Nearly all breast cancers that are detected early can be treated successfully. A screening mammogram is the most effective way to detect breast cancer at an early stage and annual mammograms are recommended for women aged 40 or older. Additionally, since a few breast cancers may not be visible with mammography, annual clinical breast exams by a doctor or nurse are recommended for the early detection of breast cancer.

Risk Factors that Cannot be Controlled

A number of personal characteristics have been found to increase the chances of developing breast cancer. They include:

- Gender (male breast cancer is rare)
- Age (the risk of breast cancer increases as you age; 95% of breast cancers occur in women aged 40 and older)
- Family history of breast cancer/genetic factors (about 10% of breast cancers are hereditary; BRCA1 and BRCA2 account for 40-50% of familial breast cancers)
- Personal history of breast cancer (women with breast cancer in one breast are 3 - 4 times more likely to develop cancer in the other breast than the general population)
- History of atypical hyperplasia on a previous breast biopsy (the risk of breast cancer is 4 - 5 times that of the general population)
- Long menstrual history (menstrual periods that start early and end late in life; one of several factors that result in a longer lifetime exposure to estrogen which promotes breast cell division)
- Never having a child or having a first child born after age 30

Risk Factors that Can be Changed

- Obesity (especially after menopause)
- Alcohol use (associated with two or more drinks daily)
- Use of postmenopausal hormone replacement therapy (especially with estrogen plus progestin)

Prevention/Screening/Early Detection

Management of risk factors may help some women reduce their chances of being diagnosed with breast cancer. Most important, however, is annual screening with mammography after age 40.

Mammography can detect breast cancer about 1.7 years earlier than by clinical or self-breast examination alone, often before physical symptoms develop. Studies have shown that early detection saves lives and increases treatment options. Improved mammography screening to detect breast cancer early, along with better treatment options, have made breast cancer a more curable disease than it was 30 years ago. Unfortunately, we do not have optimal screening rates in Indiana.

In 2004, approximately 31% of Indiana women aged 40 and older surveyed in the Indiana Behavioral Risk Factor Surveillance System (BRFSS) reported that they had not had a mammogram in the past two years. Women aged 40 and older who had health care coverage were more likely than those without coverage to have had a mammogram in the past two years (70.1% vs. 43.3% respectively). There were no statistically significant differences in mammography rates between white, African American, and Hispanic/Latina female respondents.

Cancer Burden

Breast cancer is the most common cancer, other than skin cancer, among women in Indiana, regardless of race. Breast cancer accounts for over two-thirds of all cancers diagnosed in women. Only lung cancer accounts for more cancer deaths in women. From 2000-2003, 3,693 women in Indiana died from breast cancer with an average annual mortality rate of 26.6 per 100,000. The risk of developing breast cancer increases with age.

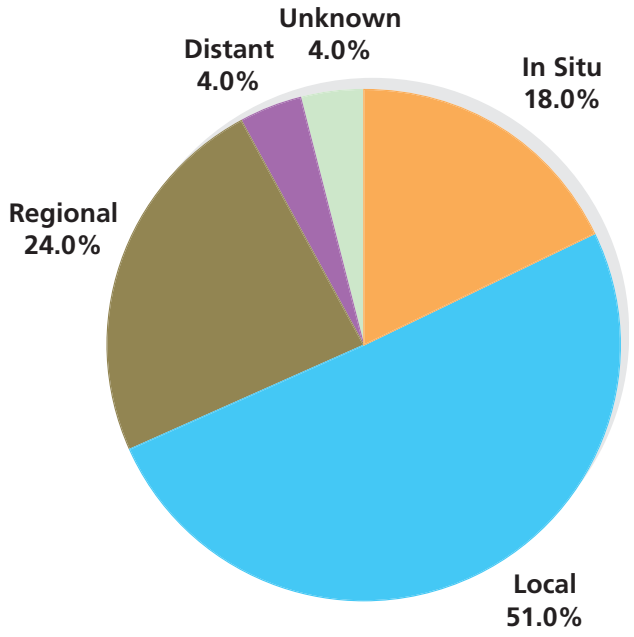
Age and ethnicity are related to breast cancer mortality. Nationally, 95% of new cases and 97% of breast cancer deaths occur in women aged 40 and older. Similarly, between 2000 and 2003 in Indiana, approximately 94% of women who developed breast cancer were aged 40 and over and these women accounted for 96.8% of the breast cancer deaths. In Indiana and nationally, African-American women are less likely to be diagnosed with breast cancer, but have a greater mortality rate from breast cancer than do white women.

Breast cancer has steadily increased from 1940 to 1982. Improved mammography screening rates contributed to an increase in the reported incidence of the disease from 1982 through 1988, and at the same time, caused a shift to earlier stage diagnosis of smaller, more easily treatable cancers. Increases in breast cancer also are attributed to the gradual increase in underlying risk factors for breast cancer, such as earlier menarche, delayed childbearing, and smaller family size. Earlier diagnosis, in turn, has resulted in a reduction in mortality from breast cancer. From 1992 - 1998, breast cancer mortality declined significantly, with the largest decreases in younger women both African American and non-Hispanic/Latina white women. About 30 men are diagnosed with breast cancer each year in Indiana. Clinically, breast cancer in men is very similar to breast cancer in women, but the prognosis is often poorer for men because they tend to be diagnosed at a later stage than women.

Stages at Diagnosis

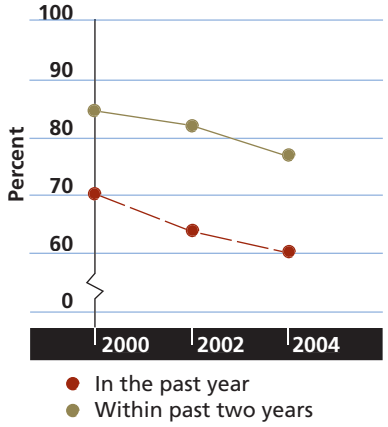
Nationally, from 1995-2001, 64% of breast cancer cases were diagnosed early and the five-year relative survival rate for women diagnosed at a local stage was 98% from 1995-2001. Nine out of 10 women remain in remission 10 years after diagnosis when the tumor is detected early (in situ or at a local stage). In Indiana, 69% of women's breast cancer from 2000-2003 was diagnosed early (Figure 4). However, African American women were significantly less likely to have their breast cancers diagnosed at an early stage (61.7% vs. 70.7% for white women). In order to improve the odds of survival, early detection through mammography screening provides the best chance of discovering breast cancer at an early

Figure 4. Breast Cancer Average Stage At Diagnosis, 2003



Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

Figure 5. Mammogram In Past Year, Women 40+



Source: Indiana Behavioral Risk Factor Surveillance System, Indiana State Department of Health, 2006

Table 6. Female Breast Cancer Incidence And Mortality, 2000-2003

	INCIDENCE	MORTALITY
	Female	Female
All Races	**123.2**	**26.6**
White	123.3	26.0
African American	112.8	35.8

Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006
Rates are per 100,000 female population and age adjusted to the 2000 U.S. Population standard.

Cervical Cancer

Bottom Line

With avoidance of controllable risk factors and regular screening Pap tests, as recommended by the American Cancer Society, cancer of the uterine cervix is almost 100% preventable and curable. The ACS recommends an annual Pap test or a bi-yearly liquid based test beginning by age 21 or three years after the onset of sexual activity. At or after age 30, women who have had three normal test results in a row may get screened every two to three years. In Indiana, 83% of women surveyed by the Behavioral Risk Factor Surveillance System 2004 Survey reported having had a Pap test in the past three years (Figure 7).

Risk Factors that Can be Changed

The most important risk factor is infection with the human papillomavirus (HPV), which can lead to cervical cancer. This virus is passed from person to person during sexual activity. The following behaviors and situations increase the risk for infection with HPV and are therefore modifiable risk factors for cervical cancer:

- Having multiple sexual partners
- Unprotected sex, especially at an early age
- Having a sexual partner who has had multiple sexual partners
- Other sexually transmitted infections, particularly HIV
- Cigarette smoking (women who smoke have about twice the risk of non-smokers)

Risk Factors That Cannot Be Controlled

- Age (approximately 2 out of 3 cervical cancer deaths occur among women aged 55+)
- Race/ethnicity (Vietnamese women have the highest incidence of cervical cancer in the U.S., followed by Hispanic/Latinas, Alaska Natives, and Koreans. Hispanic/Latina women have a risk about twice as high as white women. African American women have the highest age-adjusted cervical cancer mortality rate, though comparable data for Vietnamese women is not available.)

Prevention/Screening/Early Detection

Almost all cervical cancers can be prevented. First, to prevent pre-cancers, women should avoid behaviors that place them at higher risk. Young women can delay their first sexual experience until they are older. Women of all ages can reduce their risk of HPV infection by limiting their number of sexual partners and by using condoms during sexual intercourse. Condoms provide partial protection from HPV as well as from other sexually transmitted diseases including HIV. Women can avoid smoking; those women who are current smokers should try to quit. Second, women can prevent the progression of pre-cancers to invasive cervical cancer by early detection through regular Pap tests and prompt treatment. Pre-cancers do not cause pain or other symptoms and are detected only if a woman has a pelvic exam and Pap test. Signs and symptoms of cervical cancer include abnormal vaginal discharge and abnormal vaginal bleeding or spotting. Invasive cervical cancer has decreased 70% since the introduction of Pap test.

Cancer Burden

For the four-year period of 2000-2003, 1,098 Indiana women were diagnosed with invasive cervical cancer giving an age-adjusted incidence rate of 8.7 per 100,000. The incidence rate of cervical cancer in Indiana for those years is higher than the national rate of 7.6 per 100,000 as estimated by the Surveillance, Epidemiology and End Results (SEER) 9 areas rate. Three hundred forty-seven Indiana women died of cervical cancer in the same time frame for a mortality rate of 2.6 per 100,000, compared with an estimated national rate of 2.9 per 100,000. In the 2005, there were 10,370 estimated new cases of cervical cancer in the United States and 3,710 deaths. As Pap screening becomes more prevalent, pre-cancerous lesions of the cervix will be detected far more frequently than invasive cancer.

Table 7. Cervical Cancer Average Incidence And Mortality, 2000-2003

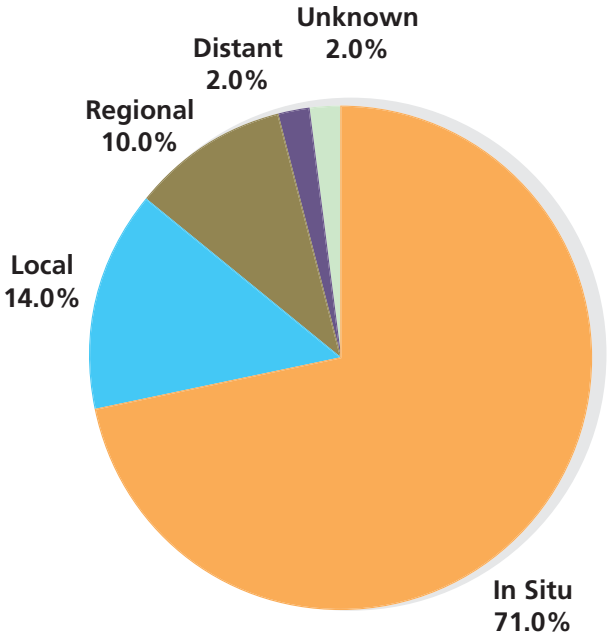
	INCIDENCE	MORTALITY
	Female	Female
All Races	8.7	2.6
White	8.5	2.5
African American	11.0	4.1

Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.
Rates are per 100,000 female population and age-adjusted to the 2000 U.S. Population standard.

Stages at Diagnosis

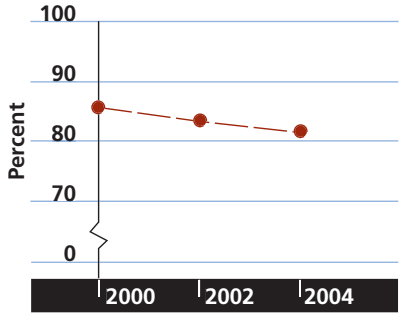
Nine out of 10 women remain in remission 10 years after diagnosis when the tumor is detected early and followed by prompt, appropriate treatment. Nationally, from 1995-2000, 55% of cervical cancer cases were diagnosed early (in situ or at a local stage). Nationally, the five-year relative survival rate for women diagnosed at a local stage was 92% in 1995-2000. In Indiana, from 2000-2003, 85% of women's cervical cancer was diagnosed early at the in situ or local stage (Figure 6). However, African American women in Indiana are more likely to be diagnosed at a late stage than are white women. Regular Pap screenings provide the best chance of discovering cervical cancer in situ or at a local stage.

Figure 6. Cervical Cancer Average Stage At Diagnosis, 2003



Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

Figure 7. Pap Test In Past Three Years, Women 18+



Source: Indiana Behavioral Risk Factor Surveillance System, Indiana State Department of Health, 2006

Colon & Rectum Cancer

Bottom Line

Screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of colorectal cancers. Yet fewer than 37% of Americans ages 50 and older follow the American Cancer Society's recommended screening guidelines for colorectal cancer. While people cannot change their genetic makeup or family health history, most people can reduce their risk of colorectal cancer by following screening guidelines, eating a healthy, low-fat, high fiber diet, and increasing their level of physical activity.

Risk Factors that Cannot be Controlled

Several risk factors may contribute to the development of colorectal cancer. They include:

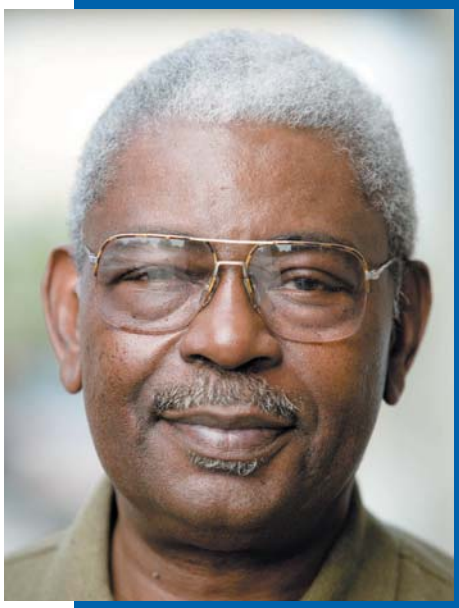
- Age (over 90% of colorectal cancers are diagnosed in people over age 50)
- Race (African Americans are more likely than other racial and ethnic groups to develop colorectal cancer)
- Personal or family history of colorectal and other cancers, colon polyps, or inflammatory bowel disease (nearly 10% are caused by inherited gene mutations)

Risk Factors that Can be Changed

- Physical inactivity
- A diet that is high in fat (especially from red meat) or low in fruits and vegetables
- Obesity
- Smoking
- Alcohol use

Prevention/Screening/Early Detection

Modifiable factors for colorectal cancer include healthy eating, especially fruits and vegetables, regular physical activity, maintaining suggested body weight, and avoiding smoking. Unfortunately, 80% of Hoosiers are not eating the recommended minimum nine servings of fruits and vegetables to lower their colorectal cancer risks. Research suggests that aspirin-like drugs, post-menopausal hormones, folic acid, calcium supplements, selenium, and vitamin E may help prevent colorectal cancer. Because the effectiveness, appropriate dosages, and potential toxicities of supplements need to be better understood, the American Cancer Society does not include these in current guidelines and recommendations. Colorectal cancer can almost always be cured if it is detected early. Screening tests can detect colon polyps (tissue growths) before they become cancerous, as well as early-stage colorectal cancers. Therefore, it is important for all adults aged 50 and older at average risk to follow the screening guidelines outlined in Table 13 on page 30.



Individuals with a family history before age 60 or in two first-degree relatives of any age; a personal history of colorectal cancer, polyps, or chronic inflammatory bowel disease; or a family history of hereditary colorectal cancer syndrome should consider screening prior to age 50. However, 90% of colorectal cancer occurs in people over age 50 with no predisposing risk factors. Figure 9 displays the trend in prevalence of having a sigmoidoscopy or colonoscopy reported by Hoosiers aged 50 and older. While we are making progress, only 51% of Indiana adults ages 50 and over surveyed in the Indiana Behavioral Risk Factor Surveillance System (BRFSS) reported ever having had sigmoidoscopy or colonoscopy in 2005.

Signs and Symptoms of Colorectal Cancer:

- Bleeding from rectum
- Blood in stool or in the toilet after a bowel movement
- A change in the shape of stool or in pattern of bowel movements
- Cramping pain in lower abdomen
- A feeling of discomfort or an urge to have a bowel movement when there is no need to have one

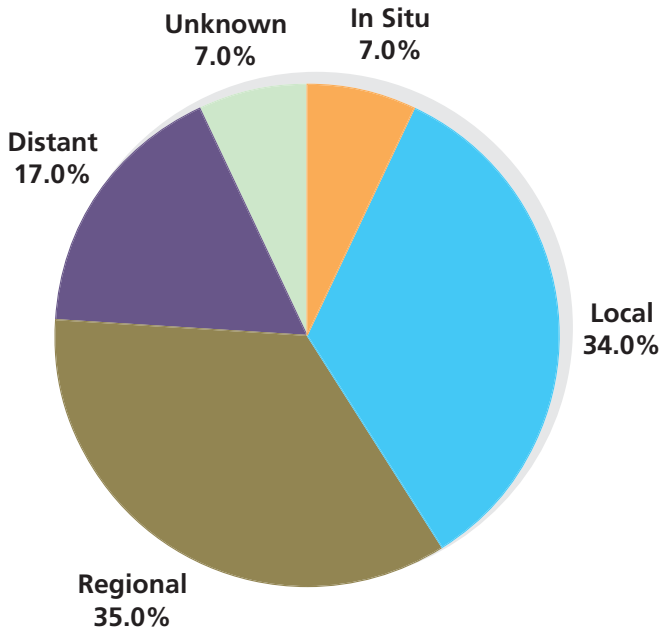
Cancer Burden

Colorectal cancer mortality has declined 27% in Indiana over the past two decades. From 2000 to 2003, a yearly average of 3,452 Hoosiers developed colorectal cancer and 1,309 Hoosiers died of the disease. Mortality rates have dropped from 31.4 per 100,000 in 1976 to 21.4 per 100,000 in 2003. Increased use of sigmoidoscopy or colonoscopy, which in turn has increased benign polyp removal, has been suggested as one potential reason for the decline in mortality rates. Other possible contributors to reducing colorectal cancer mortality are dietary changes (including increased calcium intake) and increased use of aspirin to prevent heart disease.

Stages at Diagnosis

Survival from colorectal cancer is more than 90% when the cancer is diagnosed before it has extended beyond the intestinal wall. Between 2000 and 2003, about 41% of colorectal cancers diagnosed in Indiana were early stage, compared to 75% for prostate and 69% for breast cancer. Figure 8 displays average stage at diagnosis for colorectal cancer. The American Cancer Society's goal is to prevent cancer; however, when cancer is not prevented, the goal is to detect the cancer as early as possible, when it is most treatable.

Figure 8. Colorectal Cancer Average Stage At Diagnosis, 2000-2003

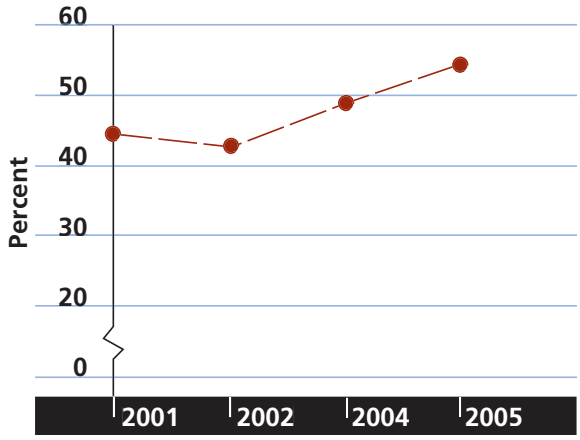


Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

Reduce your colon cancer risk by:

- ***Following screening guidelines***
- ***Eating a low-fat, high fiber diet***
- ***Increasing your physical activity***

Figure 9. Ever had a Sigmoidoscopy or Colonoscopy, 50+



1. Source: Indiana Behavioral Risk Factor Surveillance System, Indiana State Department of Health, 2006.
2. The weighted percentage was adjusted to: 1) probability of selection, i.e. the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, i.e. age and gender.
3. "Don't Know" and "Refused" were excluded from the denominator.
4. In 1999 and 2001, the question asked if person had ever had a sigmoidoscopy or colonoscopy exam.

Table 8. Colorectal Cancer Average Incidence And Mortality, 2000-2003

	INCIDENCE			MORTALITY		
	Both Sexes	Male	Female	Both Sexes	Male	Female
All Races	56.5	67.6	48.2	21.4	26.8	17.5
White	55.6	66.6	47.4	20.9	26.1	17.3
African American	67.3	79.1	58.8	29.6	39.5	22.4

Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.
Rates are per 100,000 population and age-adjusted to the 2000 U.S. Population standard.

Lung Cancer

Bottom Line

Stopping tobacco use can significantly reduce lung cancer by as much as 90%. Still, 25% of Hoosier adults and 37% of Indiana's high school students continue to smoke. Until tobacco use ends, lung cancer will continue to be the number one cause of cancer deaths in the United States, killing more than 170,000 Americans every year, at least 4,000 of those being Hoosiers.

Risk Factors

- Cigarette smoking, as tobacco use is responsible for 87% of lung cancers. Lung cancer mortality rates are about 23 times higher for current male smokers and 13 times higher for current female smokers compared to people who have never smoked.
- Exposure to secondhand tobacco smoke.
- A first-degree relative who has had lung cancer.
- Age, as lung cancer is fairly uncommon in people under the age of 40.
- Tuberculosis (TB) and some types of pneumonia.
- Exposure to cancer-causing agents such as asbestos, radon, arsenic, talc, vinyl chloride, coal products, and radioactive ores like uranium. If people who are exposed to these agents also smoke, their risk is greatly increased.

Prevention/Screening/Early Detection

Early detection has not been shown to be effective in reducing mortality from lung cancer. Chest x-ray, analysis of cells contained in sputum, and fiber optic examination of the bronchial passages have all shown limited effectiveness in improving survival. More recent advancements, such as low dose spiral computed tomography (spiral CT) scans and molecular markers in sputum, have shown more promising outcomes, but are still being evaluated for possible risks and effectiveness.

Cancer Burden

Like most cancers, lung cancer occurs more frequently among older people. However, people of all ages, even children as early as elementary school, become tobacco users. These current smokers comprise a large part of the at-risk population for eventually developing lung cancer.

Nationally, the 2002 incidence rate for men averaged 77.8 per 100,000. In Indiana men, lung cancer incidence rates are much higher: 107.0 per 100,000 from 2000-2003. The national incidence rate for women has remained stable since 1998 at 51.4 per 100,000. The Indiana incidence rate for women during the 2000-2003 time periods was 61.4 per 100,000. For the past 15 years, far more women have died each year of lung cancer than breast cancer. Between 2000 and 2003, an average of 4,889 new cases of lung cancer was diagnosed each year in Indiana.

Lung cancer is the leading cause of cancer mortality in Indiana, killing an average of 3,954 Hoosiers per year between 2000 and 2003. In 2006, 4,620 new cases of lung cancer are expected in Indiana.

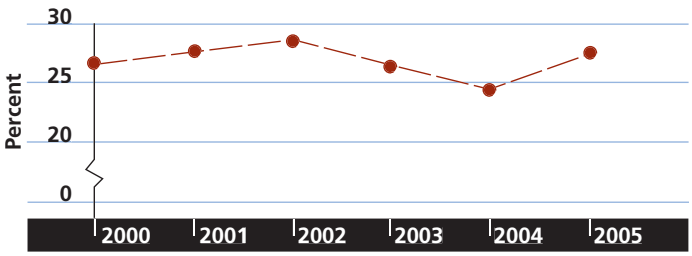
Gender and race also are factors in lung cancer incidence and mortality rates. Lung cancer mortality rates are significantly higher (47% higher) in Indiana males than in Indiana females (Table 9). Indiana males develop an average of 2,791 new cases of lung cancer each year, compared to an average of 2,097 new cases in Indiana females. In any given week, approximately 94 Hoosiers are diagnosed and about 76 Hoosiers die from lung

Table 9. Lung Cancer Average Incidence And Mortality, 2000-2003

	INCIDENCE			MORTALITY		
	Both Sexes	Male	Female	Both Sexes	Male	Female
All Races	80.2	107.0	61.4	64.9	89.6	47.7
White	79.6	106.0	61.0	64.4	88.7	47.3
African American	89.8	122.8	66.8	78.0	109.3	56.7

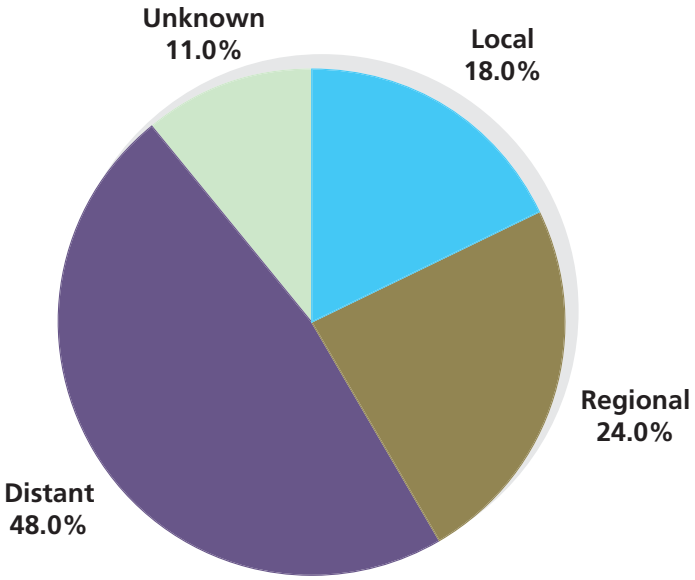
Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.
Rates are per 100,000 population and age-adjusted to the 2000 U.S. Population standard.

Figure 10. Adult Smoking Prevalence Rates



Source: Indiana Behavioral Risk Factor Surveillance System, Indiana State Department of Health, 2006

Figure 11. Lung Cancer Average Stage At Diagnosis, 2000-2003



Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

cancer. Lung cancer causes more deaths every year than colorectal, breast, and prostate cancers combined.

Stages at Diagnosis

Lung cancer is often diagnosed at a later stage, which negatively impacts odds of survival. Five-year probability of survival is highest if lung cancer is diagnosed when cancer is confined entirely within the lung, with a 55-67% five-year relative survival rate for lung cancers diagnosed at the local stage. However, only 18% of lung cancers in Indiana were diagnosed at the local stage between 2000 and 2003 (Figure 11).

Tobacco Use

Smoking is the single most preventable cause of death responsible for more than one of every six deaths in the United States. In 2000, two and a half million people in developed countries died prematurely from smoking-related diseases. Tobacco use kills more people than alcohol, HIV/AIDS, car accidents, illegal drugs, murders and suicides combined. In Indiana, 9,700 Hoosiers die from smoking-related diseases each year. Nearly 40% of those deaths are due to lung cancers. This large number of deaths is due to Indiana's high smoking rates.

Adult prevalence: Indiana ranks seventh among the country's top tobacco users, 25% of adults are smokers, compared to 21% in the U.S. Indiana consistently is in the list of states with the highest smoking rates. [i] More than 1.2 million adults in Indiana smoke cigarettes, including 27% of all men and 23% of all women. Smoking rates in Indiana vary slightly among race/ethnic groups. Smoking prevalence among African Americans (27%) is higher than among whites (24%) and Hispanics/Latinos (23%). One-third of adults aged 34 and younger report current smoking.[ii] Smoking rates decline as age increases. One of the most striking relationships is between smoking and education level. More than 40% of those with less than a high school education report current smoking behavior. As educational level increases, smoking prevalence among Hoosiers decreases. [ii]

Youth Prevalence: In 2004, the smoking rate among 9th to 12th grade Indiana youth (21.3%), is similar to the national average of 22%.[iii] If current smoking trends continue, 182,800 Indiana youth under age 18 eventually will die from tobacco use.[iv] Access to tobacco results in 15,200 Hoosier youth becoming daily smokers each year. A majority of this use is cigarettes, with approximately 32% of Indiana high school and 10% of middle school students reporting current cigarette use, compared to 28% in the U.S. Smoking prevalence for middle school Indiana youth are similar to the rest of the U.S. Tobacco use among youth is shocking, considering it is illegal in Indiana to sell tobacco products to anyone under the age of 18. However, an estimated 22.4 million packs of cigarettes each year are sold to or smoked by teenagers and children in Indiana.[v] Approximately 37% of Indiana high school (9th to 12th grades) and 15% of middle

Continued

school (6th to 9th grades) students currently use some form of tobacco. This translates to 41 Hoosier youths each day or two children each hour.[vi] If children and youth can be prevented from starting to smoke, a substantial portion of tobacco-related health problems can be avoided.

Pregnant women: Smoking can impact the lives of even the youngest Hoosiers. In Indiana, about one fifth (18.5%) of women who gave birth in 2003 reported smoking during pregnancy, compared with only 11.0% nationwide in 2003.[vii] Smoking during pregnancy is associated with poor health outcomes, such as low birth weight, growth retardation, spontaneous abortions and Sudden Infant Death Syndrome (SIDS). County smoking rates vary from 6% to 37%, with all but two Indiana counties having higher smoking rates during pregnancy than the national average.

Other Tobacco Use

Other tobacco includes smokeless tobacco, cigars, bidis and kreteks. Smokeless, or spit tobacco, can cause cancer of the lips, esophagus, throat, larynx, pancreas and stomach. These cancers can form within only five years of regular spit tobacco use. Users of spit tobacco are 50 times more likely to get oral cancer than nonusers. Holding one pinch of spit tobacco in your mouth for 30 minutes gives the same amount of nicotine as smoking four cigarettes. Cigar smoking has been found to cause cancers of the larynx, oral cavity (lip, tongue, mouth, and throat), esophagus, and lung. Tobacco use also is a significant risk factor for several other cancers, including cancer of the stomach, pancreas, kidney, bladder, cervix, and possibly the liver. In addition to cancer, smoking is a major cause of heart disease, stroke, chronic bronchitis, and emphysema. Along with cancers, heart disease, stroke and chronic respiratory diseases are the leading causes of death to Hoosiers.

Currently little information is known about the prevalence of other tobacco use in Indiana. In 1998, 15% of Hoosier adults reported using smokeless tobacco. According to the 2002 and 2004 Indiana Youth Tobacco Survey (YTS), Hoosier youth at the middle school level use more smokeless tobacco and bidis than in the rest of the country, while use rates are slightly lower than the U.S. for cigarette, cigar and pipe smoking. Once youth reach high school, tobacco use for all products increases significantly and surpass or equal use rates for the U.S. In addition, 5% of middle school and 15% of high school students regularly smoke cigars and 4% of middle school and 7% of high school students use smokeless tobacco.

Groups at High Risk for Smoking

- Males are 53% more likely than females to be current smokers.
- Hispanics/Latinos are 68% less likely than whites to be current smokers.
- Individuals who live with smokers are more than 15 times more likely to smoke than individuals who do not live with smokers.
- Unmarried or separated adults are more than three times more likely to smoke than those who are married.

Secondhand Smoke

Nationally, each year, secondhand smoke is responsible for as many as 53,000 deaths, including about 3,000 deaths of nonsmoking adults due to lung cancer. Approximately 930 to 1,650 Hoosiers die due to others smoking, including secondhand smoke and smoking among pregnant women.[ix]

In 1992, the U.S. Environmental Protection Agency declared that secondhand smoke, or environmental tobacco smoke (ETS), causes cancer in humans. Secondhand smoke contains over 4,000 substances, more than 40 of which are known or suspected to cause cancer in humans and animals. Secondhand smoke is responsible for many childhood illnesses, including sudden infant death syndrome (SIDS), respiratory problems, chronic ear infections, and aggravation of asthma. Every day more than 15 million children are exposed to ETS in the home.[x]

Millions of doctor visits and thousands of hospitalizations occur due to children's exposure to secondhand smoke. Children are affected more by secondhand smoke than adults because their bodies are still developing and smoke can hinder the growth and function of their lungs. Hundreds of thousands of lung and bronchial infections are caused by secondhand smoke each year. Children of parents who smoke have an increased number of respiratory infections and

symptoms and slower lung development. Almost half of Hoosier youth live with someone who smokes cigarettes. More than half of middle school and 75% of high school students reported being in the same room as someone who was smoking cigarettes in the past 7 days.[viii]

Cessation

The best way to avoid developing lung cancer is to not start using tobacco or to quit if you do. Quitting tobacco use substantially decreases the risk of cancer and cardiovascular disease. Smokers who quit, regardless of age, live longer than people who continue to smoke. Once smoking rates begin to decline in a population, it takes 20-30 years to see a decline in lung cancer rates. A majority of Hoosier smokers say they plan to quit sometime (86%), with 62% of current smokers planning to quit in the next six months. In the past year, half of adult smokers tried to quit but only 10% were successful. While cessation counseling and nicotine replacement therapy can help smokers quit, only 25% of those who tried to quit used these aids. Quitting can be a tremendous challenge. For those successful at quitting, the risk of lung cancer decreases over time. After ten years of being smoke-free, the lung cancer risk is half that of a current smoker. Strategies that assist people to quit smoking, reduce secondhand smoke exposure, or prevent youth initiation of cigarette smoking are crucial parts of making a difference in tobacco-related cancer incidence.

Factors related to success in quitting smoking include:

- Beliefs that secondhand smoke was harmful and caused lung cancer. Smokers that believed secondhand smoke causes lung cancer were twice as likely to be successful in quitting.
- Those with rules prohibiting smoking in the home were almost twice as likely to successfully quit compared to those without such rules.

Notes

[i] BRFFS Indiana Statewide Survey Data 2004

[ii] Indiana Adult Tobacco Survey 2004

[iii] Indiana Youth Tobacco Survey 2004

[iv] Campaign for Tobacco Free Kids

[v] DiFranza and Librett, 1999; Cummings et al, 1994

[vi] Campaign for Tobacco Free Kids

[vii] ISDH, 2003 Indiana Natality Report

[viii] Indiana Youth Tobacco Survey 2000

[ix] U.S. Department of Health and Human Services, August 1999

[x] *MMWR*, 46(44)

Melanoma/Skin Cancer

Bottom Line

Skin cancers are divided into 2 general types: nonmelanoma and melanoma. Nonmelanoma skin cancers are the most common cancers of the skin. They are called nonmelanoma because this group of cancers includes all skin cancers except one — malignant melanoma. Cancers that develop from melanocytes, the pigment-producing cells of the skin, are called melanoma. Melanocytes can also form benign growths called moles. There are many types of nonmelanoma skin cancers, but 2 types are most common — basal cell carcinoma and squamous cell carcinoma. These 2 types are also known as keratinocyte carcinomas. More than 1 million cases of basal cell or squamous cell cancers occur nationwide annually. In Indiana, in 2006, 1,420 cases of melanoma are expected. Nearly all skin cancers are preventable by limiting unprotected exposure to the sun. When they do occur, most skin cancers can be treated successfully if detected early, even melanoma, the most serious type of skin cancer.

Risk Factors that Cannot be Controlled

Several inherited risk factors may contribute to the development of skin cancer. They include:

- Fair to light skin complexion (freckles are an indicator of sun sensitivity and skin damage)
- Gender (men are more likely to develop skin cancer than women)
- Age (over 50% of all melanomas occur in people over the age of 50)
- Race (risk of melanoma is more than 10 times higher for whites than for African Americans)
- Multiple or atypical nevi (moles)
- Family history (numerous moles, as well as certain types of high risk moles, often run in families and may indicate high risk for melanoma; risk of melanoma is greater if one or more close relatives have been diagnosed with melanoma)

Risk Factors that Can be Changed

- Excessive exposure to ultraviolet radiation from sunlight or tanning lamps
- History of sunburns early in life
- Occupational exposure to coal tar, pitch, creosote, arsenic compounds, or radium (although occupation may or may not be changed, but exposure to harmful carcinogenic agents can often be minimized)

Prevention/Screening/Early Detection

Since excessive sun exposure is, by far, the greatest risk factor for skin cancer, reducing your skin's unprotected time in the sun is of utmost importance. Limit or avoid exposure to the sun during the midday hours (10 a.m. - 4 p.m.). When outdoors, wear a hat that shades the face, neck, and ears, and a long-sleeved shirt and long pants. Wear sunglasses to protect the skin around the eyes. Use a sunscreen with a sun protection factor (SPF) of 15 or higher. Because severe sunburns in childhood may greatly increase risk of melanoma in later life, children, in particular, should be protected from the sun.

Key warning signs of non-melanoma skin cancers are: a new growth, a spot that is getting larger, or a sore place that does not heal within three months; any change on the skin, especially in the size or color of a mole or other darkly pigmented growth or spot; scaliness, oozing, bleeding, or change in the appearance of a bump or a nodule; the spread of pigmentation beyond its border; and a change in sensation, itchiness, tenderness, or pain.

Recognition of changes in skin growths or the appearance of new growths is the best way to find early skin cancer. Adults should practice skin self-examination regularly. Suspicious lesions should be evaluated promptly by a physician. Basal and squamous cell skin cancers often take the form of a pale, wax like, pearly nodule, or a red, scaly, sharply outlined patch. A sudden or progressive change in a lesion's appearance should be checked by a physician. Melanomas often start as small, mole-like growths that increase in size and change color. A simple ABCD rule outlines the warning signals of melanoma:

A is for asymmetry: one half of the mole does not match the other half;

B is for border irregularity: the edges are ragged, notched, or blurred;

C is for color: the pigmentation is not uniform, with variable degrees of tan, brown, or black;

D is for diameter greater than 6 millimeters. Any sudden or progressive increase in size should be of concern.

Cancer Burden

In the four years of 2000-2003, 3,680 Hoosiers were diagnosed with, and 691 Hoosiers died of malignant melanoma. Approximately 61% of the deaths occurred in men and 39% of the deaths occurred in women. After increasing for several decades, the melanoma mortality rate has stabilized since 1990 for white men. Among white women, the mortality rate has decreased since 1988. Due to low reporting for this cancer site, the reader must use caution when analyzing the incidence data for skin cancer. The most serious form of skin cancer is melanoma, which is expected to be diagnosed in about 1,460 persons in 2005. During the 1970s, the incidence rate of melanoma increased rapidly at about 6% per year. Since 1981, however, the rate of increase slowed to a little less than 3% per year. Other less frequent forms of skin cancer include Kaposi sarcoma, which commonly occurred among patients with AIDS prior to the introduction of protease inhibitors, and cutaneous T-cell lymphoma.

Stages at Diagnosis

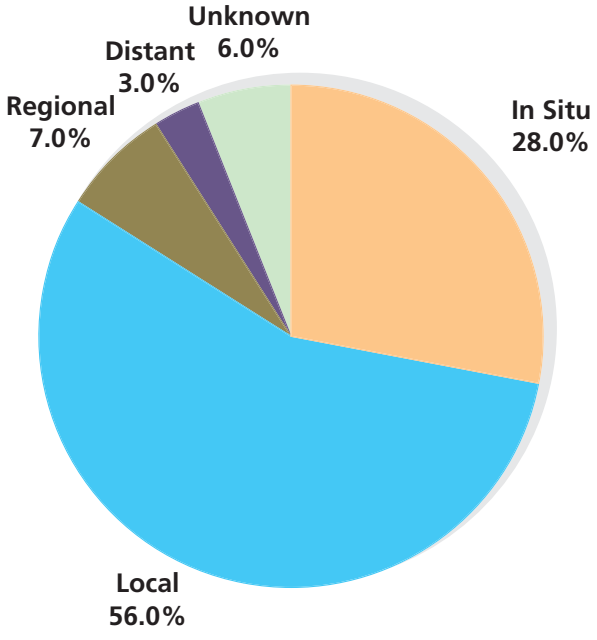
Basal cell or squamous cell cancers (non-melanoma skin cancers) are highly curable if detected and treated early. Generally they remain localized and do not spread to other parts of the body. Melanoma can spread to other body parts quickly, but it too can be cured if detected early. For localized melanoma, the five-year survival rate is 96% nationally, with about 82% of melanomas diagnosed at the local stage. In Indiana, 84% are diagnosed at the local stage (Figure 12).

Table 10. Melanoma Average Incidence And Mortality, 2000-2003

	INCIDENCE			MORTALITY		
	Both Sexes	Male	Female	Both Sexes	Male	Female
All Races	15.1	18.7	12.7	2.8	3.9	2.0

Source: Indiana State Department of Health — Indiana State Cancer Registry, June 2006. Rates are per 100,000 population age-adjusted to the 2000 U.S. Population Standard.

Figure 12. Melanoma Average Stage At Diagnosis, 2000-2003



Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

Ovarian Cancer

Bottom Line

Ovarian cancer accounts for approximately 3 percent of all women's cancers and is the fourth leading cause of cancer related death among women in the United States. The incidence rate for ovarian cancer had been slowly declining since the early 1990's. Ovarian cancer has the highest mortality rate of all cancers of the female reproductive system, which reflects, in part, a lack of early symptoms and proven ovarian cancer screening tests. Thus, ovarian cancer is often diagnosed at an advanced stage, after the cancer has spreads beyond the ovary. White women have higher incidence and mortality rates than other racial and ethnic groups.

Risk Factors that Cannot be Changed

A number of personal characteristics and behaviors have been found to increase the chances of developing ovarian cancer. They include:

- Age (peaks in the late 70's)
- Personal or family history of breast or ovarian cancer
- Inherited mutations in BRCA1 or BRCA2 genes
- Hereditary nonpolyposis colon cancer has been associated with ovarian cancer

Risk Factors that Can be Changed

- Use of postmenopausal estrogen alone
- Obesity

Protective Factor

- Pregnancy and use of oral contraceptives decrease a woman's risk of developing ovarian cancer

Prevention/Early Detection

Studies have suggested that women with BRCA1 and BRCA2 gene mutations who have their ovaries and fallopian tubes removed can decrease their risk of developing ovarian cancer.

There are no tests suggested for routine screening for ovarian cancer because no adequately accurate tests have been developed. Pelvic examination alone only occasionally detects ovarian cancer and usually at an advanced stage. Women with symptoms or who are at high risk for the disease should be offered a pelvic exam, transvaginal ultrasound, and a blood test for the tumor marker CA125. In women at average risk, these tests are not used for routine screening.

Stages at Diagnosis

If diagnosed in a localized stage, when the cancer is contained within the ovary, the 5-year survival rate is 94%, however, only 18% of cases in Indiana are detected at this stage. Five-year survival rates for women whose disease has spread to other parts of the body, with regional or distantly staged disease, are 68% and 29%, respectively. Most cases of ovarian cancer, 59%, are diagnosed at a distant stage.

Cancer Burden

Ovarian cancer is the 2nd most common gynecological cancer, after cancer of the uterine corpus, among women in Indiana, regardless of race. Between 2000 and 2003, 1,818 women in Indiana were diagnosed with ovarian

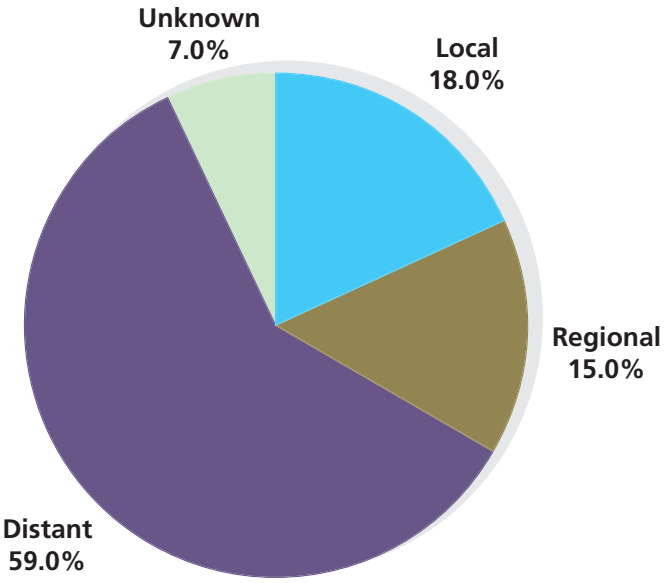
cancer, most of them at distant, less treatable stages. Ovarian cancer ranks first in mortality rates among gynecological cancers in Indiana. From 2000-2003, 1330 Hoosier women died from ovarian cancer, with an average annual mortality rate of 9.5 per 100,000. The risk of developing ovarian cancer increases with age. Ethnicity has not been shown to be significantly related to ovarian cancer; however, ovarian cancer incidence rates worldwide are highest for Western industrialized countries. Ovarian cancer incidence rates have declined from 1985-2002 at a rate of 0.7% per year.

Table 11. Ovarian Cancer Average Incidence And Mortality, 2000-2003

	INCIDENCE	MORTALITY
	Females	Females
All Races	**13.5**	**9.5**
White	13.8	9.8
African American	8.5	5.8

Source: Indiana State Department of Health — Indiana State Cancer Registry, June 2006. Rates are per 100,000 population age-adjusted to the 2000 U.S. Population Standard.

Figure 13. Ovarian Cancer Average Stage At Diagnosis, 2000-2003



Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

Prostate Cancer

Bottom Line

Prostate cancer is the most commonly diagnosed cancer in Hoosier men, and it is the second leading cause of cancer deaths for these men. Age is the principal risk for prostate cancer, and discovering the cancer earlier increases patient survival and treatment options. All men 50 years and older should talk to their physicians about having annual Digital Rectal Exams (DRE) and Prostate-Specific Antigen (PSA) tests to help detect prostate cancer early. Further, men should discuss an abnormal DRE or PSA test with their physicians in order to determine the optimal course of action, especially since it is not clear if all men need to be treated immediately for prostate cancer.

Risk Factors that Cannot be Controlled

Although the actual causes of prostate cancer are not yet clear, several risk factors may be linked to its development. They include:

- Age (more than 65% of all prostate cancers are diagnosed in men over 65)
- Race (death rates from prostate cancer for African American men are more than twice that of white men)
- Family history (individuals with a family history of prostate cancer experience a 2.5 fold increase in risk; 5% to 10% of prostate cancers may be inherited)

Risk Factors that Can be Changed

Although risk factors for prostate cancer such age, race, and family history are not modifiable, there are lifestyle strategies that individuals can adopt that may reduce their risk.

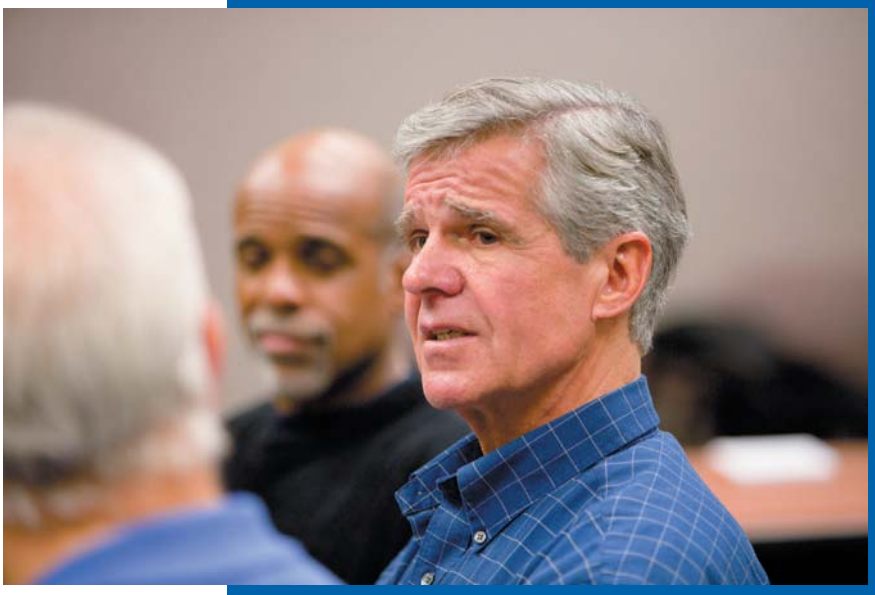
- Diet low in animal fat
- Diet high in whole grains and vegetables and fruits, which are rich food sources of antioxidants

Prevention/Screening/Early Detection

The precise cause of prostate cancer is not known; therefore, early detection may offer men with prostate cancer the greatest opportunity for full recovery. However, unlike breast cancer where clinical trials have clearly demonstrated a decrease in mortality following screening, such a clear relationship does not exist for prostate cancer. Prostate cancer can be very slow or fast growing, and therefore the treatment approach must be individualized. Depending on the specific situation, patients and their physicians may choose "watchful waiting" or a more aggressive treatment approach. Patients should be made aware of the potential benefits and risks of early detection and treatment, and should discuss them thoroughly with their physician.

The Prostate-Specific Antigen (PSA) and the Digital Rectal Exam (DRE) are the two primary methods used to screen for prostate cancer. The PSA test and the DRE should be offered annually for men beginning at age 50. Men at high risk (African-American men and men who have a first-degree relative diagnosed with prostate cancer at a young age) should begin testing at age 45.

The PSA test measures blood levels of a protein made by the prostate. The higher the PSA level, the more likely that prostate cancer is present. The PSA test alone does not provide a definitive diagnosis "for" or "against" prostate cancer. The DRE allows a physician to feel for any irregular or abnormally firm area on the prostate that might be cancer. While it is uncomfortable, the exam isn't painful and takes only a short time. Again, the PSA test and DRE are screening tools, and patients



with a high PSA result or an abnormal DRE exam are usually advised to have a repeat PSA test, trans-rectal ultrasound, or a biopsy to determine if cancer is present.

Cancer Burden

There were 14,786 prostate cancer cases in Indiana in the years 2000-2003. Prostate cancer accounted for just over 42% of all newly diagnosed cancer cases in Indiana men in that time period. Further, the Indiana incidence rate for prostate cancer was 140.5 in those years (170.2/100,000 in U.S.). Prostate cancer deaths make up approximately 17% of all cancer deaths in Indiana men. There were 2,589 deaths from prostate cancer in Indiana from 2000-2003, an average of 647 deaths each year. When viewed as a rate, there were 29.1 deaths per 100,000 men in Indiana due to prostate cancer in 2000-2003 (31.1 per 100,000 in U.S.). African American men in Indiana experience a significantly greater prostate cancer burden than other men in the state when compared to Hoosier white men, whose incidence and mortality rates averaged 133.3 and 27.0 per 100,000 respectively from 2000-2003, average incidence and mortality rates in African-American men were 214.7 and 64.7 per 100,000 (Table 12). Such significant disparity, particularly mortality, may be due to several factors including late diagnosis, waiting too long to receive treatment after being diagnosed, inappropriate treatment, more aggressive tumors, and overall health. This disparity is also seen nationally.

Table 12. Prostate Cancer Average Incidence And Mortality, 2000-2003

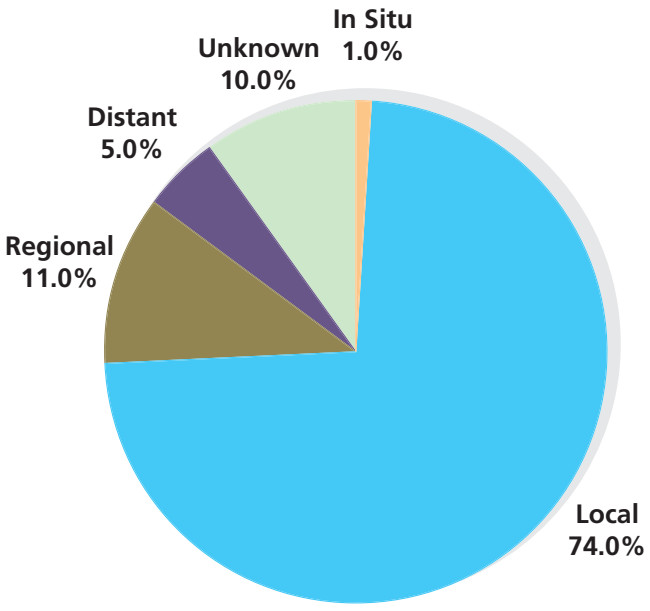
	INCIDENCE	MORTALITY
	Male	Male
All Races	**140.5**	**29.1**
White	133.3	27.0
African American	214.7	64.7

Source: Indiana State Department of Health - Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.
Rates are per 100,000 population and age-adjusted to the 2000 U.S. Population standard.

Stages at Diagnosis

Detecting prostate cancer earlier (earlier stage) can lead to a higher survival rate. From 2000-2003, 85% of Indiana men diagnosed with prostate cancers were diagnosed in the local and regional stages. When considering race, 91% of white men diagnosed with prostate cancer were diagnosed at a local or regional stage, compared to 88% of African Americans. Additionally, 5% of white men and 7% of African American men were diagnosed at the distant stage, a stage where prognosis is generally less positive.

Figure 14. Prostate Cancer Average Stage At Diagnosis, 2000-2003



Source: Indiana State Department of Health — Indiana State Cancer Registry and the Epidemiology Resource Center, Data Analysis Team, May 2006.

Nutrition, Physical Activity, and Obesity among Adults

For the majority of Americans who do not use tobacco, dietary choices and physical activity are the most important modifiable factors to reduce cancer risk, in addition to not using tobacco products.[i] Nutritional factors account for about one-third of US cancer deaths.[ii,iii] To provide the public with current cancer prevention information, the American Cancer Society periodically reviews, updates, and publishes guidelines on nutrition and physical activity. The most recent ACS guidelines, completed in 2001, recommend dietary and physical activity patterns to maintain a healthy body weight and to reduce cancer risk. The guidelines also recommend community action to facilitate healthy dietary and physical activity behaviors.[iv]

Nutrition

Increased knowledge and awareness about the relationship between diet and disease has influenced food consumption patterns. However, a large gap remains between the recommended dietary patterns and the actual food consumed. In 1996, US vegetable consumption was heavily weighted toward starchy vegetables, and one-half of the fruit servings were concentrated toward a select number of fruits (apples and bananas). In addition, only one serving was from whole grains, and one-half of the recommended meat servings were red meat (beef, veal, pork, and lamb) instead of lean, white meat choices. The recommended guidelines may be difficult to maintain since more meals are consumed outside the home. These meals are often lower in nutritional quality, higher in fat and saturated fat, and lower in fiber and calcium than foods prepared at home. In addition, restaurant food portions have increased dramatically and have led to an excess of calories consumed. At the state level, healthful diets are monitored through fruit and vegetable consumption. In 2003, 78% of Hoosiers reported eating fewer than five servings of fruits and vegetables per day.

Physical Activity

Recent evidence has shown that physical activity is strongly associated with reducing the risk of developing colon and rectum cancer and breast cancer. More limited evidence suggests that physical activity may also decrease the risk for cancer of the endometrium, ovary, pancreas, prostate and testicles. In addition to the cancer related benefits of regular physical activity, risk reduction has also been shown for dying of coronary heart disease, the nation's leading cause of death. Also decreased by keeping physically active are risk of stroke, diabetes, and high blood pressure. Despite the numerous cancer related benefits of remaining physically active, in 2003, 25.3% of Hoosier adults still report engaging in no leisure time physical activity. Regular physical activity also helps to control weight (potentially reducing the risk of those cancers associated with excess weight), contributes to healthy bones, muscles, and joints, reduces falls among older adults, relieves some pain from arthritis, reduces the symptoms of anxiety and depression and is associated with fewer hospitalizations, physician visits and medications.[v,vi,vii,viii]

Overweight and Obesity

High caloric intake combined with inadequate physical activity leads to weight gain and subsequent development of overweight and obese children and adults. Whereas the majority of Americans are aware of the link between being overweight, obesity, and heart disease (89%) or diabetes (86%), only one-fourth (25%) are aware that overweight and obesity increase cancer risk. Obesity is a risk factor for cancers of the breast (among postmenopausal women), endometrium, prostate, kidney, esophagus, and thyroid. More limited evidence suggests that obesity may increase the risk for cancers of the lung, ovary, testis, liver, pancreas, gallbladder, and head and neck. Recent national data show that obesity has reached epidemic proportions in the United States. The Third National Health and Nutrition Examination Survey indicated that the percentage of obese adults rose dramatically from 13.4% in 1960 to 20.9% in 2000, with the largest increases occurring in the 1990s. The percentage of adults in Indiana classified as clinically overweight was 35.1% and as clinically obese was 27.2% in 2005.

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention

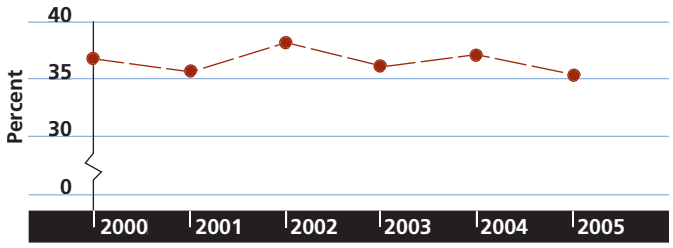
1. **Eat a variety of healthy foods, with an emphasis on plant sources**
   - Eat five or more servings of a variety of vegetables and fruits each day.
   - Choose whole grains in preference to processed (refined) grains and sugars.
   - Limit your consumption of red meats, especially high-fat and processed meats.
   - Choose foods that maintain a healthy weight.
2. **Adopt a physically active lifestyle.**
   - **Adults:** Engage in at least moderate activity for 30 minutes or more on five or more days of the week; 45 minutes or more of moderate to vigorous activity on five or more days per week may further enhance reductions in the risk of breast and colon cancer.
   - **Children and adolescents:** Engage in at least 60 minutes per day of moderate to vigorous physical activity at least five days per week.
3. **Maintain a healthy weight throughout life.**
   - Balance caloric intake with physical activity.
   - Lose weight if currently overweight or obese.
4. **If you drink alcoholic beverages, limit consumption.**

Recommendations for Community Action

Public, private, and community organizations should work to create social and physical environments that support the adoption and maintenance of healthful nutrition and physical activity behaviors.

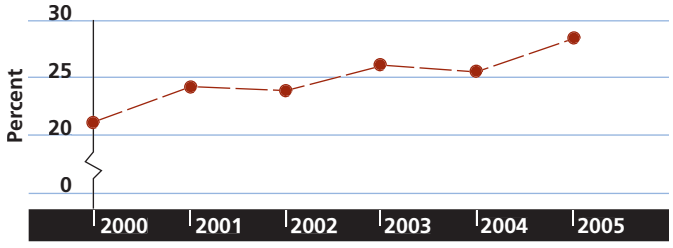
- Increase access to healthy foods in schools, worksites, and communities.
- Provide safe, enjoyable, and accessible environments for physical activity in schools and for transportation and recreation in communities

Figure 15. Prevalence of Adult Overweight, Indiana, 2000-2005



Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data.* Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2000-2005.

Figure 16. Prevalence of Adult Obesity, Indiana, 2000-2005



Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data.* Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2000-2005.

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Table 13. Summary Information for Major Cancer Sites

	CANCER RISK FACTORS	RISK REDUCTION	EARLY DETECTION (Asymptomatic Persons)
FEMALE BREAST	Age; family history in mother or sisters; precancerous condition on breast biopsy; first child born after age 30; obesity; obesity in post-menopausal women never having had children; hormone replacement therapy; cancer genes have been identified.	Follow the American Cancer Society's nutrition guidelines; maintain normal weight; exercise three times or more per week.	Mammography; breast self-examinations; clinical breast examinations.
CERVIX	Papilloma virus infections; early age at first intercourse; multiple sexual partners; smoking; low socioeconomic status; poor compliance to screening programs or never having had screening.	Avoid early onset of sexual activity; practice safe sex; avoid numerous lifetime sexual partners; have regular Pap exams to detect precancers; avoid use of tobacco products.	Pap smear and pelvic examination.
COLON & RECTUM	Personal or family history of colorectal cancer; colorectal polyps; diets high in fat and low in fiber; inflammatory bowel disease.	Removal of polyps; follow the ACS nutrition guidelines for diets high in fiber and low in fats; recent studies suggest that drugs like aspirin may reduce risk.	Men and women at average risk begin regular screening for colorectal cancer at age 50; flexible sigmoidoscopy, stool blood test, colonoscopy, or double-contrast barium enema.
CORPUS UTERUS	Some forms of infertility; obesity; use of unopposed post-menopausal estrogens; diabetes.	When considering estrogen replacement therapy, benefits and risks must be considered by woman and her physician.	Pelvic exam; endometrial tissue sampling at menopause if high risk.
NON-HODGKIN'S LYMPHOMA	AIDS in some cases; transplantation and immuno-suppression therapy; viral causes have been suggested in some types; increased risk is associated with certain genetic diseases.	None known.	Health-related checkups may identify early signs and symptoms.
LEUKEMIA	Persons with genetic abnormalities such as Down Syndrome; ionizing radiation; exposure to certain chemicals, cytotoxic drugs; certain forms are related to retrovirus, HTLG-1.	Reduce exposure to radiation and hazardous chemicals.	Health-related checkups may identify early signs and symptoms.
LUNG & BRONCHUS	Tobacco use; voluntary and involuntary smoking; occupational exposure to hazardous substances such as asbestos; radon exposure.	Avoid tobacco products in all forms; stop smoking; avoid secondhand smoke; follow workplace safety practices; check home for radon.	Health-related checkups may identify early signs and symptoms.
MELANOMA (SKIN)	Fair skin; sun exposure; severe sunburn in childhood; familial conditions such as dysplastic nevous syndrome; large congenital moles.	Protect against sun exposure, especially in childhood; use protective clothing and sunscreens with SPF 15 or greater when exposed to the sun.	Annual skin examinations by an experienced physician; monthly self-exams.
OVARY	Increases with age; possible dietary factors; older women who have never had children; history of breast, endometrial, or colon cancer; family history; genes have been identified.	Pregnancy, breast feeding, using birth control pills for at least five years; eating a low-fat, high fiber diet; for women with a family history of ovarian cancer, having the ovaries and/or uterus removed or the fallopian tubes tied.	Health-related checkups may identify early signs and symptoms.
PROSTATE	Age is the most important risk factor: 80% of all prostate cancer occurs in men over age 65; dietary fat may play a role; higher in African Americans.	High-fat diets have been linked to prostate cancer; thus, ACS nutrition guidelines recommend eating a diet low in fat and high in vegetables, fruits, and grains.	Digital rectal examination; prostate-specific antigen (PSA).

WARNING SIGNS	TREATMENT	AMERICAN CANCER SOCIETY CANCER DETECTION GUIDELINES
Thickening; swelling; skin irritation or distortion; nipple symptoms–erosion, inversion, tenderness.	**Early stage —** mastectomy or local removal with radiation therapy. **Adjuvant therapy —** hormones and/or combination chemotherapy. **Later stage —** combination chemotherapy or hormones and radiation therapy for selected clinical problems.	Yearly mammogram, women 40+ continuing for women in good health; clinical breast examinations every three years for women 20-39, and every year for women 40 and older; breast self examination is an option for women starting in their 20s. Women at increased risk should talk with their doctors about the benefits and limitations of earlier mammogram.
Abnormal vaginal bleeding.	**Precursor lesions —** cryotherapy (kills cells by cold), electro-coagulation (kills cells by heat from an electrical current); surgery. **Later stage —** combination chemotherapy or hormones and radiation therapy for selected clinical problems.	Pap test and pelvic examination every year for women who are or have been sexually active or have reached age 18; after three or more consecutive satisfactory normal annual exams, the Pap test may be performed less frequently at the discretion of the physician.
Rectal bleeding; change in bowel habits; blood in the stools.	**Localized —** surgery or radiation therapy. **Invasive —** surgery or radiation therapy. **Metastatic —** chemotherapy/radiation therapy. Surgery at times combined with radiation therapy or chemotherapy. Chemotherapy in advanced cases is under study.	50+: colonoscopy every 10 years; or flexible sigmoidoscopy every five years; or double-contrast barium enema every five years; or stool blood test or fecal immunochemical test every year (acceptable but not preferred). Flexible sigmoidoscopy every five years with annual stool blood test is preferred over stool blood test or flexible sigmoidoscopy alone. Follow positive tests with colonoscopy.
Vaginal bleeding after menopause.	For uterine hyperplasia, progestins may be used. Surgery sometimes with radiation therapy. Advanced metastases — progestins/chemotherapy.	Women at high risk for cancer of the endometrium should have a sample of endometrial tissue examined when menopause begins.
Lymph node enlargement; fever.	Usually disseminated at time of diagnosis; chemotherapy is used. At times, autologous bone marrow transplantation may be used.	Annual physician examination for people age 40+, every three years for people aged 20-40.
Fatigue; pallor; repeated infection; easy bruising; nose bleeds.	Combination chemotherapy; bone-marrow transplantation may be used in some cases.	Annual physician examination for people age 40+, every three years for people aged 20-40.
Nagging cough; change in breathing habits; coughing up blood; chest pain; hoarseness; shortness of breath; weight loss; appetite loss; anemia; unresolved pneumonia.	**Early stage —** surgery. **Advanced stages —** surgery, radiation therapy, chemotherapy, immunotherapy.	Annual physician examination for people age 40+, every three years for people aged 20-40.
Change in the size, shape, or color of a mole or signs that its border is becoming ragged; a sore that doesn't heal.	Surgery, radiation therapy, and chemotherapy depending on type. In small-cell lung cancer, chemotherapy alone or combined with radiation therapy may be the first choice.	Annual physician examination for people age 40+, every three years for people aged 20-40.
Symptoms are often "silent"; enlarged abdomen; digestive problems such as gas and bloating that persist and cannot be tied to another cause; abnormal vaginal bleeding; pelvic or leg pain.	Surgery, radiation therapy, and chemotherapy.	Health-related checkups may identify early signs and symptoms.
Difficulty passing urine; blood in urine.	**Early stage —** surgery or radiation therapy. **Advanced stages —** radiation therapy, hormone treatments, or anticancer drugs. Radiation therapy can ease painful areas in the bones.	Beginning at age 50, men who have at least a 10-year life expectancy should be offered an annual digital rectal exam and prostate-specific antigen (with counseling about benefits and limitations); Men in high risk groups – African Americans and men with two or more affected first degree relatives — should begin at age 45.

Understanding Cancer Incidence & Mortality Rates

Cancer rates in this document represent the number of new cases of cancer per 100,000 population (incidence) or the number of cancer deaths per 100,000 population (mortality) during a specific time period.

For example, if a county's lung cancer incidence rate is 40.0 that means 40 new cases of lung cancer were diagnosed for every 100,000 people. If the county's population is 25,000, then an incidence rate of 40.0 means 10 new cases of lung cancer were diagnosed in that county that year.

$$\frac{\text{40 new cases diagnosed in one year}}{\text{100,000 population}} = \frac{\text{10 new cases diagnosed in one year}}{\text{25,000 population}}$$

Rates provide a useful way to compare cancer burden irrespective of the actual population size. Rates can be used to compare demographic groups (males have higher lung cancer rates than females), race/ethnic groups (African-American males have higher prostate cancer rates than white males), or geographic areas (Indiana has higher lung cancer incidence rates than California).

Age-Adjusted Rates

Older age groups generally have higher cancer rates than younger age groups. For example, more than 60% of new lung cancer cases occur in those aged 65 and older. As a result, if one county's lung cancer incidence rate is higher than another, the first question asked is whether the county with a higher rate has an older population.

To address this issue, all mortality and incidence rates presented in this booklet have been age-adjusted. This removes the impact of different age distributions between populations and allows for direct comparisons of those populations. Age-adjustment also allows for a comparison of rates within a single population over time. An age adjusted rate is not a real measure of the burden of the disease on a population, but rather an artificial measure that is used for comparison purposes.

All mortality and incidence rates in this publication, provided by the Indiana State Cancer Registry, were age-adjusted using the direct method. The direct standardization method weights the age-specific rates for a given gender, race, or geographic area by the age distribution of the standard population. The 2000 United States standard million population was used for all rates provided in this booklet.

Glossary

Burden: Number of new cases and/or deaths from cancer or overall impact of cancer in a community.

Carcinogen: Anything chemical, physical or viral that causes cancer.

Five-year Survival: The percentage of people with a given cancer who are expected to survive five years or longer with the disease. Five-year survival rates have some drawbacks. While statistically valid, these may not reflect current advances in treatment. Therefore, five-year survival rates should not be seen as a predictor in an individual case.

Lifetime risk: The probability that an individual, over the course of a lifetime, will develop or die from cancer.

Malignant: The description for the kind of cancer that has spread beyond the location in which it started.

Metastasis: Movement of disease from one organ or part to another not directly connected.

Morbidity: The number of people who have a disease.

Prevalence: A calculation of the proportion of people with a certain disease at a given time.

Rate: The frequency of an event in a defined population at a given period of time. Often expressed per 100,000 people.

Risk factor: Anything that increases a person's probability of getting a disease, such as cancer. Risk factors can be lifestyle-related, environmental, or genetic (inherited).

Staging: The process of finding out whether cancer has spread and if so, how far. There is more than one system for staging.

Indiana Cancer Consortium

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- Primary Prevention
- Early Detection
- Treatment Access
- Quality of Life
- Data
- Advocacy

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