Iowa Cancer Facts & Figures 2012

American Cancer Society®

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Stay Well. Get Well. Find Cures. Fight Back.

We are pleased to present the first edition of *Iowa Cancer Facts & Figures*. The American Cancer Society, the Iowa Cancer Consortium, the State Health Registry of Iowa, and the Iowa Department of Public Health have collaborated to produce this summary of cancer in our state. Stakeholders will use this document to measure progress toward meeting the objectives in the *2012-2017 Iowa Cancer Plan*, the state's cancer prevention and control blueprint. Cancer patients, health care and public health professionals, policy makers, advocates, media, and the public may find this book useful when seeking detailed, easy-to-read information about cancer in Iowa.

Stay Well

This report shows the risk of developing several common cancers is falling. There is no doubt this progress is due to the joint efforts of many organizations and individuals to reduce smoking, increase screening, and grow public awareness about cancer prevention strategies. One-third of cancer deaths would be prevented if no one smoked cigarettes or used tobacco products. Another third could be prevented if individuals maintained a healthy weight, ate a healthy diet, and lived an active lifestyle. We are dedicated to making even more progress in helping all Iowans stay well.

Get Well

An estimated 135,000 Iowans are living with a cancer diagnosis. While this can be attributed to an increase in cancer screening rates, survivorship is also on the rise because of improved treatment regimens. As new cancer treatments are developed, patients participate in clinical trials and health care providers incorporate improved treatments into their practice. We are committed to ensuring every Iowan diagnosed with cancer has access to the information and support needed to help them get well.

Find Cures

It is a goal we are committed to realizing: new ways to beat cancer. However, the causes of many cancers are still unknown and cures for many also remain elusive. Research helps us uncover the causes of cancer, how to prevent it, and how to successfully treat and cure the disease while maintaining a high quality of life for survivors.

Fight Back

Consider joining us in our efforts to reduce the burden of cancer for all Iowans and eliminate cancer as a cause of illness and death. Live a healthy lifestyle. Volunteer for the American Cancer Society. Join the Iowa Cancer Consortium. Be an advocate for cancer-fighting policy. You can help make a difference.

Too many lives are still being lost to cancer. Every day, we are making progress. With your ongoing support and dedication, even more lives can be saved – even spared – from cancer.

Sincerely,

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Partner Profiles

American Cancer Society

The American Cancer Society is the nation's largest community-based voluntary health organization, dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering through cancer research, education, advocacy, and service.

Iowa Cancer Consortium

The Iowa Cancer Consortium is a 501(c)(3) organization consisting of a diverse partnership of Iowans working together to conquer cancer. It is a collaboration of cancer survivors, researchers, caregivers, health care providers, public health professionals, private sector representatives, family members, volunteers, and many others who are passionate about ending the suffering and sadness that cancer causes for thousands of Iowans each year. The organization's mission is to reduce cancer incidence and mortality in Iowa through collaborative efforts that provide services and programs directed toward comprehensive cancer prevention and control. For more information visit www.canceriowa.org.

Iowa Department of Public Health

The vision of the Iowa Department of Public Health (IDPH) is healthy Iowans living in healthy communities. To achieve this vision, the IDPH partners with local public health agencies, policy makers, health care providers, businesses and many others to promote and protect the health of Iowans. IDPH cancer programs and associated providers with whom the Department contracts educate, prevent, detect, and treat cancer, one person at a time.

State Health Registry of Iowa

The State Health Registry of Iowa (SHRI) is part of the Department of Epidemiology within the College of Public Health at The University of Iowa. Since 1973, the SHRI has been a member of the National Cancer Institute's (NCI) Surveillance, Epidemiology and End Results (SEER) Program. There are 15 state and/or regional cancer registries (and three supplemental targeted populations) throughout the United States that participate in this prestigious program (see www.seer.cancer.gov for more information). Currently, these geographic areas contain 26% of the total US population. The SEER Program's broad scope and rigorous standards make it the most authoritative source of cancer statistics in the United States. This local, national, and international resource provides a vital, dynamic measure of progress toward cancer prevention and control and helps guide a vast array of research, prevention, diagnosis, treatment, and planning efforts.

Iowa Cancer Plan

The *2012-2017 Iowa Cancer Plan* provides direction for those involved in the planning, implementation, and evaluation of cancer control programs, research, policy initiatives, and advocacy efforts. The plan sets forth four goals:

- Whenever possible, prevent cancer from occurring.
- If cancer does occur, find it in its earliest stages.
- Improve the accessibility, availability, and quality of cancer treatment services and programs.
- Ensure optimal quality of life for people impacted by cancer.

Each of the goals includes a set of evidence-based cancer control priorities, strategies, and action steps.

For more information, visit: http://bit.ly/IowaCancerPlan_2012FF

A Call to Action

In addition to joining the Iowa Cancer Consortium, there are many ways to support the goals, priorities, strategies, and implementation of the *2012-2017 Iowa Cancer Plan*.

Hospitals or health care organizations can:

- Acquire or maintain American College of Surgeons membership.
- Collaborate to sponsor community screening programs.
- Implement office-based reminders that identify patients due for cancer prevention and screening services.
- Offer clinical cancer research efforts across the state.
- Provide a meeting space for cancer support groups.

Health care providers can:

- Enroll patients in clinical trials.
- Learn about clinical cancer research studies available to patients.
- Make earlier referrals to hospice for end-of-life care.
- Provide cancer patients with a written summary of their care plan.
- Recommend appropriate cancer screening tests.
- Refer patients to smoking-cessation services and nutrition programs.
- Routinely ask patients about healthy lifestyle factors including tobacco use, physical activity, diet, and in-home radon testing.

Local health departments can:

- Provide access to low-cost radon test kits and cancer screenings.
- Provide cancer awareness education to Iowans.
- Support community wellness campaigns.

Survivors can:

- Consider joining an advocacy group or organization working to improve survivors' experiences.
- Mentor other survivors.
- Share personal experiences to help educate the public about the needs of survivors.

Policy makers can:

- Appropriate funding for comprehensive cancer control.
- Ensure that all Iowans have access to health care and to cancer screening services.
- Raise constituents' awareness about cancer prevention and control programs and help establish new programs where needed.
- Sponsor or support legislation that promotes cancer prevention and control.
- Support cancer research efforts across the state.
- Support full funding of all cancer prevention programs.
- Support or establish a cancer caucus in the Iowa General Assembly to provide the most up-to-date cancer information to all members of the legislature.

All Iowans can:

- Ask community organizations what they are doing to support the Iowa Cancer Plan.
- Eat more fruits and vegetables, and maintain a healthy weight.
- If diagnosed with cancer, consider enrolling in a clinical trial.
- Increase daily physical activity.
- Know when to be screened and do it on a schedule.
- Show support and care for those who are diagnosed with cancer.
- Stop smoking or never start.
- Support cancer control legislation.
- Test homes for radon and, if elevated, implement radon mitigation.
- Volunteer with organizations that support those living with cancer.
- Wear protective clothing when applying fertilizers, pesticides, and insecticides.
- Wear sunscreen, seek shade, and wear protective eye wear and clothing when outdoors.

Cancer: Basic Facts

What is Iowa Cancer Facts & Figures?

Iowa Cancer Facts & Figures is a publication designed to provide state and local cancer statistics, along with cancer information and risk factors, to policy makers, community members, public health and medical professionals, and cancer patients.

What is cancer?

Cancer is not a single disease. It is a group of diseases that share in common the uncontrolled growth and spread of abnormal cells. Cancer cells can form a mass, referred to as a tumor, which may compress, invade, and destroy normal tissue. If cells break away from the tumor, they can be carried by the lymph system or by way of the bloodstream to other areas of the body. This spreading, or traveling, of the original tumor is called metastasis. In this new location, the cancerous cells continue to grow. If the spread is not controlled, it can result in death.

Cancer is classified by the part of the body in which it originates, by its appearance under the microscope, and by the results of laboratory tests. Since cancer is not a single disease, each type of cancer will vary in growth and pattern of spread, and will also respond differently to various types of treatment. This makes it very important to treat each cancer and each cancer patient individually.

What causes cancer?

Although the cause of a cancer in an individual can only rarely be determined, scientists believe that the first step in developing cancer is damage to a cell. This damage can either directly lead to uncontrolled growth or may prevent normal cell repair and normal functioning. The cell can be damaged or inhibited from repairing damage by external or internal factors. Some examples of external factors are tobacco, chemicals, sunlight and other forms of radiation, and viruses and bacteria. Internal factors include hormone levels, inherited conditions, immune function, and mutations that occur from metabolism. Causal factors may act together or in sequence to initiate or promote cancer. Ten or more years often pass between exposure or mutations and detectable cancer.

Who is at risk?

Anyone is at risk. Even people who "do everything right" can develop cancer. Based on current statistics for the state, about 40% of Iowans will be diagnosed with a potentially serious cancer during their lifetime, and about 25% will die from one of these diseases. Cancer risk increases with age. Approximately 60% of cancers in Iowa are diagnosed among people age 65 years and older, and nearly 75% of cancer deaths are in this age group. Cancer is about 4% more common among men than women.

Can cancer be cured?

The answer to this question depends very much on the type of cancer and whether or not the cancer is detected early. The five-year relative survival rate for many common cancers (cancers of the breast, prostate, colon and rectum, cervix, uterus, bladder, testis, and melanoma of the skin) is greater than 90% if found before the cancer has metastasized. Following guidelines for cancer screening increases the likelihood of finding cancer early and, therefore, of survival. Based on data from the Surveillance Epidemiology and End Results (SEER) Program, the five-year relative survival rate for cancers diagnosed between 2002 and 2008 was 68%, up from 49% in 1975-1977.

The five-year relative survival rate for many common cancers (cancers of the breast, prostate, colon, rectum, cervix, uterus, bladder, testis, and melanoma of the skin) is greater than 90% if found before the cancer has metastasized.

For more information about survival rates and stages of cancer diagnosis, see the appendices on pages 51-52.

Cancer in Iowa

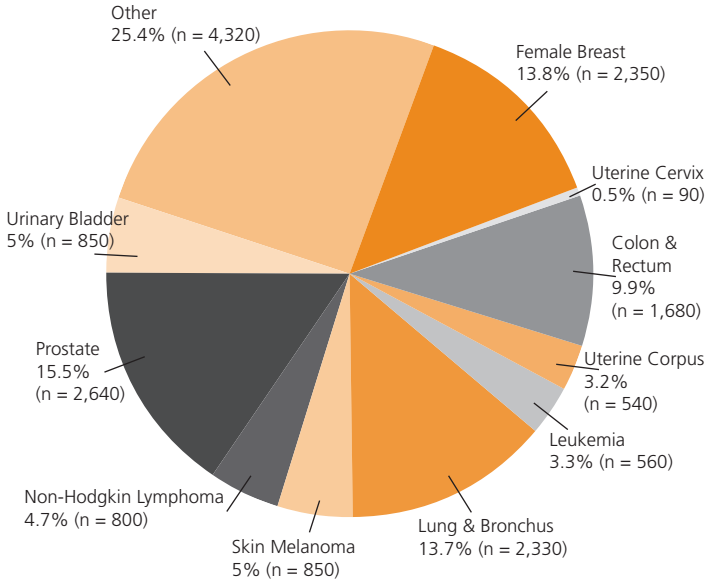
Cancer is very common.

From 2004 to 2008, 16,101 Iowans, on average, were diagnosed with cancers each year (Table 1, page 14). During the same period, an average of 6,390 Iowans died of these diseases annually (Table 2, page 15).

How many new cases of cancer are expected this year?

In 2012, approximately 17,010 Iowa residents will be diagnosed with cancer (Figure 1). This means that every day approximately 47 people in Iowa will hear the words "you have cancer."

Figure 1. Estimated Percentage and Number of New Cancer Cases in Iowa, 2012



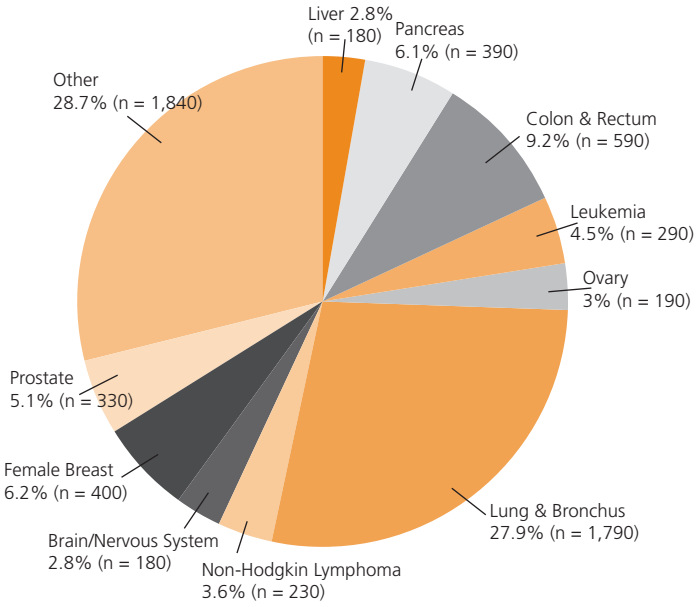
Source: 2012 American Cancer Society, Inc., Surveillance and Health Policy Research.

Each day 47 people in Iowa will hear the words "you have cancer."

How many cancer deaths are expected this year?

In 2012, approximately 6,410 Iowa residents will die of cancer-approximately 18 deaths every day (Figure 2).

Figure 2. Estimated Percentage and Number of Cancer Deaths in Iowa, 2012

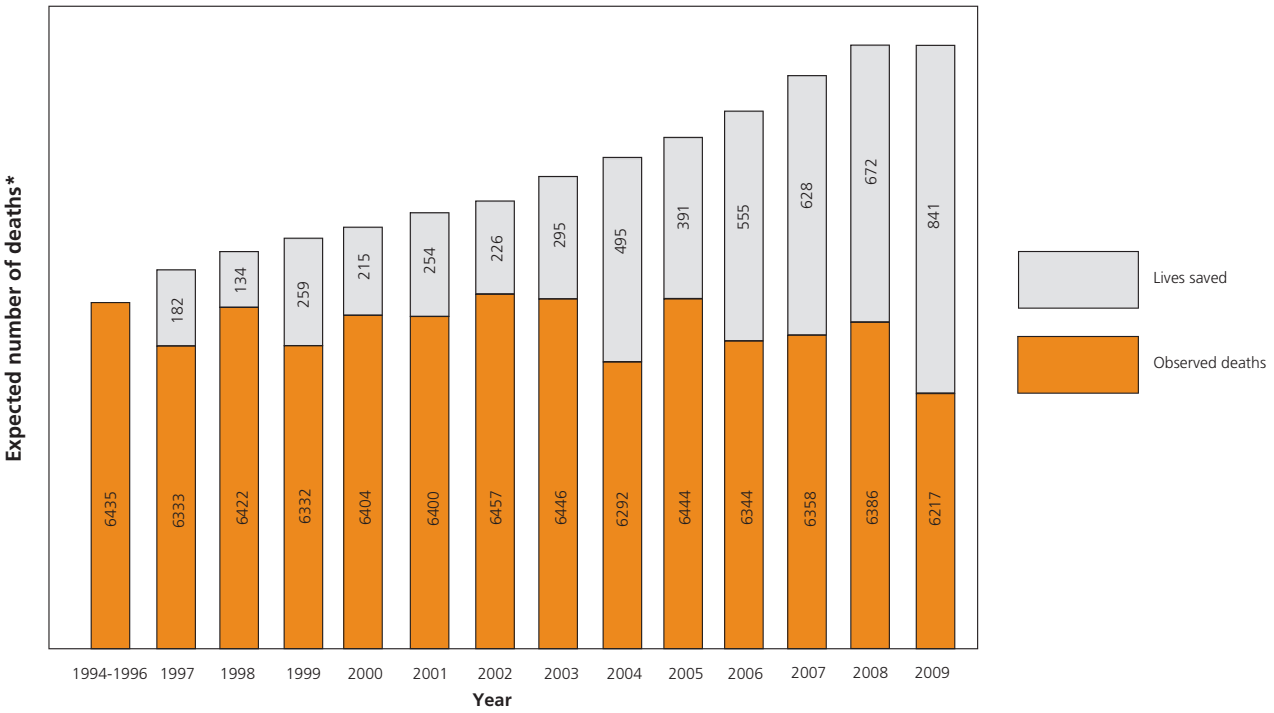


Source: US Mortality Data, National Center for Health Statistics, Centers for Disease Control and Prevention. 2012 American Cancer Society, Inc., Surveillance and Health Policy Research.

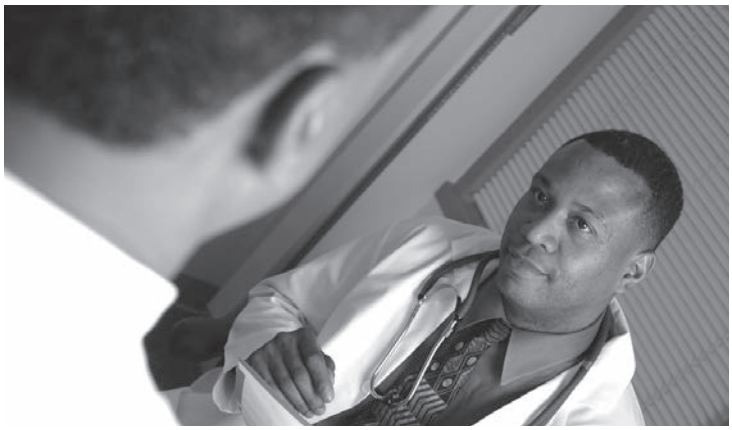
Could more lives be saved?

Yes! While progress has been made (Figure 3, page 6), more lives could be saved through lifestyle changes such as eliminating tobacco use, increasing physical activity, improving dietary habits, and obtaining appropriate cancer screenings. All cancers caused by cigarette smoking and heavy use of alcohol could be prevented. Scientific evidence also suggests that nearly one-third of cancer deaths are related to being overweight or obese, physical inactivity, and poor nutrition. In addition, regular cancer screenings by a health care professional can result in early detection of many cancers, when treatment is more likely to be effective. Additional information about prevention and early detection is found in the prevention and cancer site-specific sections of this document.

Figure 3. Estimated Lives Saved from Cancer Deaths, Iowa, 1997-2009



*Computed using indirect standardization with sex-and age-specific rates for 1994-1996 as the standard.
Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.5.



Cancer Prevention

Much of the suffering and death from cancer could be prevented by more comprehensive efforts to improve healthy lifestyles. Therefore, it is important to focus public health interventions on changing behaviors related to cancer. For example:

- Tobacco use is responsible for about 30% of cancer deaths. If no one used tobacco products, nearly one out of three cancer deaths would be prevented.
- Evidence indicates that poor diet, lack of exercise, and obesity increase risk for cancer. It is estimated that one-third of the deaths from cancer could be prevented by maintaining a healthy weight, eating a healthy diet, and being physically active.
- All cancers caused by heavy use of alcohol could be completely prevented.
- Certain cancers related to infectious agents, such as hepatitis B virus (HBV), human papilloma virus (HPV), human immunodeficiency virus (HIV), Helicobacter pylori (H. pylori), and others could be prevented through behavioral changes, vaccines, or antibiotics.
- Many of the skin cancers that are diagnosed annually could be prevented by protecting skin from intense sun exposure and avoiding indoor tanning.

If no one used tobacco products, nearly one out of three cancer deaths would be prevented.

Causes of Cancer Deaths in the United States

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.

Factors that influence the risk of cancer such as age, gender, or family history cannot be changed and are classified as non-modifiable risk factors. Lifestyle factors that influence cancer risk, such as diet, physical activity, and exercise habits are modifiable. By changing these modifiable aspects of their lifestyle, people may reduce their risk of cancer. People of all ages should eat healthy foods and participate in regular physical activity. Developing good dietary and exercise practices in children at a young age can help to instill these behaviors and prevent many chronic diseases, including cancer, in the future.

Many cancers can also be prevented through regular screening examinations by a health care professional. Regular screenings can result in the detection and removal of precancerous growths. Cancers of the cervix, colon, and rectum can be prevented by removal of precancerous tissue.

In addition, screening exams can lead to the diagnosis of cancers at an early stage, when they are most treatable. Cancers that can be diagnosed early through screening include those of the breast, colon, rectum, cervix, prostate, oral cavity, and skin. However, screening is known to reduce mortality only for cancers of the breast, colon, rectum, and cervix.

Tobacco

Overview

Tobacco use remains the leading preventable cause of premature death in the United States and is responsible for 4,400 deaths in Iowa each year.

The health consequences of smoking are many and include:

- Half of all those who continue to smoke will die from smoking.
- Smoking accounts for at least 30% of all cancer deaths and 87% of lung cancer deaths.
- The risk of developing lung cancer is about 23 times higher in male smokers and 13 times higher in female smokers, compared to lifelong nonsmokers.
- Smoking increases the risk of the following types of cancer: nasopharynx, nasal cavity and paranasal sinuses, lip, oral cavity, pharynx, larynx, lung, esophagus, pancreas, uterine cervix, ovary (mucinous), kidney, bladder, stomach, colorectal, and acute myeloid leukemia.
- Smoking is a major cause of heart disease, cerebrovascular disease, chronic bronchitis, and emphysema, and is associated with gastric ulcers.
- When heart disease and other types of lung disease caused by tobacco are considered, the Centers for Disease Control and Prevention estimates that smoking reduces life expectancy by 13.2 years for men and 14.5 years for women. Given that current life expectancy in the US is 77.9 years, this means that smoking can basically eliminate a person's retirement years.

Trends in Tobacco Use in Iowa

The 2010 Behavioral Risk Factor Surveillance Survey (BRFSS) Annual Report defines current smoking as smoking at least 100 cigarettes in a lifetime and smoking every day or some days

during the past 30 days. Using this definition, Iowans were asked about their use of tobacco. Of all respondents surveyed in 2010, 16.1% reported being a current smoker. This was a decrease from 17.2% found in 2009 and continues a steady decline in the current smoking rate since 2006.

The 2010 BRFSS Report also shows:

- The proportion of current smokers was higher for males than for females.
- Smoking generally declined with increasing age, education, and income.
- Minority and ethnic populations had a higher proportion of smokers.
- Respondents with household incomes of less than $15,000 reported the highest proportion of current smokers (32.9%).
- Only 3.6% of Iowans age 75 years and older were current smokers.

Youth and Tobacco Use

In March 2012, *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General* was released. This national report describes the epidemic of tobacco use among youth ages 12 through 17 and young adults ages 18 through 25. Key statistics in the new report include:

- More than three million high school students and 600,000 middle school students smoke.
- One out of four high school seniors is a regular cigarette smoker.
- About 80% of high school smokers will continue to smoke into adulthood.
- Among those who continue to smoke, about half will die earlier than their non-smoking peers, losing on average about 13 years of life.
- Of adults who smoke daily, 88% started smoking by age 18; 99% started by age 26.
- Of the more than 3,000 children who smoke their first cigarette, more than 1,000 of them will become daily smokers.

According to the Iowa Youth Survey, youth smoking in Iowa has steadily declined over the past decade. Among 11th grade students, the rate of current cigarette use dropped between 1999 and 2010, decreasing from 33% to 17% (Figure 7, page 22).

Among 8th grade students, the rate of current cigarette use dropped between 1999 and 2010, decreasing from 13% to 6% (Figure 7, page 22).

The Cost of Tobacco Use

The number of people who die prematurely or suffer illness from tobacco use imposes substantial health-related economic costs to society. It is estimated that in the US, between 2000 and 2004, smoking accounted for 3.1 million years of potential life lost in men and 2.0 million years of potential life lost in women. The total annual health care cost in Iowa, directly related to tobacco use, is estimated at $1 billion.

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Secondhand Smoke

Secondhand smoke (SHS), or environmental tobacco smoke, contains numerous human carcinogens for which there is no safe level of exposure. It is estimated that more than 88 million nonsmoking Americans three years of age and older were exposed to SHS in 2007-2008. In 2006, the US Surgeon General published a comprehensive report titled *The Health Consequences of Involuntary Exposure to Tobacco Smoke* that stated SHS contains more than 7,000 chemicals, at least 69 of which cause cancer. Each year, about 3,400 nonsmoking adults die of lung cancer as a result of breathing SHS.

Policies and laws that prohibit smoking in public places and create smoke-free environments are an extremely effective approach to preventing exposure to and harm from SHS. In addition to providing protection against harmful exposure to SHS, there is strong evidence that smoke-free policies decrease the prevalence of both adult and youth smoking. In recent years, Iowa has passed legislation to encourage current smokers to quit and make it less likely that new people will start smoking:

- March 2007 - The Iowa state legislature passed a one dollar increase in the tax on a pack of cigarettes. Funds were used to provide tobacco cessation tools to Iowans wanting to quit and to fund other chronic disease and prevention programs.
- July 2008 - A smoking ban in most public places in the state took effect with the passage of the Iowa Smoke Free Air Act. The legislation prohibits smoking in almost all public places and enclosed areas within places of employment, as well as some outdoor areas. This made it more difficult for smokers to find a place to smoke and was beneficial at reducing exposure to secondhand smoke.

In addition, the state of Iowa is charged with the responsibility of enforcing state and federal (Synar) laws prohibiting the sale of tobacco products to minors. To help assure enforcement, tobacco compliance checks of Iowa's approximately 4,000 tobacco sales permit holders are performed at least once a year.

Smoking Cessation

A US Surgeon General's Report from 2008 outlines the benefits of smoking cessation:

- People who quit, regardless of age, live longer than people who continue to smoke.
- Smokers who quit before 50 years of age cut their risk of dying in the next 15 years in half, compared to those who continue to smoke.
- Quitting smoking substantially decreases the risk of lung, laryngeal, esophageal, oral, pancreatic, bladder, and cervical cancers.

Data from the 2010 Iowa BRFSS Report shows:

- Nearly 23.4% of respondents were former smokers. (This means that they had smoked at least 100 cigarettes in their lifetime, but do not smoke now.)
- The 18 to 24 year age group had only 4.7% former smokers, while the 65 to 74 year age group had 40.8%.
- White non-Hispanics had a higher prevalence of former smokers than other minority racial or ethnic groups.
- 60.6% of former smokers stated it had been ten years or more since they last regularly smoked a cigarette.
- 52.6% of Iowa's current smokers reported they quit smoking for a day or more during the past year.
- Women were more likely to try to quit than men.

State-level interventions have been implemented to reduce Iowan's tobacco use and the toll of tobacco-caused disease and death. The following initiatives have been designed to help prevent youth from starting to use tobacco and help adults to quit:

- Quitline Iowa - provides toll-free, statewide smoking cessation telephone counseling. Trained counselors assist callers in making an individualized quit plan and provide ongoing support through optional follow-up calls. (1-800-QUIT-NOW or 1-800-784-8669.)
- Youth Tobacco Prevention Program - provides peer-to-peer education to change the general social attitude towards tobacco use, raise awareness through education, create effective counter-marketing, protect the rights of all Iowans from secondhand smoke, and support cessation among young tobacco users so they quit and are encouraged to never begin using tobacco.

In addition, there are a number of treatments that can help tobacco users quit and thus reduce the incidence of lung and bronchus cancer. Tobacco users who are ready to quit can consult their physicians who will conduct an intervention and prescribe an appropriate medication.

Radon

Overview

Radon gas occurs naturally in the soil, and is produced by the radioactive breakdown or decay of uranium and radium. It can seep into buildings, including homes, the same way air and other gases enter: from the soil through cracks in the foundation, floor or walls; hollow-block walls; openings around floor drains, pipes and sump pumps; and crawl spaces. Radon gas is odorless and invisible, and it can be harmful to humans when inhaled.

Health Effects of Radon

There is overwhelming scientific evidence that exposure to elevated levels of radon causes lung cancer in humans. Radiation emitted from radon can cause cellular damage that can lead to cancer when it strikes living tissue in the lungs. Radon is the leading cause of lung cancer in nonsmokers, and the second-leading cause of lung cancer overall. It is responsible for about 21,000 deaths every year in the US. The Environmental Protection Agency (EPA) estimates that long-term exposure to radon potentially causes approximately 400 deaths each year in Iowa.

Radon Levels in Iowa

The EPA has identified all counties in Iowa as having a predicted average indoor radon screening level of more than 4 pCi/L (picocuries per liter). An average radon level of 4 pCi/L is considered elevated, and remediation is recommended.

Based on data collected from radon home tests, the Iowa Department of Public Health (IDPH) estimates that as many as seven in ten homes across Iowa have elevated radon levels. Levels can vary from area to area and can vary considerably from house to house, even on the same street and neighborhood.

Radon Mitigation

Mitigation is a process or action done to reduce radon concentrations in a building. Licensed or credentialed radon mitigation contractors can install a mitigation system that provides a permanent solution. A typical radon mitigation system includes a suction point that addresses the soil underneath the structure. Radon levels in most homes or buildings can be reduced to below the EPA's action level of 4 picocuries per liter using existing mitigation technology. A list of licensed radon mitigation contractors can be obtained from the state radon program online at www.idph.state.ia.us/eh/radon.asp. A radon information packet can also be obtained by calling 1-800-383-5992.

Radon Action Plan

IDPH recommends homes and other buildings be checked for radon and has developed the following course of action:

1. Conduct a short term test - Follow the directions for setting up the detector and conducting the test. This will give results in a fairly short period of time. The higher the test results, the sooner you should take corrective measures.
2. Test in the winter - The best time to test radon levels is during the heating season, although testing can be done during any season.
3. Arrange for radon detection - When testing for the purpose of buying real estate, contact a certified radon measurement specialist for performing this test. Call 1-800-383-5992 for a list of Iowa radon measurement specialists. For testing one's own home, purchase an approved radon detector from a retail store, an Iowa certified radon testing lab, or a county or city health department.
4. Corrective measures - The help of a professional to work on the more complex aspects of stopping radon seepage will be needed. Assure the professional is certified by the Iowa Department of Public Health. A list of licensed radon mitigation contractors can be obtained from the state radon program online at www.idph.state.ia.us/eh/radon.asp, then clicking on the list of Iowa credentialed radon mitigation specialists by county.
5. For questions - Call the Iowa Radon Line, 1-800-383-5992.

The Iowa Department of Public Health (IDPH) estimates that as many as seven in ten homes across Iowa have elevated radon levels.

Nutrition, Physical Activity, Obesity

Overview

Nearly one-third of the cancer deaths that occur in the US each year are due to poor nutrition, physical inactivity, and excess weight. For the majority of people, next to not smoking tobacco, healthy dietary choices and physical activity are the most important choices they can make to reduce their cancer risk.

Excessive caloric intake combined with inadequate physical activity lead to obesity. Being overweight and obese are clearly associated with increased risk for developing many cancers, including cancers of the breast in postmenopausal women, colon, endometrium, kidney, and adenocarcinoma of the esophagus. Evidence is highly suggestive that obesity also increases risk for cancers of the pancreas, gallbladder, thyroid, ovary, and cervix, as well as for myeloma, Hodgkin lymphoma, and aggressive forms of prostate cancer. At the same time that evidence connecting excess weight to increased cancer risk has been accumulating, trends for being overweight and obese have been increasing in the United States and in Iowa.

Nutrition

Eating a diet high in fruits and vegetables as part of an overall healthy diet can help lower cancer risk and aid in weight management. Despite the known benefits of a healthy diet, many Americans, including Iowans, are not following recommended dietary guidelines. The 2009 Iowa BRFSS report indicates:

- Only 18.5% of Iowans consume fruits and/or vegetables five or more times per day.
- Significantly more females than males eat fruits and vegetables five or more times each day.
- Older Iowans are more likely to report consumption of fruits and vegetables five or more times per day, as are those with more education.
- Iowans in the youngest age group (18 to 24 years of age) are the least likely to report consumption of fruits and vegetables five or more times per day.
- About 15% of Hispanic Iowans consume fruits and vegetables five or more times per day.
- Adult Iowans drink an average of 4.3 glasses of sugar sweetened beverages weekly.
- Young adults, 25 to 34 years of age, report the highest consumption of sugar sweetened beverages (6.4 glasses weekly).

To improve dietary habits, both individual and community actions are important. Consumers should ask for nutritional information when it is not available and request healthy changes to menu items in restaurants. Community efforts are needed to support educational programs that promote nutritional quality in food selections and to ensure quality meals are offered in public schools and other settings away from the home.

Physical Activity

Physical activity indirectly reduces the risk of developing the many types of obesity-related cancers because of its role in helping to maintain a healthy weight. According to the American Cancer Society, adults should take part in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity activity each week, or an equivalent combination, preferably spread throughout the week.

According to the Iowa 2009 BRFSS Report:

- 75.8% of Iowa respondents reported that they had engaged in some sort of physical activity for exercise during the past month, other than their regular job.
- The lowest percentage of Iowans who reported engaging in leisure physical activity were those with less than a $15,000 annual household income (62.9%).
- The percentage of non-white or Hispanics reporting any leisure physical exercise in the last month was 63.1%, compared to 76.8% of white, non-Hispanics.
- On the weekend 41.1% of Iowans report they spend five hours or more in front of a TV or computer screen.
- During the week, 53.5% of Iowans spend one to three hours in front of a TV or computer screen each day.

Increased opportunities for physical activity require individual and community efforts to provide social support, user-friendly environmental opportunities, and policies promoting more accessible recreational facilities. Community programs need to include walking and bicycling trails, walking groups in malls, as well as incentives for physical activity during the workday at places of employment. From an extensive array of activities (whether gardening, dancing, pushing a stroller, sports or walking), everyone should engage in physical activities that are fun, easy, practical, and appropriate in relation to any health conditions.

Obesity

Excess body weight contributes to as many as 20% of all cancer-related deaths. Being overweight or obese is clearly linked with an increased risk of many cancers, including cancers of the breast (in women past menopause), colon and rectum, endometrium, esophagus, kidney, and pancreas.

Body mass index (BMI) is used to assess if a person is overweight or obese. BMI is calculated using weight and height measurements (body weight in kilograms divided by height in meters square). In adults, overweight is considered to be a BMI value greater than or equal to 25 and less than 30. Obesity is considered to be a BMI greater than or equal to 30.

The percentage of overweight and obese adults has increased dramatically in Iowa over the last decade. According to the Iowa 2010 BRFSS:

- 37.1% of Iowans are overweight.
- 29.1% of Iowans are obese.
- The combined percentage of Iowans who are overweight or obese is 66.2%.
- 74.3% of Iowa males are over their healthy weight.
- 69.8% of non-white or Hispanics are overweight or obese, compared to 65.9% of white, non-Hispanics.

More than 66% of Iowans are overweight or obese.

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

Maintain a healthy weight throughout life.

- Balance caloric intake with physical activity.
- Avoid excessive weight gain.
- Achieve and maintain a healthy weight if currently overweight or obese.

Adopt a physically active lifestyle.

- Adults should engage in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on five or more days of the week; 45 - 60 minutes of intentional physical activity is preferable.
- Children and adolescents should engage in at least 60 minutes per day of moderate to vigorous physical activity at least five days per week.

Consume a healthy diet, with an emphasis on plant sources.

- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Eat five or more servings of a variety of vegetables and fruits each day.
- Choose whole grains instead of processed (refined) grains.
- Limit consumption of processed and red meats.

If you drink alcoholic beverages, limit consumption.

- Drink no more than one drink per day for women or two per day for men.

While many Americans would like to adopt a healthy lifestyle, many encounter substantial barriers to consuming healthy food and engaging in physical activity. Increased portion sizes, especially of restaurant meals; marketing and advertising of foods and beverages high in calories, fat, and added sugar, particularly to kids; schools and worksites that are not conducive to good health; community design that hinders physical activity; economic and time constraints, as well as other influences, have collectively contributed to increasing trends in obesity.

Current behaviors such as eating meals away from home, reduced physical activity, longer work hours, and the increased availability of electronic entertainment contribute to lifestyles highly conducive to weight gain. Community strategies are needed to create environments that support healthy dietary and physical activity behaviors. Strategies range from worksite policies and benefit packages that support healthy activities, to school-based physical education programs that reward physical activity achievements.

American Cancer Society Recommendations for Community Action

- Increase access to affordable, healthy foods in communities, places of work, and schools.
- Decrease access to and marketing of foods and drinks of low nutritional value, particularly to youth.
- Provide safe, enjoyable, and accessible environments for physical activity in schools and workplaces, and for transportation and recreation in communities.

Alcohol

Overview

Alcohol raises the risk of cancers of the mouth, pharynx, larynx, esophagus, liver, breast, colon, and rectum. For each of these cancers, risk increases substantially with the intake of more than two drinks per day. Therefore, the American Cancer Society recommends people who drink alcohol should limit their intake to no more than two drinks per day for men and one drink per day for women. (A drink is defined as 12 ounces of beer, five ounces of wine, or 1½ ounces of 80-proof distilled spirits or hard liquor.)

Even a few drinks per week may be associated with a slightly increased risk of breast cancer in women. Women at high risk of breast cancer may want to consider not drinking any alcohol.

When assessing alcohol consumption among Iowans, the 2010 BRFSS defines heavy drinking to be greater than two drinks per day for men and one drink per day for women. According to the survey report:

- 5.2% of all survey respondents were heavy drinkers.
- 6.2% of men were considered to be heavy drinkers.
- 4.3% of women were considered to be heavy drinkers.

American Cancer Society Guidelines on Alcohol Consumption

If you drink alcoholic beverages, limit consumption.

The American Cancer Society recommends people who drink alcohol should limit their intake to no more than two drinks per day for men and one drink per day for women. (A drink is defined as 12 ounces of beer, five ounces of wine, or 1½ ounces of 80-proof distilled spirits or hard liquor.)

Ultraviolet Radiation

Overview

Skin cancer is the most common of all cancer types. More than 3.5 million skin cancers are diagnosed each year in the United States. That's more than all other cancers combined.

Risk Factors

The vast majority of skin cancers are caused by unprotected exposure to excessive ultraviolet radiation (UVR), primarily from the sun. While UVR exposure is associated with a small percentage of all cancer deaths, most skin cancer deaths are due to melanoma. Melanoma is primarily a disease that afflicts whites, as rates are more than 10 times higher in whites than in African Americans. The incidence of melanoma in the US has been increasing for at least 30 years.

A 2004 survey by the Environmental Protection Agency found that 43.6% of white adults in Iowa had at least one sunburn in the past year. This is concerning as sunburns are a significant risk factor for the development of skin cancer. To address this problem, the Centers for Disease Control and Prevention (CDC) recommends using evidence-based strategies such as education and policy approaches in primary schools (for children) and in recreational or tourism settings (for adults) to improve sun safety behaviors.

A second source of exposure is artificial UVR emitted by devices (indoor tanning booths or lamps) that are increasingly available for cosmetic use. Studies show that use of indoor tanning devices is a risk factor for skin cancer.

American Cancer Society Recommendations for the Prevention of Skin Cancer

- Limit or avoid sun exposure during the midday hours (10 a.m. to 4 p.m.).
- Wear a hat that shades the face, neck, and ears, as well as a long-sleeved shirt and long pants.
- Wear sunglasses to protect the eyes.
- Use a sunscreen with SPF of 15 or higher.
- Avoid indoor tanning booths and sunlamps.
- Emphasize sunburn protection with children; severe sunburns in childhood greatly increase the risk of melanoma later in life.

Vaccinations

HPV, Vaccine and Prevention of Cervical Cancer and Other Genital Cancers

HPV, human papilloma virus, is the most common sexually transmitted infection in the US, with approximately 6.2 million people becoming newly infected annually. There are more than 100 types of HPV, more than 40 of which can infect the genitals. Although most HPV infections are benign and transient, virtually all cervical cancers are related to infections by HPV. Vaccines have been developed against HPV-16 and HPV-18 (Gardasil and Cervarix) and other subtypes (Gardasil also protects against HPV-6 and HPV-11 types); recent clinical trials show that these vaccines are effective in preventing persistent new infections and in reducing rates of precursor lesions (adenoma in situ or intraepithelial neoplasia) in the cervix. These vaccines offer a promising new approach to the prevention of cervical cancer, as well as other HPV-associated cancer and conditions (e.g., vulvar, anal, and oral cancers and genital warts).

The HPV vaccine is available in all 50 states through the federal Vaccine for Children (VFC) program, which covers vaccine costs for children and teens who do not have insurance and for some children and teens who are underinsured or eligible for Medicaid.

Recommendations for HPV Vaccine Use to Prevent Cervical Cancer and Its Precursors

- Routine HPV vaccination is recommended for females 11 to 12 years of age.
- Females as young as 9 years of age may receive the HPV vaccination.
- The HPV vaccination is also recommended for females 13 to 18 years of age to catch up on missed vaccines or to complete the vaccination series.
- There is currently insufficient data* to recommend for or against universal vaccination of females 19 to 26 years of age in the general population. A decision about whether a woman 19 to 26 years of age should receive the vaccine should be based on an informed discussion between the woman and her health care provider regarding her risk of previous HPV exposure and potential benefit from vaccination. Ideally, the vaccine should be administered prior to potential exposure to genital HPV through sexual intercourse, because the potential benefit is likely to diminish with the increasing number of lifetime sexual partners.
- The HPV vaccination is not recommended for women over 26 years of age.
- Screening for cervical intraepithelial neoplasia (CIN) and cancer should continue in both vaccinated and unvaccinated women according to current American Cancer Society early detection guidelines.

*Insufficient evidence of benefit in women 19 to 26 years of age refers to (1) clinical trial data in women with an average of two – and not more than four – lifetime sexual partners, indicating a limited reduction in the overall incidence of CIN2/3; (2) the absence of efficacy data for the prevention of HPV 16/18 related CIN2/3 in women who have had more than four lifetime sexual partners; and (3) the questionable cost-effectiveness of vaccination in this age group.

Table 1 Average Annual Number of Cases and Age-Adjusted Incidence Rates by Sex, Iowa and US, 2004-2008

Primary Cancer Site/Type	Total			Males			Females		
	IA Cases	IA Rate	US Rate	IA Cases	IA Rate	US Rate	IA Cases	IA Rate	US Rate
All Sites	16,101	476.1	469.2	8,327	552.9	545.5	7,774	424.5	416
Lung and Bronchus	2,358	69.0	61.1	1,318	87.9	73.4	1,041	55.3	52.3
Prostate	2,172	141.7	162.5	2,172	141.7	162.5			
Female Breast	2,168	122.5	126.6				2,168	122.5	126.6
Colon and Rectum	1,862	53.5	46.6	916	61.3	53.6	946	47.1	41.0
Urinary Bladder	801	23.0	21.2	622	42.1	37.6	179	8.9	9.2
Non-Hodgkin Lymphoma	744	21.9	20.5	394	26.4	25.0	351	18.4	17.0
Melanoma of the Skin	632	19.7	21.7	350	23.4	27.1	282	17.4	17.9
Kidney and Renal Pelvis	563	16.7	14.5	349	22.9	19.6	214	11.6	10.3
Corpus and Uterus, NOS	509	28.4	25.1				509	28.4	25.1
Leukemia	489	14.4	12.9	275	18.6	16.7	215	11.2	10.0
Pancreas	398	11.4	12.2	200	13.3	14	198	9.8	10.7
Oral Cavity and Pharynx	385	11.4	10.7	269	17.4	15.8	116	6.3	6.3
Thyroid	324	10.7	11.5	89	5.9	5.8	235	15.6	17.0
Brain and Other Nervous System	242	7.6	6.6	137	9.1	7.7	106	6.2	5.6
Ovary	242	13.2	12.9				242	13.2	12.9
Stomach	191	5.5	7.4	126	8.4	10.5	65	3.3	5.0
Myeloma	190	5.5	5.8	106	7.1	7.3	84	4.3	4.7
Esophagus	184	5.4	4.8	148	9.7	8.2	37	1.9	2.0
Liver and Intrahepatic Bile Duct	156	4.5	7.0	106	6.8	10.8	51	2.5	3.7
Larynx	140	4.1	3.3	113	7.3	5.8	27	1.5	1.3
Cervix Uteri	105	6.9	6.8				105	6.9	6.8

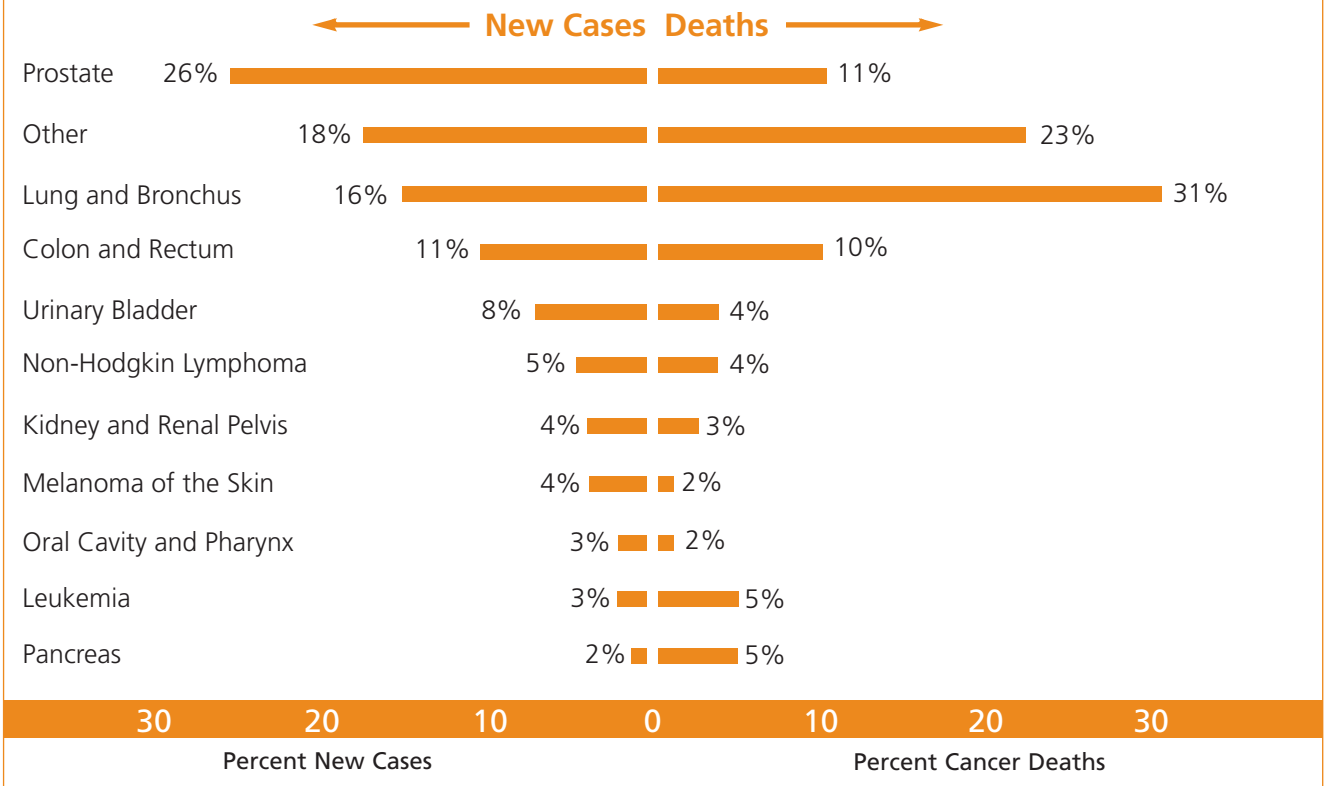
Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population.

Table 2 Average Annual Number of Deaths and Age-Adjusted Mortality Rates by Sex, Iowa and US, 2004-2008

Primary Cancer Site/Type	Total			Male			Females		
	IA Deaths	IA Rate	US Rate	IA Deaths	IA Rate	US Rate	IA Deaths	IA Rate	US Rate
All Malignant Cancers	6,390	180.5	181.3	3,326	224.7	223	3,065	151.7	153.2
Lung and Bronchus	1,803	52.2	51.6	1,044	70.0	67.4	759	39.3	40.1
Colon and Rectum	656	18.0	17.1	314	21.3	20.7	341	15.5	14.5
Female Breast	437	22.1	23.5				437	22.1	23.5
Pancreas	362	10.2	10.8	179	12.1	12.5	182	8.8	9.4
Prostate	359	25.1	24.4	359	25.1	24.4			
Leukemia	280	7.8	7.1	157	10.8	9.7	123	5.9	5.4
Non-Hodgkin Lymphoma	257	7.1	6.7	135	9.2	8.6	122	5.6	5.4
Ovary	180	9.1	8.4				180	9.1	8.4
Brain and Other Nervous System	175	5.3	4.3	101	6.8	5.2	73	4.1	3.5
Kidney and Renal Pelvis	173	4.9	4.0	106	7.1	5.9	67	3.3	2.7
Urinary Bladder	168	4.5	4.4	121	8.4	7.7	46	2.1	2.2
Esophagus	166	4.8	4.3	134	8.8	7.8	32	1.6	1.6
Liver and Intrahepatic Bile Duct	145	4.1	5.3	89	5.8	7.9	57	2.7	3.2
Myeloma	123	3.4	3.5	66	4.5	4.4	56	2.6	2.8
Corpus and Uterus, NOS	96	4.8	4.2				96	4.8	4.2
Stomach	93	2.6	3.7	57	3.8	5.2	36	1.8	2.7
Melanoma of the Skin	89	2.6	2.7	54	3.6	4.0	35	1.8	1.7
Oral Cavity and Pharynx	86	2.5	2.5	56	3.7	3.9	30	1.5	1.4
Larynx	36	1.0	1.2	28	1.9	2.2	9.0	0.5	0.5
Cervix Uteri	36	2.1	1.9				36	2.1	1.9

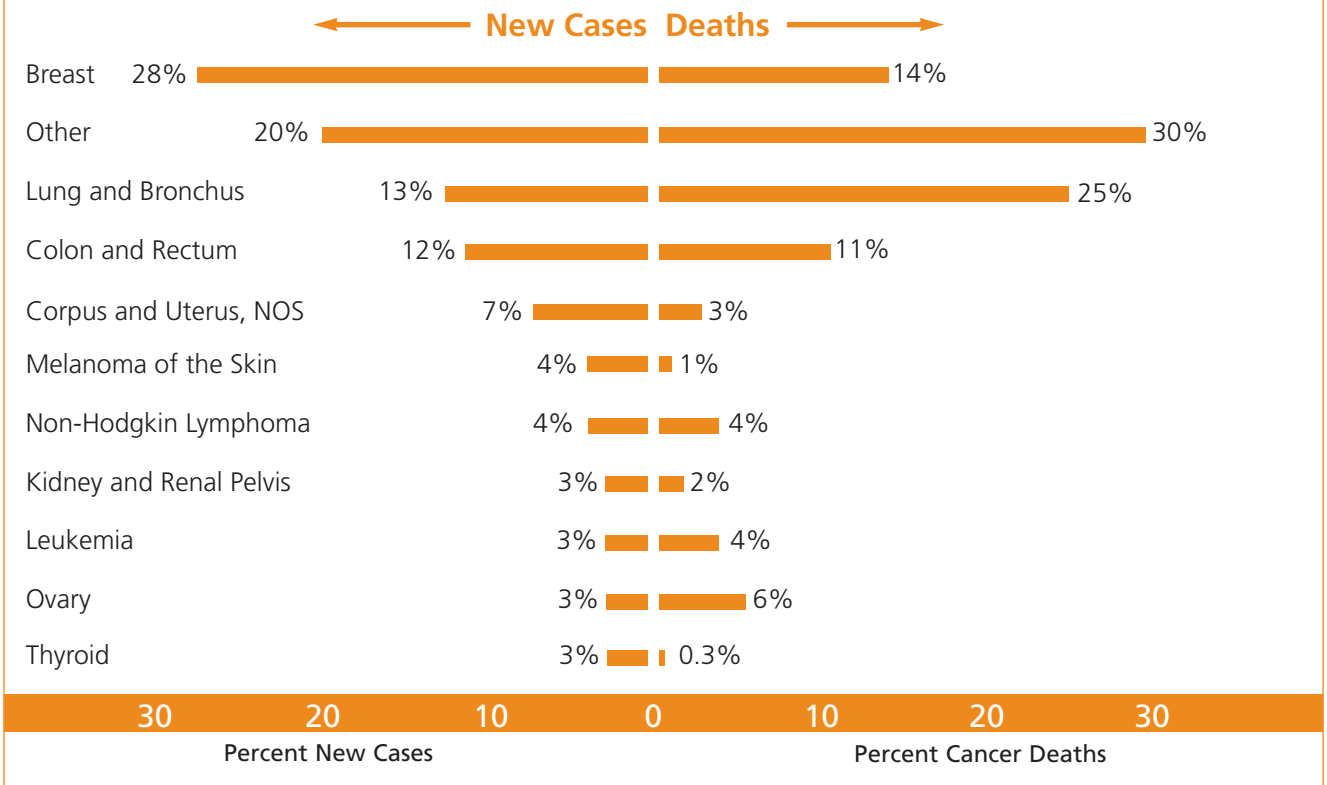
Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population.

Figure 4. Leading Cancer Sites: Percentage of New Cases and Deaths Among Males in Iowa, 2004-2008



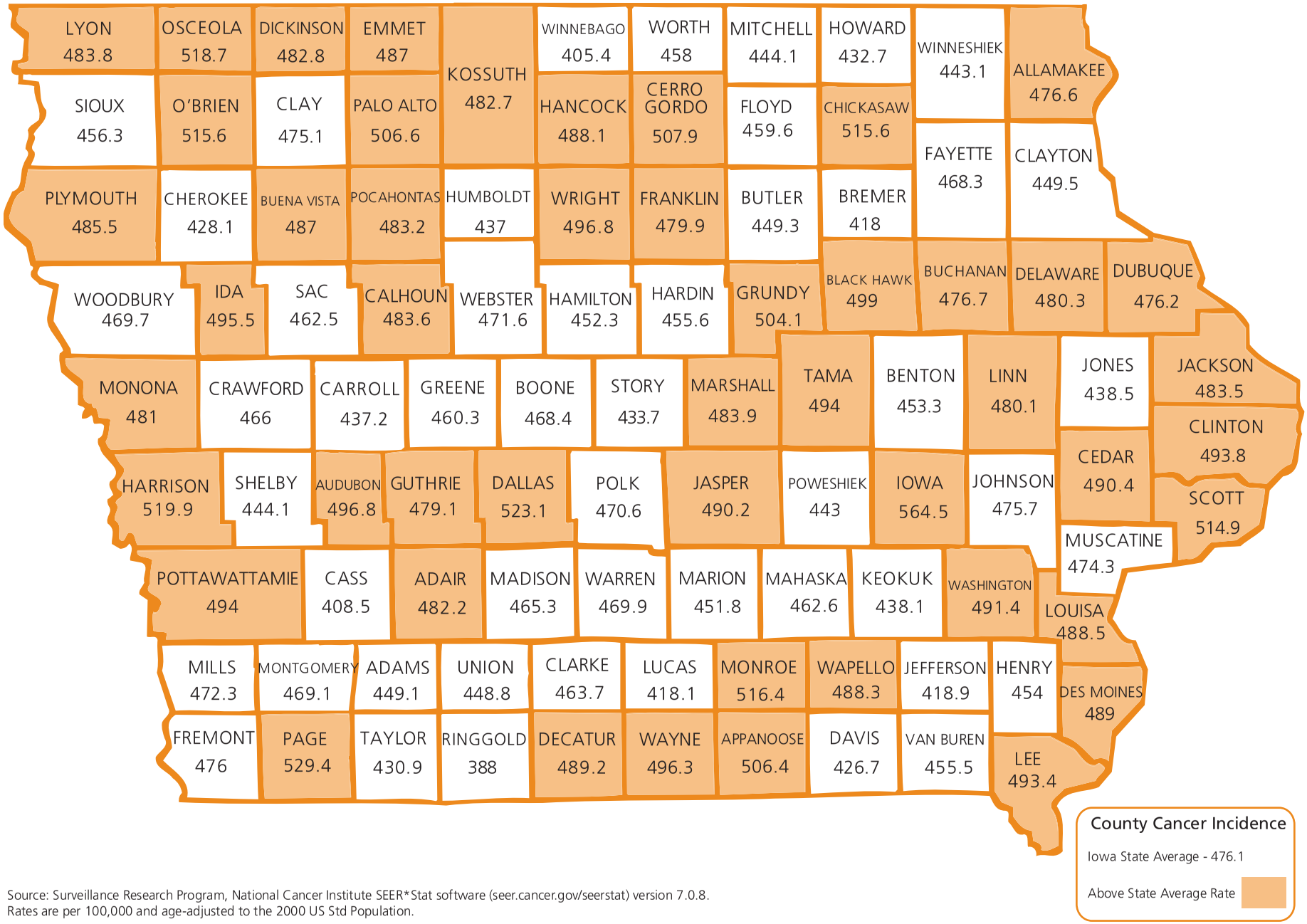
Sources: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.

Figure 5. Leading Cancer Sites: Percentage of New Cases and Deaths Among Females in Iowa, 2004-2008



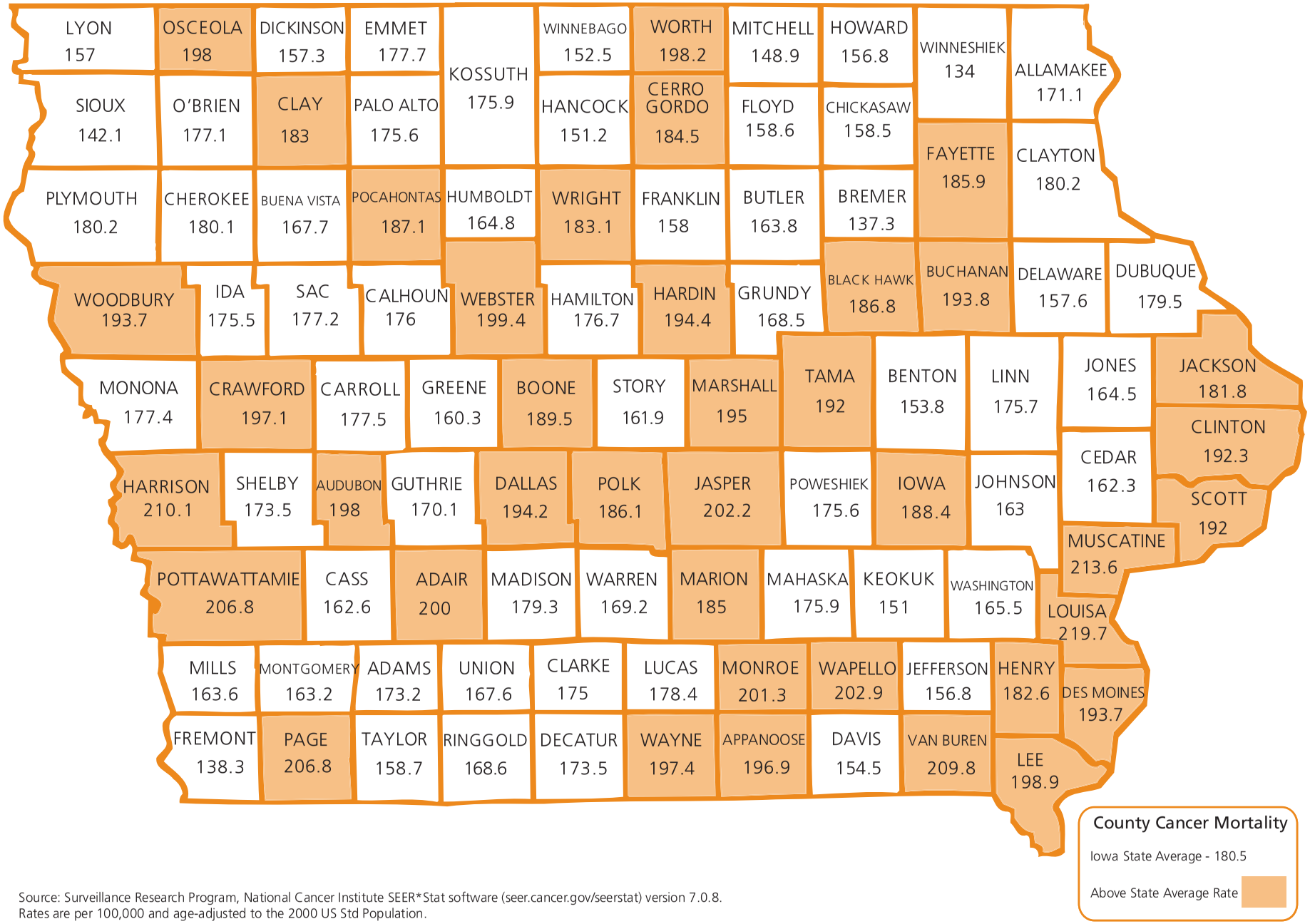
Sources: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.

Map 1. Cancer Incidence Rates for All Cancers by County in Iowa, Diagnosis Years 2004-2008



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population.

Map 2. Cancer Mortality Rates for All Cancers by County in Iowa, Death Years 2004-2008



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population.

Iowa Cancer Incidence and Mortality Data

Cancer Incidence

Cancer incidence refers to the number of new cancer cases that occur during a specified period for a population at risk for developing the disease, expressed as a number of cases or as a rate, usually per 100,000 people.

The leading cancer sites among males in Iowa are presented in Figure 4 on page 16. They are displayed by percentage of new cases and cancer deaths. Prostate cancer is the most frequently diagnosed cancer among Iowa males, representing 26% of all male cancers diagnosed between 2004 and 2008. Breast cancer remains the most frequently diagnosed cancer in Iowa women, representing 28% of all female cancer diagnoses, as is shown in Figure 5 on page 16. Overall, lung cancer continues to be the most frequently diagnosed cancer in Iowa for both genders combined.

The average annual new cases and age-adjusted incidence rates for common cancers are displayed by gender with national comparisons in Table 1 on page 14. The lung cancer incidence rate for 2004-2008 was 87.9 per 100,000 for Iowa men, higher than the national lung cancer incidence rate for men of 73.4 per 100,000.

Cancer incidence rates for all counties in Iowa for 2004-2008 are displayed on Map 1 on page 17. For additional county-level information, such as the number of newly diagnosed cases and age-adjusted rates for specific cancer sites, refer to the supplemental Table A, pages 39-44.

Cancer Mortality

Cancer mortality refers to deaths from cancer that occur during a specified period of time for a particular population, expressed as number of deaths or as a rate, usually per 100,000 people.

Table 3. Trends in Iowa Cancer Incidence and Mortality Rates for All Cancer Sites, 1999-2008

Incidence

	Total			Male			Female		
	Rate	Count	Population	Rate	Count	Population	Rate	Count	Population
1999-2008	480.2	159,543	29,465,210	560.4	82,050	14,495,827	427.5	77,493	14,969,383
1999	488.3	15,786	2,917,634	579.5	8,112	1,429,411	430.9	7,674	1,488,223
2000	484.6	15,721	2,928,184	575.1	8,114	1,436,738	425.8	7,607	1,491,446
2001	486.9	15,890	2,929,424	568.6	8,084	1,438,196	433.6	7,806	1,491,228
2002	488.5	15,997	2,929,264	565.2	8,097	1,439,942	441.0	7,900	1,489,322
2003	475.2	15,644	2,932,799	551.7	8,006	1,442,729	424.6	7,638	1,490,070
2004	477.0	15,871	2,941,358	556.6	8,161	1,447,644	424.7	7,710	1,493,714
2005	478.3	16,021	2,949,450	565.9	8,378	1,452,821	419.3	7,643	1,496,629
2006	480.6	16,237	2,964,391	559.7	8,414	1,460,976	426.2	7,823	1,503,415
2007	476.7	16,265	2,978,719	546.5	8,372	1,469,395	430.5	7,893	1,509,324
2008	468.2	16,111	2,993,987	536.5	8,312	1,477,975	421.9	7,799	1,516,012

Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard.

Mortality

	Total			Male			Female		
	Rate	Count	Population	Rate	Count	Population	Rate	Count	Population
1999-2008	184.7	64,092	29,465,210	231.4	33,309	14,495,827	154.5	30,783	14,969,383
1999	188.4	6,346	2,917,634	242.2	3,334	1,429,411	154.6	3,012	1,488,223
2000	190.7	6,448	2,928,184	245.0	3,399	1,436,738	156.5	3,049	1,491,446
2001	188.2	6,404	2,929,424	233.5	3,265	1,438,196	160.0	3,139	1,491,228
2002	189.2	6,473	2,929,264	236.5	3,342	1,439,942	158.1	3,131	1,489,322
2003	187.7	6,469	2,932,799	233.9	3,341	1,442,729	157.4	3,128	1,490,070
2004	182.5	6,340	2,941,358	226.4	3,266	1,447,644	154.3	3,074	1,493,714
2005	184.1	6,453	2,949,450	233.0	3,395	1,452,821	152.7	3,058	1,496,629
2006	179.9	6,359	2,964,391	222.0	3,281	1,460,976	152.1	3,078	1,503,415
2007	178.0	6,376	2,978,719	218.1	3,277	1,469,395	151.6	3,099	1,509,324
2008	178.2	6,424	2,993,987	224.2	3,409	1,477,975	148.2	3,015	1,516,012

Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard.
Underlying mortality data provided by NCHS (www.cdc.gov/nchs).
Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.

Table 4. Trends for Leading Cancers: Incidence Rates in Iowa by Gender, 1999-2008

All Sites		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1999-2008 PC*
	Total	488.3	484.6	486.9	488.5	475.2	477.0	478.3	480.6	476.7	468.2	-4.1
	Male	579.5	575.1	568.6	565.2	551.7	556.6	565.9	559.7	546.5	536.5	-7.4
	Female	430.9	425.8	433.6	441.0	424.6	424.7	419.3	426.2	430.5	421.9	-2.1
Lung & Bronchus		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Total	67.5	68.2	66.4	67.3	70.2	68.1	71.2	69.6	68.7	67.3	-0.3
	Male	92.8	93.7	88.6	88.0	94.9	90.4	91.0	91.4	84.5	82.8	-10.7
	Female	49.4	50.2	50.3	53.1	52.6	52.0	57.1	53.5	57.5	56.3	13.8
Colorectal		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Total	65.8	62.2	63.3	61.1	57.2	56.4	54.6	54.8	51.0	50.8	-22.9
	Male	78.8	72.4	74.5	70.0	66.5	66.5	62.5	61.5	57.3	58.9	-25.4
	Female	56.1	54.2	54.5	54.2	49.4	48.6	48.2	49.2	45.6	44.0	-21.6
Melanoma		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Total	17.1	17.5	19.6	18.6	16.4	17.5	18.7	20.8	19.9	21.4	24.7
	Male	20.7	20.9	20.2	20.3	19.8	20.2	22.3	25.0	23.2	25.9	24.8
	Female	14.7	15.2	19.6	18.1	13.9	15.9	16.2	18.2	18.4	18.6	26.2
Female Breast		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Female	136.1	128.1	132.5	133.3	122.8	123.1	123.1	121.5	123.7	121.3	-10.9
Prostate		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Male	160.3	164.9	158.8	159.7	142.3	143.7	143.1	147.1	143.3	131.4	-18

*Percent changes (PC) were calculated using 1 year for each end point; APCs were calculated using weighted least squares method.
Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard;
Confidence intervals are 95% for rates (Tiwari mod) and trends.

Table 5. Trends for Leading Cancers: Mortality Rates in Iowa by Gender, 1999-2008

All Sites		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1999-2008 PC*
	Total	188.4	190.7	188.2	189.2	187.7	182.5	184.1	179.9	178.0	178.2	-5.4
	Male	242.2	245.0	233.5	236.5	233.9	226.4	233.0	222.0	218.1	224.2	-7.5
	Female	154.6	156.5	160.0	158.1	157.4	154.3	152.7	152.1	151.6	148.2	-4.1
Lung & Bronchus		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Total	50.6	52.3	51.5	51.6	52.4	54.0	54.3	49.5	52.4	50.7	0.1
	Male	73.8	76.9	70.3	74.3	71.5	73.7	74.3	67.4	67.9	66.8	-9.5
	Female	34.5	35.3	38.1	35.7	38.5	40.0	40.1	36.2	41.1	39.1	13.2
Colorectal		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Total	21.5	22.0	21.1	20.0	20.0	18.7	18.2	18.4	17.5	17.0	-21.2
	Male	28.4	26.4	25.1	23.8	24.7	23.5	22.5	21.3	19.3	20.1	-29.0
	Female	16.6	18.8	18.4	17.2	16.3	15.5	15.1	16.4	15.9	14.6	-12.1
Melanoma		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Total	3.0	2.4	2.2	2.3	2.1	2.6	2.7	2.7	2.1	2.9	-4.1
	Male	3.8	4.1	3.5	3.1	3.1	3.6	3.7	3.6	2.8	4.5	18.3
	Female	2.4	1.2	1.2	1.7	1.2	1.8	2.0	1.8	1.7	1.8	-24.3
Female Breast		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Female	25.8	23.7	24.0	25.0	23.2	22.4	21.3	22.7	20.5	23.6	-8.4
Prostate		**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1999-2008 PC***
	Male	31.7	29.4	29.6	29.4	30.1	25.3	24.8	25.6	25.7	24.1	-23.8

*Percent changes (PC) were calculated using 1 year for each end point; APCs were calculated using weighted least squares method.
Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Underlying mortality data provided by NCHS (www.cdc.gov/nchs).
Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard; Confidence intervals are 95% for rates (Tiwari mod) and trends.

Lung cancer is the leading cause of cancer deaths among both males and females in Iowa, with a yearly average of 1,044 men and 759 women dying from the disease (Table 2, page 15). Colorectal cancer is the second-leading cause of cancer deaths in Iowa residents; Iowa males have a higher mortality rate from colorectal cancer than do females, 21.3 and 15.5, respectively (Table 2, page 15).

Prostate cancer ranks as the second-leading cause of cancer deaths for men (Figure 4, page 16), accounting for 11% of male cancer deaths, while breast cancer ranks as the second-leading cause of cancer deaths for women at 14% (Figure 5, page 16).

Average mortality rates for all cancers in Iowa for 2004-2008 are displayed by county on Map 2 on page 18. More detailed county level-data on the number of deaths and the age-adjusted rates are provided in the supplemental Table B, pages 45-50.

Trends in Cancer Incidence and Mortality 1999-2008

From 1999-2008, male incidence rates for all cancers declined 7.4% (Table 4, page 20). Females experienced a decline of 2.1% in overall incidence during this same time period (Table 4, page 20). From 1999 to 2008, cancer mortality rates for both males and females in Iowa declined -- 7.5% in males and 4.1% in females (Table 5, page 20). This decline in mortality is attributed to an increase in early detection, better treatments, declining mortality for the more common cancers such as lung, prostate, female breast, and colorectal, and increased awareness of high-risk behaviors such as smoking.

The cancer incidence rates displayed in Table 4 provide trend data for some of the most common cancers in Iowa. One major trend in incidence rates is shown with skin melanoma, increasing by 24.8% for males and 26.2% for females. A trend not shown is the male thyroid cancer rate increasing by approximately 54.7% while the female rates increased by 82.8%. Liver cancer also increased by 28.2% for males and 22.7% in females, and kidney cancer increased 25.1% for men and 23.4% for women.

The largest declines in incidence rates were seen with colorectal cancer, with a decrease of 25.4% in males and 21.6% in females. Males saw a 10.7% decrease in the incidence of lung cancer, while females saw a 13.8% increase. Men saw a decrease in prostate cancer of 18%. In trends not shown, ovarian cancer decreased 21.2%, and stomach cancer decreased 13.6% in males and 25% in females over this period.

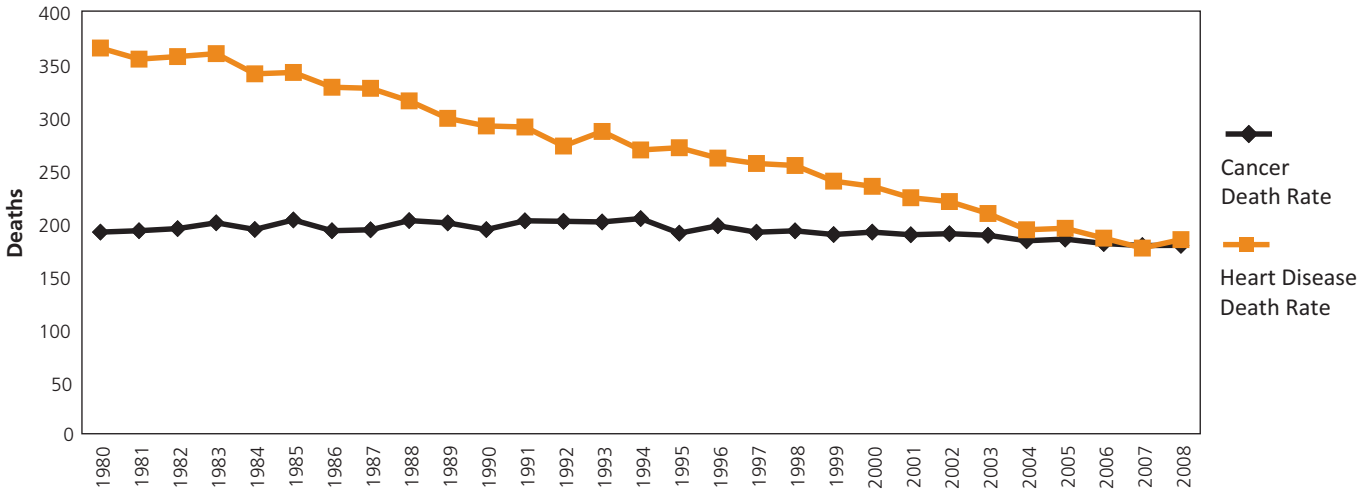
The mortality rates for cancer in Iowa are displayed in Table 5 and show that female breast cancer mortality declined 8.4% during the 1999-2008 time period. Prostate cancer mortality decreased 23.8% from 1999-2008. In a trend not shown in the table, cervical cancer mortality rates decreased by 22% during this same time.

Both males and females experienced lower mortality rates in colorectal cancer, as shown in Table 5; males saw a 29% decrease in colorectal cancer mortality while women saw a 12.1% decrease. Lung cancer mortality rates parallel the incidence rates and show a gender disparity; male mortality dropped by 9.5% while female mortality increased by 13.2%. Similar results, not shown in the table, were seen with laryngeal cancer.

Cancer as a Leading Cause of Death

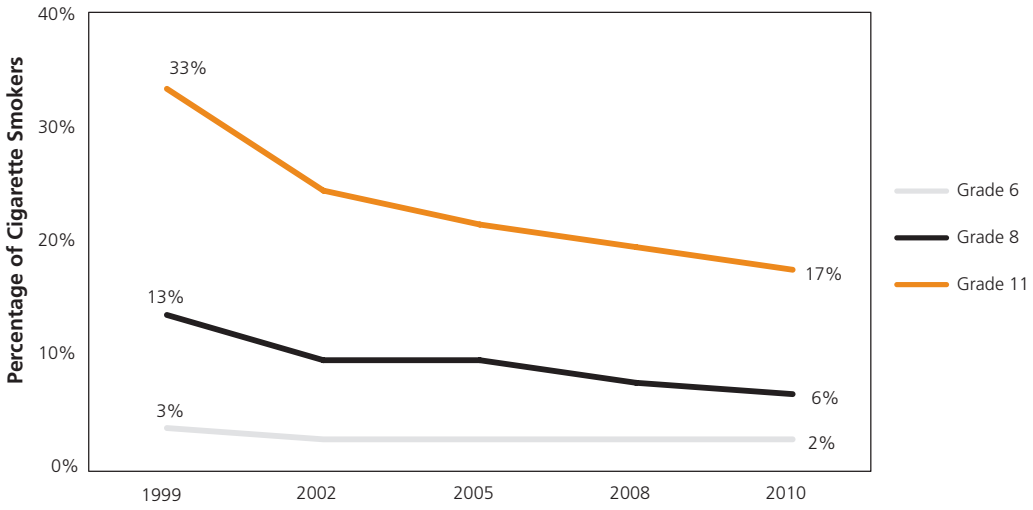
For decades, cancer and heart disease have combined to account for half of all deaths in Iowa. Between 1999 and 2008, cancer death rates in Iowa decreased 5.4% while heart disease death rates decreased 23% (Figure 6, page 22). Declining cancer mortality in Iowa has primarily been a result of decreases in the four most common types of cancer -- lung, colorectal, prostate, and female breast. Heart disease deaths have been declining at a faster pace for a longer period of time than cancer deaths. In 2007, cancer mortality surpassed heart disease mortality for the first time. Barring a noteworthy shift in trends, cancer will soon become the leading cause of death in Iowa.

Figure 6. Deaths due to Heart Disease and Cancer in Iowa, 1980-2008



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
Underlying mortality data provided by NCHS (www.cdc.gov/nchs).
Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard.

Figure 7. Cigarette Smoking Among Youth in Iowa, 1999-2010



Source: Iowa Youth Survey, 1999-2010 State of Iowa Results.

Lung & Bronchus Cancer

Overview

In Iowa, lung cancer killed an average of 1,803 citizens per year during the five-year period 2004 through 2008 (Table 2, page 15), and an average of 2,358 new cases of lung cancer were diagnosed each year (Table 1, page 14). What is particularly tragic is that we know how to prevent nearly all lung cancers.

Cancer Burden

Between 2004 and 2008, lung cancer was the second most commonly diagnosed cancer for men and for women. About 70% of Iowans diagnosed with lung cancer were 65 years of age or older. The age-adjusted incidence rate for lung cancer in Iowa in 2008 was 82.8 new cases per 100,000 men and 56.3 new cases per 100,000 women (Table 4, page 20).

For the period 2004-2008, lung cancer was the leading cause of cancer deaths for men and for women, and killed as many Iowans as prostate, breast, colorectal, and pancreatic cancer combined. About 73% of the deaths due to lung cancer occurred among Iowans 65 years of age or older. The age-adjusted mortality rate for lung and bronchus cancer in Iowa in 2008 was 66.8 deaths per 100,000 men and 39.1 deaths per 100,000 women (Table 5, page 20).

Lung cancer is the leading cause of cancer deaths for both men and women. Every year, lung cancer causes as many Iowa deaths as prostate, breast, colorectal, and pancreatic cancer combined.

Although about the same number of Iowans were diagnosed with lung cancer as with prostate cancer or breast cancer each year, more than four times as many died from lung cancer. Based on data from the Iowa SEER Program, the five-year relative survival rate for lung cancer is 14.2%, compared to 97.9% for prostate cancer and 90.7% for breast cancer (Table 6, page 36). Even when diagnosed at the same stage, lung cancer patients have a poorer chance of survival than people diagnosed with many of the other most common cancers.

Both gender and race are factors in lung cancer incidence and mortality rates. Lung cancer incidence and mortality rates are significantly higher among Iowa males than Iowa females. Iowa males have an average of 1,044 deaths from lung cancer each year (Table 1, page 14), compared to an average of 759 deaths for Iowa females during 2004-2008 (Table 2, page 15). While men traditionally experienced higher lung cancer rates, the difference has decreased in recent years, largely as the result of stable smoking rates among women. In Iowa, between 1999 and 2008, deaths from lung cancer among women increased by 13.2%, compared to a 9.5% decrease among men (Table 5, page 20). African Americans in Iowa are more likely than other races to die from lung cancer. The mortality rate for African Americans with lung cancer for the years of 2004-2008 was 78.1 per 100,000. The mortality rate for whites was 52.1, and American Indians/Alaska Natives, Asian/Pacific Islanders had the lowest mortality rate of 32.9 per 100,000.

Risk Factors

Cigarette smoking has been reported to cause 87% of all lung cancer deaths and 30% of all cancer deaths. Stopping the use of tobacco could eliminate most lung cancer. Quitting smoking reduces an individual's risk significantly, although former smokers remain at greater risk than those who never smoked.

The second-leading cause of lung cancer is exposure to radon, a radioactive gas that can damage the lungs and increase the risk of lung cancer. Radon is estimated to cause 21,000 lung cancer deaths annually in the US. Because of Iowa's higher than average radon levels relative to other areas of the US, there are an estimated 400 radon-related lung cancer deaths in Iowa each year. Radon is the leading cause of lung cancer among people who have never smoked. Additional information about radon is found in the Prevention section, on page 9.

The third-leading cause of lung cancer is secondhand smoke, estimated to cause 3,400 lung cancer deaths among non-smokers each year in the US. In Iowa there are an estimated 30 lung cancer deaths each year attributable to secondhand smoke. Breathing in the tobacco smoke of others is also estimated to be responsible for 46,000 deaths each year nationwide from heart disease, and increases the risk among children for low birth weight, SIDS, and asthma.

Prevention, Screening, and Early Detection

Lung cancer is the most preventable cancer. Most people with early lung cancer do not have any symptoms and, in 2008, only 20% of all lung cancers in Iowa were found at an early stage.

Currently, screening for early lung cancer detection has not been proven to reduce mortality. Identifying an effective screening method is the key to improving early detection of 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 reducing lung cancer deaths. Newer tests, such as low-dose helical CT scans and molecular markers in sputum, have produced promising results in detecting lung cancer at earlier, more operable stages in high-risk patients, but have not yet been shown to reduce lung cancer deaths.

The most effective prevention for lung cancer at this time is not smoking. Cigarette use among Iowa students in grade 11 has dropped by nearly 50% over the past decade (Figure 7, page 22).

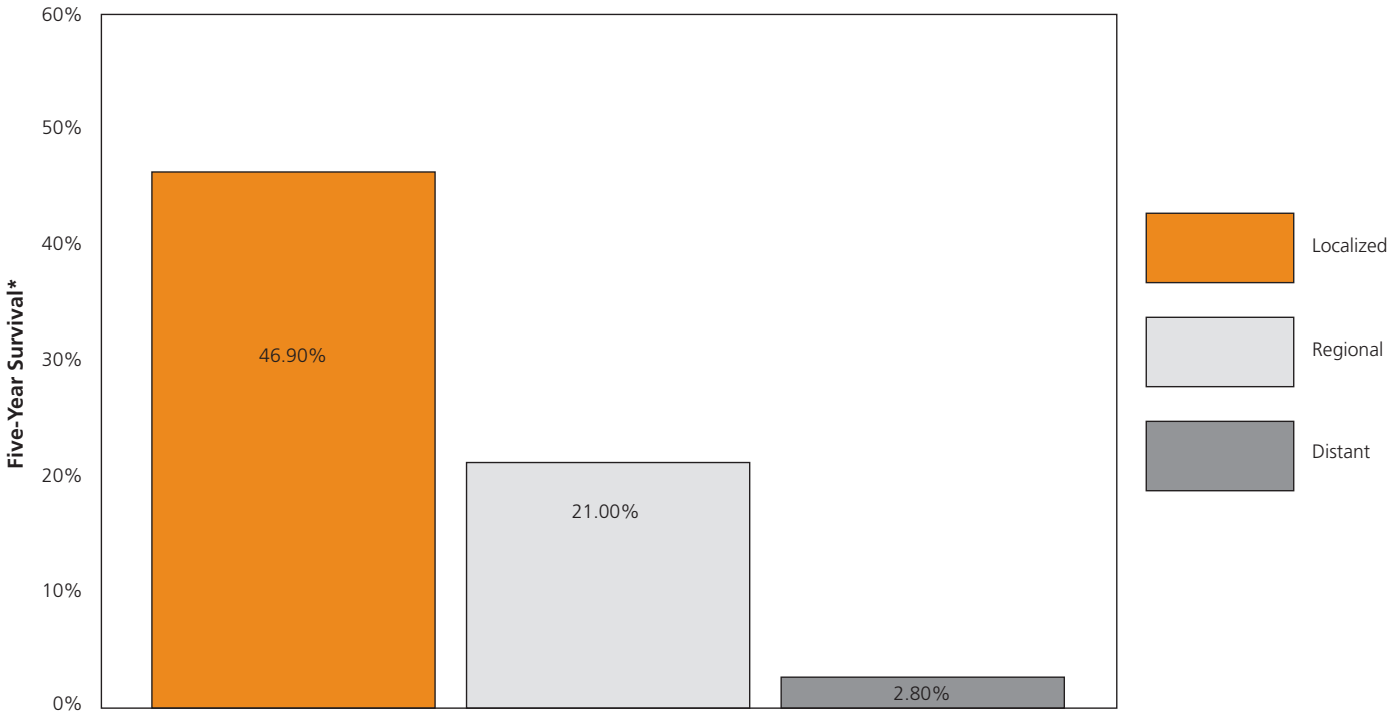
Stage at Diagnosis

Lung cancer in Iowa is most often (51% of new cases between 1999 and 2006) diagnosed at the distant stage, which negatively impacts the length of survival. The five-year survival rate is highest when lung cancer is diagnosed early, with a 46.9% five-year relative survival rate for lung cancers diagnosed at the local stage (Figure 8). However, only 16.6% of lung cancers in Iowa were diagnosed at this stage in this same period.

Risk Factors for Lung Cancer

- Tobacco smoking, even low-tar cigarettes.
- Breathing in radon, a radioactive gas produced by uranium and present in some homes.
- Breathing in secondhand smoke, whether in the home or workplace.
- Exposure to asbestos fibers, especially among smokers.
- Occupational exposures to diesel exhaust, gasoline, some organic chemicals, radioactive ores, and dust from chromium, cadmium, and arsenic.
- Chronic inflammation of the lungs due to pneumonia, tuberculosis, silicosis, or berylliosis.
- Air pollution.

Figure 8. Five-Year Relative Survival Rate for Lung Cancer in Iowa by Stage, Diagnosis Years 1999-2006



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
*Five-year relative survival is the rate of people who are alive five years after diagnosis (after adjusting for expected mortality).

Colorectal Cancer

Overview

Colon and rectal cancers have many features in common and are referred to as colorectal cancer. Cancer can develop in any part of the colon or rectum. More Iowans die of colorectal cancer than either breast or prostate cancer. Only lung cancer kills more people. Screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of this disease, but only two-thirds of Iowans age 50 and older report being screened as recommended. Because precancerous polyps can often be removed during screening by colonoscopy, not being screened increases the risk for being diagnosed with this disease. Individuals with any of the moderate- to high-risk factors listed should discuss with their physician the advisability of initiating screening at an earlier age or being screened more frequently. 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.

More Iowans die of colorectal cancer than either breast or prostate cancer.

Cancer Burden

In Iowa, colorectal cancer is the third most common cancer among men and women. From 2004-2008, a yearly average of 1,862 Iowa residents were diagnosed with colorectal cancer (Table 1, page 14) and 656 residents died of the disease (Table 2, page 15). The incidence rate for both genders combined was 53.5 per 100,000 (2004-2008). Males had a higher incidence rate than females, 61.3 compared with 47.1, respectively (Table 1, page 14). The Iowa colorectal cancer mortality rate was 18.0 per 100,000, with a rate of 21.3 per 100,000 males and 15.5 per 100,000 females (Table 2, page 15).

Increased use of sigmoidoscopy or colonoscopy, which in turn has increased benign polyp removal, has been suggested as the 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. Table 4 on page 20 shows that the incidence rates for colorectal cancer decreased 25.4% in males and 21.6% in females between 1999 and 2008. Mortality rates decreased 29% in males and decreased 12.1% in females during this same time period. (Table 5, page 20).

Risk Factors

The risk factors that may contribute to the development of colorectal cancer include:

- Age – 91% of colorectal cancers are diagnosed in individuals age 50 and older.
- Race – African Americans are more likely than other racial and ethnic groups to develop colorectal cancer.
- A family history of colorectal cancer or a personal history of colorectal cancer, colon polyps, or inflammatory bowel disease.
- Inherited genetic mutations (familial adenomatous polyposis [FAP] and hereditary non-polyposis colorectal cancer [HNPCC], also known as Lynch syndrome).
- Studies have also found an association between diabetes and colorectal cancer.

Modifiable risk factors include:

- Being sedentary or not physically active.
- A diet that is high in fat (especially from red meat) or low in fruits and vegetables.
- Obesity, particularly excess fat around the waist, increases the risk.
- Long-term smoking.
- Alcohol, especially heavy use.

Prevention, Screening, and Early Detection

Modifiable factors for reducing the risk of colorectal cancer include healthy eating, regular physical activity, maintaining suggested body weight, and avoiding smoking.

The American Cancer Society recommends screening beginning at age 50 for those who are at average risk for developing colorectal cancer. Screening can result in the detection and removal of colorectal polyps before they become cancerous. Screening can also find colorectal cancer early, when treatment can be most effective.

Colorectal cancers can almost always be cured if detected early. When colorectal cancers are detected at an early, localized stage, the five-year relative survival rate is greater than 90%; however, only 42% of colorectal cancers were diagnosed at this stage in 2008 in Iowa. Therefore, it is important for all adults age 50 and older (at average risk) to follow the American Cancer Society's screening guidelines. Individuals at increased risk of colorectal cancer should begin screening before age 50 and should discuss their screening options with their health care provider.

American Cancer Society Screening Recommendations for Colorectal Cancer

Beginning at age 50, men and women at average risk should follow one of the examination schedules below:

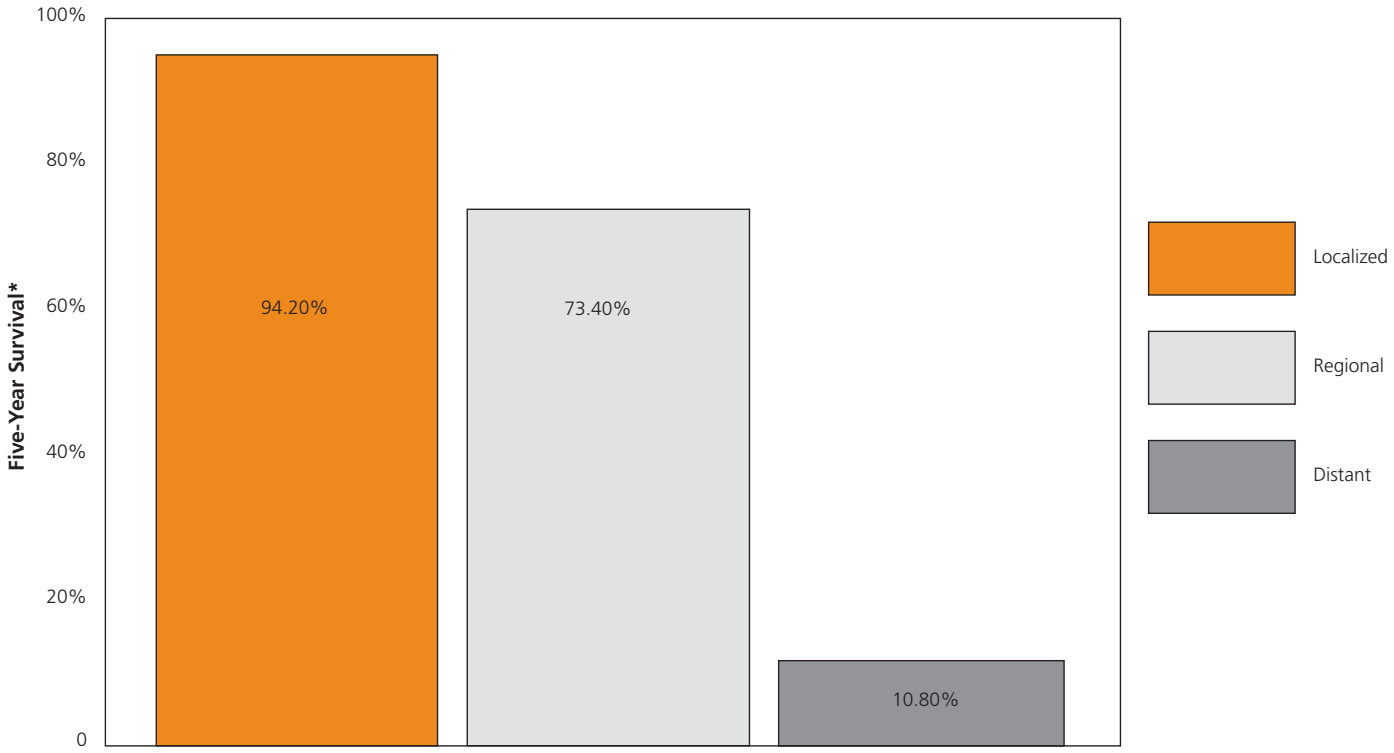
Tests that find polyps and cancer:	When to get one:
• Flexible sigmoidoscopy, or	• Every five years, starting at age 50
• Colonoscopy, or	• Every 10 years, starting at age 50
• Double-contrast barium enema (DCBE), or	• Every five years, starting at age 50
• CT colonography (virtual colonoscopy)	• Every five years, starting at age 50

Tests that mainly find cancer:	When to get one:
• Fecal occult blood test (FOBT) with at least 50% test sensitivity for cancer, or	• Annually, starting at age 50
• Fecal immunochemical test (FIT) with at least 50% test sensitivity for cancer, or	• Annually, starting at age 50
• Stool DNA test (sDNA)	• Interval uncertain, starting at age 50

Stage at Diagnosis

The five-year relative survival rate from colorectal cancer in Iowa is 94.2% when the cancer is diagnosed before it has extended beyond the intestinal wall (Figure 9). The higher death rate for colorectal cancer compared to breast and prostate cancer results in part from the fact that only 42% of colorectal cancers in Iowa are diagnosed at an early stage, when they can be more successfully treated. In comparison, nearly 65% of breast cancers and more than 90% of prostate cancers are diagnosed at an early stage.

Figure 9. Five-Year Relative Survival Rate for Colorectal Cancer In Iowa by Stage, Diagnosis Years 1999-2006



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
*Five-year relative survival is the rate of people who are alive five years after diagnosis (after adjusting for expected mortality).

Breast Cancer

Overview

The majority of breast cancers can be treated successfully if detected early. An annual mammogram starting at age 40 is the most effective way to detect breast cancer at an early, curable stage. American Cancer Society guidelines also recommend that women at an increased risk of developing breast cancer (family history, genetic predisposition, history of the disease) may benefit from starting early detection practices at a younger age or having additional tests or more frequent examinations. These women should talk to their health care provider about the benefits and limitations of beginning screening at an earlier age and then make a decision about breast cancer screening. Specific guidelines for clinical breast exams (CBE) and breast self-exams (BSE) are also provided based on both age and level of risk.

Cancer Burden

Breast cancer is the most commonly diagnosed cancer among women in Iowa regardless of race. Breast cancer accounts for nearly one-third of all cancers diagnosed among Iowa women. Only lung cancer accounts for more cancer deaths in women. The average annual mortality rate for breast cancer in Iowa for females during 2004-2008 was 22.1 per 100,000 population (Table 2, page 15). This represents 437 deaths from breast cancer each year during this time period (Table 2, page 15).

During 2004-2008, the age-adjusted incidence rate for female breast cancer was 122.5 per 100,000 population, representing 2,168 newly diagnosed breast cancers annually (Table 1, page 14). The risk of developing breast cancer increases with age. Nationwide, 95% of new cases and 97% of breast cancer deaths occur in women age 40 and older. In Iowa, during the five-year period from 2004 to 2008, approximately 96% of women who developed breast cancer were age 40 and over, and 80% of women diagnosed with breast cancer were age 50 and over. Of women who died from breast cancer in Iowa, 98% were over age 40, and 90% were age 50 and older.

The overall increase in breast cancer incidence during the last four decades is attributed to the gradual increase in underlying risk factors for breast cancer. Women experiencing earlier menarche, delaying childbearing, and having fewer children increase their exposure to higher known hormonal contributors. Additional increases in incidence rates also are expected as a large number of women reach an advanced age where breast cancer characteristically becomes more common. Improved mammography screening rates contributed to an increase in the reported incidence of the disease from the 1980s through 2000 and, at the same time, caused a shift to earlier stage diagnosis of smaller, more easily treatable cancers. Earlier diagnosis and treatment have resulted in a reduction in mortality from breast cancer. Breast cancer mortality declined 8.4% from the 1999 rate of 25.8 per 100,000 population to the 2008 rate of 23.6 per 100,000 (Table 5, page 20).

Each year, about 10 men are diagnosed with breast cancer in Iowa and approximately 1,900 men are diagnosed with the disease nationwide. Clinically, breast cancer in men is very similar to breast cancer in women, but the prognosis is often worse for men because they tend to be diagnosed at a later stage than women.

> Breast cancer is the most commonly diagnosed cancer among women in Iowa.

Risk Factors

The risk factors that may contribute to the development of breast cancer include:

- Increasing age.
- Personal or family history of breast cancer and inherited genetic mutations in the breast cancer susceptibility genes BRCA1 and BRCA2. (These mutations account for approximately 5%-10% of all breast cancer cases.)
- History of noncancerous breast disease.
- Long menstrual history (menstrual periods that start early and end late in life).

Modifiable risk factors include:

- Weight gain after age 18.
- Being overweight or obese (postmenopausal breast cancer).
- Use of combined estrogen and progestin menopausal hormonal therapy (MHT).
- Physical inactivity.
- Alcohol consumption, especially two or more drinks daily.
- Never having children or having the first child after age 30.
- Recent use of oral contraceptives.

Prevention, Screening, and Early Detection

Some breast cancer risk factors such as family history cannot be changed. However, a woman's risk of developing breast cancer may be reduced by staying physically active, avoiding obesity and limiting alcohol use. Management of risk factors may help some women decrease their chances of being diagnosed with breast cancer. For women at high risk for breast cancer, two medications, tamoxifen and raloxifene, have been approved to reduce breast cancer risk.

Mammography can detect breast cancer at an early stage, when treatment is more effective and a cure is more likely. Death rates for breast cancer have steadily declined since 1990. This decrease represents progress in earlier detection and improved treatment.

Data from the BRFSS shows that women in Iowa having a mammogram during the past two years increased from 70.6% in 1998 to 76.5% in 2008, and women ever having had a mammogram increased from 82.2% in 1998 to 91.3% in 2008.

American Cancer Society Screening Recommendations for Breast Cancer
Women at average risk should follow the examination schedules below:

- Yearly mammograms starting at age 40 and continuing for as long as a woman is in good health.
- Clinical breast exams (CBE) should be part of a periodic health exam, preferably at least every three years for women in their 20s and 30s, and every year for women 40 and older.
- Breast self-exam (BSE) is an option for women starting in their 20s and women should report any breast change promptly to their health care providers.

Women at increased risk (family history, genetic tendency, history of breast cancer) should talk with their health care provider about the benefits and limitations of starting mammography screening earlier, having additional tests (breast ultrasound or MRI) or having more frequent exams.

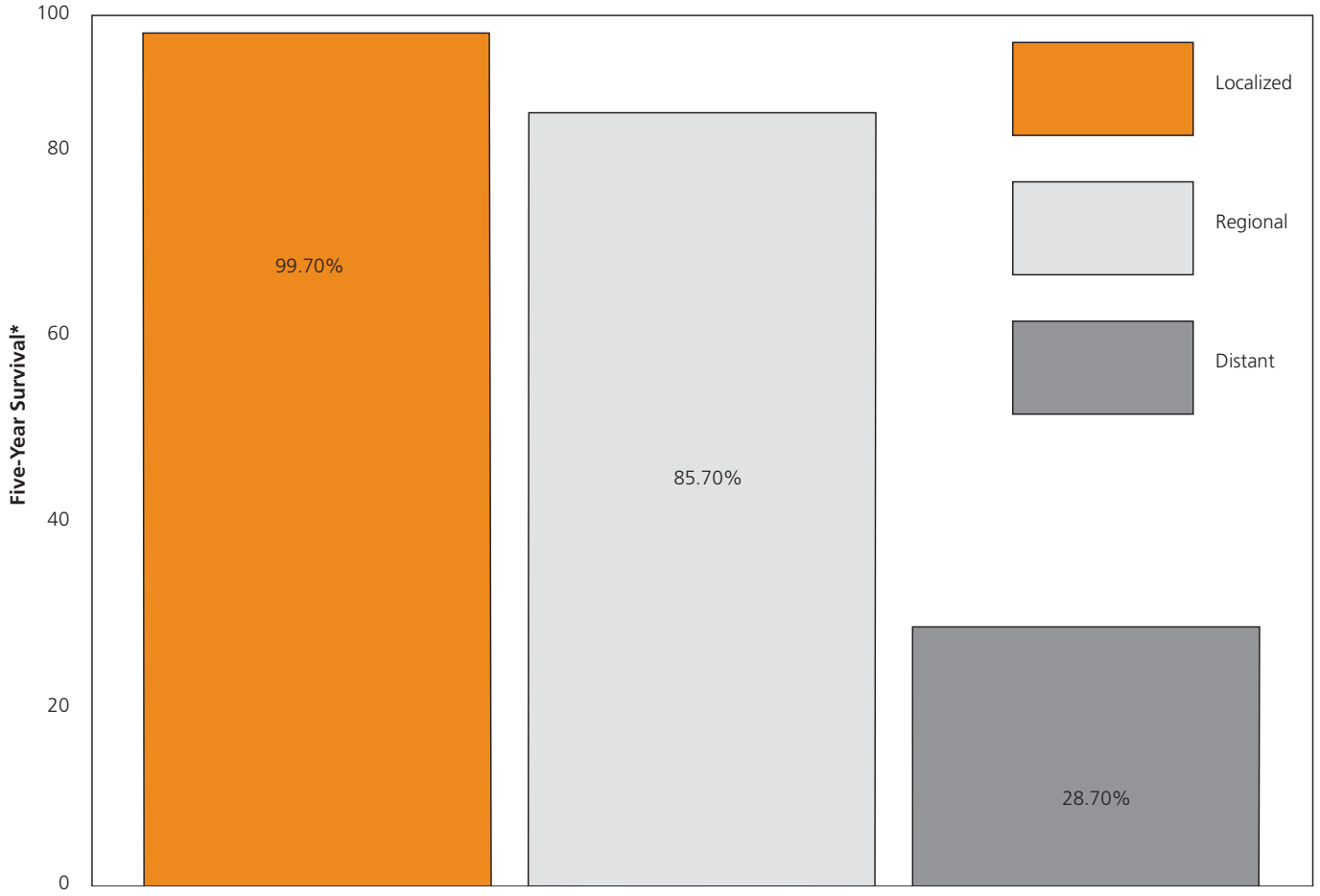
A mammogram is able to detect the earliest sign of breast cancer before it can be seen or felt physically.

Stage at Diagnosis

The national five-year relative survival rate for women diagnosed with breast cancer at the local stage was 98% in 1999-2006. The rate for Iowans was 99.7% (Figure 10). The five-year relative survival rate is much higher for localized and regional disease than for distant disease. Nationwide, during 1999-2006, 60% of invasive breast cancer cases were diagnosed early, or at the local stage. In Iowa, 65% of invasive female breast cancers during that same period were diagnosed at the local stage.

The percentage of diagnoses at the pre-invasive, or in situ stage, increased from approximately 16% in 1999 to almost 18% in 2006. This increase in pre-invasive breast cancer largely reflects a rise in mammography use. Early detection through mammography screening provides the best chance of discovering breast cancer at an early stage and increasing survival.

Figure 10. Five-Year Relative Survival Rate for Female Breast Cancer in Iowa by Stage, Diagnosis Years 1999-2006



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
*Five-year relative survival is the rate of people who are alive five years after diagnosis (after adjusting for expected mortality).

Prostate Cancer

Overview

Prostate cancer is the most commonly diagnosed cancer among men. It is estimated that about one in six men in the US will be diagnosed with prostate cancer during their lifetime. Prostate cancer is typically a disease found among older men and often is a relatively slow-growing cancer. When prostate cancer is diagnosed at the localized or regional stage, the five-year relative survival rate is nearly 100%.

Cancer Burden

Prostate cancer is the most commonly diagnosed cancer and the second-leading cause of cancer deaths among men. In Iowa from 2004-2008, the average number of newly diagnosed prostate cancers was 2,172 (age-adjusted rate of 141.7 cases per 100,000 population) (Table 1, page 14). The average number of deaths was 359 (25.1 deaths per 100,000 population) (Table 2, page 15). Nationwide, the incidence rate was higher for that same period, 162.5 per 100,000. However, the national death rate, 24.4 per 100,000, was lower than Iowa's rate. Both the incidence and mortality rates for prostate cancer have been decreasing in Iowa. The incidence rate has decreased 18% between 1999 and 2008 (Table 4, page 20) while the mortality rate has decreased 23.8% (Table 5, page 20).

Risk Factors

Although a specific cause is unknown, the American Cancer Society recognizes that several risk factors may contribute to the development of prostate cancer. They include:

- Increasing age – About 60% of all prostate cancer cases are diagnosed in men 65 years of age and older, and 97% occur in men 50 years of age and older.
- Race – African-American men have higher incidence and mortality rates than other races. The African-American mortality rate from prostate cancer is twice as high as white men.
- Family history – Having a father or brother with prostate cancer can double a man's risk of developing this disease.
- Diet – Recent studies suggest that a diet high in processed meat or dairy foods may be a risk factor, and obesity appears to increase risk of aggressive prostate cancer. Diets high in fat and red meat and low in fruits and vegetables may increase the chance of developing prostate cancer.

Prevention, Screening, and Early Detection

Three of the four main risk factors for prostate cancer are not preventable (age, race, family history), but maintaining a healthy body weight and being physically active may reduce the risk of developing aggressive prostate cancer and improve outcomes following treatment.

Most prostate cancers are diagnosed through PSA screening or a digital rectal exam (DRE) before symptoms develop. The American Cancer Society recommends that asymptomatic men who have at least a 10-year life expectancy have an opportunity to make an informed decision with their health care provider about whether to be screened for prostate cancer after receiving information about the uncertainties, risks, and potential benefits associated with the screening. Men at average risk should receive this information beginning at age 50. Men at higher risk, including African-American men and men with a first-degree relative (father or brother) diagnosed with prostate cancer before age 65, should receive this information beginning at age 45.

American Cancer Society Guidelines for the Early Detection of Prostate Cancer

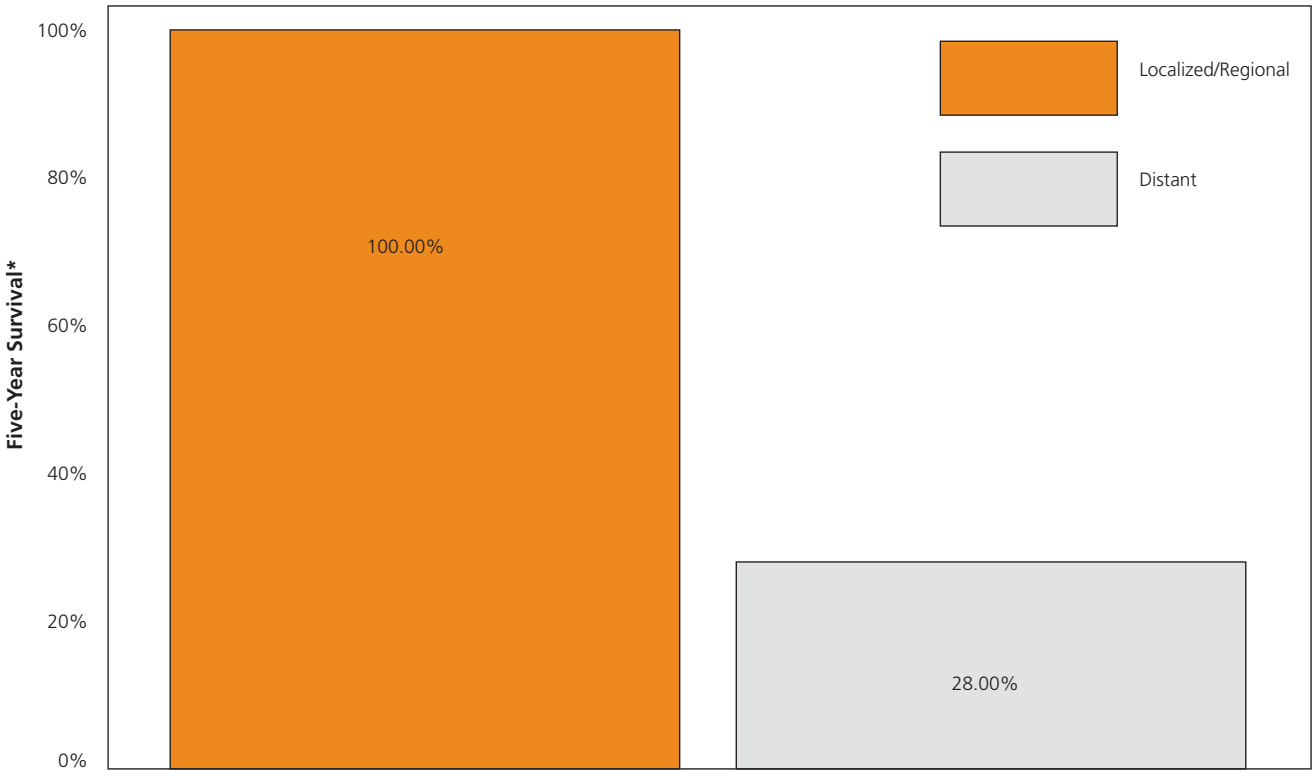
The American Cancer Society recommends that men make an informed decision with their doctor about whether to be tested for prostate cancer. Research has not yet proven that the potential benefits of testing outweigh the harms of testing and treatment. The American Cancer Society believes that men should not be tested without learning what we know and don't know about the risks and possible benefits of testing and treatment.

Starting at age 50, men should talk to a doctor about the pros and cons of testing so they can decide if testing is the right choice for them. If they are African American or have a father or brother who had prostate cancer before age 65, men should have this talk with a doctor starting at age 45. If men decide to be tested, they should have the PSA blood test with or without a rectal exam. How often they are tested will depend on their PSA level.

Stage at Diagnosis

The majority of prostate cancers are diagnosed at the local stage. In Iowa, the percent of prostate cancer diagnosed at the local/regional stage increased from 87% in 1999 to 93% in 2006. In Iowa and nationwide, African-American men and men of other non-white races were more likely to be diagnosed at a distant stage. The five-year relative survival rate, all races combined, for locally and regionally diagnosed prostate cancers in Iowa was 100%. However, the relative survival rate for prostate cancer diagnosed at the distant stage drops to 28% (Figure 11).

Figure 11. Five-Year Relative Survival Rate for Prostate Cancer in Iowa by Stage, Diagnosis Years 1999-2006



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
*Five-year relative survival is the rate of people who are alive five years after diagnosis (after adjusting for expected mortality).

Melanoma of the Skin

Overview

Skin cancer is the most common form of cancer in the United States. Most skin cancers are classified as nonmelanoma (basal cell or squamous cell) and develop on sun-exposed areas of the body. Although these cancers are highly curable if detected and treated early, basal cell and squamous cell carcinomas can cause considerable damage and disfigurement if left untreated.

Melanoma is a skin cancer that develops in melanocytes, the cells that produce our skin color. This type of cancer can spread quickly to other parts of the body. Even though melanoma is very curable when detected in its early stages, melanoma is far more dangerous than other skin cancers.

The number of melanomas diagnosed in the United States, as well as Iowa, is increasing. From 1999 to 2008, the number of melanomas diagnosed in Iowa increased from 530 to 690. Melanoma accounts for less than 5% of all skin cancer cases, but the vast majority of skin cancer deaths. Fortunately melanoma is often curable if detected and treated at early stages.

Melanoma accounts for less than 5% of all skin cancer cases, yet accounts for the vast majority of skin cancer deaths.

Cancer Burden

Each year between 2004 and 2008, an average of 632 Iowa residents were diagnosed with melanoma (Table 1, page 14) and 89 died from the disease (Table 2, page 15). Between 1999 and 2008 the incidence rate increased by 24.7%, from 17.1 to 21.4 per 100,000 (Table 4, page 20). The Iowa incidence rate for 2004-2008 was 19.7, lower than the national rate of 21.7 per 100,000 (Table 1, page 14). The Iowa mortality rate has remained stable at around 2.6 per 100,000, close to the national rate of 2.7 (for 2004-2008) (Table 2, page 15). Approximately 61% of the melanoma deaths occurred in men and 39% of the deaths occurred in women.

Risk Factors

The risk factors that may contribute to the development of melanoma include:

- Family history of melanoma.
- Presence of atypical or numerous moles (more than 50).

Risk factors for the development of all types of skin cancer include:

- Sun sensitivity (sunburning easily, difficulty tanning, natural blond or red hair color).
- A history of excessive sun exposure, including sunburns.
- Use of tanning booths.
- Personal history of skin cancer.
- Diseases that suppress the immune system.

Prevention, Screening, and Early Detection

Skin should be protected from intense sun exposure by covering with clothing or a hat and applying sunscreen that has a sun protection factor (SPF) of 15 or higher to uncovered skin. Children in particular should be protected from the sun because severe sunburns in childhood may greatly increase risk of melanoma in later life.

In order to detect skin cancer early, it is important to recognize changes in skin growths or the appearance of new growths. A new or unusual lesion should be evaluated promptly by a physician.

Key warning signs of nonmelanoma 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.

American Cancer Society Guidelines for the Early Detection of Melanoma

The ABCD rule is a guide to the usual signs of melanoma. Be on the lookout and tell your doctor about spots that have any of the following features:

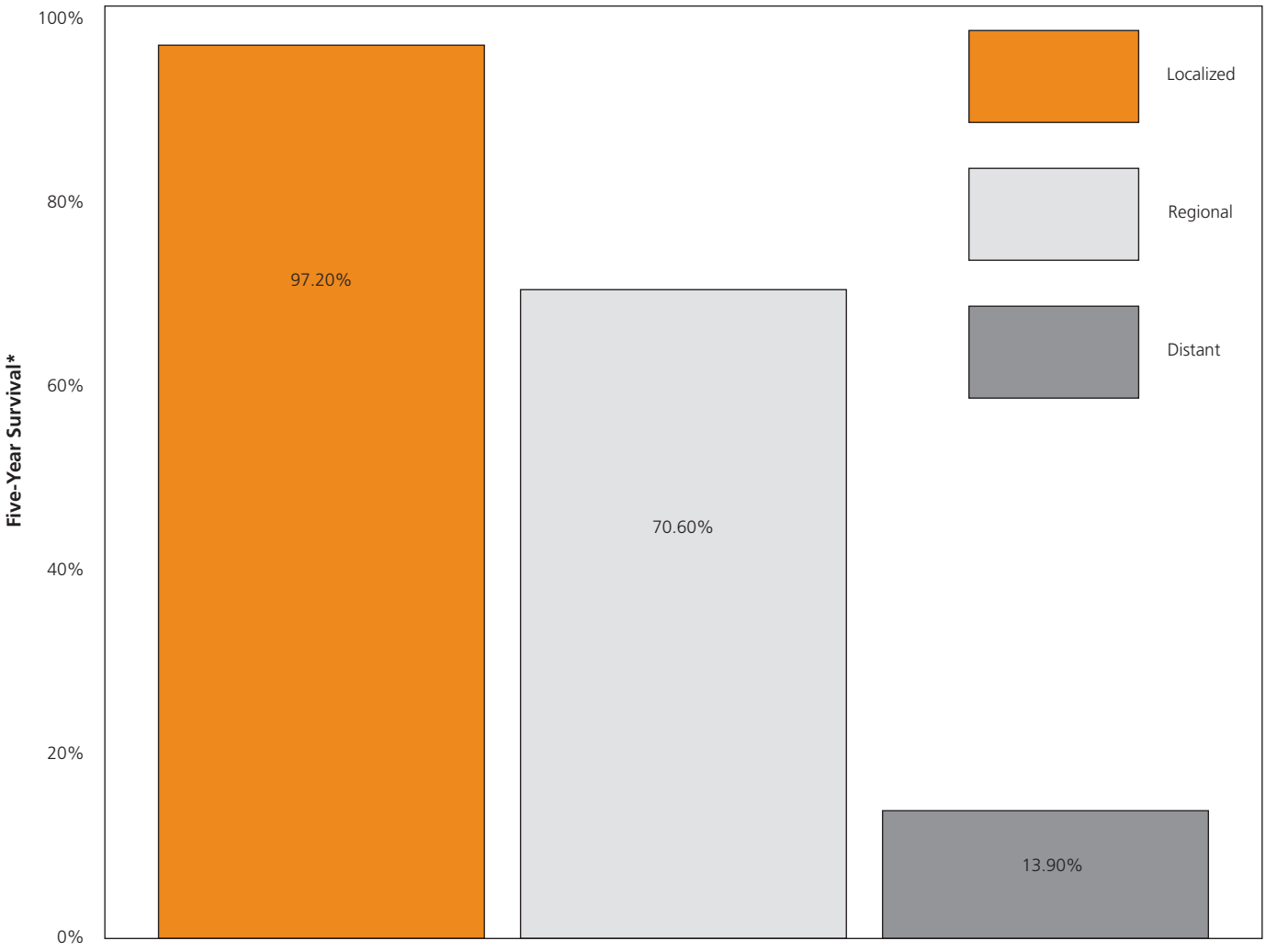
- A is for Asymmetry - One half of a mole or birthmark does not match the other.
- B is for Border - The edges are irregular, ragged, notched, or blurred.
- C is for Color - The color is not the same all over and may include shades of brown or black, or sometimes with patches of pink, red, white, or blue.
- D is for Diameter - The spot is larger than 6 millimeters across (about ¼ inch – the size of a pencil eraser), but melanomas can sometimes be smaller than this.

Some melanomas do not fit the rules described above, so it is important to tell your doctor about any changes in skin lesions, new skin lesions, or growths that look different from the rest of your moles.

Stage at Diagnosis

Melanoma can spread to other parts of the body quickly, but is highly curable if detected early. The five-year national relative survival rate for patients with melanoma is 90.4% (Table 6, page 36). For localized melanoma, the national five-year relative survival rate is 99%. The rate in Iowa is similar at 97.2% (Figure 12). About 84% of invasive melanomas in the US are diagnosed at the local stage. In Iowa, 80% of invasive melanomas were diagnosed at the local stage in 1999-2006. Early detection of skin melanoma greatly increases one's chances of survival.

Figure 12. Five-Year Relative Survival Rate for Skin Melanoma in Iowa by Stage, Diagnosis Years 1999-2006



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
*Five-year relative survival is the rate of people who are alive five years after diagnosis (after adjusting for expected mortality).

Cervical Cancer

Overview

Screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of cervical (cervix uteri) cancer. National cervical cancer incidence and mortality rates decreased 50% over the past three decades with most of the reduction attributed to the Pap test. Approximately 95% of Iowa women have had a Pap test at some time in their lives.

> Cervical cancer is now one of the most successfully controlled cancers in developed countries.

Cancer Burden

In an average year, 105 Iowa women develop invasive cervical cancer, and 36 women die of the disease. The incidence rate of cervical cancer in Iowa from 2004-2008 was 6.9 per 100,000 population (Table 1, page 14). In that same period, the mortality rate was 2.1 per 100,000 population (Table 2, page 15). The national incidence rate for those same years was 6.8 per 100,000 population (Table 1, page 14). The national mortality rate was 1.9 per 100,000 population (Table 2, page 15).

Risk Factors

The primary cause of cervical cancer is infection with certain types of Human Papilloma Virus (HPV). Factors that increase a woman's risk for cervical cancer and HPV infection include:

- Women who begin having sex at an early age.
- Women who have many sexual partners. However, a woman may be infected with HPV even if she has had only one sexual partner.
- Long-term use of oral contraceptives.

Prevention, Screening, and Early Detection

Cervical cancer is closely linked to sexual behavior and to sexually transmitted infections with certain types of HPV. The Food and Drug Administration (FDA) has approved two vaccines for the prevention of the most common HPV infections that cause cervical cancer. The vaccines cannot protect against established infections, nor do they protect against all HPV types. To be most effective, the HPV vaccine should be given before a person becomes sexually active.

Screening can prevent cervical cancer by detecting precancerous lesions. As screening has become more common, preinvasive lesions of the cervix are detected far more frequently than invasive cancer. Cervical cancer can be cured if detected early. In March 2012, the Society released updated cervical cancer screening recommendations. In brief, the latest recommendations target screening to those women who evidence suggest are most likely to benefit (i.e., certain age groups) and extend screening intervals to reduce harms associated with over-screening and over-diagnosis. The new guidelines also address the role and use of newer screening technology, such as the HPV tests.

Invasive cervical cancer has decreased significantly during the past 25 years due to increased screening with Pap tests. In the last decade, the percentage of Iowa women who reported having had a Pap test during the past three years has declined since 2001. In 2001, 90% of Iowa women age 18 and older reported having had a Pap test in the past three years. In 2008, 83% of adult women reported comparable Pap tests within that time frame.

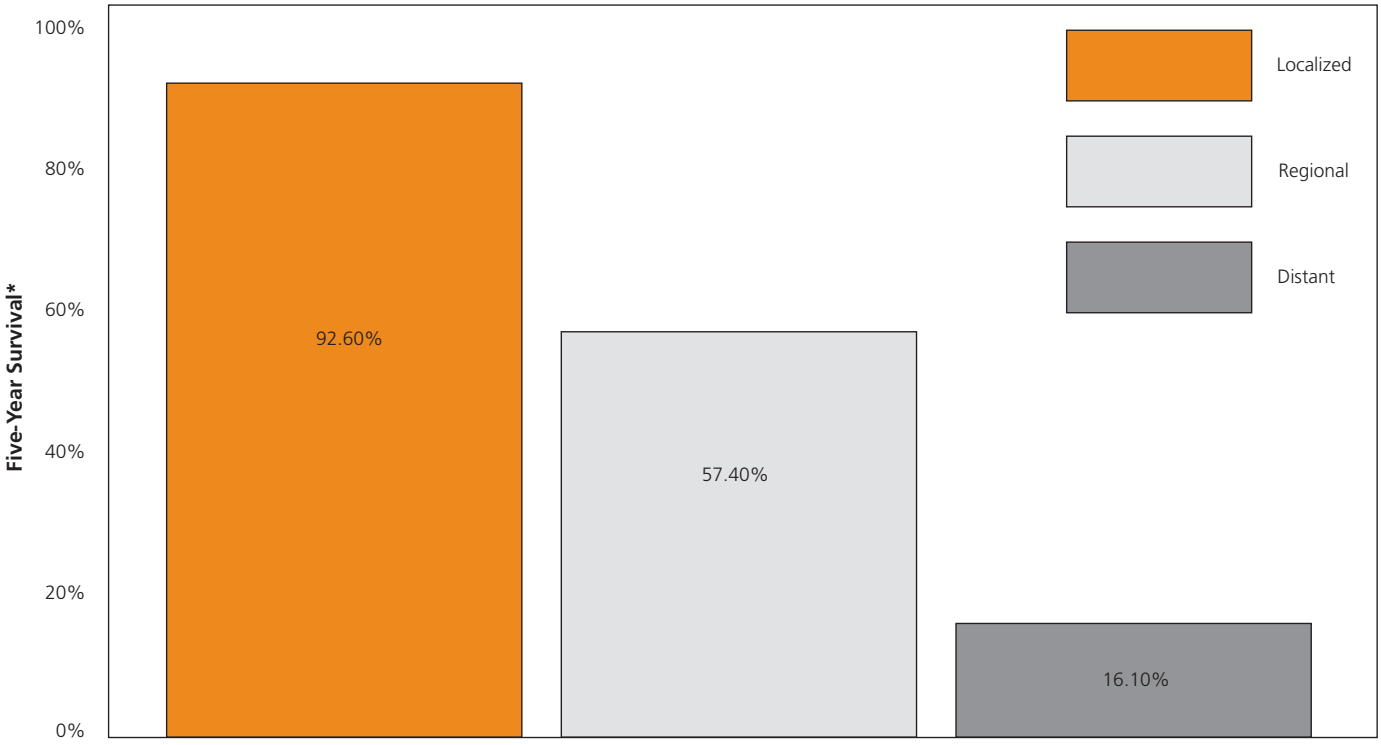
American Cancer Society Guidelines for the Early Detection of Cervical Cancer

Population:	Tests:	When to get one:
Women, ages 21-29	Pap test	Pap test alone every 3 years. Recommend AGAINST annual Pap test.
Women, ages 30-65	Co-testing with HPV test and Pap test	HPV + Pap test "co-testing" every 5 years (preferred) or every 3 years with Pap test alone (acceptable). Recommend AGAINST more frequent screening.
Women ages >65		Discontinue after age 65 if 3 normal Pap tests or 2 negative HPV tests in past 10 years with most recent test in past 5 years.

Stage at Diagnosis

Early detection through Pap test provides the best chance of discovering cervical cancer at a local stage. Early stage invasive cervical cancer is one of the most treatable cancers. In Iowa, from 1999-2006, the percent of invasive cervical cancers diagnosed at the local stage decreased from 60% to 55%. Nationwide, during 1999 to 2006, 48% of cervical cancer cases were diagnosed early (at a local stage), and the relative survival rate was 91%. The five-year relative survival rate for localized disease in Iowa was 92.6% for 1999-2006, decreasing to 16.1% for distant disease (Figure 13).

Figure 13. Five-Year Relative Survival Rate for Cervical Cancer in Iowa by Stage, Diagnosis Years 1999-2006



Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.9.
*Five-year relative survival is the rate of people who are alive five years after diagnosis (after adjusting for expected mortality).

Cancer Survivorship

Overview

Only a few decades ago, the prognosis (outlook) for people facing cancer was not nearly as favorable as it is today. During the 1970s, about one in two people diagnosed with cancer survived at least five years. Now, more than two in three survive at least five years. Today there are more than 13 million cancer survivors in the United States; of those 135,000 are in Iowa. Table 6 on page 36 shows the five-year relative survival rate by cancer type.

> During the 1970s, about one in two people diagnosed with cancer survived at least five years. Now, more than two in three survive at least five years.

Five-Year Relative Survival Rate among Iowans

Five-year relative survival is the rate of people who are alive five years after diagnosis whether disease-free, in remission, or under treatment (after adjusting for expected mortality). This statistic is commonly used to measure progress in treating cancer. Five-year relative survival rates assume that some people will die of other causes and compare the observed survival with that expected for people without the cancer. This is a better way to see the impact of cancer on survival.

Survival rates depend in part on the type of cancer, as cancer sites vary in the rate of growth, tendency to metastasize, importance of the organ, and likelihood of early detection. In addition, the introduction of a new screening test can appear to increase survival, due to lead time bias, even if mortality is not improved.

Cancer survival has increased dramatically in the US over the last century. The overall five-year relative survival rate increased from 20% in the 1930s, to 33% in the 1960s, to 62% in 1993-1995, to 65.1% among people diagnosed with cancer in 1999-2006 (Table 6, page 36).

Cancer survivorship data from the 2010 Iowa BRFSS Report showed:

- People who reported being cancer survivors were more likely older, women, white non-Hispanic, having lower annual household income, and having a lower level of education.
- Nearly one-fourth (23.2%) of cancer diagnoses occurred between ages 60 and 70 years.
- Of all the Iowa cancer survivors 11.4% were currently receiving treatment.
- Of all cancer survivors, 26.9% had received a summary of cancer treatments received. A set of instructions for follow-up was received by 68.1% of survivors. For about 69.7% these instructions were written or printed.
- Health insurance was reported to have paid for all cancer treatments for 93.6% of cancer survivors. Having insurance denied because of cancer was reported by 5.8% of cancer survivors.
- Only 8% of cancer survivors reported participating in a clinical trial for treatment of their cancer.
- Physical pain from cancer or treatment was reported for 5.4% of cancer survivors. The majority of these reported their pain was under control.

Quality of Life

Because more people are surviving cancer, more attention than ever is focused on the quality of life and long-term outcomes of cancer survivors. Behavioral researchers are working to learn more about the problems survivors face. Some of these problems are medical, while others are emotional or social challenges. From the time of diagnosis, the quality of life for every cancer patient and survivor is affected in some way. For example:

- Lung – People with lung cancer tend to be distressed about their physical appearance, including weight loss, the social stigma and guilt associated with a history of tobacco use, and end-of-life issues due to the low survival rate for this cancer.
- Colorectal – People with colorectal cancer are often concerned with bowel dysfunction and the associated social stigma, as well as the effects of chemotherapy and radiation.
- Female breast – Women with breast cancer often feel uncertainty about treatment options and have concerns about their fatigue, sexuality, and body image.
- Melanoma of the skin – People with skin cancer may have a fear of possible disfigurement, and concern about protecting their skin from the sun may greatly increase.
- Cervical – Women with cervical cancer are often concerned about their ability to become pregnant.
- Prostate – Men with prostate cancer may experience impotence and bladder or bowel problems.

The American Cancer Society supports programs that empower cancer patients, survivors, and their families to seek and recognize ongoing sources of support within their community. Comprehensive cancer information and access to community-based support are available 24-hours a day, seven days a week, by calling 1-800-227-2345 or visiting www.cancer.org.

American Cancer Society Nutrition and Physical Activity Guidelines for Cancer Survivors

Guidelines from the American Cancer Society, released April 2012, report that for many cancers, maintaining a healthy weight, getting adequate physical activity, and eating a healthy diet can reduce the chance of recurrence and increase the likelihood of disease-free survival after a diagnosis. Among the report's conclusions:

- Avoiding weight gain throughout treatment may be important not only for survivors who are overweight, but also for those of normal weight.
- Intentional weight loss after recovering from cancer treatment among overweight and obese patients may be associated with health-related benefits.
- Evidence strongly suggests that exercise is not only safe and feasible during cancer treatment, but can also improve physical functioning, fatigue, multiple aspects of quality of life, and may increase the rate of completion of chemotherapy.
- Physical activity after cancer diagnosis is associated with a reduced risk of cancer recurrence and improved overall mortality among multiple cancer survivor groups, including breast, colorectal, prostate, and ovarian cancer.
- Among breast cancer survivors, physical activity after diagnosis has consistently been associated with reduced risk of breast cancer recurrence and breast cancer-specific mortality.
- Results from observational studies suggest that diet and food choices may affect cancer progression, risk of recurrence, and overall survival in individuals who have been treated for cancer. For example, a dietary pattern high in fruits, vegetables, whole grains, poultry, and fish was associated with reduced mortality compared with a dietary pattern of a high intake of refined grains, processed and red meats, desserts, high-fat dairy products, and French fries in women after breast cancer diagnosis and treatment.
- Compelling evidence exists against the use of select supplements in certain oncology populations; therefore, health care professionals and survivors need to proceed with caution.

Table 6. 5-Year Relative Survival Rate by Cancer Type, Iowa, Diagnosis Years 1999-2006

	Relative Survival		Relative Survival
All Sites	65.10%	Non-Hodgkin Lymphoma	68.00%
Prostate	97.90%	Kidney and Renal Pelvis	67.20%
Thyroid	96.60%	Leukemia	53.60%
Female Breast	90.70%	Ovary	39.80%
Melanoma of the Skin	90.40%	Myeloma	37.20%
Corpus and Uterus, NOS	84.40%	Brain	27.00%
Urinary Bladder	80.90%	Esophagus	22.70%
Cervix Uteri	70.40%	Stomach	22.70%
Larynx	68.40%	Lung and Bronchus	14.20%
Oral Cavity and Pharynx	68.30%	Liver and Intrahepatic Bile Duct	12.60%
Colon and Rectum	68.10%	Pancreas	5.40%

Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.1.9.

Cancer Disparities in Iowa

Disparities Defined

Cancer health disparities are differences in the incidence, mortality, and burden of cancer among specific population groups. These population groups may be characterized by age, disability, education, ethnicity, gender, geographic location, income, or race. People who are poor, lack health insurance, and are medically underserved — regardless of ethnic and racial background — often bear a greater burden of disease than the general population.

Complex and interrelated factors contribute to the observed disparities in cancer incidence and mortality among racial, ethnic, and underserved groups. Common factors are associated with a lack of health care insurance and low socioeconomic status (SES).

Socioeconomic Status (SES)

SES is most often based on a person's income, education level, occupation and other factors, such as social status in the community and where he or she lives. Studies have found that SES, more than race or ethnicity, predicts the likelihood of an individual's or a group's access to education, certain occupations, health insurance, and living conditions including conditions where exposure to environmental toxins is most common — all of which are associated with the risk of developing and the probability of surviving cancer. In particular, SES appears to play a major role in influencing the prevalence of behavioral risk factors for cancer (e.g., tobacco smoking, physical inactivity, obesity, and excessive alcohol intake), as well as adherence to cancer screening guidelines.

Age

Cancer occurs at all ages, but it occurs most often among older age groups. Sixty percent of new cancers occur in people age 65 and older. Of all cancer deaths, nearly 75% occur in this group. Age is especially important in Iowa where 14.9% of residents are age 65 and older, higher than the national average of 13.3%.

Education

Education level is an important factor in cancer mortality rates. African-American men ages 50-64 who have less than 12 years of education are dying from cancer at rates more than two times that of African-American men with more than 12 years of education. Similar results are seen in white males. Educational differences do not play as large a role for Iowa women in determining cancer mortality, but as education increases, cancer mortality rates decrease for both African American and white Iowa women. Higher education levels are also associated with higher levels of cancer screening.

Race/Ethnicity

Race, like education, is a determining factor in predicting cancer mortality. African-American males, regardless of education, have higher mortality rates than their white counterparts. African Americans are diagnosed with cancer at rates 10% higher than whites and die from cancer at rates nearly one and a half times that of white Iowans. Available data show that African Americans die at higher rates than any other racial group in Iowa. American Indians/Alaska Natives have the highest rates of cancer incidence in Iowa, although small numbers in this population make this rate unstable. Low representation of American Indians in Iowa prevents cancer mortality rates from being released.

Gender

Cancer does not affect men and women at the same rate. In Iowa, men are diagnosed with cancer at rates 30% higher than in women. For every two women that die from cancer in Iowa, three men die. African-American men are dying from cancer at a rate of more than one and half times that of African-American women.

Geographic Location

It is known that most of the cancer cases among racial minorities occur in the state's larger cities, where most of the state's minority citizens live. These metropolitan areas are particularly located within Black Hawk, Linn, Polk and Scott counties.

Income

Income is linked to risk-reduction behaviors. Cancer risk-reduction behaviors tend to increase with higher income levels.

Table 7. Cancer Incidence by Race in Iowa, Diagnosis Years 2004-2008

	White	African American	American Indian/ Alaska Native	Asian/Pacific Islander	Other/ Unknown
All Sites	78,595	1,188	129	362	863
Breast	10,702	140	16	36	35
Colorectal	9,166	125	13	36	35
Lung and Bronchus	11,594	223	23	46	8
Melanoma of the Skin	3,052	*	5	*	129
Prostate	10,418	204	6	34	325

Source: Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.1.0.
*less than 5 cases

Understanding Cancer Rates

What is meant by "stage at diagnosis"?

Stage at diagnosis describes the extent to which the cancer has spread from the site in which it originated at the time it is discovered. For most cancers, it is one of the best predictors of survival. A number of different staging systems are used to classify tumors. It can be confusing, because some systems use numbers (I, II, etc.), some use terms (in situ, localized, etc.), and some are only used for specific types of cancers. Some cancers, especially those originating in the blood and the immune system, are not typically staged. Definitions of terms related to stage at diagnosis used in this report are provided in the Glossary of Terms.

Cancer Rates

The number of cases and deaths due to cancer is important but for many purposes the number by itself isn't sufficient information. We can only determine if the number is "high" or "low" if we know the size of the population in which the cases or deaths occurred, and the period of time involved.

When comparing geographic areas, different types of people, or time periods, cancer occurrence is usually presented as a rate. The number of events (cases or deaths) during a specified period of time (usually a year) is divided by the number of people in the population that generated the events (for example, the population estimate for Iowa in that year). Typically, cancer rates are presented as the average number of cases or deaths occurring for every 100,000 people during a calendar year.

In 2000, 15,734 new cancers were diagnosed among the 2,928,184 people living in Iowa, and 6,448 Iowans died due to cancer. This results in a crude cancer incidence rate of 537 new cases per 100,000 Iowans per year, and a crude cancer mortality rate of 220 deaths per 100,000 Iowans per year.

Age-Adjusted Cancer Rates

Because cancer occurs more frequently with increasing age, a population with a larger proportion of elderly individuals will have more cancers occur than a younger population of the same size, when the risk of developing cancer at each age is similar in the two groups. To make meaningful comparisons, the age of the population therefore needs to be taken into consideration.

Direct age-adjustment is a statistical method that accomplishes this. It calculates the rate that would occur if the population had the age distribution of an agreed-upon, or "standard" population. If cancer rates are age-adjusted to the same standard population, they will not be biased by differences in age. On the other hand, it is important to remember that an age-adjusted rate is a hypothetical number (the rate that would occur if…), and the value of the rate will vary considerably depending on the choice of the standard population.

Choice of Standard Population for Age-Adjustment

By convention, cancer registries in the US currently adjust their rates to the age distribution of the US population in 2000. Until recently, the age distribution of the 1970 US population was used for age-adjusting cancer incidence rates, while cancer mortality rates were often age-adjusted to the 1940 US population. However, international cancer registries usually age-adjust to the World Population. This means that when comparing cancer rates, one must be careful that they were age-adjusted to the same standard population.

All rates in this report were age-adjusted to the 2000 US population. The cancer incidence and mortality rates in Iowa in 2000, age-adjusted to the 2000 US population, were 485 new cases per 100,000 people and 191 deaths per 100,000 people. If the same data were age-adjusted to the 1970 US population, Iowa cancer incidence and mortality rates in 2000 would be reported as 407 new cases per 100,000 people and 152 deaths per 100,000 people, respectively.

Relationship between Incidence and Mortality Rates

A frequent misconception when incidence and mortality data are presented together is that the mortality rates are directly related to the cases included in the incidence rates; that is, incidence rates based on 15,734 new cancer diagnoses in 2000 and mortality rates based on 6,448 cancer deaths in the same year, are sometimes misconstrued to mean that 41% (6,448/15,734) of the cases diagnosed in 2000 died in the same year. That interpretation is incorrect. Unless specifically stated otherwise, cancer mortality rates include every individual who died during the calendar year with cancer as the underlying cause of death on the death certificate, regardless of year of diagnosis.

Table A: Cancer Incidence, Total Number of Cases and Age-Adjusted Rates by County, Iowa, 2004 - 2008

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Iowa Registry (Statewide)	Cases	80,505	9,311	11,792	10,842	10,861
	Rate	476.1	53.5	69	122.5	141.7
	95% CI	472.8 - 479.4	52.4 - 54.6	67.7 - 70.2	120.2 - 124.9	139 - 144.4
Adair	Cases	266	37	45	28	43
	Rate	482.2	57.6	80.5	94.3	160.2
	95% CI	423.1 - 547.9	39.9 - 81.9	58 - 109.9	61.2 - 141.4	115.8 - 218.5
Adams	Cases	145	21	20	21	16
	Rate	449.1	65.4	63.5	118.7	109
	95% CI	376.7 - 533.4	40.2 - 103.5	38.6 - 101.6	71.4 - 192.6	62.2 - 182.7
Allamakee	Cases	458	62	51	61	85
	Rate	476.6	62.5	51.1	130.9	183.4
	95% CI	433 - 523.8	47.7 - 80.9	37.9 - 67.9	98.6 - 171.1	146.4 - 227.5
Appanoose	Cases	467	42	75	60	54
	Rate	506.4	43.9	80.1	125.7	125.4
	95% CI	460.2 - 556.4	31.2 - 60.5	62.6 - 101.5	94.6 - 164.7	94.1 - 164.8
Audubon	Cases	224	32	36	26	39
	Rate	496.8	68.7	72.8	106.6	178.9
	95% CI	428.1 - 574.4	46.4 - 100.2	50.4 - 104.2	66.3 - 166.2	127 - 248.9
Benton	Cases	689	77	91	84	99
	Rate	453.3	48.1	58.8	109.5	137.5
	95% CI	419.7 - 489.1	37.8 - 60.5	47.2 - 72.4	87 - 136.3	111.6 - 167.8
Black Hawk	Cases	3,427	346	548	409	480
	Rate	499	48.6	78.7	114	154.2
	95% CI	482.1 - 516.3	43.5 - 54.1	72.2 - 85.7	102.9 - 126	140.6 - 168.8
Boone	Cases	737	93	131	109	68
	Rate	468.4	58.1	83.1	132.9	95.4
	95% CI	434.6 - 504.2	46.7 - 71.5	69.3 - 99	108.2 - 161.7	74 - 121.3
Bremer	Cases	614	81	73	107	103
	Rate	418	54.8	48.4	139.5	149.9
	95% CI	384.9 - 453.4	43.3 - 68.6	37.9 - 61.3	113.4 - 170.1	122.2 - 182.4
Buchanan	Cases	574	64	84	55	82
	Rate	476.7	49.7	68.5	91.5	151.2
	95% CI	438 - 518	38.1 - 63.8	54.6 - 85.1	68.4 - 120.1	119.8 - 188.4
Buena Vista	Cases	561	72	68	68	113
	Rate	487	59.3	61	113.6	216.7
	95% CI	446.5 - 530.4	46 - 75.5	47.1 - 77.9	87.1 - 145.9	178.1 - 261.3
Butler	Cases	468	43	65	63	68
	Rate	449.3	38.4	60.3	118.1	140
	95% CI	407.7 - 494.3	27.7 - 52.7	46.2 - 77.8	88.7 - 155	108.6 - 178.5
Calhoun	Cases	377	53	51	51	57
	Rate	483.6	62.6	62.1	118.3	158.9
	95% CI	433.3 - 538.7	46.5 - 83.6	45.8 - 83.3	86.4 - 161	120.3 - 207.5
Carroll	Cases	618	105	81	63	74
	Rate	437.2	70.5	55.1	91.4	119.9
	95% CI	401.8 - 475	57.2 - 86.3	43.5 - 69.1	67.4 - 121.2	94.1 - 151.1
Cass	Cases	416	49	66	64	53
	Rate	408.5	45	58.5	127.1	113.2
	95% CI	367.9 - 452.7	32.6 - 61.2	44.9 - 75.6	95.9 - 166.1	84.7 - 149.3
Cedar	Cases	550	71	71	70	83
	Rate	490.4	60.9	61.4	118.7	156.1
	95% CI	449.6 - 534.2	47.4 - 77.5	47.8 - 78	92.2 - 151	124.1 - 194.4
Cerro Gordo	Cases	1,477	178	200	218	189
	Rate	507.9	58.3	65.1	143.3	147.9
	95% CI	481.7 - 535.1	49.9 - 67.8	56.3 - 75	124.2 - 164.8	127.5 - 170.9

Table A: Cancer Incidence, Total Number of Cases and Age-Adjusted Rates by County, Iowa, 2004 - 2008 (*continued*)

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Cherokee	Cases	387	52	50	48	50
	Rate	428.1	51.4	52.6	110.6	121.2
	95% CI	384.6 - 475.9	38.2 - 68.9	38.6 - 71	79.8 - 151.1	89.8 - 161.7
Chickasaw	Cases	415	44	59	53	76
	Rate	515.6	52.2	67.8	124.5	192.2
	95% CI	465 - 570.5	37.6 - 71.3	51.5 - 88.3	92.4 - 165.6	151.4 - 241.7
Clarke	Cases	264	34	34	31	31
	Rate	463.7	56.4	61.1	109.7	120.4
	95% CI	408.5 - 524.6	38.8 - 80	42.2 - 86.1	74 - 157.5	81.6 - 172
Clay	Cases	543	60	83	68	82
	Rate	475.1	50.9	69	112.2	161.7
	95% CI	435 - 518.1	38.6 - 66.4	54.7 - 86.2	86.1 - 144.3	128.5 - 201.4
Clayton	Cases	547	71	59	48	82
	Rate	449.5	56	47.2	73.1	139.7
	95% CI	411.5 - 490.4	43.6 - 71.3	35.8 - 61.4	53.2 - 99	111 - 174.3
Clinton	Cases	1,482	176	220	219	189
	Rate	493.8	56.1	70.8	138.1	136.5
	95% CI	468.6 - 520.1	48 - 65.2	61.7 - 81	119.9 - 158.4	117.6 - 157.7
Crawford	Cases	483	64	59	61	90
	Rate	466	58.8	55.6	121.1	192.7
	95% CI	424.4 - 510.7	45 - 75.8	42.2 - 72.2	91.1 - 158.2	154.8 - 237.5
Dallas	Cases	1,178	134	153	173	138
	Rate	523.1	64	74.2	133.5	136.1
	95% CI	492.7 - 554.8	53.3 - 76	62.6 - 87.2	113.9 - 155.3	113.3 - 161.9
Davis	Cases	223	32	23	23	36
	Rate	426.7	55.7	46	91.1	145.1
	95% CI	371.3 - 488.4	37.9 - 79.7	28.9 - 69.7	56.3 - 139.9	101.5 - 201.9
Decatur	Cases	260	36	36	38	25
	Rate	489.2	64.6	63.9	141.2	106.8
	95% CI	429.7 - 555.1	45 - 90.8	44.6 - 89.5	97.3 - 198.9	68.8 - 159.1
Delaware	Cases	512	68	86	66	64
	Rate	480.3	62.3	76.2	123.9	125.5
	95% CI	438.7 - 524.9	48.1 - 79.5	60.8 - 94.6	94.9 - 159.5	96.5 - 160.8
Des Moines	Cases	1,275	147	215	191	165
	Rate	489	55	80.3	141.5	141.9
	95% CI	461.9 - 517.3	46.3 - 65	69.8 - 92.1	121.3 - 164.1	120.9 - 165.7
Dickinson	Cases	604	76	66	76	128
	Rate	482.8	55.5	49.2	116	212.6
	95% CI	443.4 - 525.1	43.4 - 70.6	37.9 - 63.5	89.9 - 148.3	177.1 - 254.1
Dubuque	Cases	2,496	230	369	326	372
	Rate	476.2	42	67.6	120.4	155.1
	95% CI	457.5 - 495.5	36.7 - 47.9	60.8 - 75	107.4 - 134.6	139.7 - 171.9
Emmet	Cases	331	51	53	40	51
	Rate	487	73.7	73.4	127.7	162
	95% CI	433.6 - 545.4	53.9 - 98.9	54.7 - 97.2	88.3 - 178.9	120.5 - 214
Fayette	Cases	679	81	97	85	112
	Rate	468.3	52.5	64.6	110.6	170.8
	95% CI	432.6 - 506.5	41.5 - 65.9	52.1 - 79.6	86.6 - 139.8	140.6 - 206.1
Floyd	Cases	505	72	71	51	79
	Rate	459.6	62.5	62.6	94.6	150.8
	95% CI	419 - 503.4	48.3 - 79.8	48.7 - 79.8	69 - 126.9	119.2 - 188.9
Franklin	Cases	352	47	47	50	39
	Rate	479.9	55.7	58.8	125.5	112
	95% CI	429.2 - 535.5	40.5 - 75.7	43 - 79.4	91.4 - 169.9	79.6 - 154.4
Fremont	Cases	256	33	37	39	32
	Rate	476	60.1	64.1	143.3	125.7
	95% CI	417.8 - 541	41.2 - 86	44.9 - 90.3	100.1 - 201.4	85.8 - 180

Table A: Cancer Incidence, Total Number of Cases and Age-Adjusted Rates by County, Iowa, 2004 - 2008 (*continued*)

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Greene	Cases	330	54	52	29	33
	Rate	460.3	70.1	70.4	83.8	105.7
	95% CI	409.9 - 516	52.1 - 93.4	52 - 94.4	54.2 - 125.6	72.5 - 150.3
Grundy	Cases	420	54	45	50	55
	Rate	504.1	64.1	50.9	113.7	143.5
	95% CI	455.8 - 556.7	47.8 - 84.8	36.9 - 69.2	82.9 - 153.3	107.9 - 188
Guthrie	Cases	380	51	51	54	52
	Rate	479.1	61.8	61.8	126.3	139.9
	95% CI	431 - 531.6	45.9 - 82.3	46 - 82.3	93.8 - 168	104.4 - 184.9
Hamilton	Cases	454	55	72	54	62
	Rate	452.3	52.5	69.2	105.6	129.4
	95% CI	410.7 - 497.1	39.3 - 69.1	54 - 87.7	78.2 - 139.9	99.2 - 166.5
Hancock	Cases	370	43	46	42	43
	Rate	488.1	52.5	54.4	107.9	122.5
	95% CI	437.8 - 543	37.8 - 71.8	39.6 - 73.7	76 - 149.5	88.5 - 166.3
Hardin	Cases	573	66	92	78	70
	Rate	455.6	45	72.7	113.6	124.7
	95% CI	417.2 - 496.8	34.5 - 58.3	58.2 - 90	88.2 - 144.9	97.1 - 158.5
Harrison	Cases	512	68	79	68	73
	Rate	519.9	64.3	79.5	128.4	166.2
	95% CI	475 - 568.1	49.7 - 82.3	62.7 - 99.7	98.7 - 164.9	130.1 - 209.8
Henry	Cases	533	51	88	66	75
	Rate	454	41	74.6	109.3	143.4
	95% CI	415.7 - 495	30.4 - 54.4	59.6 - 92.2	83.9 - 140.3	112.5 - 180.4
Howard	Cases	280	34	33	33	34
	Rate	432.7	48.5	47.4	103.6	111.6
	95% CI	381.6 - 489.3	33 - 69.5	32.2 - 68.1	70 - 148.9	77.1 - 157.5
Humboldt	Cases	309	37	50	45	41
	Rate	437	48.9	68.6	118.3	130.7
	95% CI	387.7 - 491.5	34 - 69	50.3 - 92.2	84.6 - 162.7	93.4 - 179.2
Ida	Cases	263	31	26	39	42
	Rate	495.5	53.9	46.3	154.9	175.4
	95% CI	432.9 - 565.4	35.1 - 80.4	29.9 - 70.1	105.5 - 220.8	126.2 - 240
Iowa	Cases	556	55	73	65	82
	Rate	564.5	52.1	72.4	130.3	177.8
	95% CI	517.4 - 614.8	39 - 68.5	56.5 - 91.6	99.8 - 167.7	141.3 - 221.4
Jackson	Cases	623	77	78	76	86
	Rate	483.5	57	58.3	116	136.7
	95% CI	445.4 - 524.2	44.8 - 71.8	46.1 - 73.2	90.6 - 146.9	109.3 - 169.5
Jasper	Cases	1,110	134	193	149	126
	Rate	490.2	57.3	83.8	122.7	121
	95% CI	461.5 - 520.3	48 - 68.1	72.4 - 96.7	103.4 - 144.8	100.7 - 144.3
Jefferson	Cases	404	43	55	71	52
	Rate	418.9	46.6	58.4	140.2	119.4
	95% CI	377.2 - 464.1	33.3 - 63.8	43.5 - 77.1	108.3 - 179.4	88.2 - 158.7
Johnson	Cases	2,202	192	237	348	342
	Rate	475.7	42.7	56.6	137.8	161.4
	95% CI	455.5 - 496.5	36.8 - 49.3	49.5 - 64.3	123.5 - 153.3	144.2 - 180.1
Jones	Cases	554	64	86	63	74
	Rate	438.5	49.5	66.4	102.5	126.9
	95% CI	402.4 - 477.1	38.1 - 63.6	53.1 - 82.4	78.1 - 132.5	99.5 - 159.7
Keokuk	Cases	327	52	45	40	44
	Rate	438.1	67.7	58.9	89.8	132.3
	95% CI	390.4 - 490.5	50.1 - 90.2	42.5 - 80	62.6 - 126.5	96.1 - 178.7
Kossuth	Cases	539	56	67	73	85
	Rate	482.7	47.3	56.1	116.7	154
	95% CI	439.3 - 529.6	35.2 - 62.9	43.2 - 72.3	90.6 - 149.8	122.9 - 191.6

Table A: Cancer Incidence, Total Number of Cases and Age-Adjusted Rates by County, Iowa, 2004 - 2008 (*continued*)

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Lee	Cases	1,146	146	184	127	146
	Rate	493.4	61.9	78.4	100.8	135.9
	95% CI	464.7 - 523.5	52.1 - 73.1	67.4 - 90.9	83.3 - 121.1	114.6 - 160.3
Linn	Cases	5,013	511	781	683	694
	Rate	480.1	48.4	75.5	124	147.2
	95% CI	466.8 - 493.7	44.2 - 52.8	70.3 - 81.1	114.7 - 133.7	136.3 - 158.7
Louisa	Cases	327	33	51	40	38
	Rate	488.5	47.7	74.6	118	122.8
	95% CI	436.6 - 545	32.8 - 67.4	55.4 - 98.4	83.7 - 162.1	86.7 - 169.1
Lucas	Cases	267	44	38	29	44
	Rate	418.1	64.2	58.9	87.8	150.6
	95% CI	368.1 - 473.5	46.2 - 87.6	41.4 - 82	58 - 128.9	109.1 - 203.6
Lyon	Cases	352	47	36	45	63
	Rate	483.8	61	49.6	124.2	193.1
	95% CI	433.5 - 538.7	44.5 - 82	34.5 - 69.5	89.4 - 168.9	148.2 - 247.8
Madison	Cases	394	31	63	49	50
	Rate	465.3	37	73.3	110.9	125.2
	95% CI	419.9 - 514.4	24.9 - 52.9	56.2 - 94.2	81.6 - 147.7	92.6 - 165.9
Mahaska	Cases	606	93	94	73	72
	Rate	462.6	69.5	72.2	106.3	123
	95% CI	426 - 501.6	56 - 85.5	58.2 - 88.6	82.7 - 134.8	96.1 - 155.2
Marion	Cases	858	115	118	133	103
	Rate	451.8	56.4	62.5	133.2	116.5
	95% CI	421.6 - 483.6	46.4 - 68	51.6 - 75	110.8 - 159	95 - 141.5
Marshall	Cases	1,178	139	159	150	160
	Rate	483.9	53.9	63.2	121.6	140
	95% CI	456.2 - 512.9	45.2 - 63.9	53.7 - 74	102.2 - 143.7	119.1 - 163.8
Mills	Cases	388	50	54	55	54
	Rate	472.3	61.5	66.9	134	133.1
	95% CI	425.5 - 522.9	45.4 - 81.6	50 - 87.9	100.3 - 175.7	98.9 - 175.5
Mitchell	Cases	352	49	36	50	55
	Rate	444.1	60.9	44.2	129.2	155
	95% CI	396.9 - 495.9	44.5 - 82.2	30.5 - 62.8	93.7 - 175.1	116.6 - 203.4
Monona	Cases	351	47	49	43	48
	Rate	481	59	66.2	116.7	141.2
	95% CI	429.4 - 538	43.1 - 80.4	48.5 - 89.5	81.9 - 163.5	104 - 189.6
Monroe	Cases	271	38	56	22	32
	Rate	516.4	63.3	100.9	77.1	129.1
	95% CI	454.8 - 584.7	44.4 - 88.8	76 - 132.4	46.7 - 121.7	88.1 - 184.3
Montgomery	Cases	364	57	50	52	36
	Rate	469.1	68.4	64.3	131.4	103.6
	95% CI	420.5 - 522.3	51.3 - 90.1	47.6 - 85.7	97 - 175.3	72.5 - 144.9
Muscatine	Cases	1,063	104	161	127	145
	Rate	474.3	46.4	72.7	105	143.4
	95% CI	446 - 504	37.9 - 56.3	61.8 - 84.9	87.3 - 125.3	120.5 - 169.5
O'Brien	Cases	533	66	61	82	70
	Rate	515.6	61.7	59.2	149.8	151.2
	95% CI	470.3 - 564.4	46.9 - 80.1	44.9 - 77.1	116.6 - 190.7	117.7 - 192
Osceola	Cases	224	36	29	33	29
	Rate	518.7	81.5	65.6	149.8	149.1
	95% CI	450.9 - 594.6	56.5 - 114.8	43.7 - 95.6	100 - 217.2	99.7 - 215.9
Page	Cases	603	94	83	73	85
	Rate	529.4	77.8	71.4	132.1	162.8
	95% CI	486.6 - 575.2	62.3 - 96.5	56.6 - 89.5	102.3 - 168.8	130 - 202.1
Palo Alto	Cases	345	52	49	40	60
	Rate	506.6	70.2	67.5	117	192.8
	95% CI	451.7 - 567	51.9 - 93.9	49.2 - 91.3	80.2 - 165.9	146.9 - 249.9

Table A: Cancer Incidence, Total Number of Cases and Age-Adjusted Rates by County, Iowa, 2004 - 2008 (*continued*)

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Plymouth	Cases	715	91	92	97	98
	Rate	485.5	59.4	61.2	124	143.4
	95% CI	450 - 523.3	47.7 - 73.4	49.2 - 75.4	99.9 - 152.5	116.3 - 175.1
Pocahontas	Cases	291	36	35	40	54
	Rate	483.2	54.4	55.1	132.7	197.9
	95% CI	426.4 - 546.6	37.5 - 78.3	38 - 79.2	92.2 - 188.2	148.4 - 261.4
Polk	Cases	9,140	946	1,487	1,358	1,061
	Rate	470.6	49.5	78.8	126.4	125.8
	95% CI	460.9 - 480.4	46.4 - 52.8	74.8 - 82.9	119.7 - 133.3	118.2 - 133.7
Pottawattamie	Cases	2,437	280	434	398	260
	Rate	494	55.9	88.1	151.5	117.2
	95% CI	474.5 - 514.2	49.5 - 62.9	80 - 96.8	136.8 - 167.4	103.2 - 132.5
Poweshiek	Cases	537	82	63	77	58
	Rate	443	62.9	51.5	115.9	104.3
	95% CI	405.2 - 483.5	49.7 - 78.8	39.4 - 66.5	90.2 - 147.2	79.1 - 135.5
Ringgold	Cases	162	20	36	21	16
	Rate	388	47.2	81.7	104.9	82.6
	95% CI	328.2 - 457.3	28.1 - 76.7	56.8 - 116.3	61.7 - 170.4	47.2 - 139.4
Sac	Cases	371	45	46	52	49
	Rate	462.5	50.8	54.3	113.1	131.6
	95% CI	413.6 - 516.2	36 - 70.6	39.4 - 74.1	81.8 - 154.7	97.2 - 176
Scott	Cases	4,308	418	644	613	614
	Rate	514.9	50.5	77.7	137.3	158.6
	95% CI	499.5 - 530.7	45.7 - 55.6	71.8 - 84	126.6 - 148.8	146 - 172
Shelby	Cases	398	51	48	60	53
	Rate	444.1	48.6	52.7	132.2	125.2
	95% CI	399.6 - 492.7	35.9 - 65.5	38.4 - 71.2	99.6 - 173.5	93.7 - 165.5
Sioux	Cases	811	118	66	112	112
	Rate	456.3	64.8	36.1	123.6	142.1
	95% CI	424.6 - 489.8	53.4 - 78	27.7 - 46.3	100.9 - 149.8	116.9 - 171.2
Story	Cases	1,494	169	192	234	198
	Rate	433.7	48.3	56.7	130.8	129.5
	95% CI	411.6 - 456.6	41.2 - 56.3	48.9 - 65.4	114.1 - 149.2	112 - 148.9
Tama	Cases	579	91	85	61	77
	Rate	494	69.3	73.9	101.4	140.3
	95% CI	453.3 - 537.5	55.4 - 86	58.9 - 91.8	76.4 - 132.4	110.7 - 176
Taylor	Cases	212	24	24	22	36
	Rate	430.9	45.3	44.8	100	164.1
	95% CI	372.1 - 497.5	27.9 - 70.9	28.3 - 69.3	61.3 - 156.3	114.5 - 230.4
Union	Cases	367	46	58	48	44
	Rate	448.8	53.2	67.7	114	118.6
	95% CI	402.9 - 498.9	38.7 - 71.9	51.3 - 88.4	83.1 - 153.5	86 - 160.3
Van Buren	Cases	239	31	44	26	30
	Rate	455.5	60.5	78.9	99	117
	95% CI	398.1 - 519.5	40.7 - 87.5	56.9 - 107.6	62.8 - 150.1	78.9 - 169.1
Wapello	Cases	1,086	125	189	141	126
	Rate	488.3	55.2	84.3	117.3	125.2
	95% CI	459.2 - 518.9	45.8 - 66	72.6 - 97.5	98 - 139.5	104.2 - 149.4
Warren	Cases	1,077	133	149	158	123
	Rate	469.9	57.3	65.3	128	117.5
	95% CI	441.9 - 499.1	47.9 - 68.1	55.1 - 76.8	108.6 - 150	97.3 - 140.6
Washington	Cases	646	78	76	76	100
	Rate	491.4	57.2	55.5	105.3	166.8
	95% CI	453.1 - 532.1	44.9 - 72.1	43.5 - 70	82.1 - 133.5	135.6 - 203.5
Wayne	Cases	248	29	44	27	37
	Rate	496.3	53.5	86.2	103.4	160.5
	95% CI	433.4 - 566.8	35 - 80	62.1 - 118.2	64.6 - 159.3	112.7 - 225.1

Table A: Cancer Incidence, Total Number of Cases and Age-Adjusted Rates by County, Iowa, 2004 - 2008 *(continued)*

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Webster	Cases	1,112	117	198	123	117
	Rate	471.6	47.6	82.9	101.2	110.4
	95% CI	443.7 - 500.9	39.2 - 57.3	71.6 - 95.5	83.5 - 121.7	91.2 - 132.5
Winnebago	Cases	299	36	40	31	42
	Rate	405.4	50.4	51.3	79.9	127.2
	95% CI	359.4 - 456.2	34.7 - 71.3	36.4 - 71.2	53.6 - 116.1	91.5 - 173.3
Winneshiek	Cases	567	75	64	72	102
	Rate	443.1	55.5	48.5	114.9	170.5
	95% CI	406.3 - 482.5	43.4 - 70.3	37.1 - 62.6	88.7 - 146.7	138.9 - 207.4
Woodbury	Cases	2,469	271	384	321	349
	Rate	469.7	50.8	73.5	113.5	150.9
	95% CI	451.2 - 488.7	44.9 - 57.3	66.3 - 81.2	101.3 - 126.9	135.3 - 167.8
Worth	Cases	233	39	25	30	32
	Rate	458	72.6	48.5	118.9	132.1
	95% CI	399.6 - 523.2	51.3 - 100.8	31.2 - 72.9	78.4 - 174.3	90.2 - 188.4
Wright	Cases	473	57	76	52	71
	Rate	496.8	52.2	76.4	109.8	166.6
	95% CI	450.6 - 546.9	39.1 - 69.1	59.9 - 96.8	79.3 - 149	129.9 - 211.4

Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard; Confidence intervals (Tiwari mod) are 95% for rates. This means that the range between the lower and upper confidence interval defines with 95% probability the "true" rate.

Table B: Cancer Mortality, Total Number of Deaths and Age-Adjusted Rates by County, Iowa, 2004-2008

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Iowa Registry (Statewide)	Deaths	31,952	3,278	9,015	2,187	1,795
	Rate	180.5	18	52.2	22.1	25.1
	95% CI	178.5 - 182.5	17.3 - 18.6	51.1 - 53.2	21.2 - 23.1	23.9 - 26.3
Adair	Deaths	119	14	36	^	^
	Rate	200	21.3	61.7	^	^
	95% CI	164 - 242.5	11.3 - 38.4	42.9 - 87.3	^	^
Adams	Deaths	56	^	13	^	^
	Rate	173.2	^	41.1	^	^
	95% CI	127.9 - 231.5	^	21.8 - 74	^	^
Allamakee	Deaths	178	24	51	12	^
	Rate	171.1	22.8	49.2	19	^
	95% CI	146.5 - 199.2	14.5 - 34.7	36.5 - 65.4	8.7 - 37.7	^
Appanoose	Deaths	197	19	54	^	12
	Rate	196.9	17.4	56.1	^	27.6
	95% CI	169.7 - 227.8	10.4 - 28.3	41.8 - 74.3	^	14.3 - 49.8
Audubon	Deaths	104	14	29	^	^
	Rate	198	25.5	59.3	^	^
	95% CI	160.5 - 243.7	13.3 - 47.2	39.2 - 88.4	^	^
Benton	Deaths	247	21	71	13	12
	Rate	153.8	12.2	44.8	15.8	17.6
	95% CI	135 - 174.7	7.5 - 19	34.9 - 56.8	8.3 - 27.7	9 - 30.8
Black Hawk	Deaths	1,337	118	394	86	65
	Rate	186.8	15.5	55.6	23	22.2
	95% CI	176.8 - 197.3	12.8 - 18.7	50.2 - 61.5	18.2 - 28.6	17.1 - 28.3
Boone	Deaths	315	30	97	22	17
	Rate	189.5	18.1	60.1	21.7	25.5
	95% CI	168.7 - 212.2	12.1 - 26.2	48.5 - 73.6	13.2 - 34.3	14.8 - 40.9
Bremer	Deaths	221	22	52	24	24
	Rate	137.3	13.6	33.7	25.8	37.4
	95% CI	119.5 - 157.3	8.4 - 21.1	25 - 44.5	16.2 - 39.9	23.9 - 56.1
Buchanan	Deaths	246	29	67	15	^
	Rate	193.8	23.4	54.3	19.7	^
	95% CI	170.1 - 220.1	15.6 - 33.9	42 - 69.2	10.3 - 34.5	^
Buena Vista	Deaths	212	31	48	12	15
	Rate	167.7	22.4	43.3	16.7	24.9
	95% CI	145.2 - 192.9	15 - 32.5	31.8 - 57.8	8.2 - 31.2	13.9 - 41.9
Butler	Deaths	189	23	51	^	^
	Rate	163.8	18.3	45.1	^	^
	95% CI	140.7 - 190.2	11.4 - 28.5	33.4 - 60.2	^	^
Calhoun	Deaths	156	18	47	11	12
	Rate	176	18.1	54.6	17.5	31.4
	95% CI	147.7 - 209	10.5 - 30.9	39.7 - 74.5	7.8 - 39.7	16.2 - 57.4
Carroll	Deaths	282	41	65	18	^
	Rate	177.5	24.3	42.5	20.3	^
	95% CI	156.6 - 200.9	17.2 - 33.9	32.5 - 54.9	11.2 - 34.9	^
Cass	Deaths	181	19	43	20	^
	Rate	162.6	15.9	39.7	32.1	^
	95% CI	138.6 - 190	9.4 - 26.2	28.4 - 54.7	18.4 - 53.9	^
Cedar	Deaths	195	16	56	11	10
	Rate	162.3	13.3	48.5	17.4	19.5
	95% CI	139.8 - 187.5	7.5 - 22.2	36.5 - 63.5	8.2 - 33.1	9.3 - 36.4
Cerro Gordo	Deaths	570	43	162	33	27
	Rate	184.5	13.3	52.8	19.6	22.1
	95% CI	169.4 - 200.8	9.6 - 18.2	44.9 - 61.8	13.1 - 28.5	14.5 - 32.4

Table B: Cancer Mortality, Total Number of Deaths and Age-Adjusted Rates by County, Iowa, 2004-2008 *(continued)*

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Cherokee	Deaths	176	20	45	11	10
	Rate	180.1	18.7	44.8	19	25.6
	95% CI	153.2 - 211.2	11.3 - 30.7	32.5 - 61.5	8.9 - 39.4	12.2 - 49.3
Chickasaw	Deaths	136	17	34	^	^
	Rate	158.5	21.3	38.6	^	^
	95% CI	132.4 - 188.8	12.1 - 35.2	26.6 - 54.8	^	^
Clarke	Deaths	103	13	27	^	^
	Rate	175	24.2	48.7	^	^
	95% CI	142.1 - 213.6	12.7 - 42.1	31.7 - 71.8	^	^
Clay	Deaths	227	18	71	13	16
	Rate	183	13	58.6	17.8	30.1
	95% CI	159.5 - 209.4	7.7 - 21.5	45.5 - 74.8	9.2 - 32.8	17.2 - 49.7
Clayton	Deaths	238	18	43	16	18
	Rate	180.2	13.8	33.8	24.5	31.1
	95% CI	157.5 - 205.8	8.1 - 22.6	24.3 - 46.2	13.3 - 42.3	18.4 - 50.1
Clinton	Deaths	607	65	171	46	37
	Rate	192.3	20.2	55.1	26.1	30.1
	95% CI	177.1 - 208.6	15.5 - 26	47.1 - 64.2	18.8 - 35.6	21.1 - 41.6
Crawford	Deaths	212	24	55	10	15
	Rate	197.1	22.4	52.3	17.2	32.7
	95% CI	170.8 - 226.6	14.2 - 34	39.3 - 68.7	8.1 - 33.5	18.3 - 54.4
Dallas	Deaths	409	49	96	36	17
	Rate	194.2	23	46.7	27.3	22.6
	95% CI	175.4 - 214.4	16.9 - 30.5	37.6 - 57.2	19 - 38	13.1 - 35.8
Davis	Deaths	86	^	20	^	^
	Rate	154.5	^	40.9	^	^
	95% CI	122.9 - 192.3	^	24.8 - 63.8	^	^
Decatur	Deaths	100	14	25	^	^
	Rate	173.5	24.7	45.1	^	^
	95% CI	140.6 - 212.7	13.3 - 43	29.1 - 67.6	^	^
Delaware	Deaths	179	30	48	13	^
	Rate	157.6	24.7	41.6	24.9	^
	95% CI	134.8 - 183.3	16.5 - 35.9	30.6 - 55.7	12.8 - 44.1	^
Des Moines	Deaths	535	48	169	35	31
	Rate	193.7	16.4	62.4	23.2	28.9
	95% CI	177.3 - 211.3	12 - 22.1	53.2 - 72.8	15.9 - 33.1	19.6 - 41.1
Dickinson	Deaths	212	27	57	14	12
	Rate	157.3	18.6	41.8	15.7	19.8
	95% CI	136.2 - 181.3	12.2 - 28	31.5 - 55.2	8.4 - 29.4	10.2 - 36.2
Dubuque	Deaths	1,002	88	297	66	43
	Rate	179.5	15	53.7	20.6	20.8
	95% CI	168.5 - 191.2	12 - 18.6	47.7 - 60.3	15.7 - 26.6	15 - 28
Emmet	Deaths	136	18	37	10	^
	Rate	177.7	23.4	51.8	27.1	^
	95% CI	147.7 - 212.5	13.2 - 39	36.3 - 72.5	12.2 - 53.4	^
Fayette	Deaths	290	30	86	21	19
	Rate	185.9	18.2	56	22.7	28.3
	95% CI	164.3 - 209.9	12.2 - 26.8	44.4 - 70	13 - 37.7	17 - 44.9
Floyd	Deaths	193	15	53	10	12
	Rate	158.6	10.4	45	14.2	21.7
	95% CI	136.3 - 183.9	5.7 - 18.2	33.6 - 59.6	6.6 - 28.3	11.2 - 39.3
Franklin	Deaths	129	12	33	13	^
	Rate	158	13.5	40.4	24.6	^
	95% CI	131.2 - 189.3	6.9 - 25.3	27.6 - 58	12.5 - 47	^
Fremont	Deaths	80	10	31	^	^
	Rate	138.3	16.3	54.8	^	^
	95% CI	108.9 - 174.4	7.7 - 32.6	36.8 - 79.8	^	^

Table B: Cancer Mortality, Total Number of Deaths and Age-Adjusted Rates by County, Iowa, 2004-2008 (*continued*)

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Greene	Deaths	129	15	48	^	^
	Rate	160.3	16.7	60.3	^	^
	95% CI	132.7 - 193	9.1 - 30	43.9 - 81.9	^	^
Grundy	Deaths	154	15	37	10	^
	Rate	168.5	17.1	40.1	19.1	^
	95% CI	142.3 - 198.7	9.5 - 29.4	28 - 56.4	8.8 - 38.7	^
Guthrie	Deaths	141	15	43	^	^
	Rate	170.1	17.7	51.9	^	^
	95% CI	142.7 - 201.9	9.9 - 30.3	37.5 - 71	^	^
Hamilton	Deaths	195	22	54	^	17
	Rate	176.7	19.5	50.6	^	34.3
	95% CI	152.3 - 204.3	12 - 30.4	37.8 - 66.6	^	19.9 - 55.7
Hancock	Deaths	126	15	37	^	^
	Rate	151.2	16	43.9	^	^
	95% CI	125.1 - 181.9	8.8 - 27.9	30.7- 61.8	^	^
Hardin	Deaths	271	26	78	28	14
	Rate	194.4	16	60.2	36.7	22.8
	95% CI	170.9 - 220.6	10.2 - 24.7	47.3 - 76.1	23.1 - 56.4	12.4 - 39.5
Harrison	Deaths	216	23	70	10	^
	Rate	210.1	21.1	67.8	17.1	^
	95% CI	182.5 - 240.9	13.2 - 32.6	52.7 - 86.2	7.9 - 33.7	^
Henry	Deaths	227	26	73	18	15
	Rate	182.6	21.5	59.7	24.4	30.2
	95% CI	159.2 - 208.7	13.9 - 31.9	46.6 - 75.5	13.9 - 40.5	16.8 - 49.8
Howard	Deaths	113	17	24	10	^
	Rate	156.8	23	32.6	28.3	^
	95% CI	128.4 - 190.5	13.1 - 38.4	20.6 - 50.1	13.4 - 55	^
Humboldt	Deaths	131	16	40	^	^
	Rate	164.8	18.9	56.5	^	^
	95% CI	136.8 - 197.9	10.5 - 32.7	39.8 - 78.6	^	^
Ida	Deaths	106	11	20	12	^
	Rate	175.5	18.2	32.7	32.8	^
	95% CI	142.2 - 215.6	8.9 - 35.4	19.6 - 53.3	16.3 - 64.7	^
Iowa	Deaths	208	24	35	15	17
	Rate	188.4	20	34.3	25.2	37.4
	95% CI	162.9 - 217	12.6 - 30.7	23.8 - 48.3	13.3 - 44.2	21.8 - 60.6
Jackson	Deaths	247	27	54	14	18
	Rate	181.8	18.7	39.8	18.3	30.7
	95% CI	159.5 - 206.7	12.2 - 27.9	29.9 - 52.4	9.6 - 32.8	18.2 - 49.1
Jasper	Deaths	475	47	164	27	16
	Rate	202.2	19.9	70.2	20.1	16.9
	95% CI	184.3 - 221.5	14.6 - 26.6	59.8 - 82	13.1 - 30	9.7 - 27.6
Jefferson	Deaths	159	12	47	11	10
	Rate	156.8	12.9	47.8	20.8	25.7
	95% CI	132.5 - 184.6	6.5 - 23.3	34.7 - 64.7	10.1 - 39.2	12.1 - 48.2
Johnson	Deaths	713	56	188	41	44
	Rate	163	12.4	44.7	16.4	27.8
	95% CI	151 - 175.6	9.4 - 16.2	38.4 - 51.7	11.7 - 22.4	20.1 - 37.1
Jones	Deaths	220	22	67	^	13
	Rate	164.5	16.4	51.7	^	25.5
	95% CI	143.2 - 188.2	10.2 - 25.2	40 - 66.1	^	13.5 - 43.6
Keokuk	Deaths	122	11	37	^	^
	Rate	151	12.8	48.8	^	^
	95% CI	124.6 - 182	6.3 - 24.4	33.9 - 68.6	^	^
Kossuth	Deaths	226	19	57	18	14
	Rate	175.9	14.9	46.5	26.9	25
	95% CI	153 - 201.9	8.8 - 24.7	35.1 - 61.3	15.4 - 46.3	13.6 - 43.7

Table B: Cancer Mortality, Total Number of Deaths and Age-Adjusted Rates by County, Iowa, 2004-2008 *(continued)*

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Lee	Deaths	477	61	134	28	16
	Rate	198.9	24.7	56.4	20.4	16.6
	95% CI	181.2 - 218.1	18.8 - 32	47.2 - 67.1	13.2 - 30.5	9.5 - 27.2
Linn	Deaths	1,854	164	564	115	95
	Rate	175.7	15.2	54.2	19.6	22.8
	95% CI	167.7 - 183.9	12.9 - 17.7	49.8 - 58.9	16.1 - 23.6	18.4 - 27.9
Louisa	Deaths	154	13	44	14	^
	Rate	219.7	18.8	64.2	33.3	^
	95% CI	186.2 - 257.8	10 - 32.6	46.6 - 86.6	17.9 - 58	^
Lucas	Deaths	123	12	32	17	11
	Rate	178.4	15.4	49.7	40.8	37.5
	95% CI	147.4 - 214.7	7.8 - 28.8	33.8 - 71.3	22.4 - 70.6	18.7 - 68.7
Lyon	Deaths	125	15	25	11	^
	Rate	157	18.6	33.6	23.3	^
	95% CI	130.1 - 188.4	10.3 - 31.8	21.6 - 50.3	11 - 45.5	^
Madison	Deaths	155	12	46	12	13
	Rate	179.3	14	53.6	24.6	35.9
	95% CI	151.8 - 210.4	7.2 - 24.9	39.2 - 71.9	12.4 - 44.7	19 - 61.6
Mahaska	Deaths	238	22	71	16	11
	Rate	175.9	16.4	54.9	20.1	19.1
	95% CI	153.9 - 200.2	10.2 - 25.2	42.7 - 69.5	11.3 - 33.9	9.5 - 34.3
Marion	Deaths	376	52	109	37	24
	Rate	185	24.1	56.3	30.8	27.2
	95% CI	166.4 - 205.1	17.9 - 31.9	46.2 - 68.2	21.2 - 43.7	17.4 - 40.6
Marshall	Deaths	499	59	121	33	40
	Rate	195	22.4	48.7	24.9	39
	95% CI	178 - 213.2	17 - 29.2	40.3 - 58.3	16.8 - 35.7	27.8 - 53.2
Mills	Deaths	132	^	39	19	^
	Rate	163.6	^	48.4	41	^
	95% CI	136.5 - 194.7	^	34.2 - 66.7	24.3 - 65.4	^
Mitchell	Deaths	132	17	24	13	14
	Rate	148.9	21.7	29.5	27.3	33.4
	95% CI	123.3 - 179.1	12.1 - 36.5	18.5 - 45.5	13.7 - 51.5	18.2 - 58.8
Monona	Deaths	148	22	33	^	^
	Rate	177.4	26.5	41.1	^	^
	95% CI	148.7 - 211.1	16.1 - 42.7	28 - 59.9	^	^
Monroe	Deaths	113	13	39	^	^
	Rate	201.3	20.3	70.3	^	^
	95% CI	165 - 244.1	10.7 - 36.8	49.9 - 97.4	^	^
Montgomery	Deaths	133	15	38	13	^
	Rate	163.2	16.3	48.6	28.3	^
	95% CI	135.7 - 195.3	8.9 - 28.4	34.2 - 67.7	14.4 - 52.3	^
Muscatine	Deaths	476	49	135	30	33
	Rate	213.6	22.1	60.9	24.2	43.2
	95% CI	194.7 - 233.8	16.3 - 29.3	51 - 72.2	16.3 - 34.9	29.5 - 60.6
O'Brien	Deaths	199	24	42	17	^
	Rate	177.1	20.5	40	29	^
	95% CI	151.6 - 206	12.5 - 32.3	28.6 - 55.1	16 - 50.2	^
Osceola	Deaths	90	^	23	14	^
	Rate	198	^	51.5	54	^
	95% CI	157.8 - 246.3	^	32.3 - 79.2	27.5 - 98.3	^
Page	Deaths	254	24	61	17	19
	Rate	206.8	17.4	53.1	24.7	35.8
	95% CI	181.3 - 235.2	11 - 27	40.3 - 69.2	13.8 - 42.7	21.5 - 56.8
Palo Alto	Deaths	135	15	35	10	14
	Rate	175.6	17.3	48.1	20.1	41.6
	95% CI	145.6 - 210.8	9.5 - 30.6	33.2 - 68.4	9.4 - 42.3	22.7 - 72.2

Table B: Cancer Mortality, Total Number of Deaths and Age-Adjusted Rates by County, Iowa, 2004-2008 *(continued)*

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Plymouth	Deaths	285	26	66	23	17
	Rate	180.2	15.5	42.5	26.5	25.6
	95% CI	159.7 - 202.9	10.1 - 23.2	32.8 - 54.4	16.5 - 40.9	14.9 - 41.3
Pocahontas	Deaths	122	15	28	^	^
	Rate	187.1	18.8	47.6	^	^
	95% CI	153.1 - 227.9	10.3 - 34.8	31.3 - 71.3	^	^
Polk	Deaths	3,581	363	1,099	244	204
	Rate	186.1	18.6	58.4	21.7	28.4
	95% CI	180 - 192.3	16.7 - 20.7	55 - 62	19 - 24.6	24.6 - 32.6
Pottawattamie	Deaths	1,038	114	320	76	47
	Rate	206.8	22.6	64.6	27.2	24
	95% CI	194.4 - 219.9	18.7 - 27.2	57.7 - 72.1	21.4 - 34.2	17.6 - 31.9
Poweshiek	Deaths	227	37	53	19	11
	Rate	175.6	28.5	42.5	25.9	20.3
	95% CI	152.9 - 201	19.8 - 40.1	31.7 - 56.3	15.2 - 42.2	10.1 - 37.1
Ringgold	Deaths	79	^	27	^	^
	Rate	168.6	^	57	^	^
	95% CI	132.1 - 214.5	^	37.3 - 86.2	^	^
Sac	Deaths	162	24	28	12	^
	Rate	177.2	22.3	33.1	22.7	^
	95% CI	149.8 - 209	14 - 35.4	21.7 - 49.6	10.6 - 46.1	^
Scott	Deaths	1,600	136	493	111	71
	Rate	192	16.3	59.6	23.5	22.8
	95% CI	182.6 - 201.7	13.7 - 19.3	54.4 - 65.1	19.3 - 28.4	17.7 - 28.7
Shelby	Deaths	172	26	40	17	^
	Rate	173.5	24.2	42.1	36	^
	95% CI	147.4 - 203.7	15.6 - 37	29.7 - 58.9	20.6 - 60.8	^
Sioux	Deaths	272	29	51	14	14
	Rate	142.1	15.1	28	13	17.6
	95% CI	125.2 - 160.8	9.9 - 22.2	20.7 - 37.1	6.7 - 23.1	9.6 - 29.7
Story	Deaths	583	43	148	45	36
	Rate	161.9	12.2	43.4	20.5	25.4
	95% CI	148.7 - 175.8	8.7 - 16.5	36.6 - 51	14.7 - 27.9	17.8 - 35
Tama	Deaths	250	42	55	14	24
	Rate	192	29.8	45.5	20.7	42.7
	95% CI	168.5 - 218.4	21.3 - 41.1	34.2 - 59.7	10.9 - 36.7	27.4 - 64.3
Taylor	Deaths	85	12	18	^	^
	Rate	158.7	24	35.9	^	^
	95% CI	124.5 - 200.8	11.4 - 45.7	20.3 - 60	^	^
Union	Deaths	147	23	45	11	11
	Rate	167.6	24.4	52.3	21.6	30.3
	95% CI	141.1 - 198.2	15.3 - 37.7	38 - 70.9	10.4 - 41.6	15.1 - 55.4
Van Buren	Deaths	119	^	41	^	14
	Rate	209.8	^	73.8	^	55.1
	95% CI	172.9 - 253.1	^	52.5 - 101.8	^	30.1 - 94.7
Wapello	Deaths	476	40	162	22	34
	Rate	202.9	16.7	71.4	15.6	32.7
	95% CI	184.8 - 222.5	11.9 - 23	60.7 - 83.6	9.6 - 24.5	22.6 - 46
Warren	Deaths	388	44	108	31	17
	Rate	169.2	19	47.1	24.2	20.7
	95% CI	152.6 - 187	13.7 - 25.6	38.6 - 57	16.3 - 34.7	12 - 32.8
Washington	Deaths	244	28	56	21	14
	Rate	165.5	18.3	40.1	24.5	21.3
	95% CI	144.7 - 188.7	11.9 - 27.1	30 - 52.7	14.6 - 39.4	11.6 - 36.4
Wayne	Deaths	106	15	29	^	10
	Rate	197.4	29	51.8	^	42.1
	95%	160.1 - 242.2	15.9 - 50.6	34.4 - 77.1	^	20.1 - 82.3

Table B: Cancer Mortality, Total Number of Deaths and Age-Adjusted Rates by County, Iowa, 2004-2008 *(continued)*

County	Statistic	All Sites	Colon & Rectum	Lung & Bronchus	Female Breast	Prostate
Webster	Deaths	500	34	146	30	27
	Rate	199.4	13	59.9	24.1	24.6
	95% CI	182 - 218.2	8.9 - 18.4	50.4 - 70.7	15.9 - 35.2	16.2 - 36
Winnebago	Deaths	124	10	35	^	^
	Rate	152.5	12	43.8	^	^
	95% CI	126.1 - 183.5	5.6 - 23.6	30.3 - 62.2	^	^
Winneshiek	Deaths	193	23	41	12	17
	Rate	134	15.6	31.5	16	27.2
	95% CI	115.3 - 155.2	9.8 - 24.2	22.3 - 43.5	8.1 - 29.7	15.8 - 44.3
Woodbury	Deaths	1,041	100	323	86	61
	Rate	193.7	18.3	61.5	27	30.1
	95% CI	182.1 - 206	14.9 - 22.3	54.9 - 68.7	21.5 - 33.6	22.9 - 38.6
Worth	Deaths	105	18	25	^	^
	Rate	198.2	32.3	49.2	^	^
	95% CI	161.5 - 241.5	18.8 - 52.9	31.8 - 73.8	^	^
Wright	Deaths	206	23	56	20	15
	Rate	183.1	19.4	54	34.5	30.8
	95% CI	157.6 - 212.1	12 - 30.7	40.4 - 71.4	19.6 - 58	17.2 - 52.7

Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 7.0.8.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard; Confidence intervals (Tiwari mod) are 95% for rates. This means that the range between the lower and upper confidence interval defines with 95% probability the "true" rate.
^ Statistic not displayed if there were fewer than 10 cases.

Glossary of Terms

Age-adjusted rate – Incidence or mortality rate adjusted to account for the different age distributions between populations. In this report, all rates are age-adjusted using the 2000 US standard population.

Benign – Tumors that grow at their site of development, but do not have the ability to spread to regional and distant sites.

Body Mass Index (BMI) – The standard adopted by the World Health Organization for the classification of body weight categories. BMI, which measures a person's weight in relation to their height, is calculated using the formula: BMI = weight / height^2 (kg/m^2).

Burden – Number of new cases and/or deaths from cancer or overall impact of cancer in the state or specified region.

Cancer incidence – The number of new cancer cases that occur during a specified period for a population at risk for developing the disease, expressed as the number of cases or as a rate, usually per 100,000 people.

Cancer mortality – Deaths from cancer that occur during a specified period of time for a particular population, expressed as the number of deaths or as a rate, usually per 100,000 people.

Cancer Rates – The number of cancer cases or deaths, most often expressed per 100,000 population, within a given period of time.

Colonoscopy – A screening/diagnostic procedure in which a health care professional views the entire colon through a flexible, lighted instrument called a colonoscope.

Confidence interval (CI) – A 95% confidence interval is commonly reported with rates. The range between the lower and upper confidence interval defines with 95% probability the "true" rate.

Crude Incidence Rate - The number of new cancers of a specific site/type occurring in a specified population during a year, usually expressed as the number of cancers per 100,000 population at risk.

Five-year relative survival – The ratio of the proportion of observed 5-year survivors in a cohort of cancer patients to the proportion of expected 5-year survivors in the general US population of similar race, gender, age, and time period.

Invasive – Malignant cancer or tumor that has invaded tissue or surrounding organs.

Malignant – A tumor that can grow not only at its site of development, but can also spread to regional and distant sites.

Mammography – A screening and diagnostic technique that uses low-dose x-rays to find tumors in the breast.

Metastasis – The spread of the disease from one part of the body to another.

Pap test or Pap smear – A screening or diagnostic procedure that examines cervical cells microscopically to detect precancerous lesions or cancer. This screening procedure has reduced the death rate from cervical cancer by 75% since the 1950s.

Percent change (PC) – Percent of change from selected base year to most current year, usually computed for incidence and mortality rates, in this report calculated using SEER*Stat statistical software.

Prevalence – The percentage of people alive exhibiting a behavior out of the total number at risk for the behavior. In this report, the prevalence is expressed as a percent of the population.

Prostate-Specific-Antigen (PSA) – A blood protein, the level of which is increased in many men who have prostate cancer or benign prostate hyperplasia (overgrowth of prostate cells).

Risk factors – Behaviors/conditions related to the occurrence of a disease. Risk factors can be lifestyle, environmental, or genetic. For example, smoking is a risk factor for lung cancer.

Sigmoidoscopy – A screening/diagnostic procedure in which a health care professional views the inside of the rectum and lower part of the colon through a flexible, lighted instrument called a sigmoidoscope.

In Situ – A small cancer, confined to the cells in which the cancer began, that has not invaded or penetrated the surrounding tissue.

Stage of Disease at Diagnosis

Localized – An invasive tumor (penetrated the surrounding tissue) that is still confined to the organ of origin.

Regional – A tumor that has spread beyond the organ of origin to an adjacent organ, tissue or lymph nodes.

Distant – The tumor has spread beyond adjacent organs, tissue or lymph nodes, or has metastasized through the blood stream or lymph system.

Unknown/Unstaged – Insufficient information is available to determine the stage or extent of the tumor at the time of diagnosis.

Acronyms and Abbreviations

BMI: Body Mass Index
BRFSS: Behavioral Risk Factor Surveillance System
CDC: Centers for Disease Control and Prevention
EPA: Environmental Protection Agency
FDA: Food and Drug Administration
ICC: Iowa Cancer Consortium
IDPH: Iowa Department of Public Health
NCI: National Cancer Institute
SHRI: State Health Registry of Iowa
SEER Program: Surveillance, Epidemiology, and End Results Program of the National Cancer Institute

Data Sources

American Cancer Society The expected numbers of cancer cases and deaths in Iowa for 2012 were obtained from the American Cancer Society publication, *Cancer Facts & Figures 2012*. It is available on the Society's Web site, www.cancer.org.

Behavioral Risk Factor Surveillance System (BRFSS) Information on behaviors related to cancer such as smoking and screening utilization were obtained from the BRFSS, a telephone survey of randomly selected adults age 18 and older. Results for Iowa were obtained by downloading data from the CDC Web site and analyzing with SAS software. Prevalence rates were weighted by the age- and gender-specific Iowa population distribution. The denominator represents all survey respondents except those with missing, don't know, or refused to answer for the relevant questions. Unless otherwise stated, data for the US as a whole represents the median value for all states, the District of Columbia, and three territories. Information on the strengths and weaknesses of the BRFSS and additional data can be found at www.cdc.gov/brfss.

State Health Registry of Iowa (SHRI) The numbers and types of cancers diagnosed among Iowa residents were obtained from the State Health Registry of Iowa, which has provided information on cancer incidence and survival among Iowa residents since 1973. The numbers of types of cancer deaths among Iowa residents were obtained from death certificates compiled by the Iowa Department of Public Health. More detailed information on the State Health Registry of Iowa and cancer in Iowa can be found at www.public-health.uiowa.edu/shri/.

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