View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Iowa Publications Online

State Health Registry of Iowa

2007 CANCER IN IOWA REPORT

Iowa's Progress toward Cancer Mortality Goals for the Year 2010

The University of Iowa

2007 CANCER IN IOWA REPORT

In 2007, an estimated 6,400 Iowans will die from cancer, 15 times the number caused by auto fatalities. Cancer is second only to heart disease as a cause of death. These projections are based upon mortality data the State Health Registry of Iowa receives from the Iowa Department of Public Health. The Registry has been recording the occurrence of cancer in Iowa since 1973, and is one of fourteen population-based registries and three supplementary registries nationwide providing data to the National Cancer Institute. With *2007 Cancer in Iowa* the Registry makes a general report to the public on the status of cancer. This report will focus on:

- a description of the Registry and its goals;
- cancer estimates for 2007;
- a special section on Iowa's progress toward cancer mortality goals for the year 2010;
- brief summaries of recent/ongoing research projects;
- a selected list of publications from 2006.

The State Health Registry of Iowa

Cancer is a reportable disease as stated in the Iowa Administrative Code. Cancer data are collected by the State Health Registry of Iowa, located at The University of Iowa in the College of Public Health's Department of Epidemiology. The staff includes more than 50 people. Half of them, situated throughout the state, regularly visit hospitals, clinics, and medical laboratories in Iowa and neighboring states to collect cancer data. A follow-up program tracks more than 99 percent of the cancer survivors diagnosed since 1973. This program provides regular updates for follow-up and survival. The Registry maintains the confidentiality of the patients, physicians, and hospitals providing data.

In 2007 data will be collected on an estimated 15,700 new cancers among Iowa residents. In situ cases of bladder cancer are included in the estimates for bladder cancer, to be in agreement with the definition of reportable cases of the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

Since 1973 the Iowa Registry has been funded by the SEER Program of the National Cancer Institute. Iowa represents rural and Midwestern populations and provides data included in many NCI publications. Beginning in 1990 about 5-10 percent of the Registry's annual operating budget has been provided by the state of Iowa. Beginning in 2003, the University of Iowa has also been providing cost-sharing funds. In addition, the Registry receives funding through grants and contracts with university, state, and national researchers investigating cancer-related topics.

The goals of the Registry are to:

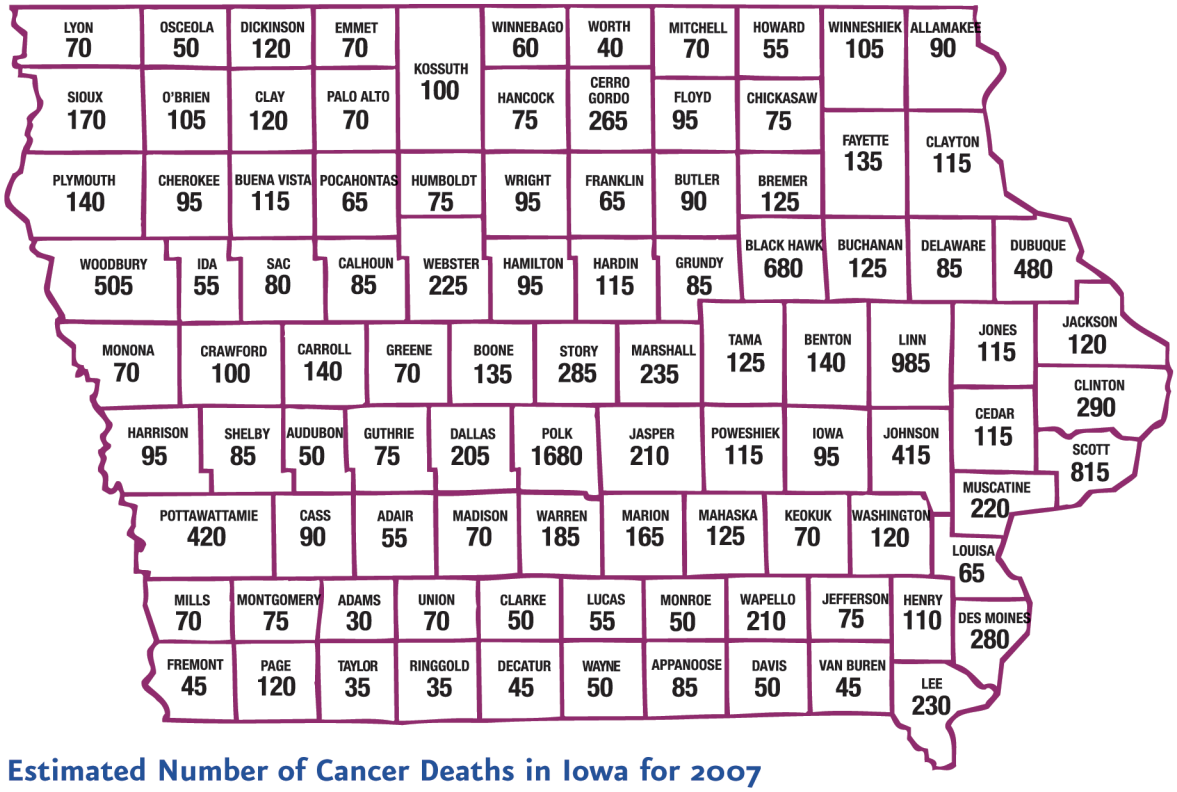
* assemble and report measurements of cancer incidence, survival and mortality among Iowans;
* provide information on changes over time in the extent of disease at diagnosis, therapy, and patient survival;
* promote and conduct studies designed to identify factors relating to cancer etiology, prevention and control;
* respond to requests from individuals and organizations in the state of Iowa for cancer data and analyses;
* provide data and expertise for cancer research activities and educational opportunities.

THE STATE HEALTH REGISTRY OF IOWA IS THE BEST STATEWIDE RESOURCE FOR DETERMINING THE BURDEN OF CANCER ON THE IOWA POPULATION AND ASSESSING TRENDS IN THE OCCURRENCE OF CANCER OVER TIME.

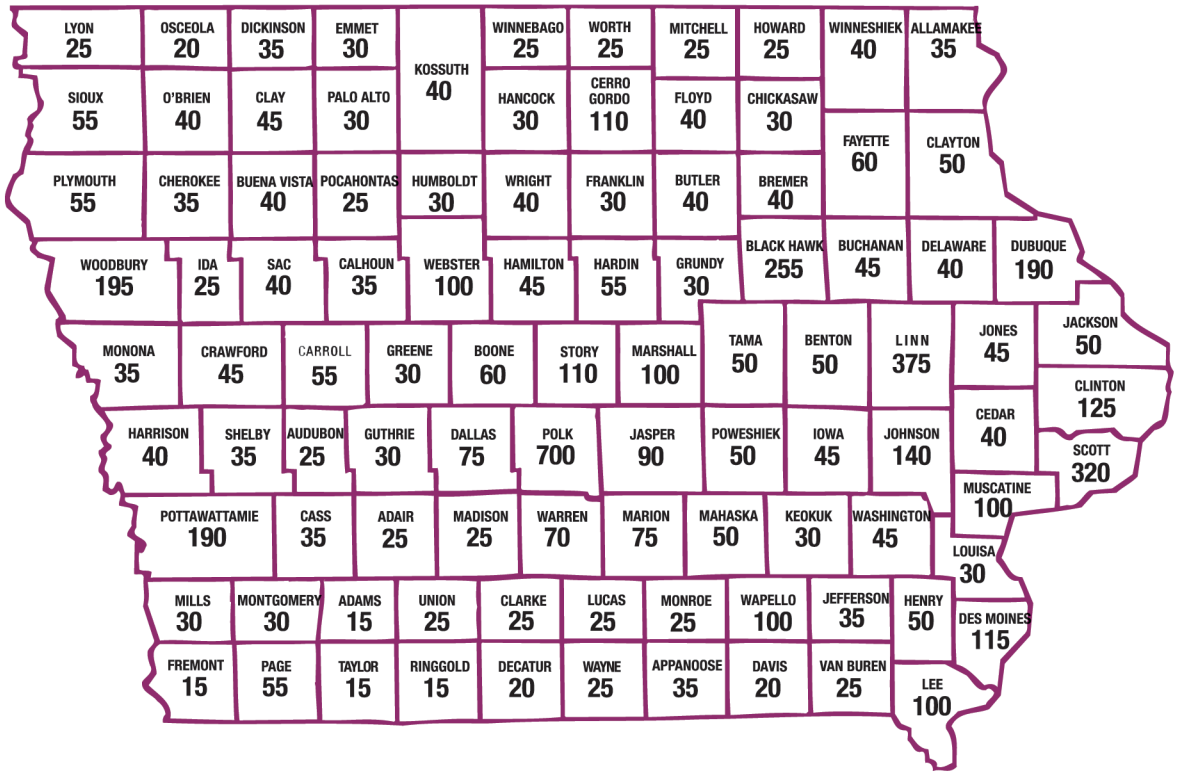
Cancer Projections for 2007

In 2007, cancer will strike five out of every 1,000 Iowans. Cancer is the second leading cause of death in Iowa, responsible for about 230 of every 1,000 deaths. Breast, colon & rectum, lung, and prostate cancers will account for more than half of all new cancers and cancer deaths.

Estimated Number of New Cancers in Iowa for 2007



Estimated Number of Cancer Deaths in Iowa for 2007



Top 10 Types of Cancer in Iowa Estimated for 2007

New Cancers in Females

Type	# of Cancers	% of Total
Breast	2100	27.3
Lung	950	12.4
Colon & rectum	940	12.2
Uterus	480	6.2
Non-Hodgkin's lymphoma	380	4.9
Skin melanoma	280	3.7
Ovary	240	3.1
Thyroid	230	3.0
Bladder (invasive and noninvasive)	210	2.7
Leukemia	210	2.7
All others	1680	21.8
Total	7700	

Cancer Deaths in Females

Type	# of Cancers	% of Total
Lung	780	25.2
Breast	410	13.2
Colon & rectum	330	10.6
Pancreas	190	6.1
Ovary	180	5.8
Non-Hodgkin's lymphoma	130	4.2
Leukemia	130	4.2
Uterus	100	3.2
Brain	80	2.6
Kidney & renal pelvis	70	2.3
All others	700	22.6
Total	3100	

New Cancers in Males

Type	# of Cancers	% of Total
Prostate	2100	26.3
Lung	1250	15.6
Colon & rectum	950	11.9
Bladder (invasive and noninvasive)	600	7.5
Non-Hodgkin's lymphoma	400	5.0
Skin melanoma	300	3.7
Kidney & renal pelvis	290	3.6
Leukemia	260	3.2
Oral cavity	200	2.5
Pancreas	190	2.4
All others	1460	18.3
Total	8000	

Cancer Deaths in Males

Type	# of Cancers	% of Total
Lung	1100	33.3
Prostate	350	10.6
Colon & rectum	330	10.0
Leukemia	170	5.2
Pancreas	170	5.2
Non-Hodgkin's lymphoma	140	4.3
Esophagus	130	3.9
Bladder	110	3.3
Kidney & renal pelvis	100	3.0
Brain	90	2.7
All others	610	18.5
Total	3300	

Fortunately for Iowans, the chances of being diagnosed with many types of cancer can be reduced through positive health practices such as smoking cessation, physical exercise, healthful dietary habits, and alcohol consumption in moderation. Early detection through self-examination and regular health checkups can improve cancer survival.

Iowa's Progress toward Cancer Mortality Goals for the Year 2010

Healthy Iowans 2010 is a health plan for the state of Iowa and is a companion to the national plan, *Healthy People 2010*. Herein progress made toward the *Healthy Iowans 2010* cancer mortality goals is updated.

Table 1 shows the cancer sites included in *Healthy Iowans 2010*. All cancer sites combined is included, as well as specific cancer sites where modifiable risk factors have been identified and/or screening guidelines are practiced. The baseline mortality rate is given for 1994-1996, the most recent data available at the time *Healthy Iowans 2010* was initially developed. To monitor progress, the rates for the years 2003-2005 are now available and the percent improvement can be calculated over these two time periods. Improvement is seen at each site and the magnitude has been double-digit for prostate, female breast, colorectal, and cervical cancers. The goal for the year 2010 is also presented, to see how much work is still needed to meet the established goal. The 2003-2005 prostate cancer rate indicates the *Healthy Iowans 2010* goal has already been reached for this cancer. Even though the percent improvement for lung cancer was small, the number of lives saved is large because this is the leading cause of cancer mortality.

Table 1. Progress toward cancer mortality goals in *Healthy Iowans 2010**

Cancer Site	Gender+	1994-1996 Baseline Rate§	2003-2005 Rate§	2010 Rate Goal§	Percent Improvement‡
All sites	M & F	196.4	182.8	173.0	6.9%
Prostate	M	36.0	26.0	26.0	27.8%
Breast	F	29.0	22.1	19.0	23.8%
Colon & rectum	M & F	23.2	18.7	15.5	19.4%
Cervix	F	2.6	2.2	1.9	15.4%
Skin melanoma	M & F	2.5	2.4	1.9	4.0%
Oral cavity & pharynx	M & F	2.6	2.5	1.8	3.8%
Lung	M & F	54.1	53.1	46.0	1.8%

* The complete cancer chapter is available at http://www.idph.state.ia.us/bhpl/common/pdf/healthy_iowans_2010_chapters/Healthy_Iowans_2010_Complete.pdf

+ M=male; F=female.

§ Expressed per 100,000 and age-adjusted to the 2000 U.S. standard population.

‡ Determined by subtracting the 2003-2005 rate from the 1994-96 baseline rate and dividing by the 1994-96 baseline rate.

Indirect standardization is a statistical technique that allows for the conversion of percent improvements into the number of lives saved. For this report, the number of lives saved was estimated for the years 1997-2005 using this technique. Indirect standardization assumes the age- and gender-specific rates from 1994-1996 and applies them to age- and gender-specific Iowa census populations for each of the years 1997-2005 to yield the expected number of cancer deaths. The observed number of deaths is obtained by summing the number of deaths in specified years where the cancer site is listed as the underlying cause of death on the death certificate. The number of lives saved can be estimated by subtracting the observed number of cancer deaths for the years 1997-2005 from the expected number of deaths. Table 2 presents these

numbers by cancer site and gender. For the time period 1997-2005, 3,066 lives have been saved from cancer death, 2,103 attributed to males and 963 to females.

Figure 1 shows how these 3,066 lives are distributed over the years 1997-2005. The expected number of cancer deaths increases each year because the population is both increasing in absolute numbers and proportionally increasing in older age groups. Meanwhile, the number of observed cancer deaths has remained steady at around 6,400 deaths annually. The net result is a greater number of lives saved in the more recent years.

For cancer prevention and control purposes it is important to evaluate additional characteristics in the population to see how the lives saved are distributed. In Table 3 data are presented by gender, age, race, and urban/rural status. The standardized mortality ratio (SMR) was calculated by dividing the observed number of cancer deaths by the expected number of these deaths. The SMR provides a simple way to look at progress. When the SMR is less than 1, it means progress is being made. When the SMR is greater than 1, it means that more cancer deaths were seen than expected. In females, progress has been made in all areas except for those 75 years of age or older and those who are black. In males there is also a need for improvement among blacks and those aged 0-19 years. Overall, the progress has been widespread across the state with a noticeable racial disparity.

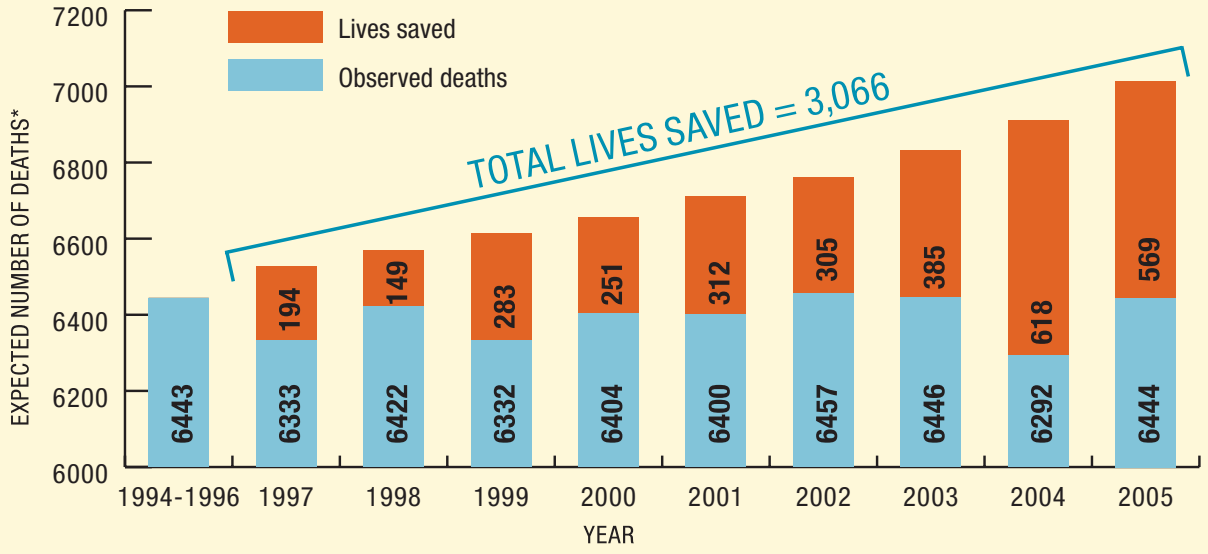
The greatest improvements in mortality rates to date are seen with prostate, colorectal, female breast, and male lung cancers. These are the same cancer sites that for years have been responsible for over 50% of

Table 2. Distribution of 3,066 estimated lives saved by cancer site and gender, Iowa, 1997-2005

Cancer site	Gender	Observed number of deaths	Expected number of deaths*	Difference "+" = lives saved "-" = lives lost
All sites	M	29,881	31,984	+ 2,103
	F	27,649	28,612	+ 963
Prostate	M	3,571	4,411	+ 840
Breast	F	4,172	4,880	+ 708
Colon & rectum	M	3,206	3,508	+ 302
	F	3,358	3,850	+ 492
Cervix	F	342	389	+ 47
Skin melanoma	M	448	459	+ 11
	F	272	280	+ 8
Oral cavity & pharynx	M	453	486	+ 33
	F	255	303	+ 48
Lung	M	9,427	10,409	+ 982
	F	6,255	5,932	- 323
All other sites	M	12,776	12,711	-65
	F	12,995	12,978	-17

* Computed using indirect standardization with sex- and age-specific rates for 1994-1996 as the standard

Figure 1. Estimated Lives Saved from Cancer Death, Iowa



* Computed using indirect standardization with sex- and age-specific rates for 1994-1996 as the standard.

cancer deaths in Iowa. Cancer mortality rates are primarily affected by incidence rates (the rate at which new cancers are diagnosed), screening tests available (to detect cancers earlier), and treatment. The decline in male lung cancer deaths can be attributed to declines in cigarette smoking, thereby reducing the number of new lung cancer cases being diagnosed. When Table 2 was repeated among males for newly diagnosed cancers rather than cancer deaths, the number of new lung cancers observed over the period 1997-2004 was 900 fewer than expected. A recent published report indicates that mammography screening and improved treatments have equally contributed to the fewer women dying from breast cancer. Reductions in breast cancer incidence have not been seen. A recent publication also indicated that currently available interventions could reduce colorectal cancer mortality by 50% by the year 2020 with most of this reduction coming from increased screening followed by decreasing risk factor prevalence. The reasons for the decline in the prostate cancer mortality rates are not as well understood. The prostate specific antigen (PSA) screening test is available for prostate cancer, but the clinical trials are not complete yet on the effectiveness of this test in reducing prostate cancer mortality.

Table 3. Distribution of 3,066 estimated lives saved from a cancer death by gender and characteristic, Iowa, 1997-2005

Gender	Characteristic	Observed number of deaths	Expected number of deaths[§]	Difference "+" = lives saved "-" = lives lost	SMR*
Female	**Age**				
	0-19	87	107	+20	0.81[t]
	20-44	916	1052	+136	0.87[t]
	45-64	5818	6546	+728	0.89[t]
	65-74	6495	6734	+239	0.96[t]
	75+	14333	14173	-160	1.01
	Race				
	White	27174	28161	+987	0.96[t]
	Black	351	285	-66	1.23[t]
	Other	124	166	+42	0.75[t]
	Urban/Rural**				
	MSA[γ]	13029	13247	+218	0.98
	>20,000	6623	6852	+229	0.97[t]
	10-20,000	6079	6491	+412	0.94[t]
	Rural	1918	2022	+104	0.95[t]
Male	**Age**				
	0-19	128	97	-31	1.32[t]
	20-44	783	923	+140	0.85[t]
	45-64	6526	7278	+752	0.90[t]
	65-74	8329	8635	+306	0.96[t]
	75+	14115	15051	+936	0.94[t]
	Race				
	White	29305	31488	+2183	0.93[t]
	Black	451	320	-131	1.41[t]
	Other	125	176	+51	0.71[t]
	Urban/Rural**				
	MSA[γ]	13709	14540	+831	0.94[t]
	>20,000	7532	7712	+180	0.98[t]
	10-20,000	6517	7428	+911	0.88[t]
	Rural	2123	2304	+181	0.92[t]

[§] Computed using indirect standardization with sex- and age-specific rates for 1994-1996 as the standard
* Standardized mortality ratio (SMR) equals the observed number of deaths divided by the expected number.
** Urban/rural groupings were obtained from the 2005 Iowa Health Fact Book (see http://www.public-health.uiowa.edu/factbook/)
[γ] Metropolitan statistical area (MSA) consists of one or more counties that contain a city of 50,000 or more inhabitants
[t] SMR is statistically significant from 1.00 at 0.05 level of significance.

These data show that progress with saving lives from cancer has been relatively widespread across Iowa. Furthermore, this progress has been accomplished primarily with the major cancer sites of prostate, female breast, colon & rectum, and lung.

Research Projects during 2007

The State Health Registry of Iowa is participating in around two dozen funded studies during 2007. Brief descriptions of a few of these studies are provided.

The Agricultural Health Study

The Agricultural Health Study is a long-term study of agricultural exposures (including pesticides) and chronic disease (especially cancer) among commercial or private pesticide applicators (and their spouses, if married) in Iowa and North Carolina. The study is funded primarily by the National Cancer Institute. We are in the 15th year of the study, which received renewed funding at the end of 2003 for continuation through 2008.

In the first five years, 89,658 subjects (58,564 in Iowa and 31,094 in North Carolina) were enrolled in the study. This total for Iowa included 31,877 private applicators, 21,771 spouses of private applicators, and 4,916 commercial applicators. Enrollment consisted of completing questionnaires about past exposures and health. The second phase of the study for private applicators and their spouses was completed at the end of 2003. It involved a telephone interview, a mailed dietary questionnaire, and collection of a cheek cell sample from all consenting cohort members. The telephone interview asked about pesticide use since enrollment, current farming and work practices, and health changes. The dietary health questionnaire asked about cooking practices and types of foods eaten. Cooking practices and diet may play a role in cancer and other health conditions. The cheek cells will be used to understand possible links between genetics, exposures, and disease. For commercial applicators, the second phase of the study was completed at the end of 2005. The study's third phase began in 2005, involves updating information about exposures and health, and is ongoing.

Since 1997, cohort members have been linked annually to mortality and cancer registry incidence databases in both states. In addition, mortality data on the cohort are being obtained from the National Death Index. More information about recent results from this study, the study background, frequently asked questions, other resources (internet & telephone) for agricultural health information, references for publications to date, and information for scientific collaborators can be found at the website, www.aghealth.org. The abstract and/or full text is available for study publications at the website. The cancer-related references for some of the recent publications are provided in the last section of this report.

Lung Cancer Care Outcomes/Surveillance Consortium

This study involves a statistical coordinating center, the State Health Registry of Iowa, and six other primary data collection and research sites across the United States. Across these sites, we are conducting population-based research in the areas of access to care and patterns of care. We are evaluating the reasons for particular care decisions by patients and their physicians, as well as variation in dissemination of modern care protocols and practices in different geographic areas. We are investigating the effects of these decisions and practices on patient outcomes, including quality of life, for patients with lung or colorectal cancer. In Iowa, this study was limited to lung cancer patients. We enrolled over 1,000 lung cancer patients newly diagnosed between June 2003 and March 2005. We are currently working on the medical record abstraction component.

Studies involving Non-Hodgkin Lymphoma (NHL)

The State Health Registry of Iowa (SHRI), along with researchers at the Mayo Clinic participated in a collaborative, population-based case-control study of NHL involving researchers at the National Cancer Institute and three other Surveillance, Epidemiology, and End Results (SEER) registries. The main objective of the study was to better characterize risk factors for NHL. In Iowa, 364 live patients newly diagnosed with NHL between July 1, 1998 and June 30, 2000 were enrolled. A similar number of population controls participated. Blood samples were sought from study participants. The SHRI also coordinated the acquisition of pathology reports, slides and tissue blocks from all SEER centers. The slides were reviewed to determine the reliability of NHL pathologic classification. More recently, we are collaborating with researchers at the Mayo Clinic to investigate whether genes with functional, common variant polymorphisms involved in immune function and regulation are associated with overall survival from NHL among these patients. To achieve this aim, medical record reviews were performed to obtain more detailed information on the treatment received for NHL. In addition, NHL patients not diagnosed and/or treated at the University of Iowa Hospitals and

Clinics or at the Mayo Clinic are being contacted by Registry staff. If they have a family history of hematopoietic cancer, they are being invited to participate by providing a family history and by providing blood samples from themselves and their relatives. These research activities resulted in several publications during 2006. The references for some of these are provided in the last section of this report.

Second Cancer Studies

Over the past two decades, the State Health Registry of Iowa has participated in several second cancer studies. These have consisted of cohorts with a first cancer of the cervix, ovary, testis, uterus, female breast, non-Hodgkin's lymphoma, or Hodgkin's disease. They have been conducted primarily in collaboration with the Radiation Epidemiology Branch at the National Cancer Institute and other registries in North America and Europe. Generally these studies evaluate the treatment received for the first cancer and the risk it places on the patient for development of a second cancer. They typically involve medical record review and pathology material retrieval.

The WECARE (Women's Environmental Cancer and Radiation Epidemiology) Study is another example of a second cancer study. This study is designed to examine the interaction of gene carrier status and radiation exposure in the etiology of female breast cancer. Data collection has been recently completed and not only involved medical record review, but also participant interviews and blood samples.

Results from the second cancer studies have provided important medical information and will continue to do so in the future.

Geographical Information Systems

The State Health Registry of Iowa is involved with research utilizing a geographical information system to develop and test a methodology for identifying regions of excess cancer burden for breast and colorectal cancer in Iowa. It will refine measures of geographic access to cancer prevention, treatment and screening services in Iowa by computing values using fine-scaled geographic data on individuals, the spatial choices of individuals and the locations of service providers. A regional simulation workbench will generate the expected range and variations in the cancer burden measures for small geographic areas of Iowa based on local demographic characteristics of the area and statewide cancer burden rates. Results can be used to plan more appropriate cancer prevention and control programs.

The Registry is also involved with a prostate cancer study that is producing an edited book of key geocoding issues and preparing "A Primer on Geocoding for Prostate Cancer Prevention and Control Activities". This study is conducting research and field-testing to compare and evaluate different geocoding methods. Further development will be done in the area of masking the locations of geocoded prostate cancer incidences sufficient to guarantee their confidentiality, yet leaving them fit for use in prostate cancer prevention and control.

The Registry has also provided data for maps created for use by the Iowa Consortium for Comprehensive Cancer Control. The maps were created by Dr. Gerard Rushton, Professor of Geography at the University of Iowa, and graduate students Kristen Beyer, Zunqiu Chen, and Veronica Escamilla. These maps can be used for planning purposes for cancer prevention and control activities. They can be viewed at http://www.uiowa.edu/~gishlth/ICCCCMaps/index.htm.

Pooled Analyses

Today, researchers are increasingly looking to combine their study data with that of other studies evaluating similar outcomes. The State Health Registry of Iowa has been involved with such pooling activities for studies involving residential radon and lung cancer, diet and cancer, drinking water and bladder cancer, and non-Hodgkin's lymphoma. During 2006 these activities have resulted in several publications, which are listed in the last section of this report.

SEER Patterns of Care Studies

This is a collaborative set of studies between the National Cancer Institute and its 14 SEER Registries. In 2007, we will investigate state-of-the-art therapies for in situ and early stage female breast cancer, stage II/III colorectal cancer, and non-small cell lung cancer. Across these cancer sites, 235 patients will be eligible at the State Health Registry of Iowa and each will have been newly diagnosed during 2005. The SHRI has been involved with these types of studies over the past 20 years. The collected data have resulted in several publications, a few of which were published in 2006 and are listed in the references provided in the last section of this report.

The Iowa Women's Health Study

This is a population-based cohort of 41,837 Iowa women, aged 55-69 in 1986, who were recruited to determine whether diet, body fat distribution and other risk factors were related to cancer incidence. Exposure and lifestyle information was collected in a baseline mailed survey and subsequently in several follow-up mailed surveys. Mortality and cancer incidence has been ascertained since 1986 through linkage to the State Health Registry of Iowa databases and the National Death Index. The project has been extremely productive with over 200 publications, some of which occurred in 2006 and are listed in the references provided in the last section of this report. This year SHRI personnel are obtaining pathologic materials for several hundred women in this study who have been diagnosed with colorectal (CRC) cancer as part of a collaborative study with researchers at the Mayo Clinic. The primary aims of the study are to examine associations between environmental factors and CRC subtypes exhibiting DNA patterns defined by a microsatellite instability phenotype, Ki-ras mutation status, p53 mutation status, and gene-specific methylation patterns. The study will be ongoing for the next several years.

Cooperative Agreements and Other Registries

The SHRI maintains cooperative agreements with several hospital cancer registries and other agencies/entities. Some of the latter include:

- Iowa Department of Public Health
- * Iowa Consortium for Comprehensive Cancer Control
- The University of Iowa
  - Center for Health Effects of Environmental Contamination
  - Center for Public Health Statistics
  - Environmental Health Sciences Research Center
  - Health Effectiveness Research Center
  - Holden Comprehensive Cancer Center
  - Iowa Center for Agricultural Safety and Health
  - Injury Prevention Research Center
  - Preventive Intervention Center
  - Reproductive Molecular Epidemiology Research & Education Program

Selected 2006 Publications

The Agricultural Health Study

Hou, L., Lee, W. J., Rusiecki, J., Hoppin, J. A., Blair, A., Bonner, M. R., Lubin, J. H., Samanic, C., Sandler, D. P., Dosemeci, M., and Alavanja, M. C. Pendimethalin exposure and cancer incidence among pesticide applicators. Epidemiology, 17: 302-7, 2006.

Lynch, S. M., Rusiecki, J. A., Blair, A., Dosemeci, M., Lubin, J., Sandler, D., Hoppin, J. A., Lynch, C. F., and Alavanja, M. C. Cancer incidence among pesticide applicators exposed to cyanazine in the Agricultural Health Study. Environ Health Perspect, 114: 1248-52, 2006.

Mahajan, R., Blair, A., Lynch, C. F., Schroeder, P., Hoppin, J. A., Sandler, D. P., and Alavanja, M. C. Fonofos exposure and cancer incidence in the Agricultural Health Study. Environ Health Perspect, 114: 1838-42, 2006.

Mahajan, R., Bonner, M. R., Hoppin, J. A., and Alavanja, M. C. Phorate exposure and incidence of cancer in the Agricultural Health Study. Environ Health Perspect, 114: 1205-9, 2006.

Rusiecki, J. A., Hou, L., Lee, W. J., Blair, A., Dosemeci, M., Lubin, J. H., Bonner, M., Samanic, C., Hoppin, J. A., Sandler, D. P., and Alavanja, M. C. Cancer incidence among pesticide applicators exposed to metolachlor in the Agricultural Health Study. Int J Cancer, 118: 3118-23, 2006.

Samanic, C., Rusiecki, J., Dosemeci, M., Hou, L., Hoppin, J. A., Sandler, D. P., Lubin, J., Blair, A., and Alavanja, M. C. Cancer incidence among pesticide applicators exposed to dicamba in the Agricultural Health Study. Environ Health Perspect, 114: 1521-6, 2006.

Lung Cancer Care Outcomes/Surveillance Consortium

Malin, J. L., Ko, C., Ayanian, J. Z., Harrington, D., Nerenz, D. R., Kahn, K. L., Ganther-Urmie, J., Catalano, P. J., Zaslavsky, A. M., Wallace, R. B., Guadagnoli, E., Arora, N. K., Roudier, M. D., and Ganz, P. A. Understanding cancer patients' experience and outcomes: development and pilot study of the Cancer Care Outcomes Research and Surveillance patient survey. Support Care Cancer, 14: 837-48, 2006.

Studies involving Non-Hodgkin Lymphoma (NHL)

Colt, J. S., Davis, S., Severson, R. K., Lynch, C. F., Cozen, W., Camann, D., Engels, E. A., Blair, A., and Hartge, P. Residential insecticide use and risk of non-Hodgkin's lymphoma. Cancer Epidemiol Biomarkers Prev, 15: 251-7, 2006.

Cross, A. J., Ward, M. H., Schenk, M., Kulldorff, M., Cozen, W., Davis, S., Colt, J. S., Hartge, P., Cerhan, J. R., and Sinha, R. Meat and meat-mutagen intake and risk of non-Hodgkin lymphoma: results from a NCI-SEER case-control study. Carcinogenesis, 27: 293-7, 2006.

De Roos, A. J., Gold, L. S., Wang, S., Hartge, P., Cerhan, J. R., Cozen, W., Yeager, M., Chanock, S., Rothman, N., and Severson,

R. K. Metabolic gene variants and risk of non-Hodgkin's lymphoma. Cancer Epidemiol Biomarkers Prev, 15: 1647-53, 2006.

Hartge, P., Lim, U., Freedman, D. M., Colt, J. S., Cerhan, J. R., Cozen, W., Severson, R. K., and Davis, S. Ultraviolet radiation, dietary vitamin D, and risk of non-Hodgkin lymphoma (United States). Cancer Causes Control, 17: 1045-52, 2006.

Hill, D. A., Wang, S. S., Cerhan, J. R., Davis, S., Cozen, W., Severson, R. K., Hartge, P., Wacholder, S., Yeager, M., Chanock, S. J., and Rothman, N. Risk of non-Hodgkin lymphoma (NHL) in relation to germline variation in DNA repair and related genes. Blood, 108: 3161-7, 2006.

Kelemen, L. E., Cerhan, J. R., Lim, U., Davis, S., Cozen, W., Schenk, M., Colt, J., Hartge, P., and Ward, M. H. Vegetables, fruit, and antioxidant-related nutrients and risk of non-Hodgkin lymphoma: a National Cancer Institute-Surveillance, Epidemiology, and End Results population-based case-control study. Am J Clin Nutr, 83: 1401-10, 2006.

Lee, W. J., Purdue, M. P., Stewart, P., Schenk, M., De Roos, A. J., Cerhan, J. R., Severson, R. K., Cozen, W., Hartge, P., and Blair, A. Asthma history, occupational exposure to pesticides and the risk of non-Hodgkin's lymphoma. Int J Cancer, 118: 3174-6, 2006.

Linet, M. S., Taggart, T., Severson, R. K., Cerhan, J. R., Cozen, W., Hartge, P., and Colt, J. Cellular telephones and non-Hodgkin lymphoma. Int J Cancer, 119: 2382-88, 2006.

Morton, L. M., Schenk, M., Hein, D. W., Davis, S., Zahm, S. H., Cozen, W., Cerhan, J. R., Hartge, P., Welch, R., Chanock, S. J., Rothman, N., and Wang, S. S. Genetic variation in N-acetyltransferase 1 (NAT1) and 2 (NAT2) and risk of non-Hodgkin lymphoma. Pharmacogenet Genomics, 16: 537-45, 2006.

Wang, S. S., Cerhan, J. R., Hartge, P., Davis, S., Cozen, W., Severson, R. K., Chatterjee, N., Yeager, M., Chanock, S. J., and Rothman, N. Common genetic variants in proinflammatory and other immunoregulatory genes and risk for non-Hodgkin lymphoma. Cancer Res, 66: 9771-80, 2006.

Wang, S. S., Cozen, W., Severson, R. K., Hartge, P., Cerhan, J. R., Davis, S., Welch, R., Rothman, N., and Chanock, S. J. Cyclin D1 splice variant and risk for non-Hodgkin lymphoma. Hum Genet, 120: 297-300, 2006.

Wang, S. S., Davis, S., Cerhan, J. R., Hartge, P., Severson, R. K., Cozen, W., Lan, Q., Welch, R., Chanock, S. J., and Rothman, N. Polymorphisms in oxidative stress genes and risk for non-Hodgkin lymphoma. Carcinogenesis, 27: 1828-34, 2006.

Ward, M. H., Cerhan, J. R., Colt, J. S., and Hartge, P. Risk of non-Hodgkin lymphoma and nitrate and nitrite from drinking water and diet. Epidemiology, 17: 375-82, 2006.

Second Cancer Studies

Schonfeld, S. J., Gilbert, E. S., Dores, G. M., Lynch, C. F., Hodgson, D. C., Hall, P., Storm, H., Andersen, A., Pukkala, E., Holowaty, E., Kaijser, M., Andersson, M., Joensuu, H., Fossa, S. D., Allan, J. M., and Travis, L. B. Acute myeloid leukemia following Hodgkin lymphoma: a population-based study of 35,511 patients. J Natl Cancer Inst, 98: 215-8, 2006.

Geographic Information Systems

Cai, Q., Rushton, G., Bhaduri, B., Bright, E., and Coleman, P. Estimating small-area populations by age and sex using spatial interpolation and statistical methods. Transactions in GIS, 10: 577-98, 2006.

Kamel Boulos, M. N., Cai, Q., Padget, J. A., and Rushton, G. Using software agents to preserve individual health data confidentiality in micro-scale geographical analyses. J Biomed Inform, 39: 160-70, 2006.

Rushton, G., Armstrong, M. P., Gittler, J., Greene, B. R., Pavlik, C. E., West, M. M., and Zimmerman, D. L. Geocoding in cancer research: a review. Am J Prev Med, 30: S16-24, 2006.

Ward, M. H., Lubin, J., Giglierano, J., Colt, J. S., Wolter, C., Bekiroglu, N., Camann, D., Hartge, P., and Nuckols, J. R. Proximity to crops and residential exposure to agricultural herbicides in Iowa. Environ Health Perspect, 114: 893-7, 2006.

Pooled Analyses

Cho, E., Hunter, D. J., Spiegelman, D., Albanes, D., Beeson, W. L., van den Brandt, P. A., Colditz, G. A., Feskanich, D., Folsom, A. R., Fraser, G. E., Freudenheim, J. L., Giovannucci, E., Goldbohm, R. A., Graham, S., Miller, A. B., Rohan, T. E., Sellers, T. A., Virtamo, J., Willett, W. C., and Smith-Warner, S. A. Intakes of vitamins A, C and E and folate and multivitamins and lung cancer: a pooled analysis of 8 prospective studies. Int J Cancer, 118: 970-8, 2006.

Field, R. W., Krewski, D., Lubin, J. H., Zielinski, J. M., Alavanja, M., Catalan, V. S., Klotz, J. B., Letourneau, E. G., Lynch, C. F., Lyon, J. L., Sandler, D. P., Schoenberg, J. B., Steck, D. J., Stolwijk, J. A., Weinberg, C., and Wilcox, H. B. An overview of the North American residential radon and lung cancer case-control studies. J Toxicol Environ Health A, 69: 599-631, 2006.

Krewski, D., Lubin, J. H., Zielinski, J. M., Alavanja, M., Catalan, V. S., Field, R. W., Klotz, J. B., Letourneau, E. G., Lynch, C. F., Lyon, J. L., Sandler, D. P., Schoenberg, J. B., Steck, D. J., Stolwijk, J. A., Weinberg, C., and Wilcox, H. B. A combined analysis of North American case-control studies of residential radon and lung cancer. J Toxicol Environ Health A, 69: 533-97, 2006.

Puente, D., Hartge, P., Greiser, E., Cantor, K. P., King, W. D., Gonzalez, C. A., Cordier, S., Vineis, P., Lynge, E., Chang-Claude, J., Porru, S., Tzonou, A., Jockel, K. H., Serra, C., Hours, M., Lynch, C. F., Ranft, U., Wahrendorf, J., Silverman, D., Fernandez, F., Boffetta, P., and Kogevinas, M. A pooled analysis of bladder cancer case-control studies evaluating smoking in men and women. Cancer Causes Control, 17: 71-9, 2006.

Rothman, N., Skibola, C. F., Wang, S. S., Morgan, G., Lan, Q., Smith, M. T., Spinelli, J. J., Willett, E., De Sanjose, S., Cocco, P.,

Berndt, S. I., Brennan, P., Brooks-Wilson, A., Wacholder, S., Becker, N., Hartge, P., Zheng, T., Roman, E., Holly, E. A., Boffetta, P., Armstrong, B., Cozen, W., Linet, M., Bosch, F. X., Ennas, M. G., Holford, T. R., Gallagher, R. P., Rollinson, S., Bracci, P. M., Cerhan, J. R., Whitby, D., Moore, P. S., Leaderer, B., Lai, A., Spink, C., Davis, S., Bosch, R., Scarpa, A., Zhang, Y., Severson, R. K., Yeager, M., Chanock, S., and Nieters, A. Genetic variation in TNF and IL10 and risk of non-Hodgkin lymphoma: a report from the InterLymph Consortium. Lancet Oncol, 7: 27-38, 2006.

Smith-Warner, S. A., Spiegelman, D., Ritz, J., Albanes, D., Beeson, W. L., Bernstein, L., Berrino, F., van den Brandt, P. A., Buring, J. E., Cho, E., Colditz, G. A., Folsom, A. R., Freudenheim, J. L., Giovannucci, E., Goldbohm, R. A., Graham, S., Harnack, L., Horn-Ross, P. L., Krogh, V., Leitzmann, M. F., McCullough, M. L., Miller, A. B., Rodriguez, C., Rohan, T. E., Schatzkin, A., Shore, R., Virtanen, M., Willett, W. C., Wolk, A., Zeleniuch-Jacquotte, A., Zhang, S. M., and Hunter, D. J. Methods for pooling results of epidemiologic studies: the Pooling Project of Prospective Studies of Diet and Cancer. Am J Epidemiol, 163: 1053-64, 2006.

Villanueva, C. M., Cantor, K. P., King, W. D., Jaakkola, J. J., Cordier, S., Lynch, C. F., Porru, S., and Kogevinas, M. Total and specific fluid consumption as determinants of bladder cancer risk. Int J Cancer, 118: 2040-7, 2006.

Patterns of Care Studies

Harlan, L. C., Clegg, L. X., Abrams, J., Stevens, J. L., and Ballard-Barbash, R. Community-based use of chemotherapy and hormonal therapy for early-stage breast cancer: 1987-2000. J Clin Oncol, 24: 872-7, 2006.

Klabunde, C. N., Harlan, L. C., and Warren, J. L. Data sources for measuring comorbidity: a comparison of hospital records and medicare claims for cancer patients. Med Care, 44: 921-8, 2006.

Mariotto, A. B., Feuer, E. J., Harlan, L. C., and Abrams, J. Dissemination of adjuvant multiagent chemotherapy and tamoxifen for breast cancer in the United States using estrogen receptor information: 1975-1999. J Natl Cancer Inst Monogr: 7-15, 2006.

Iowa Women's Health Study

Folsom, A. R., and Hong, C. P. Magnesium intake and reduced risk of colon cancer in a prospective study of women. Am J Epidemiol, 163: 232-5, 2006.

Hayes, J. H., Anderson, K. E., and Folsom, A. R. Association between nonsteroidal anti-inflammatory drug use and the incidence of lung cancer in the Iowa Women's Health Study. Cancer Epidemiol Biomarkers Prev, 15: 2226-31, 2006.

Mahipal, A., Anderson, K. E., Limburg, P. J., and Folsom, A. R. Nonsteroidal anti-inflammatory drugs and subsite-specific colorectal cancer incidence in the Iowa Women's Health Study. Cancer Epidemiol Biomarkers Prev, 15: 1785-90, 2006.

McCarl, M., Harnack, L., Limburg, P. J., Anderson, K. E., and Folsom, A. R. Incidence of colorectal cancer in relation to glycemic index and load in a cohort of women. Cancer Epidemiol Biomarkers Prev, 15: 892-6, 2006.

Sinner, P., Folsom, A. R., Harnack, L., Eberly, L. E., and Schmitz, K. H. The association of physical activity with lung cancer incidence in a cohort of older women: the Iowa Women's Health Study. Cancer Epidemiol Biomarkers Prev, 15: 2359-63, 2006.

Sweeney, C., Schmitz, K. H., Lazovich, D., Virnig, B. A., Wallace, R. B., and Folsom, A. R. Functional limitations in elderly female cancer survivors. J Natl Cancer Inst, 98: 521-9, 2006.

Thyagarajan, B., Anderson, K. E., Folsom, A. R., Jacobs, D. R., Jr., Lynch, C. F., Bargaje, A., Khaliq, W., and Gross, M. D. No association between XRCC1 and XRCC3 gene polymorphisms and breast cancer risk: Iowa Women's Health Study. Cancer Detect Prev, 30: 313-21, 2006.

Others

Allareddy, V., Kennedy, J., West, M. M., and Konety, B. R. Quality of life in long-term survivors of bladder cancer. Cancer, 106: 2355-62, 2006.

Brock, K. E., Gridley, G., Brown, L. M., Yu, M. C., Schoenberg, J. B., Lynch, C. F., and McLaughlin, J. K. Dietary factors and cancers of the renal pelvis and ureter. Cancer Epidemiol Biomarkers Prev, 15: 1051-3, 2006.

Chen-Hardee, S., Chrischilles, E. A., Voelker, M. D., Brooks, J. M., Scott, S., Link, B. K., and Delgado, D. Population-based assessment of hospitalizations for neutropenia from chemotherapy in older adults with non-Hodgkin's lymphoma (United States). Cancer Causes Control, 17: 647-54, 2006.

Chiu, B. C., Gapstur, S. M., Chow, W. H., Kirby, K. A., Lynch, C. F., and Cantor, K. P. Body mass index, physical activity, and risk of renal cell carcinoma. Int J Obes, 30: 940-7, 2006.

Deorah, S., Lynch, C. F., Sibenaller, Z. A., and Ryken, T. C. Trends in brain cancer incidence and survival in the United States: Surveillance, Epidemiology, and End Results Program, 1973 to 2001. Neurosurg Focus, 20: E1, 2006.

Schairer, C., Brown, L. M., Chen, B. E., Howard, R., Lynch, C. F., Hall, P., Storm, H., Pukkala, E., Anderson, A., Kaijser, M., Andersson, M., Joensuu, H., Fossa, S. D., Ganz, P. A., and Travis, L. B. Suicide after breast cancer: an international population-based study of 723,810 women. J Natl Cancer Inst, 98: 1416-9, 2006.

Zhang, Y., Cantor, K. P., Dosemeci, M., Lynch, C. F., Zhu, Y., and Zheng, T. Occupational and leisure-time physical activity and risk of colon cancer by subsite. J Occup Environ Med, 48: 236-43, 2006.

For more information on cancer in Iowa, and for current Registry publications, contact:

Director

State Health Registry of Iowa
The University of Iowa
2600 University Capitol Centre (UCC)
Iowa City, IA 52242-5500
319-335-8609
www.public-health.uiowa.edu/shri

Prepared by:

Michele M. West, Ph.D.
Coordinator for Special Projects

Charles F. Lynch, M.D., Ph.D.
Principal Investigator

Kathleen M. McKeen
Director

Daniel B. Olson, M.S.
Programmer Analyst

Special thanks to the staff of the State Health Registry of Iowa. We appreciate the generous assistance of physicians and other health care personnel serving Iowans.

The State Health Registry of Iowa is funded by:
The Division of Cancer Control and Population Sciences, National Cancer Institute, Department of Health and Human Services, Contract No. N01-PC-35143; and cost-sharing from:

- The College of Public Health,
- Holden Comprehensive Cancer Center,
- The University of Iowa, and
- The State of Iowa through a Special Appropriation to the Board of Regents

Published February 2007

The University of Iowa prohibits discrimination in employment and in its educational programs and activities on the basis of race, national origin, color, creed, religion, sex, age, disability, veteran status, sexual orientation, gender identity, or associational preference. The University also affirms its commitment to providing equal opportunities and equal access to University facilities. For additional information on nondiscrimination policies, contact the Coordinator of Title IX, Section 504, and the ADA in the Office of Equal Opportunity and Diversity, (319) 335-0705 (voice) or (319) 335-0697 (text), The University of Iowa, 202 Jessup Hall, Iowa City, Iowa 52242-1316. 62850/2-07


The
University
of Iowa


UI College of
Public Health