2005 Cancer in Iowa Report

Prostate Cancer in Iowa

State Health Registry of Iowa

The University of Iowa

In 2005, an estimated 6,500 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 registries nationwide providing data to the National Cancer Institute. With *2005 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 2005;
- a special section on prostate cancer;
- brief summaries of research projects during 2005;
- a selected list of publications from 2004.

During 2005, the Registry will respond to 300 requests for data, analyses, and cancer cluster investigations.

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 97 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 2005 data will be collected on an estimated 15,800 new cancers among Iowa residents. Beginning with *2005 Cancer in Iowa*, 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. The Registry also receives funding through grants and contracts with university, state, and national researchers investigating cancer-related topics.

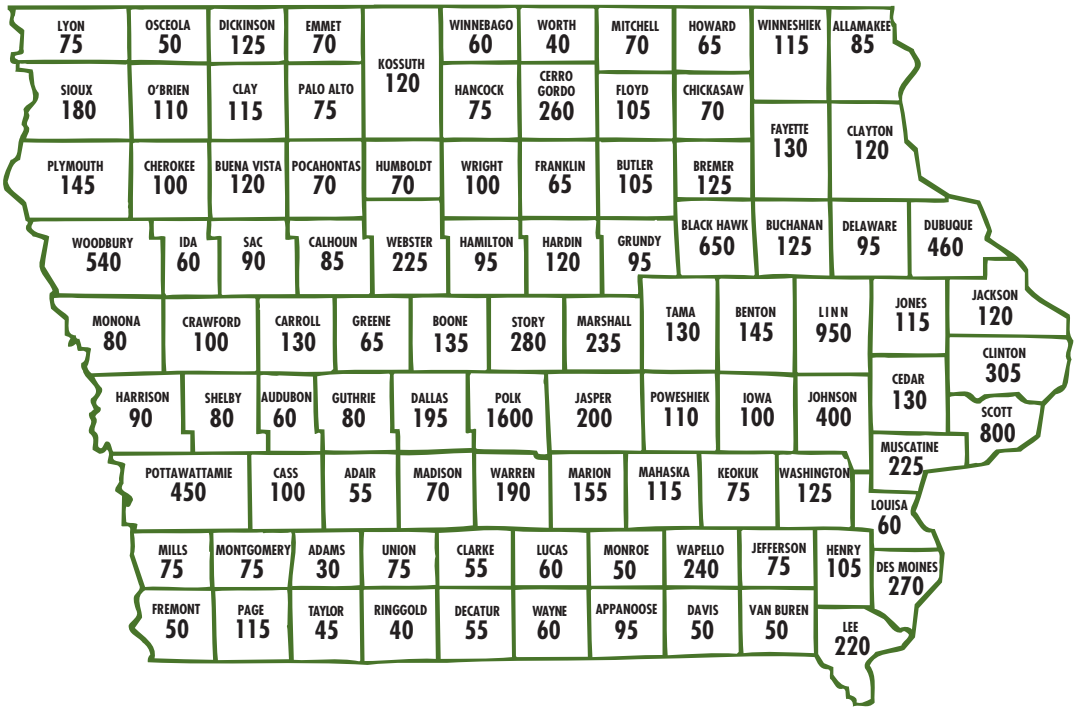
The goals of the Registry are to:

- 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.

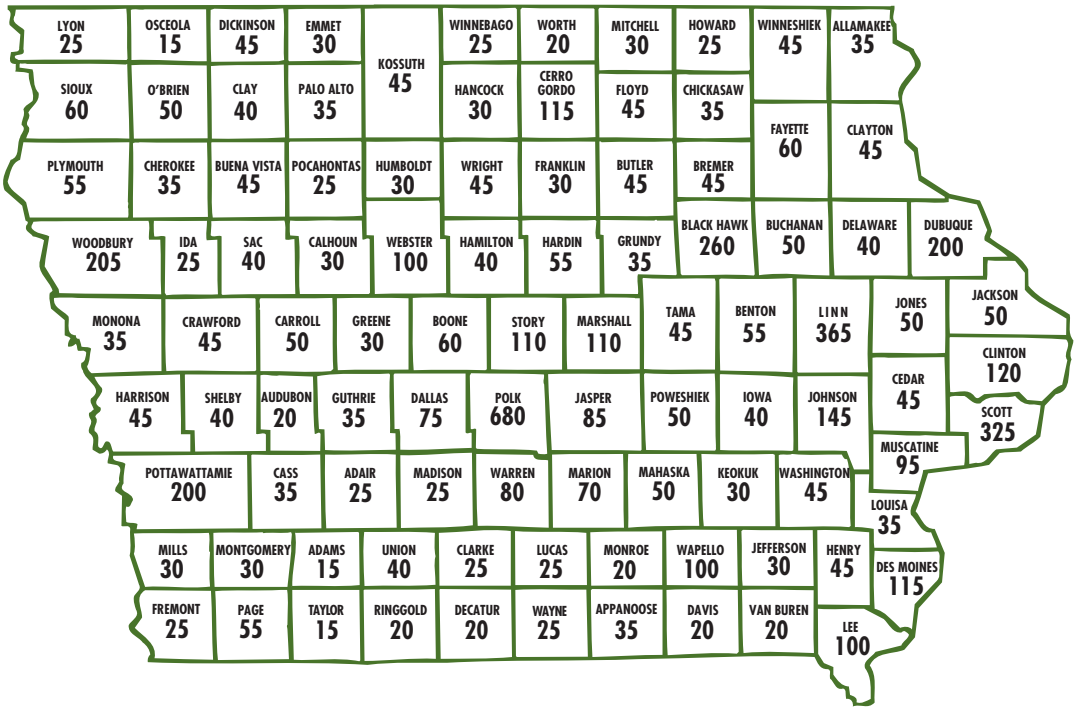
Cancer Projections for 2005

In 2005, 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 2005



Estimated Number of Cancer Deaths in Iowa for 2005



Top 10 Types of Cancer in Iowa Estimated for 2005

New Cancers in Females

Type	# of Cancers	% of Total
Breast	2250	28.8
Colon & Rectum	1080	13.8
Lung	920	11.8
Uterus	480	6.2
Non-Hodgkin Lymphoma	320	4.1
Skin Melanoma	280	3.6
Ovary	250	3.2
Bladder (invasive and noninvasive)	200	2.6
Leukemia	200	2.6
Thyroid	190	2.4
All Others	1630	20.9
Total	7800	

Cancer Deaths in Females

Type	# of Cancers	% of Total
Lung	730	23.2
Breast	440	14.0
Colon & Rectum	350	11.1
Pancreas	190	6.0
Ovary	170	5.4
Non-Hodgkin Lymphoma	140	4.5
Leukemia	130	4.1
Uterus	90	2.9
Brain	80	2.5
Multiple Myeloma	70	2.2
All Others	760	24.1
Total	3150	

New Cancers in Males

Type	# of Cancers	% of Total
Prostate	2250	28.1
Lung	1150	14.4
Colon & Rectum	1000	12.5
Bladder (invasive and noninvasive)	540	6.8
Non-Hodgkin Lymphoma	320	4.0
Skin Melanoma	290	3.6
Leukemia	270	3.4
Kidney & Renal Pelvis	260	3.3
Oral Cavity	180	2.2
Pancreas	180	2.2
All Others	1560	19.5
Total	8000	

Cancer Deaths in Males

Type	# of Cancers	% of Total
Lung	1020	30.4
Prostate	400	11.9
Colon & Rectum	350	10.4
Pancreas	160	4.8
Leukemia	160	4.8
Non-Hodgkin Lymphoma	150	4.5
Esophagus	120	3.6
Kidney & Renal Pelvis	110	3.3
Brain	90	2.7
Bladder	90	2.7
All Others	700	20.9
Total	3350	

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.

Prostate Cancer

The prostate is a gland in males that is located between the bladder and the rectum. The normal prostate gland is the size of a walnut and surrounds the urethra, the tube that carries urine from the bladder. Carcinoma of the prostate is the most common tumor (excluding non-melanotic skin cancer) in men in the United States, with 232,090 new cases and 30,350 deaths expected in 2005. The disease is histologically evident in as many as 34% of men in their fifth decade and in up to 70% of men aged 80 years and older. Prostate cancer will be diagnosed in almost one-fifth of US men during their lifetime, yet only 3% of men will be expected to die of the disease.

Figure 1 shows the overall incidence and mortality rates of prostate cancer in Iowa from 1973-2002. We saw a 145% increase in incidence between 1973 and 1992, and a 27% decrease in incidence between 1992 and 2002. Causes of these trends are not totally clear but have been largely attributed to increased awareness of the disease and more early detection. Known risk factors for prostate cancer include age (high prevalence in the elderly), race (excess in blacks), and positive family history. Dietary factors and agricultural exposures are still incompletely studied.

Between 1973 and 2002, mortality rates have fluctuated much less than incidence rates. Compared to the 1970s and 1980s, far fewer men diagnosed with prostate cancer in the 1990s and thereafter have been dying from this disease.

Figure 2 shows that relative survival is better for Iowans diagnosed with prostate cancer when it is confined to the prostate gland (local) or spread slightly beyond the prostate (regional); indirect evidence suggests that more prostate cancer has been detected in this stage as a result of screening with prostate specific antigen (PSA) followed by a digital rectal exam (DRE). Five-year relative survival rates for the 1990s compared to the 1980s has increased 20 percentage points for all stages and 13 percentage points for local/regional disease. For patients

Figure 1 Prostate Cancer in Iowa, All Ages, 1973-2002
(Rates expressed per 100,000 males and age-adjusted to 2000 U.S. population)

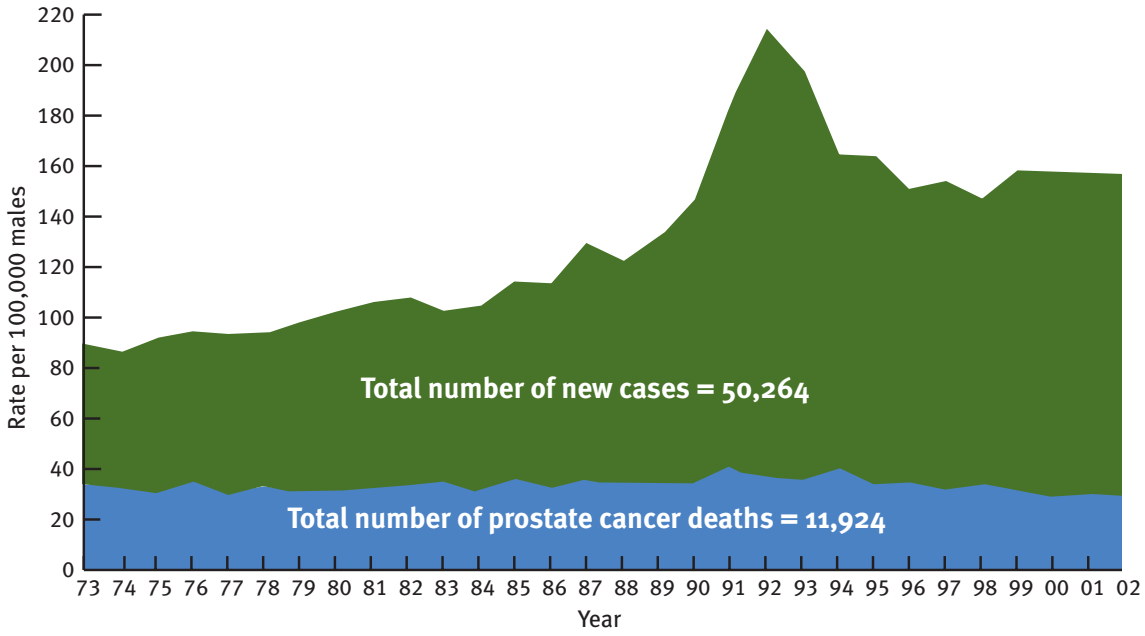
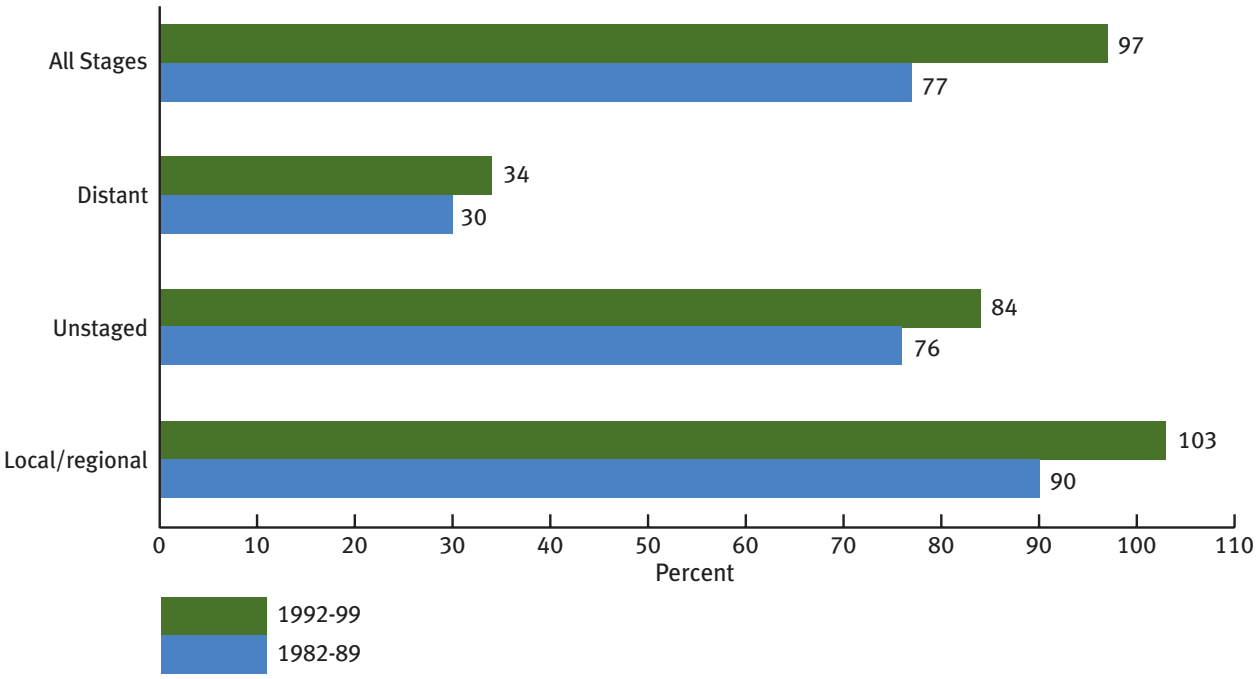


Figure 2 **Five-Year Relative Survival Rates for Prostate Cancer, All Ages, Iowa**



diagnosed with local/regional prostate cancer between 1992 and 1999, the relative survival rate was 103 percent. The relative survival rate is commonly used when comparing survival between populations over time. It is the ratio of the observed survival divided by the survival that would have been expected if these patients had experienced only the mortality of the general population of the United States. A relative survival rate in excess of 100 percent provides support for the hypothesis that PSA is being administered to men who have a longer life expectancy.

From 1990-92 compared with 2000-02, the Iowa Cancer Registry database shows that localized and regional disease has increased from 73% to 91%, respectively. Distant stage decreased from 12% to 5%. Unstaged prostate cases decreased from 16% to 4%. These findings were similar for the age groups <65, 65-74, and 75-84 but the improvement was not as dramatic in the 85+ age group. Here, 66% of cases were localized or regional in 2000-02 and 34% were still distant or unstaged.

In Table 1 (see page 6) between 1990-92 and 2000-02, the rate of newly diagnosed prostate cancers in Iowa men under the age of 65 increased from 29.4 per 100,000 to 49.9 per 100,000, an increase of 70%. During the same periods, these rates remained stable in the 65–74 age group and declined 39 and 48 percent, respectively, in the 75–84 and 85+ age groups. There has also been a shift in the age at diagnosis to where in 2000-02, 29% of prostate cancers were diagnosed under the age of 65 compared with 15% in 1990-92. These findings could be explained by more selective use of PSA screening today that more often takes into account life expectancy.

Between 1990-92 and 2000-02, the prostate cancer death rate has declined around 30% in the <65, 65-74, and 75-84 age groups, but declined much less in the 85+ age group. This correlates with the stage shift information and supports the hypothesis that PSA screening has led to earlier diagnosis of prostate cancer and a decreased likelihood of death, particularly under age 85.

Table 1 Prostate Cancer Age-specific Rates (number) by Time Period, Iowa

Outcome	Age Group in Years	Time Period		% Change
		1990-92	2000-02	2000-02 vs. 1990-92
Newly diagnosed	< 65	29.4 (1046)	49.9 (1946)	+69.7
	65 - 74	944.9 (2868)	911.7 (2598)	-3.5
	75 – 84	1502.9 (2483)	914.5 (1731)	-39.2
	85+	1568.7 (695)	816.2 (460)	-48.0
Underlying cause of death	< 65	2.3 (82)	1.3 (52)	-43.5
	65 – 74	113.0 (343)	79.6 (226)	-29.6
	75 – 84	351.7 (581)	265.3 (506)	-24.6
	85+	783.2 (347)	697.9 (398)	-10.9

The natural history of prostate cancer is poorly understood, and it is difficult to determine clinically significant prostate cancer when it is confined to the prostate gland. The general absence of modifiable risk factors for prostate cancer precludes any effective primary prevention at this time. Secondary prevention to reduce mortality through screening and early detection remains controversial. Three potential screening tests for prostate cancer include the digital rectal exam (DRE), prostate specific antigen (PSA), and transrectal ultrasound (TRUS). TRUS can be a useful diagnostic test when used in conjunction with DRE and PSA, but it is not recommended as an independent screening test. Randomized clinical trials of the benefits of DRE and PSA screening are under way, but the results are not yet available. The United States Preventive Services Task Force and the National Cancer Institute make no recommendations for routine screening with either DRE or PSA; however, the American Cancer Society recommends annual DRE and PSA testing beginning at age 50 for those who have at least a 10-year life expectancy, and for younger men who are at high risk.

While there is controversy regarding screening for prostate cancer in general, there are no norms for screening in the older patients whose life expectancy is less than 10 years. Data from large studies indicate that the rate of PSA-based screening for prostate cancer in men 75 years of age is still fairly high and occurs at a rate higher than colorectal cancer screening for fecal occult blood. Indiscriminate use of screening practices can result in significant cost and potential morbidity to these older men from interventions performed to evaluate abnormal screening tests or unnecessary treatment of diagnosed prostate cancer. On the other hand, appropriate and judicious use of screening practices may be necessary even in elderly men if there is increased suspicion of symptomatic prostate cancer or if the life expectancy is obviously >10 years such that these men will benefit from local radiation or hormonal therapy.
The Iowa Consortium for Comprehensive Cancer Control (visit their website at **www.canceriowa.org**) and the University of Iowa are collaborating on a project funded through the Centers for Disease Control aimed at assessing physician practice approaches to screening for prostate cancer and developing a more standardized approach to the care of older men with prostate cancer. As part of this project, a survey of all providers in Iowa will be conducted this year to determine prevailing approaches towards screening for and managing prostate cancer in men over 75 years of age.
A multidisciplinary committee including physicians from various specialties will be constituted to develop a set of recommendations to guide the management of older men with prostate cancer. This will be followed by a repeat survey and audit to determine the effectiveness of this approach in better standardizing prostate cancer screening, diagnosis and treatment in these older men.

Research Projects During 2005

The State Health Registry of Iowa is participating in over two dozen funded studies during 2005. 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 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 13th 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. The second phase of the study is ongoing with commercial applicators. Pilot testing for the study's third phase began at the end of 2004 and involves updating information about exposures and health.

Since 1997, personal-identifying information provided by cohort members has 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**. Here publications are organized under the following subtitles: methods, exposure assessment, high pesticide exposure events, environmental measures, health outcomes, and diet. The abstract and/or full text is available for these publications at the website.

Breast Cancer, Radiation Exposure, and Genetic Susceptibility

The objective of this study is to investigate gene-environment interactions in the etiology of breast cancer. We have established a repository of epidemiologic risk factor information and biologic specimens for about 700 women with asynchronous bilateral breast cancer (cases) and 1400 women with unilateral breast cancer (controls), who were ascertained through 5 population-based tumor registries in the U.S. and Denmark, including the State Health Registry of Iowa. All subjects were interviewed using a structured questionnaire and blood samples were collected for genetic analyses. Currently, we are examining the ataxia-telangiectasia mutated (ATM) gene, and breast cancer. Ionizing radiation is known to be a breast carcinogen and recent studies suggest that the ATM gene may increase susceptibility to radiation-induced breast cancer. Our hypothesis is that women who are ATM gene carriers and who have received radiation therapy as part of breast cancer treatment are at an increased risk of developing a second primary breast cancer. The study is providing descriptive statistics on the prevalence of ATM in this large population-based sample of women. Collected

data are also being used to determine the prevalence of BRCA1 and BRCA2 mutations in this population and evaluate interactions between breast cancer, BRCA1/2 and ATM genetic mutations, and radiation exposure. Iowa contributed questionnaire data and blood samples for 113 cases and 253 controls.

Lung Cancer Care Outcomes/Surveillance Consortium

This study involves a coordinating center, the State Health Registry of Iowa, and six other research sites across the United States. Across these sites, we are investigating patterns of care for lung cancer, the reasons for particular care decisions by patients and their physicians, variation in dissemination of modern care protocols and practices in different geographic areas, and the effects of these decisions and practices on patient outcomes, including quality of life. Through 2004, we have enrolled 565 lung cancer patients in Iowa who were newly diagnosed since June 2003. Study enrollment is planned to continue with cases diagnosed through January 2005 as we seek our goal of enrolling 1,000 patients.

Immunogenetic Determinants of Non-Hodgkin Lymphoma (NHL) Survival

In this study 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. The specific aims are to evaluate: 1) the association of polymorphisms in selected immune-related genes from four key pathways on NHL survival that include genes encoding inflammatory and regulatory cytokines, Th1/Th2 cytokines, innate immunity, and chemokines; 2) whether any effects are independent of other established NHL prognostic factors (such as age and stage) and treatment modalities; and 3) whether any effects are specific to diffuse large B-cell lymphoma or the combination of follicular and small lymphocytic lymphoma. To achieve these aims, we are developing a prognostic cohort that entails medical record review from a case-control study that involved 364 HIV-negative NHL patients in Iowa newly diagnosed from July 1, 1998 to June 30, 2000.

Second Cancer Studies of Gastrointestinal (GI) System

The Second GI Cancer Study includes seven case-control investigations with a common primary purpose of evaluating the relation between cancer treatment (radiation and/or chemotherapy) and cancer risk for three gastrointestinal organs (stomach, pancreas, esophagus). Radiation and chemotherapy are commonly used as treatment for the cancers in this series (Hodgkin disease and cancer of the testis, breast and cervix). Radiation and chemotherapy may be given with the intention of curing cancer or for cancer control and prolonged life. The cumulative effect may include a risk of developing treatment-induced cancers. The results of this series of studies will help determine if current treatment protocols should be modified to control the risk of second cancers involving the stomach, pancreas, or esophagus. Through 2004, the State Health Registry completed detailed radiation and chemotherapy data collection forms for 72 of its anticipated 99 eligible cancer patients in this collaborative international study.

A GIS Based Workbench to Interpret Cancer Maps

This research is developing and testing 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. It uses State Health

Registry of Iowa data for a thirteen-year period and links patient files to Medicare and selected medical insurance records. Statistical models are being computed to associate specific cancer burden measures to predictor variables that capture local characteristics of the area and characteristics of the individuals. A regional simulation workbench is being developed to 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.

SEER Patterns of Care Studies

This is a collaborative set of studies between the National Cancer Institute and its 14 SEER Registries. In 2005, these studies will investigate state-of-the-art therapies for bladder cancer, chronic myelogenous leukemia, myeloma, and B-cell lymphoma. Across these cancer sites, 235 patients will be eligible at the State Health Registry of Iowa and each will have been newly diagnosed during 2003.

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
- 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
  - Prevention Intervention Center
  - Reproductive Molecular Epidemiology Research & Education Program

Selected 2004 Publications Involving the Iowa Cancer Registry

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