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Illinois State Cancer Incidence Review and Update, 1986-2008



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ILLINOIS STATE CANCER INCIDENCE REVIEW AND UPDATE

1986-2008

TABLE OF CONTENTS

Overview and Technical Notes 1

SECTION I

Cancer Incidence by Race, Illinois, 1986-2008..... I-1
All Sites Combined..... I-2
Oral Cavity and Pharynx..... I-5
Digestive System..... I-32
Respiratory System..... I-65
Bones and Joints..... I-74
Soft Tissue Including Heart..... I-77
Skin Excluding Basal and Squamous..... I-80
Breast Excluding *in situ* I-86
Female Genital System..... I-89
Male Genital System..... I-95
Urinary System..... I-99
Eye and Orbit..... I-111
Brain and Other Nervous System..... I-114
Endocrine System..... I-120
Lymphoma..... I-126
Multiple Myeloma..... I-135
Leukemias..... I-138
Mesothelioma..... I-156
Kaposi Sarcoma..... I-159
Ill-defined and Unknown Sites..... I-162
Female Breast *in situ* I-165

SECTION II

Cancer Incidence by Hispanic Ethnicity and Race, Illinois, 1990-2008..... II-1
All Sites Combined..... II-2
Oral Cavity and Pharynx..... II-5
Digestive System..... II-32
Respiratory System..... II-65

Soft Tissue Including Heart.....	II-77
Skin Excluding Basal and Squamous.....	II-80
Breast Excluding In Situ.....	II-86
Female Genital System.....	II-89
Male Genital System.....	II-95
Urinary System (Incl. Bladder in situ).....	II-99
Eye and Orbit.....	II-111
Brain and Other Nervous System.....	II-114
Endocrine System.....	II-120
Lymphoma.....	II-126
Multiple Myeloma.....	II-135
Leukemias.....	II-138
Mesothelioma.....	II-156
Kaposi Sarcoma.....	II-159
III-defined and Unknown Sites.....	II-162
Female Breast In Situ.....	II-165

SECTION III

Pediatric Cancer Incidence, Illinois, 1986-2008.....	III-1
All Sites.....	III-2
I Leukemias.....	III-3
II Lymphomas and Reticuloendothelial Neoplasms.....	III-6
III CNS and Miscellaneous Intracranial and Intraspinal Neoplasms.....	III-9
IV Neuroblastoma and Other Peripheral Nervous Cell Tumors.....	III-14
V Retinoblastoma.....	III-16
VI Renal Tumors.....	III-17
VII Hepatic Tumors.....	III-19
VIII Malignant Bone Tumors.....	III-21
IX Soft Tissue and Other Extraosseous Sarcomas.....	III-24
X Germ Cell, Trophoblastic Tumors and Neoplasms of Gonads.....	III-26
XI Other Malignant Epithelial Neoplasms and Melanomas.....	III-29
XII Other and Unspecified Malignant Neoplasms.....	III-32
Appendix A: Illinois Populations Used for Rate Calculations 1986-2008.....	A-1
Appendix B: SEER Site Groups for Primary Site Based on ICD-O-3.....	B-1
Appendix C: SEER Site/Histology Recode Based on ICC3 Third Edition and ICD-O-3.....	C-1
Appendix D: Formulas for Rates.....	D-1

ILLINOIS STATE CANCER INCIDENCE REVIEW AND UPDATE

1986-2008

OVERVIEW

This is the 18th release of the annual Illinois state cancer statistics report. In previous reports, cancer statistics for both incidence and mortality were included. Since the source of information on cancer mortality is from the Surveillance, Epidemiology and End Results (SEER) program of the National Cancer Institute (NCI) and SEER has not released the mortality data for 2008, this report presented only Illinois' cancer incidence for 1986 through 2008 for all races combined, whites, blacks and Asian/other races and for 1990 through 2008 for Hispanics (any race), non-Hispanics (any race), non-Hispanic whites and non-Hispanic blacks. Pediatric cancer incidence statistics on Illinois' children for 1986 through 2008 are included in a separate section. The mortality statistics will be published in a separate report. To be consistent with national guidelines, all rates in this report were age-adjusted to the 2000 U.S. standard million population.

Cancer group definitions for major and minor sites are those established by the SEER program of NCI and are used by the North American Association of Central Cancer Registries (NAACCR) and the United States Cancer Statistics (USCS) of the Centers for Disease Control and Prevention (CDC). These standardized classification schemes allow direct comparisons of Illinois cancer statistics with international, national and state publications.¹⁻⁶

In this report, we tabulated incidence data for each major or minor cancer site for four race groups and four ethnicity/race groups. Counts, age-adjusted rates, standard errors and 95 percent confidence intervals for rates are displayed for the combined 1986-2008 time period as well as for individual years. For cancers occurring in both genders, separate tables were presented for both sexes, for males and females. Pediatric cancer incidence rates were calculated and presented for all races, both sexes and by the two age groups: 0-14 and 0-19 years.

INCIDENCE HIGHLIGHTS

- A total of 1,276,592 cases of invasive cancer among Illinois residents were reported to the Illinois State Cancer Registry (ISCR) from 1986 through 2008, including 63,837 new cases reported in 2008. The overall race distribution for these cases was 85.3 percent white, 12.5 percent black, 1.5 percent Asian/other races and 0.8 percent unknown race.
- For the ethnicity/race categories a total of 1,097,699 cases of invasive cancer among Illinois residents were reported to ISCR from 1990 through 2008. The ethnicity/race distribution for these cases was 3.8 percent Hispanics (any race) and 96.2 percent non-Hispanics (any race); among non-Hispanic cases, non-

Hispanic whites accounted for 84.5 percent and non-Hispanic blacks 13.0 percent.

- Black males had the highest overall age-adjusted invasive cancer incidence rates of all major race/gender groups. In general, males and females of Asian/other races in Illinois had substantially lower cancer incidence rates than their white or black counterparts.
- Breast cancer was the most commonly diagnosed cancer among Illinois females, accounting for 29.8 percent of 630,412 invasive cancer diagnoses in women during 1986-2008. The predominance of breast cancer among females persists for all major race and ethnicity groups.
- The incidence of female breast cancer diagnosed in the *in situ* stage increased steadily for every race and ethnicity group across 1986-1999, but appeared to have peaked around 2000 among whites and Asian/other races and 2004 among blacks. These trends suggested that screening mammography usage and the earlier detection of breast cancer among Illinois women may have plateaued.
- For Illinois males, prostate cancer was the most frequently diagnosed invasive cancer, accounting for 27.0 percent of 646,180 new cancer diagnoses in men during 1986-2008. Black males had the highest prostate cancer incidence rates among all race groups, approximately 52.7 percent higher than those observed for white males and nearly three times those observed for males of Asian/other races in Illinois.
- A total of 12,548 new cases of cancer were diagnosed during 1986-2008 among Illinois children aged 0 to 19 years. The three most common diagnostic sites for childhood cancer in Illinois were, in descending order, leukemia, central nervous system and lymphoma.

TECHNICAL NOTES

Cancer Incidence

Cancer incidence data are from the Illinois Department of Public Health, Illinois State Cancer Registry (ISCR), the only source of population-based cancer incidence data for the state. Identification of cancer cases in the ISCR is dependent upon reporting by hospitals, free-standing clinics, radiation treatment facilities, laboratories and physician offices as mandated by state law. All newly diagnosed cancer cases among Illinois residents are reported to ISCR by these reporting sources. In addition, ISCR has agreements with other central registries to send back Illinois cancer data that are identified outside of the state. These registries include Arkansas, California, Florida, Indiana, Iowa, Kentucky, Michigan, Mississippi (through August of 2004), Missouri,

North Carolina, Washington, Wisconsin, Wyoming (through February 2008), and the Mayo Clinic in Minnesota (through October 2005).

Completeness of out-of-state reporting depends upon the years of operation of these other central registries, the extent of their identification of out-of-state residents, and their standards of quality.⁷ For data used in this publication, 5.4 percent of ISCR cases were reported from out-of-state agencies and organizations. However, three states did not report all cancer cases among Illinois residents diagnosed in 2008. This had little impact on the overall cancer incidence rate for Illinois in 2008.

A death certificate clearance process has been employed since August 1993. The process involves follow back of cancer deaths in an effort to identify the cases that are not reported to ISCR. On average, between 1993 and 2008, 1.6 percent of reported cases were identified from death certificate clearance.

The preparation and release of data used for this report is dependent on the completion of annual reporting by Illinois facilities. Although case reporting is mandated within six months of diagnosis, it has been the ISCR policy to keep database files open for late reporting of cases and to allow for the two- to four-year lag in case identification of Illinois residents from other state central cancer registries. This practice is consistent with data published nationally. For this report, the database files reflect the status of ISCR as November 2010.

Population Estimates

The population estimates of the sex- and race-specific as well as sex- and ethnicity/race-specific groups in five-year age categories were used as denominators in the formulation of rates. These population estimates of Illinois for all races, whites, blacks, and Asian/other races from 1986 through 2008 and for Hispanics, non-Hispanics, non-Hispanic white, and non-Hispanic black for 1990 through 2008 were obtained from the SEER program based on United States Bureau of Census population estimates.

The U.S. Census Bureau revised their population estimation methodology for Vintage 2009. The Vintage 2009 population estimates used in this report incorporate four improvements in methodology: 1) changes in the estimation of net internal migration, 2) changes in the estimation of the distribution of deaths to people aged 70 and older by age, sex, race, and Hispanic origin, 3) changes in the estimation of domestic migration of the population 65 years and older, and 4) changes in the estimation of the age distribution of migrations to and from counties. These changes are in addition to changes made in Vintage 2008 and Vintage 2007.⁸ The net impact of these changes was a downward shift in the latest post-censal population estimates covering 2000 through 2009. In general, this shift caused a small upswing in rates.⁹ These population estimates are displayed in Appendix A.

Illinois population estimates from Vintage 2008 data for 2003 through 2007 were compared to those produced using the Vintage 2009 data for the same time period. Use of new methods in the Vintage 2009 file resulted in a 0.2 percent decrease in

Illinois' total population. The new Vintage 2009 methods put Illinois' cancer rate 0.8 percent higher than what was calculated previously using Vintage 2008. Differences in incidence rates may not solely be the result of changes in population estimates. Changes in rates could also be attributable to the addition of cases reported late.⁹

Definitions

Cancer Site Coding for Incidence Data

All cases diagnosed during 1986 through 2008 were reported with *The International Classification of Diseases for Oncology* version 3 (ICD-O-3) codes.¹⁰ Cancer sites in this report were grouped according to site group definitions established by the SEER program of the National Cancer Institute (NCI)⁶ and also are used by the North American Association of Central Cancer Registries (NAACCR). These standardized classification schemes allow direct comparisons of Illinois data with international, national and state publications.³⁻⁶ The ISCR cancer site groups used in this report are listed in Appendix B.

Beginning with the 1986-2002 report and continuing through this year's report, both Kaposi sarcoma and mesothelioma were classified as separate site groups. Compared to using the previous site grouping method, this change has a slight impact on cancer incidence rates for a few specific cancers.

When comparing this report to the ones published before the 1986-2003 report, it should be noted that several cancers that previously were not coded as malignant in ICD-O-2 (used in diagnoses prior to 2001) are coded as malignant in ICD-O-3 (beginning with 2001 diagnoses). For example, Myelodysplastic syndrome (MDS) and chronic myeloproliferative disease (CMPD) are considered malignant cancer in ICD-O-3, so are papillary ependymomas and papillary meningiomas which, according to ICD-O-3, are included in the "Brain and Other Nervous System" and "All Sites" categories. Some endometrial tumors also are classified as malignant in ICD-O-3. Conversely, some low malignant potential tumors of the ovary and pilocytic astrocytomas are no longer coded as malignant in ICD-O-3. Overall, these changes would have a slight impact on incidence of a specific cancer site; however, it might result in a noticeable increase in cancer incidence rates for "all sites" or for "all other sites."

Counts and rates were calculated only for invasive cancers with the exception of carcinoma *in situ* occurring in the urinary bladder. Counts and rates for carcinoma *in situ* of the breast are displayed separately in tables but were not included in the calculation of counts or incidence rates for all sites combined.

Pediatric Cancer Groups: Tumors diagnosed in children are classified using SEER site/histology recode based on the *International Classification of Childhood Cancer, third Edition* (ICCC-3)¹¹ and ICD-O-3. The main classification table of SEER recode scheme used in the present report was listed in Appendix C.

Incidence: The SEER*Stat® software package,¹² developed by the Information Management Services Inc. for NCI, was used to calculate both incidence and mortality rates. Rates are expressed per 100,000 population with the exception of pediatric

cancer incidence rates, which are expressed per 1 million population. Age-adjustment of rates was calculated by the direct method adjusting to the 2000 U.S. standard million population. Rates are rounded to the nearest tenth and very small rates (e.g., 0.04) are shown as 0.0. They are presented with the lower and upper confidence intervals computed at the 95 percent level using Tiwari method.¹³ Algorithms used for the calculation of standard errors and 95 percent confidence intervals are displayed in Appendix D.

Race-specific Rates: The race-specific categories in this report are all races combined, whites, blacks and Asian/other races. Cases reported as unknown race were included in the "all races" category but not in any race-specific group.

To improve the identification and surveillance of American Indians and Alaska Natives diagnosed with cancer and to be consistent with the national data, cancer incidence data since 1995 was linked to the Indian Health Service (IHS), which provides medical services to an estimated 55 percent of the American Indian/Alaska Native population.¹⁴ If a race code in the ISCR database is white, black, other, or unknown and the IHS link is positive, then the race code is re-categorized to American Indian/Alaskan Native, otherwise the race code stays unchanged. In this year's report, a total of 109 malignant cases since 1995 were re-categorized because of the linkage, including 91 whites, nine blacks, seven Asian/other races, and two unknown race. This practice would have minimal impact on the incidence rates for whites, blacks, or Asian/other races due to relatively small number of cases affected.

Through the utilization of the Asian Pacific Islander Identification Algorithm (NAPIIA) improvements have been, and will continue to be, made in classifying cases as Asian or Pacific Islander. Through the use of the birthplace and first, last and maiden name fields, NAPIIA assigns a more specific race group to cases identified as Asian NOS or Pacific Islander NOS. The next version of the NAPIIA, expected in 2011, will allow for the recoding of cases identified as Other and Unknown.¹⁵

Ethnicity/Race Rates: For the incidence report, Hispanic ethnicity was derived according to the NAACCR Hispanic identification algorithm (NHIA).¹⁶ NHIA is a generally reliable method to enhance the ethnic identification of the Latino population in the United States.¹⁷ In order to be consistent with national or state reports, categories are reported as Hispanic (any race), non-Hispanic (any race), non-Hispanic whites and non-Hispanic blacks. Cases reported as "unknown" ethnicity are included in the non-Hispanic group.

QUALITY CONTROL

Ongoing quality control procedures are integral components of ISCR operations that assure high quality cancer incidence data. In addition to these activities, in 1997, NAACCR developed a certification process that reviews registry data for completeness, accuracy and timeliness of reporting (starting with cases diagnosed in 1995). Since then, ISCR has submitted data each year to the NAACCR *Call for Data* and for NAACCR registry

certification. Based on the certification criteria shown in the following table, ² ISCR has been awarded gold certification for all diagnosis years from 1996 through 2008.

Completeness (NAACCR Method)	Pass EDITS	DCO	Timeliness	Unresolved Duplicate	Missing Data Fields				Certification Status
					Sex	Age	County	Race	
≥ 90%	≥ 97%	≤ 5%	Within 23 months	≤ 2/1000	≤ 3%	≤ 3%	≤ 3%	≤ 5%	SILVER
≥ 95%	100%	≤ 3%	Within 23 months	≤ 1/1000	≤ 2%	≤ 2%	≤ 2%	≤ 3%	GOLD

Constantly updating registry data is a standard operation in ISCR. As of November 2010, ISCR quality control data for each diagnosis year are as follow:

Year	Completeness (NAACCR Method) ^a (% As of 11-10)	Pass EDITS (%)	DCO ^b (%)	Unresolved Duplicate ^c (%)	Missing Data Fields			
					Sex (%)	Age (%)	County (%)	Race (%)
1986	88	~	~	~	0.0	0.0	0.0	0.3
1987	90	~	~	~	0.0	0.0	0.0	0.2
1988	88	~	~	0.04	0.0	0.0	0.0	0.3
1989	88	~	~	0.04	0.0	0.0	0.0	0.3
1990	89	100	~	0.04	0.0	0.0	0.0	0.3
1991	88	100	~	0.04	0.0	0.0	0.0	0.6
1992	91	100	~	0.04	0.0	0.0	0.0	0.2
1993	92	100	2.2	0.04	0.0	0.0	0.0	0.2
1994	97	100	6.1	0.06	0.0	0.0	0.0	0.3
1995	100	100	2.7	0.03	0.0	0.0	0.0	0.4
1996	100	100	1.8	0.02	0.0	0.0	0.0	0.5
1997	100	100	1.8	0.09	0.0	0.0	0.0	0.7
1998	100	100	1.5	0.03	0.0	0.0	0.0	1.0
1999	100	100	1.8	0.02	0.0	0.0	0.0	1.0
2000	100	100	2.4	0.03	0.0	0.0	0.0	1.1
2001	100	100	2.4	0.00	0.0	0.0	0.0	0.9
2002	100	100	2.6	0.00	0.0	0.0	0.0	1.2
2003	100	100	1.5	0.02	0.0	0.0	0.0	1.3
2004	100	100	1.7	0.01	0.0	0.0	0.0	1.1
2005	100	100	1.9	0.00	0.0	0.0	0.0	1.3
2006	100	100	2.0	0.00	0.0	0.0	0.0	1.0
2007	100	100	1.2	0.00	0.0	0.0	0.0	1.1
2008	100	100	1.9	0.07	0.0	0.0	0.0	1.0

~ not applicable

a. For data prior to 1995, the NAACCR's completeness estimating algorithm (version 1) was used. For data on or after 1995, the NAACCR's completeness estimating algorithm (version 2) was used.

b. DCO follow back not started until end of 1993 reporting year

c. NAACCR's duplicate protocol was run for each year at the time of data submission for registry certification.

DATA INTERPRETATION

Observed variations and differences over years and across sex and race groups in cancer incidence may be real, reflecting modifications in the risk factor status of the population or the consequence of participation in screening and early detection programs. Such changes or differences, however, may not be real but instead may be the result of random fluctuations and other factors related to the estimation process. Any conclusions should be made only after carefully considering the following factors that influence annual incidence rates.

- Random fluctuations in annual rates are usual and may be substantial, especially for rates based on small numbers of incidence counts (i.e., less than 16).
- Differences in registry database completeness and data quality will influence the magnitude of estimated cancer incidence rates. It should be noted that, because years prior to 1994 are less than 95 percent complete (see above table), some rates for those years, especially for all sites combined, would be underestimates of the “true” rates for the Illinois population. The rates presented here have not been adjusted for completeness differences across the database.
- Population estimates used for denominators may be inaccurate or lack precision. Population data for 1990 and 2000, the years of the U.S. decennial census, are the most accurate for all age-, race-, ethnicity- and sex-specific categories and would, therefore, produce the most accurate incidence and mortality rates. Those for other years are not based on actual population counts but rather on interpolation or extrapolation of estimates based on demographic characteristics of the population. Incidence rates based on these population estimates would be expected to be less accurate than those for 1990 or 2000 (see notes under “Population Estimates”).
- The 95 percent confidence intervals are included with reported rates to help put the rate in perspective and to facilitate rate comparisons over years and across sex, race and ethnicity/race groups. Observed differences may not be statistically significant. The range between the lower confidence interval and the upper confidence interval defines with 95 percent probability where the “true” rate may fall. The comparison of two sets of confidence intervals is approximately equivalent to statistical significance tests for differences between two rates and is more conservative than the standard significance test when the null hypothesis is true.¹⁸

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