State of Illinois

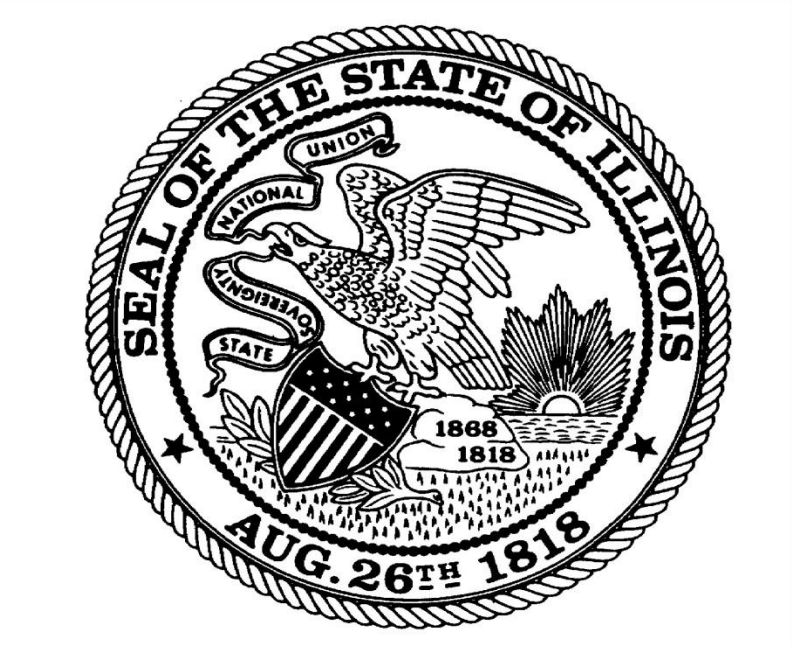
Illinois Department of Public Health

Pediatric Cancer Incidence and Mortality in the Vicinity of Nuclear Power Plants in Illinois, 1996 – 2019

Epidemiologic Report Series 23:02

October 2022

Pediatric Cancer Incidence and Mortality in the Vicinity of Nuclear Power Plants in Illinois, 1996 – 2019



A publication of the

Illinois Department of Public Health

Division of Epidemiologic Studies

Illinois State Cancer Registry

Springfield, Illinois

October 2022

Acknowledgements

This report would not have been possible without the diligent work of the Illinois State Cancer Registry staff, the personnel at the reporting facilities that diagnose or treat cancer patients throughout Illinois, and the staff members at other state central cancer registries with data exchange agreements.

The contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the National Institutes of Health.

The Illinois State Cancer Registry has been funded in whole or in part with federal funds from the National Cancer Institute, National Institutes of Health, U.S. Department of Health and Human Services, under Contract No. 75N91021D00006; the National Program of Cancer Registries, Centers for Disease Control and Prevention under cooperative agreement 6NU58DP006315-01- 01, and the state of Illinois.

Suggested Citation

Garner K, Fornoff J. Pediatric Cancer Incidence and Mortality in the Vicinity of Nuclear Power Plants in Illinois, 1996 – 2019. Epidemiologic Report Series 23:02. Springfield, Ill.: Illinois Department of Public Health, October 2022.

Copyright information

Pediatric Cancer Incidence and Mortality in the Vicinity of Nuclear Power Plants in Illinois, 1996 – 2019

TABLE OF CONTENTS

ABSTRACT

BACKGROUND: There has always been public concern over the cancer risk for people living near nuclear facilities. With a number of nuclear power plants operating in the state of Illinois, the current study was conducted to address this concern. The Illinois Department of Public Health, Division of Epidemiological Studies, examined the pediatric cancer risk in relation to the proximity of nuclear power plants in Illinois.

METHODS: Evaluations were conducted at both the county and ZIP code level. Age-adjusted cancer incidence and mortality rates for children aged 0 to 14 years diagnosed between 1996 and 2019 were calculated for a nuclear facility county group (NFCG) and a nuclear facility ZIP code group (NFZG), respectively, and then compared with those for a matched non-nuclear facility county group (NNFCG) or non-nuclear facility ZIP code group (NNFZG) as well as Illinois and the United States. The statistical significance of the rate difference was determined from rate ratios and associated 95% confidence intervals. Trends in pediatric cancer incidence were also examined for the NFCG and comparison groups.

RESULTS AND CONCLUSIONS: Pediatric cancer incidence and mortality rates for NFCG or NFZG were not significantly different from those for their comparison groups. There was evidence of an increasing trend in pediatric cancer incidence rates in the NFCG. However, this is likely a reflection of similar state and national trends. This study confirmed research findings reported previously in Illinois, but continued monitoring of cancer risk in the concerned area is warranted.

INTRODUCTION

There has always been public concern over cancer risk for people living near nuclear facilities. During the last three decades, a large number of studies have been conducted to evaluate the risk in the United States and other countries.[1-18] Since children seem more susceptible to ill-effects from radiation exposure than adults, and since pediatric cancers have relatively short latency periods, many of these studies have focused on pediatric populations.[2,4-7,10,13-16,18] The cancer sites examined most frequently are leukemia, lymphoma, thyroid, brain, and myeloma.[4-5,7-8,10,14-16,18] Some studies have reported elevated risk for certain types of cancers.[3-4,10,12,14,15,17,18] However, many others failed to confirm or did not find evidence of increased risk.[1,5-6,11,13,16]

Illinois ranks first among all states in the United States for the number of commercial nuclear facilities as well as the total nuclear capacity.[19] In 2006, Illinois Department of Public Health's Division of Epidemiologic Studies evaluated pediatric cancer risk in relation to proximity to nuclear facilities.[20] The study found no significant differences in cancer incidence rates for Illinois children residing in counties with nuclear facilities when compared to those in comparable counties without such facilities. Several years have passed since the previous study, allowing the collection of additional years of incidence and mortality data. With continued public interest in the topic, the research findings reported previously were reappraised in the current study.

METHODS

Nuclear power plants in Illinois

There have been seven nuclear power plants in Illinois with a total of 12 nuclear reactors. Six plants are still in operation and one was closed in 1998. These seven nuclear power plants are sited in seven different counties: Braidwood in Will County (reactor 1 licensed in July 1987; reactor 2 in May 1988), Byron in Ogle County (reactor 1 licensed in February 1985; reactor 2 in January 1987), Clinton in DeWitt County (licensed in April 1987), Dresden in Grundy County (reactor 1 licensed in 1960 and closed in October 1978, reactor 2 licensed in February 1991; reactor 3 in January 1971), LaSalle in LaSalle County (reactor 1 licensed in April 1982; reactor 2 in February 1983), Quad Cities in Rock Island County (reactors 1 and 2 licensed in December 1972), and Zion in Lake County (licensed in October 1973 and closed in January 1998).

Study designs

The current study design includes analysis at two geographic levels: county and ZIP code. The same approach was used as in the previous study.[20] The seven counties with nuclear facilities were combined to form the nuclear facility county group (NFCG). Each of these counties was matched to other counties with similar population density, childhood age distribution, and racial composition. Once these criteria were met, a comparison county was selected for each member of the NFCG that was geographically distant from any counties with nuclear facilities. Counties with nuclear facilities and their matched counties are: LaSalle-Adams, Rock Island-Champaign, Lake-DuPage, Will-Kane, Ogle-Macoupin, Grundy-McDonough, and DeWitt-Richland. The seven matched counties selected were combined to form the non-nuclear facility county group (NNFCG) (Map 1).

For the ZIP code level analysis, ZIP codes containing or surrounding each nuclear power facility were identified (Table1). These 46 ZIP codes were combined to form the nuclear facility ZIP code group (NFZG). The comparison group, non-nuclear facility ZIP code group (NNFZG), was made up of the remaining Illinois ZIP codes (N=1,124) with exclusion of the ZIP codes falling into Cook County (Map 2), since population characteristics in Cook County are not comparable to the rest of the state.

Cancer incidence and mortality

Cancer incidence data were obtained from the Illinois State Cancer Registry (ISCR), the only source of population-based cancer incidence data for the state. In the current evaluation, only malignant cancer cases diagnosed for Illinois children (aged from 0 to 14 years) between the years 1996 and 2019 were considered. This timeframe was selected for several reasons. It represents the most recent and most complete years of data in the registry that are a part of the operational period of the reactors, the 24-year period provides a large number of cases and populations to examine, and it also allows for the typical cancer latency period, which is 10 to 15 years for solid tumors. Pediatric cancer diagnostic groups were defined according to the International Classification of Childhood Cancer, third edition (ICCC-3).[21] Appendix A presents the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) recode scheme used in this report. For county level evaluation, all invasive cancer cases in the seven nuclear facility counties and seven matched non-nuclear facility counties were selected for analysis. For ZIP code level evaluation, cancer cases diagnosed during the same time period in the two different ZIP code groups were selected for analysis.

The SEER program was the source of information for cancer mortality.[22] The cancer deaths were recoded as SEER Cause of Death groups based on the International Classification of Diseases codes (ICD-9 code[23] used for death before 1998 and ICD-10 code[24] used for death on and after 1999). In this study, all cancer related deaths and five specific cancer deaths (brain and other nervous system, thyroid, leukemia, lymphoma, and myeloma) for Illinois children from 1996 to 2019 were evaluated in county group level. Since there was no ZIP code information available in the mortality database, no ZIP code level analysis was performed for mortality data.

Population estimates

Estimates of county populations, representing a modification of the county population estimates produced by the U.S. Census Bureau's Population Estimates Program, were obtained from the NCI's SEER program.[25] Population estimates for ZIP code were derived by interpolating the population counts for each ZIP code from the 1990 and 2000 U.S. Census, the most reliable source for small area populations. A linear function was used for the interpolation/extrapolation of population counts for all non-census years between 1996 and 2019.

Statistical analysis

For the county level analysis, annual age-adjusted cancer incidence and mortality rates were calculated for the nuclear facility county group (NFCG) and the non-nuclear facility county group (NNFCG) respectively, using Seer*Stat software (version 8.4). Rate ratios between the two county groups were also calculated, and statistical significance of rate differences were set

at the 95% level. To evaluate the trends of cancer incidence over time, annual percentage change (APC) of the incidence rates for the two county groups from 1996 to 2019 were examined and compared. The APC was calculated by fitting a least squares regression line to the natural logarithm of the rates using the calendar year as the regressor variable.

Similarly, for the ZIP code level analysis, annual age-adjusted cancer incidence rates were calculated for the nuclear facility ZIP code group (NFZG) and the non-nuclear facility ZIP code group (NNFZG), respectively, and rate ratios and associated 95% confidence intervals were used to determine the statistical significance of rate difference.

For both geographic levels of analysis, cancer incidence rates for the state of Illinois and SEER 12 cancer registries[26] (representing the U.S.) were also calculated to provide additional comparisons to the NFCG and NFZG. Cancer mortality rates for Illinois and U.S. were calculated and compared to those for the NFCG only.

RESULTS

Table 2 shows cancer incidence by major pediatric cancer sites for the nuclear facility county group (NFCG) and three comparison groups (NNFCG, Illinois state, and SEER 12 registries). No significant rate differences were found between NFCG and any of the three comparison groups. Cancer mortality for all cancer sites combined and two specific cancers are given in Table 3. Comparisons of additional pediatric cancer sites were not possible due to low numbers of deaths and the National Center for Health Statistics privacy policy of not reporting rates with fewer than 10 deaths. The NFCG displayed significantly lower childhood brain and

other nervous system cancer mortality when compared to the United States as a whole. No other significant differences were observed.

Table 4 shows the results of the cancer incidence rate trend analyses for the all cancer diagnostic group and the three specific cancers (leukemia, lymphoma, and central nervous system) that had a sufficient number of cases for the calculation of annual percentage change (APC) of rate. Since the numbers of cases for the other cancer groups were too small to calculate trends (i.e., there were individual years with no cases) in either NFCG or NNFCG, APC was not calculated. For the NFCG, Illinois, and SEER 12 registries, significantly increasing trends were observed for all sites combined, leukemia, and lymphoma across the 1996-2019 time period. The NNFGC group did not display any significant trends.

Table 5 shows the cancer incidence rates for the nuclear facility ZIP code group (NFZG), non-nuclear facility ZIP code group (NNFZG), Illinois, and SEER 12 registries. Only the "all cancer site group" and three specific cancers (leukemia, lymphoma, and central nervous system) had sufficient numbers of cases for meaningful rate calculation. No significant differences were found in the rate ratios calculated for the NFZG and the three comparison groups.

DISCUSSION

This study has evaluated the cancer risk for Illinois' children who lived near nuclear power plants based on cancer incidence and mortality data from 1996 to 2019. The evaluations were conducted at both county and ZIP code levels. The study indicated pediatric cancer incidence and mortality rates for the study areas (NFCG or NFZG) were not significantly different from those of their comparison groups (NNFCG or NNFZG, Illinois, and SEER 12

registries). Increased cancer incidence rates for several cancer sites in the NFCG were observed over time. However, these specific increasing trends were also seen at the state and national levels, indicating that broad state and national trends are likely being reflected in the study areas as well. However, this increasing trend was not observed in the NNFCG. It is unclear why the NNFCG did not follow state and national trends, but it could be due to factors not evaluated in this study. The current study confirmed the previous research findings in Illinois.[20]

Limitations

The present assessment has several important limitations that need to be acknowledged. First, since annual population data from the census are not available for the ZIP code level analysis, the 2000 and 2010 census population numbers were used to interpolating and extrapolating population counts for non-census years. These imprecise denominator numbers, when used to derive sex-specific expected numbers, might have introduced errors and biases into the comparison, of which neither the direction nor the magnitude is known.

Second, risk factors for pediatric cancer, including inherited or acquired genetic mutations, are not collected by the current registry system and, as a result, their inclusion for analysis was not possible. Living in a study area at the time of diagnosis is a crude proxy for environmental exposure to radiation. This is because a cancer patient could have either left or moved into the study areas around the time of their cancer diagnosis, resulting in either a case undercount or an over-estimation of exposure. This lack of individual-level information on the history of residence and other risk factors for cases in the study areas and the reference population made more refined analysis and comparison impossible. Therefore, any observed

increase, in and of itself, is insufficient to draw conclusions regarding the potential impact of living in the proximity of a nuclear power plant.

Finally, the lack of specific information on exposure (e.g., type of substance, the amount, and the duration) in NFCG and NFZC residents as well as comparison populations could be a source of potential confounding. It is possible that counties and ZIP codes selected for each study group may have included areas with very little exposure, thus diluting the exposed population. Without any measure of environmental exposure to radiation or other substances emitted from nuclear power plants, the magnitude and direction of any confounding influence is unknown.

CONCLUSION

The results from this study are consistent with the findings from many studies conducted elsewhere, often in different countries and under diverse settings. [1,5-6,11,13,16] Based on these results, a direct association between pediatric cancer incidence and proximity to a nuclear facility seems implausible. Many known and unknown factors, alone or in combination, can conceivably cause cancer in children and more research is needed to understand their role in oncogenesis. Nevertheless, community concern about possible cancer risk from living near nuclear power facilities will persist and continued monitoring of cancer trends for the concerned area is warranted.

REFERENCES

1. Jablon S, Hrubec Z, Doice D Jr. Cancer in populations living near nuclear facilities. A survey of mortality nationwide and incidence in two states. JAMA 1991; 265:1403-1408.
2. Michaelis J, Keller B, Haaf G, Kaatsch P. Incidence of childhood malignancies in the vicinity of west German nuclear power plants. Cancer Causes Control 1992; 3:255-263.
3. Draper GJ, Stiller CA, Cartwright RA, Craft AW, Vincent TJ. Cancer in Cumbria and in the vicinity of the Sellafield nuclear installation, 1963-90. BMJ 1993; 306:89-94.
4. Black RJ, Sharp L, Harkness EF, McKinney PA. Leukemia and non-Hodgkin's lymphoma: incidence in children and young-adults resident in the Dounreay area of Caithness, Scotland in 1968-91. J Epidemiol Community Health 1994; 48:232-236.
5. Sharp L, Black RJ, Harkness EF, McKinney PA. Incidence of childhood leukemia and non-Hodgkin's lymphoma in the vicinity of nuclear sites in Scotland, 1968-93. Occup Environ Med 1996; 53:823-831.
6. Michaelis J. Recent epidemiological studies on ionizing radiation and childhood cancer in Germany. Int J Radiat Biol 1998; 73:377-381.
7. Sharp L, McKinney PA, Black RJ. Incidence of childhood brain and other non-haematopoietic neoplasms near nuclear sites in Scotland, 1975-94. Occup Environ Med 1999; 56:308-314.
8. López-Abente G, Aragonés N, Pollán M, Ruiz M, Gandarillas A. Leukemia, lymphomas, and myeloma mortality in the vicinity of nuclear power plants and nuclear fuel facilities in Spain. Cancer Epidemiol Biomarkers Prev 1999; 8:925-934.

9. López-Abente G, Aragonés N, Pollán M. Solid-tumor mortality in the vicinity of uranium cycle facilities and nuclear power plants in Spain. Environ Health Perspect 2001; 109:721-729.
10. Mangano JJ, Sherman J, Chang C, Dave A, Feinberg E, Frimer M. Elevated childhood cancer incidence proximate to U.S. nuclear power plants. Arch Environ Health. 2003; 58:74-82.
11. Boice JD Jr, Bigbee WL, Mumma MT, Blot WJ. Cancer incidence in municipalities near two former nuclear materials processing facilities in Pennsylvania. Health Phys 2003; 85:678-690.
12. Silva-Mato A, Viana D, Fernández-SanMartín MI, Cobos J, Viana M. Cancer risk around the nuclear power plants of Trillo and Zorita (Spain). Occup Environ Med 2003; 60:521-527.
13. White-Koing ML, Hemon D, Laurier D, Tirmarche M, Jougla E, Goubin A, Clavel J. Incidence of childhood leukemia in the vicinity of nuclear sites in France, 1990-1998. Br J Cancer 2004; 91:916-922.
14. Sermage-Faure C, Laurier D, Goujon-Bellec S, Chatier M, Guyot-Goubin A, Rudant J, Hémon D, Clavel J. Childhood Leukemia Around French Nuclear Power Plants – The GEOCAP Study, 2002-2007. International Journal of Cancer 2012; 131: 769-780.
15. Kaatsch P, Spix C, Jung I, Blettner M. Childhood leukemia in the vicinity of nuclear power plants in Germany. Deutsches Arzteblatt International; 2008: 105(42): 725-32.
16. Heinavaara S, Toikkanen S, Pasanen K, Verkasalo PK, Kurttio P, Auvinen A. Cancer incidence in the vicinity of Finnish nuclear power plants: an emphasis on childhood leukemia. Cancer Causes and Control. 2002; 21: 587-595.

17. Desbiolles A, Roudier C, Goria S, Stempfelet M, Kairo C, Quintin C, Bidondo ML, Monnereau A, Vacquier B. Cancer incidence in adults living in the vicinity of nuclear power plants in France, based on data from the French network of cancer registries. International Journal of Cancer. 2018; 142: 899-909.
18. Demoury C, Faes C, De Schutter H, Carbonnelle S, Rosskamp M, Francart J, Van Damme N, Van Bladel L, Van Nieuwenhuyse A, De Clerq EM. Childhood leukemia near nuclear sites in Belgium: An ecological study at small geographical level. Cancer Epidemiology. 2021; 72: 101910.
19. The Energy Information Administration. http://www.eia.doe.gov; accessed 8/29/22.
20. Qiao B, Lehnherr M, Shen T. Pediatric Cancer Incidence and Mortality in the Vicinity of Nuclear Power Plants in Illinois. Epidemiologic Report Series 06:01. Springfield, IL: Illinois Department of Public Health, January 2006.
21. Steliarova-Foucher E, Stiller C, Lacour B, and Kaatsch P. The International Classification of Childhood Cancer, Third Edition. Cancer. 2005;103:1457-67.
22. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality – All COD, Aggregated With State (1969-2019) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2021. Underlying mortality provided by NCHS.
23. Percy C, Van Holten V, and Muir C (eds). *International Classification of Diseases for Oncology*. 2nd edition. Geneva: World Health Organization, 1990.
24. Fritz A, Percy C, Jack A, et al (eds). *International Classification of Diseases for Oncology*. Third edition. Geneva: World Health Organization, 2000.

25. The Population Estimates Program, U.S. Census Bureau. Release notes Vintage 2020. U.S. Census Bureau . 2020-est-relnotes.pdf (census.gov) Accessed August 30, 2022.
26. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER Research Data, 12 Registries, Nov 2021 Sub (1992-2019) - Linked To County Attributes - Time Dependent (1990-2019) Income/Rurality, 1969-2020 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2022, based on the November 2021 submission.

TABLES AND FIGURES:

Map 1: Illinois nuclear facility locations and nuclear facility county group (NFCG) and non-nuclear facility county group (NNFCG)

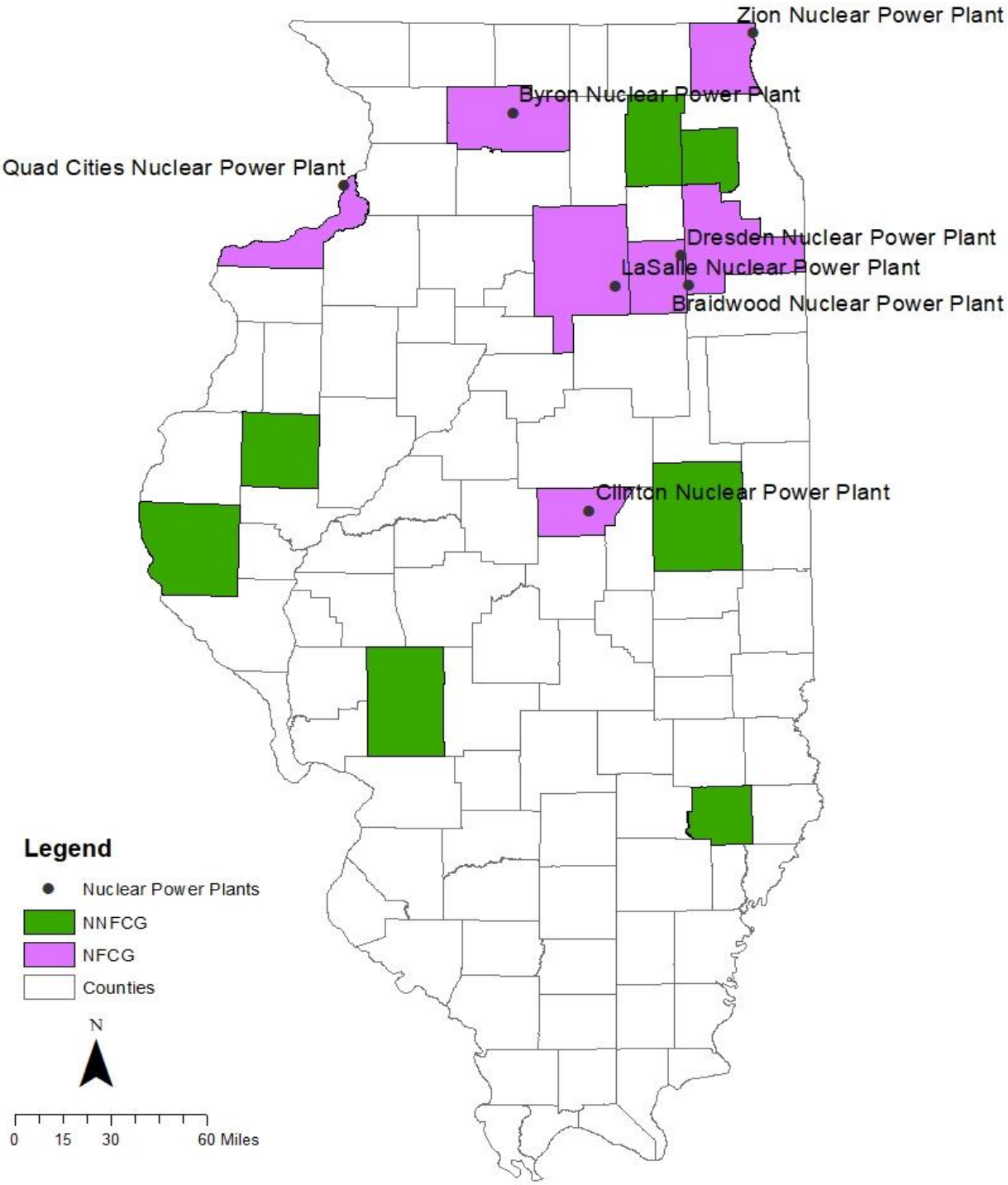


Table 1: ZIP codes included in the nuclear facility ZIP code group (NFZG)

Nuclear Power Plants	Surrounding ZIP Codes
Clinton Nuclear Power Plant	61723, 61727, 61735, 61749,61750, 61756, 61777, 61778, 61842, 61882, 62501, 62512
Quad Cities Nuclear Power Plant	61230, 61242, 61257, 61275
Byron Nuclear Power Plant	61010, 61015, 61047, 61054, 61061, 61084, 61088, 61102
Zion Nuclear Power Plant	60002, 60083, 60087, 60096, 60099
LaSalle Nuclear Power Plant Braidwood Nuclear Power Plant Dresden Nuclear Power Plant	60407, 60408, 60410, 60416, 60424, 60437, 60444, 60447, 60450, 60470, 60474, 60479, 60481, 60935, 61325, 61341, 61360

Map 2: Illinois nuclear facility locations and nuclear facility ZIP code group (NFZG) and non-nuclear facility ZIP code group (NNZFG)

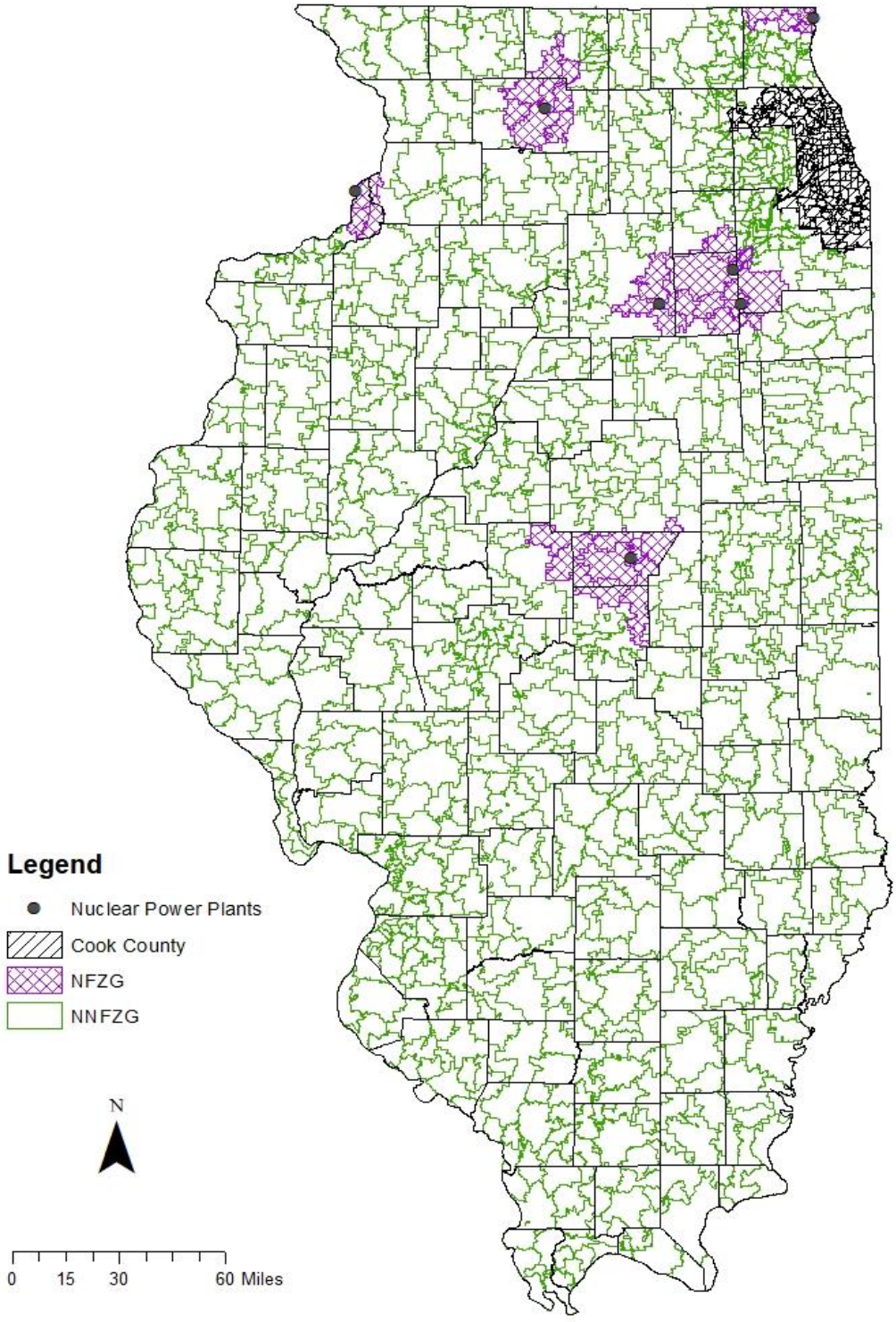


Table 2: Pediatric (0-14) cancer incidence by cancer site and county group, all races, both genders, 1996-2019

Site	County Group	Count	Rate[1]	Rate Ratio	Rate Ratio Lower CI	Rate Ratio Upper CI
All sites	NFCG[2]	1,439	162.5	~	~	~
	NNFCG[3]	1,457	166.4	0.98	0.91	1.05
	Illinois	9,785	158.0	1.03	0.97	1.09
	SEER 12[4]	29,290	160.6	1.01	0.96	1.07
Leukemias	NFCG	477	53.9	~	~	~
	NNFCG	485	55.3	0.97	0.86	1.11
	Illinois	3,175	51.2	1.05	0.95	1.16
	SEER 12	9,636	52.7	1.02	0.93	1.12
Lymphoma	NFCG	177	19.7	~	~	~
	NNFCG	173	19.8	1.00	0.80	1.24
	Illinois	1,128	18.2	1.08	0.92	1.27
	SEER 12	3,415	18.9	1.04	0.89	1.22
Central nervous system	NFCG	278	31.3	~	~	~
	NNFCG	283	32.3	0.97	0.82	1.15
	Illinois	1,944	31.4	1.00	0.88	1.13
	SEER 12	5,826	32.0	0.97	0.87	1.10
Neuroblastoma	NFCG	107	12.5	~	~	~
	NNFCG	87	10.0	1.25	0.93	1.68
	Illinois	681	11.0	1.14	0.92	1.40
	SEER 12	1,874	10.1	1.23	0.99	1.52
Retinoblastoma	NFCG	32	3.8	~	~	~
	NNFCG	22	2.5	1.49	0.84	2.69
	Illinois	239	3.8	0.98	0.66	1.42
	SEER 12	810	4.3	0.88	0.62	1.26
Renal tumors	NFCG	72	8.3	~	~	~
	NNFCG	86	9.8	0.84	0.61	1.16
	Illinois	500	8.0	1.03	0.79	1.32
	SEER 12	1,429	7.7	1.07	0.84	1.38
Hepatic tumors	NFCG	24	2.8	~	~	~
	NNFCG	22	2.5	1.11	0.59	2.07
	Illinois	145	2.3	1.20	0.74	1.85
	SEER 12	599	3.2	0.88	0.59	1.30
Malignant bone tumors	NFCG	53	5.8	~	~	~
	NNFCG	61	7.0	0.84	0.57	1.23
	Illinois	402	6.5	0.90	0.66	1.20
	SEER 12	1,239	6.9	0.84	0.65	1.08

Table 2: Cont.

Site	County Group	Count	Rate[1]	Rate Ratio	Rate Ratio Lower CI	Rate Ratio Upper CI
Soft tissue and other extraosseous sarcomas	NFCG[2]	90	10.2	~	~	~
	NNFCG[3]	97	11.1	0.92	0.68	1.23
	Illinois	674	10.9	0.93	0.74	1.16
	SEER 12[4]	1,885	10.4			
Germ cell and trophoblastic tumors and other gonadal	NFCG	42	4.7	~	~	~
	NNFCG	50	5.7	0.83	0.54	1.27
	Illinois	339	5.5	0.87	0.61	1.20
	SEER 12	1,119	6.1	0.77	0.59	1.01
Other malignant epithelial neoplasms and melanomas	NFCG	76	8.3	~	~	~
	NNFCG	83	9.5	0.88	0.64	1.22
	Illinois	503	8.1	1.03	0.80	1.31
	SEER 12	1,316	7.3	1.13	0.88	1.47
XII Other and unspecified malignant neoplasms	NFCG	5	0.6	~	~	~
	NNFCG	4	0.5	1.23	0.26	6.24
	Illinois	34	0.5	1.02	0.31	2.64
	SEER 12	107	0.6	1.00	0.36	2.80
Not classified by ICCC or in situ	NFCG	6	0.7	~	~	~
	NNFCG	4	0.5	1.48	0.35	7.16
	Illinois	21	0.3	1.99	0.66	5.10
	SEER 12	35	0.2	3.50	0.80	15.30

1. Rates are per 1,000,000 and age adjusted to the 2000 U.S. standard population.
2. NFCG - Nuclear facility county group, including DeWitt, Grundy, Lake, LaSalle, Ogle, Rock Island, and Will counties.
3.NNFCG - Non-nuclear facility county group, including Adams, Champaign, DuPage, Kane, Macoupin, McDonough, and Richland counties
4. Individual listing of SEER 12 registries can be found at https://seer.cancer.gov/registries/terms.html
~ Reference group

Table 3: Pediatric (0-14) cancer mortality by cancer site and county group, all races, both genders, 1996-2019

Site	County Group	Count	Rate[1]	Rate Ratio	Rate Ratio Lower CI	Rate Ratio Upper CI
All sites	NFCG[2]	183	20.6	~	~	~
	NNFCG[3]	169	19.3	1.06	0.86	1.32
	Illinois	1,322	21.4	0.96	0.82	1.12
	U.S.	33,190	22.8	0.90	0.79	1.04
Brain and other nervous system	NFCG	47	5.2	~	~	~
	NNFCG	51	5.8	0.90	0.59	1.36
	Illinois	371	6.0	0.87	0.63	1.18
	U.S.	10,340	7.1	0.73*	0.56	0.94
Leukemia	NFCG	49	5.5	~	~	~
	NNFCG	49	5.6	0.98	0.65	1.49
	Illinois	370	6.0	0.92	0.67	1.24
	U.S.	9,786	6.7	0.82	0.63	1.06

1. Rates are per 1,000,000 and age adjusted to the 2000 U.S. standard population.
2. NFCG - Nuclear facility county group, including DeWitt, Grundy, Lake, LaSalle, Ogle, Rock Island, and Will counties.
3.NNFCG - Non-nuclear facility county group, including Adams, Champaign, DuPage, Kane, Macoupin, McDonough, and Richland counties.
~ Reference group
*Significant at the $p<0.05$ level

Table 4: Annual Percent change of pediatric (0-14) cancer incidence by cancer site and county group, all races, both genders, 1996-2019

	NFCG[1]		NNFCG[2]		Illinois		SEER 12[3]	
	APC	P Value	APC	P Value	APC	P Value	APC	P Value
All sites	1.03*	0.04	0.87	0.07	1.05*	<0.01	0.74*	<0.01
Leukemia	1.70*	0.04	0.41	0.55	1.15*	<0.01	0.43*	<0.01
Lymphoma	2.62*	0.01	1.31	0.12	1.63*	0.01	2.66*	<0.01
Central nervous system	0.59	0.63	0.64	0.49	0.64	0.11	0.11	0.70
Renal system	-0.92	0.53	-1.32	0.45	-0.03	0.97	-1.16	0.85

1. NFCG - Nuclear facility county group, including DeWitt, Grundy, Lake, LaSalle, Ogle, Rock Island, and Will counties.
2.NNFCG - Non-nuclear facility county group, including Adams, Champaign, DuPage, Kane, Macoupin, McDonough, and Richland counties.
3. Individual listing of SEER 12 registries can be found at https://seer.cancer.gov/registries/terms.html
4. APC – Annual percent change
*APC is significantly different from 0.

Table 5: Pediatric (0-14) cancer incidence by cancer site and ZIP code group, all races, both genders, 1996-2019

Site	County Group	Count	Rate[1]	Rate Ratio	Rate Ratio Lower CI	Rate Ratio Upper CI
All sites	NFZG[2]	240	170.9	~	~	~
	NNFZG[3]	5,534	167.6	1.02	0.9	1.16
	Illinois	9,785	158	1.08	0.95	1.23
	SEER 12[4]	29,290	160.6	1.06	0.94	1.21
Leukemia	NFCG	83	59.5	~	~	~
	NNFCG	1,770	48.5	1.11	0.89	1.38
	Illinois	3,175	51.2	1.16	0.93	1.45
	SEER 12	9,636	52.6	1.13	0.91	1.4
Lymphoma	NFCG	32	22.6	~	~	~
	NNFCG	614	16.7	1.22	0.85	1.74
	Illinois	1,128	18.3	1.23	0.87	1.75
	SEER 12	3,415	18.9	1.19	0.84	1.69
Brain and central nervous system	NFCG	43	30.6	~	~	~
	NNFCG	1,134	31	0.89	0.66	1.21
	Illinois	1,944	31.4	0.97	0.72	1.32
	SEER 12	5,826	32	0.96	0.71	1.29

1. Rates are per 1,000,000 and age adjusted to the 2000 U.S. standard population.
2. NFZG - Nuclear facility ZIP code group (N=46).
3.NNFZG - Non-nuclear facility ZIP code group.
4. Individual listing of SEER 12 registries can be found at https://seer.cancer.gov/registries/terms.html
~ Reference group

APPENDIX A

Site/Histology Recode Based on International Classification of Childhood Cancer, Third Edition (ICCC-3) Based on ICD-O-3 / WHO 2008*^

Main Classification Table

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
I Leukemias, Myeloproliferative Diseases, and Myelodysplastic Diseases					
(a) Lymphoid Leukemias					
(a.1) Precursor Cell Leukemias	C000-C809	9835-9836	3	001	011
	C420-C421, C424	9811-9818, 9837			
(a.2) Mature B-cell Leukemias	C000-C809	9826, 9832-9833, 9940	3	002	011
	C420-C421, C424	9823			
(a.3) Mature T-cell and NK Cell Leukemias	C000-C809	9831, 9834, 9948	3	003	011
	C420-C421, C424	9827			
(a.4) Lymphoid Leukemia, NOS	C000-C809	9820	3	004	011
(b) Acute Myeloid Leukemias	C000-C809	9840, 9861, 9865-9867, 9869-9874, 9891, 9895-9898, 9910-9911, 9920, 9931	3	005	012
(c) Chronic Myeloproliferative Diseases	C000-C809	9863, 9875-9876, 9950, 9960-9964	3	006	013
(d) Myelodysplastic Syndrome and Other Myeloproliferative Diseases	C000-C809	9945-9946, 9975, 9980, 9982-9987, 9989, 9991-9992	3	007	014
(e) Unspecified and Other Specified Leukemias	C000-C809	9800-9801, 9805-9809, 9860, 9930, 9965-9967, 9971	3	008	015
II Lymphomas and Reticuloendothelial Neoplasms					
(a) Hodgkin Lymphomas	C000-C809	9650-9655, 9659, 9661-9665, 9667	3	009	021
(b) Non-Hodgkin Lymphomas (except Burkitt Lymphoma)					
(b.1) Precursor Cell Lymphomas	C000-C809	9727-9729	3	010	022
	C000-C419, C422-C423, C425-C809	9811-9818, 9837			
(b.2) Mature B-cell Lymphomas (except Burkitt Lymphoma)	C000-C809	9597, 9670-9671, 9673, 9675, 9678-9680, 9684, 9688-9691, 9695, 9698-9699, 9712, 9731-9735, 9737-9738, 9761-9762, 9764-9766, 9769, 9970	3	011	022

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
	C000-C419, C422-C423, C425-C809	9823			
(b.3) Mature T-cell and NK-Cell Lymphomas	C000-C809	9700-9702, 9705, 9708-9709, 9714, 9716-9719, 9724-9726, 9767-9768	3	012	022
	C000-C419, C422-C423, C425-C809	9827			
(b.4) Non-Hodgkin Lymphomas, NOS	C000-C809	9591, 9760	3	013	022
(c) Burkitt Lymphoma	C000-C809	9687	3	014	023
(d) Miscellaneous Lymphoreticular Neoplasms	C000-C809	9740-9742, 9750-9759	3	015	024
(e) Unspecified Lymphomas	C000-C809	9590, 9596	3	016	025
III CNS and Miscellaneous Intracranial and Intraspinal Neoplasms					
(a) Ependymomas and Choroid Plexus Tumor					
(a.1) Ependymomas	C000-C809	9383, 9391-9394	0,1,3	017	031
(a.2) Choroid Plexus Tumor	C000-C809	9390	0,1,3	018	031
(b) Astrocytomas	C723	9380	0,1,3	019	032
	C000-C809	9384, 9400-9411, 9420-9424, 9440-9442	0,1,3	019	032
(c) Intracranial and Intraspinal Embryonal Tumors					
(c.1) Medulloblastomas	C000-C809	9470-9472, 9474, 9480	0,1,3	020	033
(c.2) PNET	C000-C809	9473	0,1,3	021	033
(c.3) Medulloepithelioma	C700-C729	9501-9504	0,1,3	022	033
(c.4) Atypical Teratoid/Rhabdoid Tumor	C000-C809	9508	0,1,3	023	033
(d) Other Gliomas					
(d.1) Oligodendrogliomas	C000-C809	9450, 9451, 9460	0,1,3	024	034
(d.2) Mixed and Unspecified Gliomas	C700-C722, C724-C729, C751, C753	9380	0,1,3	025	034
	C000-C809	9382	0,1,3	025	034
(d.3) Neuroepithelial Glial Tumors of Uncertain Origin	C000-C809	9381, 9430, 9444	0,1,3	026	034

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(e) Other Specified Intracranial and Intraspinal Neoplasms					
(e.1) Pituitary Adenomas and Carcinomas	C000-C809	8270-8281, 8300	0,1,3	027	035
(e.2) Tumors of the Sellar Region (Craniopharyngiomas)	C000-C809	9350-9352, 9582	0,1,3	028	035
(e.3) Pineal Parenchymal Tumors	C000-C809	9360-9362	0,1,3	029	035
(e.4) Neuronal and Mixed Neuronal-glial Tumors	C000-C809	9412-9413, 9492, 9493, 9505-9507	0,1,3	030	035
(e.5) Meningiomas	C000-C809	9530-9539	0,1,3	031	035
(f) Unspecified Intracranial and Intraspinal Neoplasms	C700-C729, C751-C753	8000-8005	0,1,3	032	036
IV Neuroblastoma and Other Peripheral Nervous Cell Tumors					
(a) Neuroblastoma and Ganglioneuroblastoma	C000-C809	9490, 9500	3	033	041
(b) Other peripheral Nervous Cell Tumors	C000-C809	8680-8683, 8690-8693, 8700, 9520-9523	3	034	042
	C000-C699, C739-C768, C809	9501-9504	3	034	042
V Retinoblastoma	**C000-C809**	**9510-9514**	**3**	**035**	**050**
VI Renal tumors					
(a) Nephroblastoma and Other Nonepithelial Renal Tumors					
(a.1) Nephroblastoma	C000-C809	8959, 8960	3	036	061
(a.2) Rhabdoid Renal Tumor	C649	8963	3	037	061
(a.3) Kidney Sarcomas	C000-C809	8964-8967	3	038	061
(a.4) pPNET of Kidney	C649	9364	3	039	061
(b) Renal Carcinomas	C649	8010-8041, 8050-8075, 8082, 8120-8122, 8130-8141, 8143, 8155, 8190-8201, 8210-8211, 8221-8231, 8240-8241, 8244-8246, 8260-8263, 8290, 8310, 8320, 8323, 8401, 8430, 8440, 8480-8490, 8504, 8510, 8550, 8560-8576	3	040	062
	C000-C809	8311-8312, 8316-8319, 8361	3	040	062
(c) Unspecified Malignant Renal Tumors	C649	8000-8005	3	041	063
VII Hepatic Tumors					

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(a) Hepatoblastoma	C000-C809	8970	3	042	071
(b) Hepatic Carcinomas	C220, C221	8010-8041, 8050-8075, 8082, 8120-8122, 8140-8141, 8143, 8155, 8190-8201, 8210-8211, 8230, 8231, 8240-8241, 8244-8246, 8260-8264, 8310, 8320, 8323, 8401, 8430, 8440, 8480-8490, 8504, 8510, 8550, 8560-8576	3	043	072
	C000-C809	8160-8180	3	043	072
(c) Unspecified Malignant Hepatic Tumors	C220-C221	8000-8005	3	044	073
VIII Malignant Bone Tumors					
(a) Osteosarcomas	C400-C419, C760-C768, C809	9180-9187, 9191-9195, 9200	3	045	081
(b) Chondrosarcomas	C400-C419, C760-C768, C809	9210, 9220, 9240	3	046	082
	C000-C809	9221, 9230, 9241-9243	3	046	082
(c) Ewing Tumor and Related Sarcomas of Bone					
(c.1) Ewing Tumor and Askin Tumor of Bone	C400-C419, C760-C768, C809	9260	3	047	083
	C400-C419	9365	3	047	083
(c.2) pPNET of Bone	C400-C419	9363-9364	3	048	083
(d) Other Specified Malignant Bone Tumors					
(d.1) Malignant Fibrous Neoplasms of Bone	C400-C419	8810-8811, 8823, 8830	3	049	084
	C000-C809	8812, 9262	3	049	084
(d.2) Malignant Chordomas	C000-C809	9370-9372	3	050	084
(d.3) Odontogenic Malignant Tumors	C000-C809	9270-9275, 9280-9282, 9290, 9300-9302, 9310-9312, 9320-9322, 9330, 9340-9342	3	051	084
(d.4) Miscellaneous Malignant Bone Tumors	C000-C809	9250, 9261	3	052	084
(e) Unspecified Malignant Bone Tumors	C400-C419	8000-8005, 8800-8801, 8803-8805	3	053	085
IX Soft Tissue and Other Extraosseous Sarcomas					
(a) Rhabdomyosarcomas	C000-C809	8900-8905, 8910, 8912, 8920, 8991	3	054	091
(b) Fibrosarcomas, Peripheral Nerve Sheath Tumors, and Other Fibrous Neoplasms					

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(b.1) Fibroblastic and Myofibroblastic Tumors	C000-C399, C440-C768, C809	8810-8811, 8813-8815, 8821, 8823, 8834-8835	3	055	092
	C000-C809	8820, 8822, 8824-8827, 9150, 9160	3	055	092
(b.2) Nerve Sheath Tumors	C000-C809	9540-9571	3	056	092
(b.3) Other Fibromatous Neoplasms	C000-C809	9491, 9580	3	057	092
(c) Kaposi Sarcoma	C000-C809	9140	3	058	093
(d) Other Specified Soft Tissue Sarcomas					
(d.1) Ewing Tumor and Askin Tumor of Soft Tissue	C000-C399, C470-C759	9260	3	059	094
	C000-C399, C470-C639, C659-C768, C809	9365	3	059	094
(d.2) pPNET of Soft Tissue	C000-C399, C470-C639, C659-C699, C739-C768, C809	9364	3	060	094
(d.3) Extrarenal Rhabdoid Tumor	C000-C639, C659-C699, C739-C768, C809	8963	3	061	094
(d.4) Liposarcomas	C000-C809	8850-8858, 8860-8862, 8870, 8880-8881	3	062	094
(d.5) Fibrohistiocytic Tumors	C000-C399, C440-C768, C809	8830	3	063	094
	C000-C809	8831-8833, 8836, 9251-9252	3	063	094
(d.6) Leiomyosarcomas	C000-C809	8890-8898	3	064	094
(d.7) Synovial Sarcomas	C000-C809	9040-9044	3	065	094
(d.8) Blood Vessel Tumors	C000-C809	9120-9125, 9130-9133, 9135-9136, 9141-9142, 9161, 9170-9175	3	066	094
(d.9) Osseous and Chondromatous Neoplasms of Soft Tissue	C490-C499	9180, 9210, 9220, 9240	3	067	094
	C000-C809	9231	3	067	094
(d.10) Alveolar Soft Parts Sarcoma	C000-C809	9581	3	068	094

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(d.11) Miscellaneous Soft Tissue Sarcomas	C000-C809	8587, 8710-8713, 8806, 8840-8842, 8921, 8982, 8990, 9373	3	069	094
(e) Unspecified Soft Tissue Sarcomas	C000-C399, C440-C768, C809	8800-8805	3	070	095
X Germ Cell Tumors, Trophoblastic Tumors, and Neoplasms of Gonads					
(a) Intracranial and Intraspinal Germ Cell Tumors					
(a.1) Intracranial and Intraspinal Germinomas	C700-C729, C751-C753	9060-9065	0,1,3	071	101
(a.2) Intracranial and Intraspinal Teratomas	C700-C729, C751-C753	9080-9084	0,1,3	072	101
(a.3) Intracranial and Intraspinal Embryonal Carcinomas	C700-C729, C751-C753	9070, 9072	0,1,3	073	101
(a.4) Intracranial and Intraspinal Yolk Sac Tumor	C700-C729, C751-C753	9071	0,1,3	074	101
(a.5) Intracranial and Intraspinal Choriocarcinoma	C700-C729, C751-C753	9100	0,1,3	075	101
(a.6) Intracranial and Intraspinal Tumors of Mixed Forms	C700-C729, C751-C753	9085, 9101	0,1,3	076	101
(b) Malignant Extracranial and Extragonadal Germ Cell Tumors					
(b.1) Malignant Germinomas of Extracranial and Extragonadal Sites	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	9060-9065	3	077	102
(b.2) Malignant Teratomas of Extracranial and Extragonadal Sites	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	9080-9084	3	078	102
(b.3) Embryonal Carcinomas of Extracranial and Extragonadal Sites	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	9070, 9072	3	079	102

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(b.4) Yolk Sac Tumor of Extracranial and Extragonadal Sites	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	9071	3	080	102
(b.5) Choriocarcinomas of Extracranial and Extragonadal Sites	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	9100, 9103, 9104	3	081	102
(b.6) Other and Unspecified Malignant Mixed Germ Cell Tumors of Extracranial and Extragonadal Sites	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	9085, 9101-9102, 9105	3	082	102
(c) Malignant Gonadal Germ Cell Tumors					
(c.1) Malignant Gonadal Germinomas	C569, C620-C629	9060-9065	3	083	103
(c.2) Malignant Gonadal Teratomas	C569, C620-C629	9080-9084, 9090-9091	3	084	103
(c.3) Gonadal Embryonal Carcinomas	C569, C620-C629	9070, 9072	3	085	103
(c.4) Gonadal Yolk Sac Tumor	C569, C620-C629	9071	3	086	103
(c.5) Gonadal Choriocarcinoma	C569, C620-C629	9100	3	087	103
(c.6) Malignant Gonadal Tumors of Mixed Forms	C569, C620-C629	9085, 9101	3	088	103
(c.7) Malignant Gonadal Gonadoblastoma	C569, C620-C629	9073	3	089	103
(d) Gonadal Carcinomas	C569, C620-C629	8010-8041, 8050-8075, 8082, 8120-8122, 8130-8141, 8143, 8190-8201, 8210-8211, 8221-8241, 8244-8246, 8260-8263, 8290, 8310, 8313, 8320, 8323, 8380-8384, 8430, 8440, 8480-8490, 8504, 8510, 8550, 8560-8573, 9000, 9014, 9015	3	090	104
	C000-C809	8441-8444, 8450-8451, 8460-8473	3	090	104
(e) Other and Unspecified Malignant Gonadal Tumors	C000-C809	8590-8671	3	091	105
	C569, C620-C629	8000-8005	3	091	105
XI Other Malignant Epithelial Neoplasms and Malignant Melanomas					

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(a) Adrenocortical Carcinomas	C000-C809	8370-8375	3	092	111
(b) Thyroid Carcinomas	C739	8010-8041, 8050-8075, 8082, 8120-8122, 8130-8141, 8190, 8200-8201, 8211, 8230, 8231, 8244-8246, 8260-8263, 8290, 8310, 8320, 8323, 8430, 8440, 8480-8481, 8510, 8560-8573	3	093	112
	C000-C809	8330-8337, 8340-8347, 8350	3	093	112
(c) Nasopharyngeal Carcinomas	C110-C119	8010-8041, 8050-8075, 8082-8083, 8120-8122, 8130-8141, 8190, 8200-8201, 8211, 8230-8231, 8244-8246, 8260-8263, 8290, 8310, 8320, 8323, 8430, 8440, 8480-8481, 8500-8576	3	094	113
(d) Malignant Melanomas	C000-C809	8720-8780, 8790	3	095	114
(e) Skin Carcinomas	C440-C449	8010-8041, 8050-8075, 8078, 8082, 8090-8110, 8140, 8143, 8147, 8190, 8200, 8240, 8246-8247, 8260, 8310, 8320, 8323, 8390-8420, 8430, 8480, 8542, 8560, 8570-8573, 8940, 8941	3	096	115
(f) Other and Unspecified Carcinomas					
(f.1) Carcinomas of Salivary Glands	C079-C089	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	097	116
(f.2) Carcinomas of Colon and Rectum	C180, C182-C189, C199, C209, C210-C218	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	098	116
(f.3) Carcinomas of Appendix	C181	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	099	116
(f.4) Carcinomas of Lung	C340-C349	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589,	3	100	116

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
		8940-8941, 8983, 9000, 9010-9016, 9020, 9030			
(f.5) Carcinomas of Thymus	C379	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	101	116
(f.6) Carcinomas of Breast	C500-C509	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	102	116
(f.7) Carcinomas of Cervix Uteri	C530-C539	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	103	116
(f.8) Carcinomas of Bladder	C670-C679	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	104	116
(f.9) Carcinomas of Eye	C690-C699	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	105	116
(f.10) Carcinomas of Other Specified Sites	C000-069, C090-C109, C129-C179, C239-C339, C380-C399, C480-C488, C510-C529, C540-C549, C559, C570-C619, C630-C639, C659-C669, C680-C689, C700-C729, C750-C759	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	106	116

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	ICD-O-3 Behavior	Extended Classification	Main Classification
(f.11) Carcinomas of Unspecified Site	C760-C768, C809	8010-8084, 8120-8157, 8190-8264, 8290, 8310, 8313-8315, 8320-8325, 8360, 8380-8384, 8430-8440, 8452-8454, 8480-8586, 8588-8589, 8940-8941, 8983, 9000, 9010-9016, 9020, 9030	3	107	116
XII Other and Unspecified Malignant Neoplasms					
(a) Other Specified Malignant Tumors					
(a.1) Gastrointestinal Stromal Tumor	C000-C809	8936	3	108	121
(a.2) Pancreatoblastoma	C000-C809	8971	3	109	121
(a.3) Pulmonary Blastoma and Pleuropulmonary Blastoma	C000-C809	8972, 8973	3	110	121
(a.4) Other Complex Mixed and Stromal Neoplasms	C000-C809	8930-8935, 8950-8951, 8974-8981	3	111	121
(a.5) Mesothelioma	C000-C809	9050-9055	3	112	121
(a.6) Other Specified Malignant Tumors	C000-C809	9110	3	113	121
	C000-C399, C470-C759	9363	3	113	121
(b) Other Unspecified Malignant Tumors	C000-C218, C239-C399, C420-C559, C570-C619, C630-C639, C659-C699, C739-C750, C754-809	8000-8005	3	114	122

* This table was updated for Hematopoietic codes based on *WHO Classification of Tumors of Haematopoietic and Lymphoid Tissues (2008)*.

^ Subject to change based on evolving ICD-O-3 coding rules.