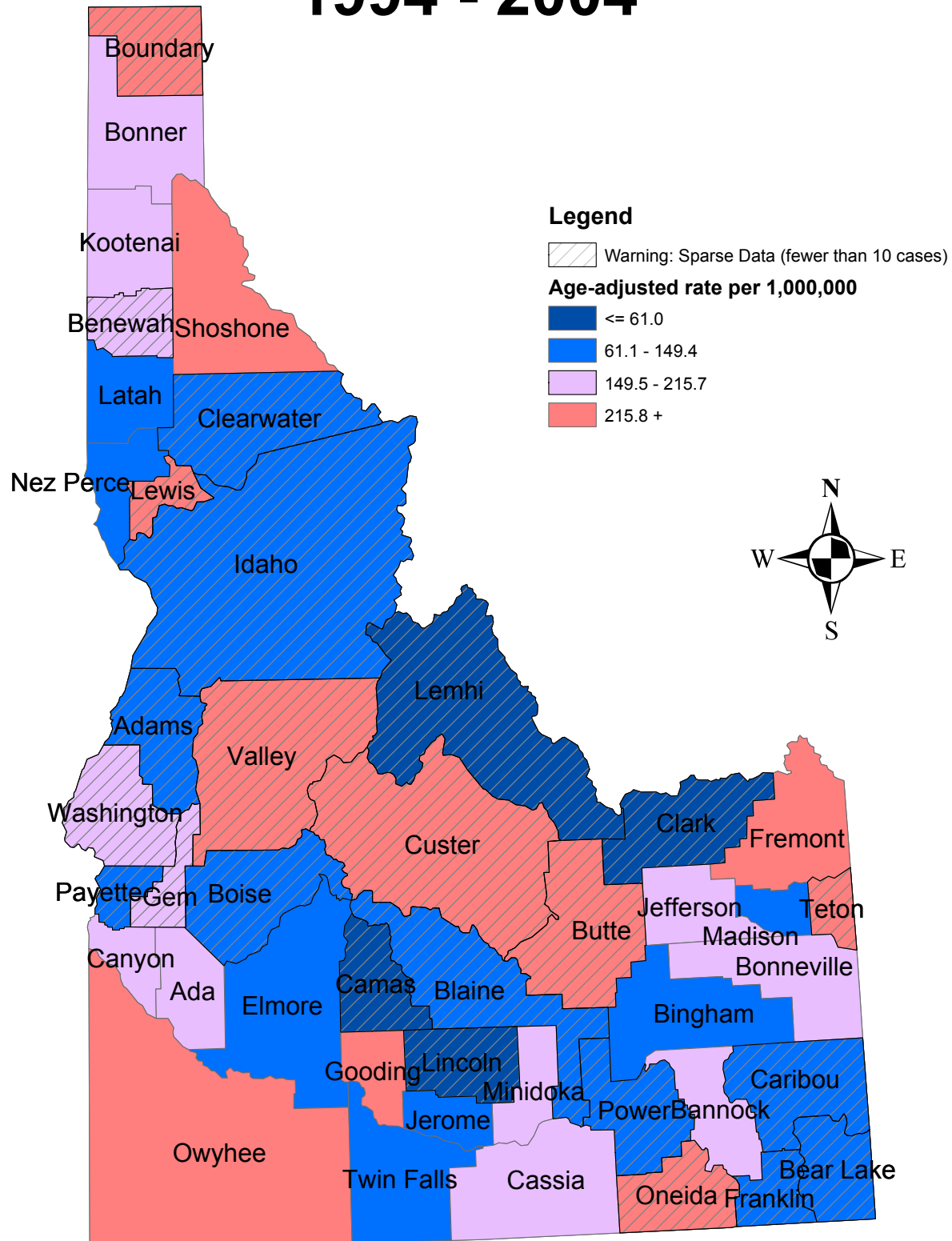


Idaho Pediatric Cancer Incidence 1994 - 2004



Pediatric Cancer in Idaho, 1994-2004

Although relatively rare in comparison with cancer in older adults, cancer is the second leading cause of death in persons aged 1-14 years. The epidemiology of cancer among children differs markedly from that of adults, both in the patterns of anatomic sites involved and the predominant histologic types. Most notably, the tumors diagnosed in children frequently involve the hematopoietic and central nervous systems or are of mesenchymal origin. In contrast, malignancies of epithelial tissues, which are predominant in adults, are uncommon in children. Similar to adult cancers, the etiology of many childhood cancers remains unclear.

The Cancer Data Registry of Idaho receives several requests per year from physicians and others for data on pediatric cancer incidence for the state of Idaho. This report describes the incidence of pediatric cancers in Idaho, with comparisons to data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. SEER currently collects and publishes cancer incidence and survival data from population-based cancer registries covering approximately 26 percent of the US population and is considered the standard for quality among cancer registries around the world.

METHODS

The data analyzed for this report include cancers diagnosed between 1994 and 2004 among Idaho residents under 20 years of age. Cases were grouped according to the International Classification of Childhood Cancer (ICCC) based on site and morphology coded according to ICD-O-3.¹

A total of 774 cases of malignant cancer were diagnosed among Idaho resident children under the age of 20 between 1994 and 2004. It was not possible to assign a group code of the ICCC system to 2 cases. County code was defined as county of residence at time of diagnosis. All rates presented were calculated per million population, and are averages for the period 1994 through 2004 (rates per million, rather than per 100,000, are commonly used for pediatric cancers). Age-adjustment was performed using the direct method to the 2000 U.S. standard population.

RESULTS

A total of 772 cases that met the study criteria were diagnosed among Idaho residents aged less than 20 years between 1994 and 2004, yielding an overall age-adjusted rate of 171.6 cases per million population. In comparison, the SEER rate for Whites was 171.2 cases per million population. The distribution of pediatric cancers by ICCC grouping was very similar for Idaho and SEER Regions. Idaho's pediatric rate of astrocytomas was about 30% higher than the rate for SEER Whites ($p < .05$). For no other ICCC grouping was there a statistically significant difference between the pediatric cancer incidence rates in Idaho and SEER Regions.

Pediatric cancer incidence has increased at a rate of about 0.9% per year in Idaho from 1975 to 2004. This parallels the long term increase observed in SEER Regions from 1973 to 2003 of about 0.8% per year.

About 80% of children aged under 20 years diagnosed with malignant cancer survived at least 5 years after their diagnosis, both in Idaho and SEER Regions.

The spatial scan statistic was used to identify potential clusters of pediatric cancers in Idaho.^{2,3} No county areas with statistically significant higher incidence of pediatric cancers were detected (most likely county cluster p-value = 0.569).

CONCLUSIONS

These data demonstrate a strong similarity between pediatric cancer incidence in Idaho and in SEER Regions. There is little evidence of differences in pediatric cancer incidence by county within Idaho. Based upon the results in this report, the Cancer Data Registry of Idaho will continue to monitor pediatric astrocytoma incidence statewide.

Pediatric Cancer in Idaho and SEER Regions (Ages 0-19)

Site/Type of Cancer	Idaho 1994-2004			SEER13 1994-2003		
	Rate	Cases	Pop	Rate	Cases	Pop
All Sites Combined	171.6	772	4,468,045	171.2	14,125	82,411,756
I Leukemias, myeloproliferative & myelodysplastic diseases	44.5	198	4,468,045	46.9	3,936	82,411,756
I(a) Lymphoid leukemias	30.7	136	4,468,045	36.3	3,059	82,411,756
I(b) Acute myeloid leukemias	8.4	38	4,468,045	8.0	657	82,411,756
I(c) Chronic myeloproliferative diseases	2.5	11	4,468,045	1.2	101	82,411,756
I(d) Myelodysplastic syndrome and other myeloproliferative	0.9	4	4,468,045	0.5	44	82,411,756
I(e) Unspecified and other specified leukemias	2.0	9	4,468,045	0.9	75	82,411,756
II Lymphomas and reticuloendothelial neoplasms	24.3	111	4,468,045	24.9	2,005	82,411,756
II(a) Hodgkin lymphomas	12.1	56	4,468,045	13.2	1,048	82,411,756
II(b) Non-Hodgkin lymphomas (except Burkitt lymphoma)	8.4	38	4,468,045	8.1	655	82,411,756
II(c) Burkitt lymphoma	2.0	9	4,468,045	2.5	203	82,411,756
II(d) Miscellaneous lymphoreticular neoplasms	1.6	7	4,468,045	0.7	58	82,411,756
II(e) Unspecified lymphomas	0.2	1	4,468,045	0.5	41	82,411,756
III CNS and misc intracranial and intraspinal neoplasms	35.7	158	4,468,045	29.3	2,441	82,411,756
III(a) Ependymomas and choroid plexus tumor	1.6	7	4,468,045	2.5	210	82,411,756
III(b) Astrocytomas	19.2	85	4,468,045	14.3	1,184	82,411,756
III(c) Intracranial and intraspinal embryonal tumors	8.1	36	4,468,045	7.1	596	82,411,756
III(d) Other gliomas	6.1	27	4,468,045	4.7	389	82,411,756
III(e) Other specified intracranial/intraspinal neoplasms	0.7	3	4,468,045	0.4	32	82,411,756
III(f) Unspecified intracranial and intraspinal neoplasms	0.0	0	4,468,045	0.4	30	82,411,756
IV Neuroblastoma and other peripheral nervous cell tumors	5.9	26	4,468,045	7.7	671	82,411,756
IV(a) Neuroblastoma and ganglioneuroblastoma	5.7	25	4,468,045	7.4	647	82,411,756
IV(b) Other peripheral nervous cell tumors	0.2	1	4,468,045	0.3	24	82,411,756
V Retinoblastoma	2.5	11	4,468,045	3.2	282	82,411,756
VI Renal tumors	6.2	27	4,468,045	6.4	551	82,411,756
VI(a) Nephroblastoma and other nonepithelial renal tumors	5.9	26	4,468,045	6.0	518	82,411,756
VI(b) Renal carcinomas	0.2	1	4,468,045	0.4	33	82,411,756
VI(c) Unspecified malignant renal tumors	0.0	0	4,468,045	0.0	0	82,411,756
VII Hepatic tumors	1.4	6	4,468,045	1.9	165	82,411,756
VII(a) Hepatoblastoma	0.7	3	4,468,045	1.5	129	82,411,756
VII(b) Hepatic carcinomas	0.7	3	4,468,045	0.4	34	82,411,756
VII(c) Unspecified malignant hepatic tumors	0.0	0	4,468,045	0.0	2	82,411,756
VIII Malignant bone tumors	10.3	47	4,468,045	8.6	691	82,411,756
VIII(a) Osteosarcomas	5.6	26	4,468,045	4.8	381	82,411,756
VIII(b) Chondrosarcomas	0.4	2	4,468,045	0.4	31	82,411,756
VIII(c) Ewing tumor and related sarcomas of bone	3.3	15	4,468,045	2.9	237	82,411,756
VIII(d) Other specified malignant bone tumors	0.2	1	4,468,045	0.4	34	82,411,756
VIII(e) Unspecified malignant bone tumors	0.6	3	4,468,045	0.1	8	82,411,756
IX Soft tissue and other extraosseous sarcomas	12.3	55	4,468,045	11.8	966	82,411,756
IX(a) Rhabdomyosarcomas	5.2	23	4,468,045	4.6	384	82,411,756
IX(b) Fibrosarcomas, peripheral nerve & other fibrous	0.9	4	4,468,045	1.3	106	82,411,756
IX(c) Kaposi sarcoma	0.0	0	4,468,045	0.0	2	82,411,756
IX(d) Other specified soft tissue sarcomas	3.9	18	4,468,045	4.7	381	82,411,756
IX(e) Unspecified soft tissue sarcomas	2.2	10	4,468,045	1.1	93	82,411,756
X Germ cell & trophoblastic tumors & neoplasms of gonads	11.0	51	4,468,045	12.8	1,028	82,411,756
X(a) Intracranial & intraspinal germ cell tumors	1.1	5	4,468,045	1.8	144	82,411,756
X(b) Extracranial & extragonadal germ cell tumors	1.1	5	4,468,045	1.4	122	82,411,756
X(c) Malignant gonadal germ cell tumors	7.7	36	4,468,045	8.4	664	82,411,756
X(d) Gonadal carcinomas	1.1	5	4,468,045	1.1	87	82,411,756
X(e) Other and unspecified malignant gonadal tumors	0.0	0	4,468,045	0.1	11	82,411,756

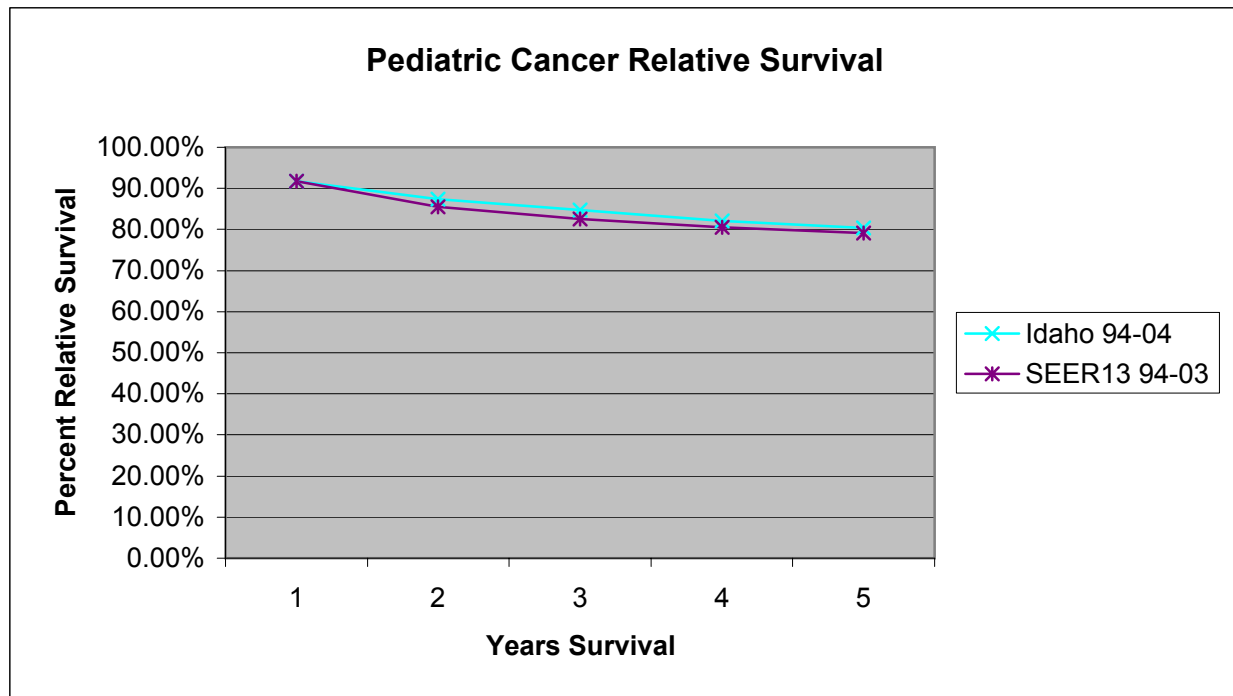
Pediatric Cancer in Idaho and SEER Regions (Ages 0-19) - continued

Site/Type of Cancer	Idaho 1994-2004			SEER 1994-2003		
	Rate	Cases	Pop	Rate	Cases	Pop
XI Other malignant epithelial neoplasms and melanomas	17.2	80	4,468,045	16.9	1,339	82,411,756
XI(a) Adrenocortical carcinomas	0.2	1	4,468,045	0.4	29	82,411,756
XI(b) Thyroid carcinomas	5.8	27	4,468,045	6.3	500	82,411,756
XI(c) Nasopharyngeal carcinomas	0.4	2	4,468,045	0.3	26	82,411,756
XI(d) Malignant melanomas	6.8	32	4,468,045	5.9	471	82,411,756
XI(e) Skin carcinomas	0.2	1	4,468,045	0.1	6	82,411,756
XI(f) Other and unspecified carcinomas	3.7	17	4,468,045	3.9	307	82,411,756
XII Other and unspecified malignant neoplasms	0.5	2	4,468,045	0.6	50	82,411,756
XII(a) Other specified malignant tumors	0.2	1	4,468,045	0.3	26	82,411,756
XII(b) Other unspecified malignant tumors	0.2	1	4,468,045	0.3	24	82,411,756
Not classified by ICCC or in situ	0.4	2	4,468,045	10.9	856	82,411,756

Rates are per 1,000,000 and age-adjusted to the 2000 U.S. standard.

SEER data are for White race. Cases and rates are for malignant behavior only.

Statistical Note: Rates based upon 10 or fewer cases (numerator) should be interpreted with caution.

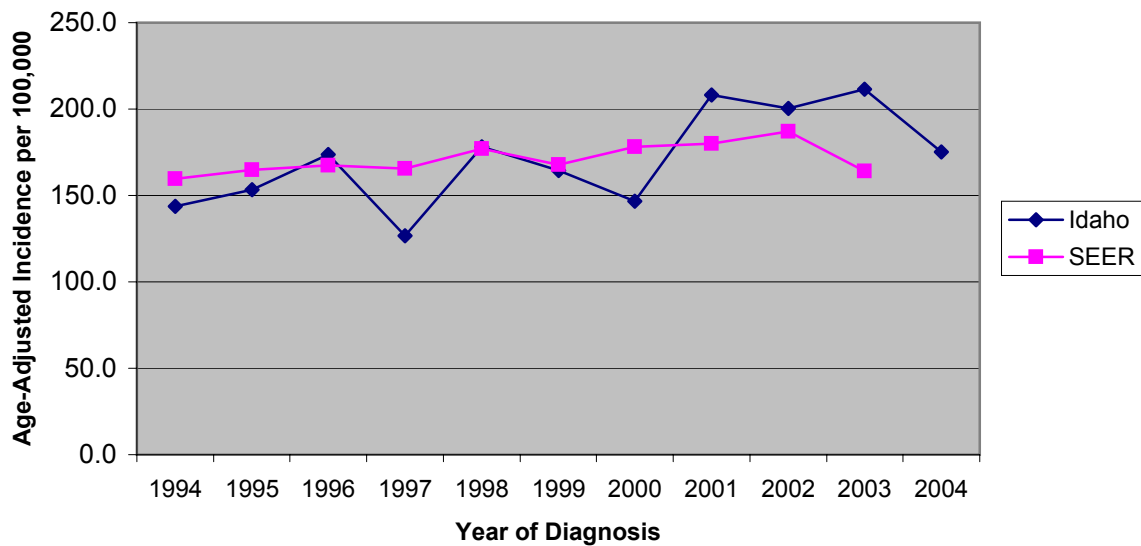


Pediatric Cancer in Idaho and SEER Regions (Ages 0-19)

Year of Diagnosis	Idaho 1994-2004			SEER13 1994-2003		
	Rate	Cases	Pop	Rate	Cases	Pop
Total	171.6	772	4,468,045	171.2	14,125	82,411,756
1994	143.6	55	382,025	159.8	1,286	8,000,125
1995	153.4	60	389,310	164.8	1,336	8,067,418
1996	173.6	69	395,663	167.3	1,369	8,156,211
1997	126.7	51	400,866	165.5	1,361	8,216,504
1998	178.3	73	406,767	177.0	1,466	8,273,535
1999	164.4	69	411,481	167.6	1,392	8,317,117
2000	146.7	61	414,319	178.1	1,484	8,343,433
2001	208.0	87	416,393	179.9	1,503	8,354,511
2002	200.2	84	416,997	187.1	1,560	8,340,584
2003	211.4	89	417,114	164.0	1,368	8,342,318
2004	175.0	74	417,110			

Rates are per 1,000,000 and age-adjusted to the 2000 US Std Million standard.

Trends in Pediatric Cancer Rates



Appendix A

Site/histology recode based on International Classification of Childhood Cancer, Third edition (ICCC-3) based on ICD-O-3¹

Site Group	ICD-O-3 Histology (Type)	ICD-O-2/3 Site	Recode
I Leukemias, myeloproliferative diseases, and myelodysplastic diseases			
(a) Lymphoid leukemias	9820, 9823, 9826, 9827, 9831-9837, 9940, 9948	C000-C809	011
(b) Acute myeloid leukemias	9840, 9861, 9866, 9867, 9870-9874, 9891, 9895-9897, 9910, 9920, 9931	C000-C809	012
(c) Chronic myeloproliferative diseases	9863, 9875, 9876, 9950, 9960-9964	C000-C809	013
(d) Myelodysplastic syndrome and other myeloproliferative diseases	9945, 9946, 9975, 9980, 9982-9987, 9989	C000-C809	014
(e) Unspecified and other specified leukemias	9800, 9801, 9805, 9860, 9930	C000-C809	015
II Lymphomas and reticuloendothelial neoplasms			
(a) Hodgkin lymphomas	9650-9655, 9659, 9661-9665, 9667	C000-C809	021
(b) Non-Hodgkin lymphomas (except Burkitt lymphoma)	9591, 9670, 9671, 9673, 9675, 9678-9680, 9684, 9689-9691, 9695, 9698-9702, 9705, 9708, 9709, 9714, 9716-9719, 9727-9729, 9731-9734, 9760-9762, 9764-9769, 9970	C000-C809	022
(c) Burkitt lymphoma	9687	C000-C809	023
(d) Miscellaneous lymphoreticular neoplasms	9740-9742, 9750, 9754-9758	C000-C809	024
(e) Unspecified lymphomas	9590, 9596	C000-C809	025
III CNS and miscellaneous intracranial and intraspinal neoplasms			
(a) Ependymomas and choroid plexus tumor	9383, 9390-9394	C000-C809	031
(b) Astrocytomas	9380	C723	032
	9384, 9400-9411, 9420, 9421-9424, 9440-9442	C000-C809	032
(c) Intracranial and intraspinal embryonal tumors	9470-9474, 9480, 9508	C000-C809	033
	9501-9504	C700-C729	033
(d) Other gliomas	9380	C700-C722, C724-C729, C751, C753	034
	9381, 9382, 9430, 9444, 9450, 9451, 9460	C000-C809	034

(e) Other specified intracranial and intraspinal neoplasms	8270-8281, 8300, 9350-9352, 9360-9362, 9412, 9413, 9492, 9493, 9505-9507, 9530-9539, 9582	C000-C809	035
(f) Unspecified intracranial and intraspinal neoplasms	8000-8005	C700-C729, C751-C753	036
IV Neuroblastoma and other peripheral nervous cell tumors			
(a) Neuroblastoma and ganglioneuroblastoma	9490, 9500	C000-C809	041
(b) Other peripheral nervous cell tumors	8680-8683, 8690-8693, 8700, 9520-9523	C000-C809	042
	9501-9504	C000-C699, C739-C768, C809	042
V Retinoblastoma	9510-9514	C000-C809	050
VI Renal tumors			
(a) Nephroblastoma and other nonepithelial renal tumors	8959, 8960, 8964-8967	C000-C809	061
	8963, 9364	C649	061
(b) Renal carcinomas	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	C649	062
	8311, 8312, 8316-8319, 8361	C000-C809	062
(c) Unspecified malignant renal tumors	8000-8005	C649	063
VII Hepatic tumors			
(a) Hepatoblastoma	8970	C000-C809	071
(b) Hepatic carcinomas	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	C220, C221	072
	8160-8180	C000-C809	072
(c) Unspecified malignant hepatic tumors	8000-8005	C220, C221	073
VIII Malignant bone tumors			
(a) Osteosarcomas	9180-9187, 9191-9195, 9200	C400-C419, C760-C768, C809	081
(b) Chondrosarcomas	9210, 9220, 9240	C400-C419, C760-C768, C809	082
	9221, 9230, 9241-9243	C000-C809	082
(c) Ewing tumor and related sarcomas of bone	9260	C400-C419, C760-C768, C809	083
	9363-9365	C400-C419	083

(d) Other specified malignant bone tumors	8810, 8811, 8823, 8830	C400-C419	084
	8812, 9250, 9261, 9262, 9270-9275, 9280-9282, 9290, 9300-9302, 9310-9312, 9320-9322, 9330, 9340-9342, 9370-9372	C000-C809	084
(e) Unspecified malignant bone tumors	8000-8005, 8800, 8801, 8803-8805	C400-C419	085
IX Soft tissue and other extraosseous sarcomas			
(a) Rhabdomyosarcomas	8900-8905, 8910, 8912, 8920, 8991	C000-C809	091
(b) Fibrosarcomas, peripheral nerve sheath tumors, and other fibrous neoplasms	8810, 8811, 8813-8815, 8821, 8823, 8834-8835	C000-C399, C440-C768, C809	092
	8820, 8822, 8824-8827, 9150, 9160, 9491, 9540-9571, 9580	C000-C809	092
(c) Kaposi sarcoma	9140	C000-C809	093
(d) Other specified soft tissue sarcomas	8587, 8710-8713, 8806, 8831-8833, 8836, 8840-8842, 8850-8858, 8860-8862, 8870, 8880, 8881, 8890-8898, 8921, 8982, 8990, 9040-9044, 9120-9125, 9130-9133, 9135, 9136, 9141, 9142, 9161, 9170-9175, 9231, 9251, 9252, 9373, 9581	C000-C809	094
	8830	C000-C399, C440-C768, C809	094
	8963	C000-C639, C659-C699, C739-C768, C809	094
	9180, 9210, 9220, 9240	C490-C499	094
	9260	C000-C399, C470-C759	094
	9364	C000-C399, C470-C639, C659-C699, C739-C768, C809	094
	9365	C000-C399, C470-C639, C659-C768, C809	094
(e) Unspecified soft tissue sarcomas	8800-8805	C000-C399, C440-C768, C809	095
X Germ cell tumors, trophoblastic tumors, and neoplasms of gonads			
(a) Intracranial and intraspinal germ cell tumors	9060-9065, 9070-9072, 9080-9085, 9100, 9101	C700-C729, C751-C753	101
(b) Malignant extracranial and extragonadal germ cell tumors	9060-9065, 9070-9072, 9080-9085, 9100-9105	C000-C559, C570-C619, C630-C699, C739-C750, C754-C768, C809	102
(c) Malignant gonadal germ cell tumors	9060-9065, 9070-9073, 9080-9085, 9090, 9091, 9100, 9101	C569, C620-C629	103
(d) Gonadal carcinomas	8010-8041, 8050-8075, 8082, 8120-8122, 8130-8141, 8143, 8190-8201,	C569, C620-C629	104

	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		
	8441-8444, 8450, 8451, 8460-8473	C000-C809	104
(e) Other and unspecified malignant gonadal tumors	8590-8671	C000-C809	105
	8000-8005	C569, C620-C629	105
XI Other malignant epithelial neoplasms and malignant melanomas			
(a) Adrenocortical carcinomas	8370-8375	C000-C809	111
(b) Thyroid carcinomas	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	C739	112
	8330-8337, 8340-8347, 8350	C000-C809	112
(c) Nasopharyngeal carcinomas	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	C110-C119	113
(d) Malignant melanomas	8720-8780, 8790	C000-C809	114
(e) Skin carcinomas	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	C440-C449	115
(f) Other and unspecified carcinomas	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	C000-C109, C129-C218, C239-C399, C480-C488, C500-C559, C570-C619, C630-C639, C659-C729, C750-C768, C809	116
XII Other and unspecified malignant neoplasms			
(a) Other specified malignant tumors	8930-8936, 8950, 8951, 8971-8981, 9050-9055, 9110	C000-C809	121
	9363	C000-C399, C470-C759	121
(b) Other unspecified malignant tumors	8000-8005	C000-C218, C239-C399, C420-C559, C570-C619, C630-C639, C659-C699, C739-C750, C754-C809	122
Not Classified by ICCC or in situ			999

References

1. Steliarova-Foucher E, Stiller C, Lacour B, Kaatsch P. International Classification of Childhood Cancer, Third Edition. *Cancer*, 2005;103:1457-67.
 2. Kulldorff M. and Information Management Services, Inc. SaTScan™ v6.0: Software for the spatial and space-time scan statistics. <http://www.satscan.org/>, 2006.
 3. Kulldorff M. A spatial scan statistic. *Communications in Statistics: Theory and Methods*, 26:1481-1496, 1997.
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