



2011 CANCER REPORT
2010 REGISTRY DATA

A FOCUS ON
PEDIATRIC NEUROBLASTOMA



Westchester
MEDICAL CENTER





Dear Friend:

Westchester Medical Center's mission is to serve as the regional healthcare referral center providing high-quality, tertiary and quaternary advanced health services to the residents of the Hudson Valley and the surrounding area, regardless of their ability to pay.

Our Cancer Program continues to experience positive change and growth. We continue to recruit key physicians to our Cancer Program in areas like pediatric hematology and oncology and gynecologic oncology. We continue to dedicate our efforts to meet and exceed all standards set forth by the American College of Surgeons Commission on Cancer.

At Westchester Medical Center, we continue to work with community healthcare organizations to improve the cancer care available to all the children and adults throughout the Hudson Valley. Together, we can continue to provide a comprehensive continuum of the best cancer services. I congratulate everyone on the hard work already underway and look forward to the progress that lies ahead.

Sincerely,

Michael D. Israel

President and Chief Executive Officer
Westchester Medical Center

CONTENTS

- 1 Letter from Michael D. Israel, President and CEO, Westchester Medical Center
- 2 2011 Cancer Committee Members
- 3 Chairman's Message – Tauseef Ahmed, M.D., F.A.C.P. Goals and Objectives
- 4-6 Cancer Registry Frequency Report: 1981 - 2010
- 7 Cancer Registry Frequency Report: 2010
- 8 2010: Top Analytic Tumor Site
2010: Frequency Distribution by County
- 8 Glossary
- 9 A Focus on Pediatric Neuroblastoma
- 10 Pediatric Neuroblastoma Tumor Registry Study
- 11-12 Frequency Report on Pediatric Patients: 1981-2010
- 13 Frequency Report on Pediatric Patients: 5-year 2006-2010 Total 2010



AT WESTCHESTER MEDICAL CENTER



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Transplant Center • Neuroscience Center • Burn Center
Joel A. Halpern Regional Trauma Center • Behavioral Health Center

2011 Cancer Committee

Physician Members

Tauseef Ahmed, M.D.	Medical Oncology Chair Cancer Committee
Mitchell Cairo, M.D.	Chief of Pediatric Hematology, Oncology and Stem Cell Transplantation
John Fallon, M.D., Ph.D.	Chairman of Pathology
Ronald Kaleya, M.D.	Surgical Oncology
Zvi Lefkovitz, M.D.	Chairman of Radiology
Avinash Mohan, M.D.	Neurosurgery
Chitti Moorthy, M.D.	Chairman of Radiation Oncology
Raj Murali, M.D.	Chairman of Neurosurgery
Kristeen Ortega, M.D.	Director Rehabilitation Medicine
John Phillips, M.D.	Chief of Urologic Oncology
Tara Pua, M.D.	Gynecologic Oncology
Patricia Sheiner, M.D.	Hepatobiliary/Liver Transplant
Yvette Smolin, M.D.	Psychiatry
Kathryn Spanknebel, M.D.	Chief of Surgical Oncology Cancer Liaison Physician
Sean Tedjarati, M.D.	Chief of Gynecologic Oncology
Oya Tugal, M.D.	Pediatric Oncology

Program Coordinators

Kathryn Spanknebel, M.D.	Accreditation Task Force
Chitti Moorthy, M.D.	Conferences and Education
Catherine Spratt, BSN, OCN	Outreach
Oya Tugal, M.D.	Pediatric Cancer Program
Carmel Sauerland, MSN, AOCN	Quality
Kathryn Spanknebel, M.D.	Quality of Registry Data
Oya Tugal	Research
Kathryn Spanknebel, M.D.	

Non-Physician Members

Patti Ariel	Clinical Research and Corporate Compliance
Andres Avila	Cancer Registry
Rose Bartone	Child Life – Social Work
Catherine Cevoli	Quality – Midas Systems Manager
Marissa Chiapperino	Nutrition Services
Maureen Cooney	Pain Service – Palliative Care
Christina Cuffari, NP	Child Life
Virginia Curran, R.N.	Clinical Trials Data Coordinator
Isabel Dichiarra	Community Relations
Marie DiMicco	Pharmacy, Clinical Lab
Rita Donovan, R.N.	Oncology Nursing
Linda Glickman	Quality/Clinical Resource Management
Tricia Hiller	Director, Child Life
Regina Kristan, M.S.W., C.S.W.	Oncology Social Services/Hospice
Rev. Susan Lunning	Pastoral Services
Magdalena Mandzielewska	Clinical Research and Corporate Compliance
Debbie More	Health Information Management
Egil Nilsen	Cancer Registry/Cancer Program Administration
Carmel Sauerland, MSN, AOCN	Nursing Oncology Services
Linda Siklos	Cancer Registry
Catherine Spratt, BSN, OCN	Patient Care Services Cancer Program Administration
Maria Torres	Cancer Registry

Acknowledgements

We gratefully acknowledge the work and support of the members of the Cancer Committee, Subcommittees and the Cancer Program.

Special gratitude to the Cancer Registry staff for their dedication and loyalty, and to our wonderful volunteers for their invaluable assistance.

Egil Nilsen, FACHE

Cancer Program Administrator

Chairman's Message



Westchester Medical Center provides a broad spectrum of cancer care to the Hudson Valley region and beyond. While the Medical Center was granted a three-year Foundation for the Accreditation of Cellular Therapy (F.A.C.T.) certificate in 2010, we continue to provide cancer treatment and clinical trials in bone marrow transplant, leukemia, lymphoma, head and neck, hepatobiliary, melanoma, neurologic tumors, prostate cancer, lung cancer and other

cancer sites for adults and children. Our oncology programs and services provided on an inpatient and outpatient basis include infusions, transfusion, apheresis, IMRT, brachytherapy, stereotactic radiosurgery and a full scope of surgical services.

Members of our multi-disciplinary Cancer Team include physicians, nurses, allied health professionals, chaplains, social workers, dietitians, clinical researchers, and hospital administrators who work together to provide quality care for our patients and their families. In addition to the Multi-Specialty Oncology Conference, the Medical Center offers disease-specific tumor boards, multiple

division level grand rounds, conferences and physician education symposia. These conferences allow us to provide the highest level of care, to teach, to explore treatment options, to maximize technological advances, and to encourage new ways of finding solutions.

The Cancer Committee at Westchester Medical Center remains committed to maintaining and improving the systems that support our mission, values and goals. The Cancer Committee and our Cancer Registry continue to work diligently to review, assess and implement the latest standards of the American College of Surgeons Commission on Cancer.

We strive to provide cancer education and prevention programs to our community through relationships with partners such as the American Cancer Society. Together, we can bring much-needed programs and services to the residents of the Hudson Valley and beyond.

Tauseef Ahmed, M.D., FACP

Chairman, Cancer Committee

Chief, Division of Oncology & Hematology, Westchester Medical Center

Professor, Oncology & Hematology, New York Medical College

Goals and Objectives

- Reduce morbidity and mortality of individuals at high risk for and diagnosed with cancer in the Hudson Valley Region and beyond.
- Obtain and disseminate descriptive data concerning the nature and extent of cancer in the communities served to promote cancer prevention and early detection.
- Promote accrual to cancer clinical trials and participate in continuous performance improvement through maintenance of a quality data base and regular reports to the medical staff, New York State Cancer Registry and the National Cancer Data Base.
- Encourage lifetime continuous medical follow-up for all Westchester Medical Center cancer patients through the annual surveillance system.
- Provide internal and external professional education for healthcare providers regarding all aspects of the cancer experience.
- Establish infrastructure competencies and oversight monitoring of subcommittee work to insure program compliance.
- Meet the standards set forth by the American College of Surgeons Commission on Cancer and earn their accreditation as a Teaching Hospital Cancer Program along with the Pediatric Cancer Program Component.

FIGURE 1

**TOTAL CANCER CASES 1981 - 2010
WESTCHESTER MEDICAL CENTER CANCER REGISTRY**

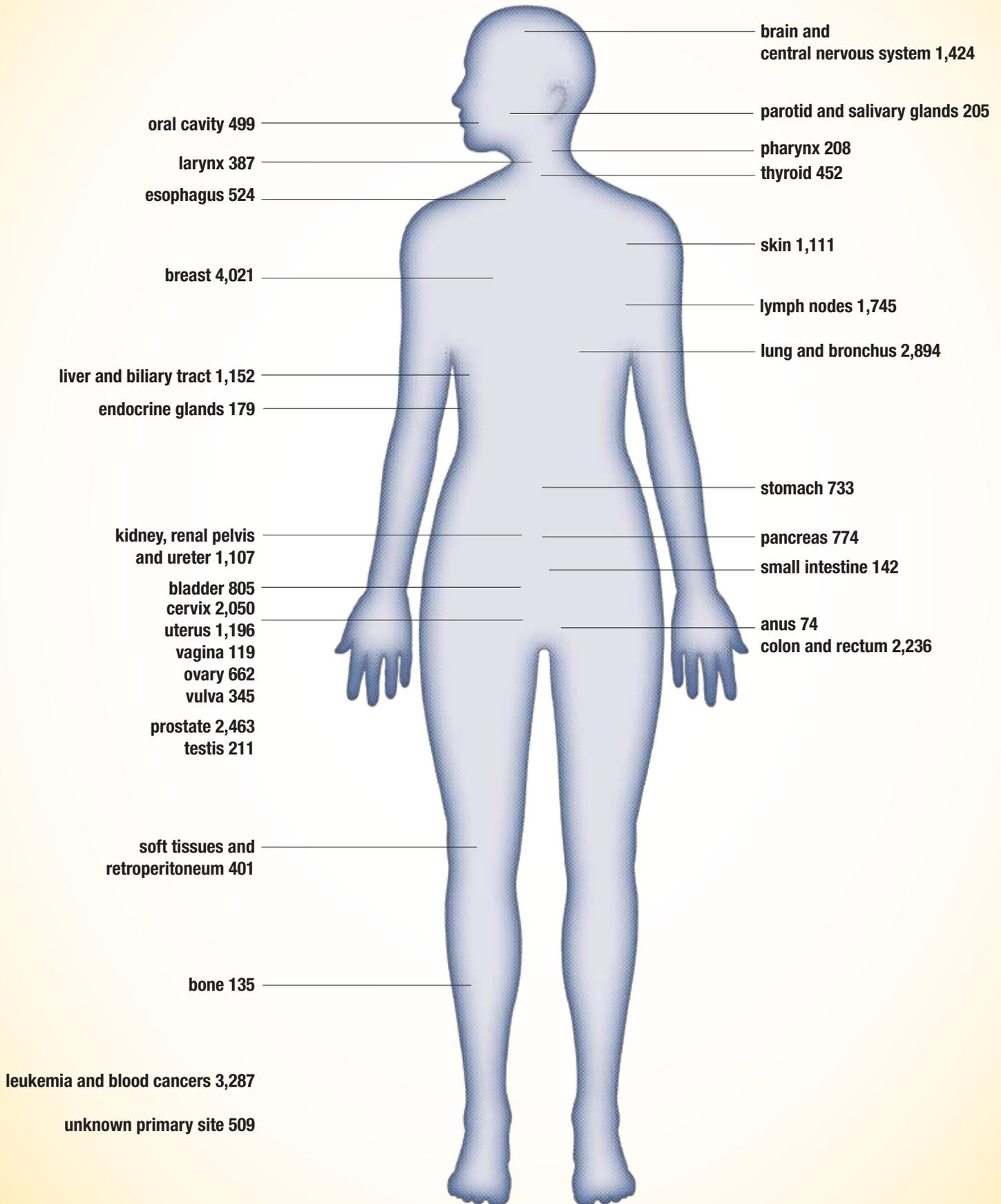


FIGURE 1A

TOTAL CANCER CASES 1981-2010 WESTCHESTER MEDICAL CENTER CANCER REGISTRY

PRIMARY SITE	TOTAL	SEX		CLASS OF CASE		STAGING ON ANALYTIC CASES ONLY						
		M	F	ANA	N-ANA	0	I	II	III	IV	None	UNK
Lip	20	17	3	15	5	1	4	3	1	1	1	4
Base of Tongue	124	89	35	110	14	2	8	13	16	54	2	15
Other and Unspecified Parts of Tongue	125	77	48	102	23	5	26	16	15	25	1	14
Gum	30	15	15	21	9	1	4	3	1	8	3	1
Floor of Mouth	82	51	31	67	15	1	14	9	2	26	7	8
Palate	62	39	23	54	8	5	5	10	2	14	6	12
Other and Unspecified Parts of Mouth	56	35	21	52	4	0	7	3	4	25	8	5
Parotid Glad	79	40	39	63	16	0	16	15	9	16	1	6
Other and Unspecified Major Salivary Glands	15	10	5	10	5	0	3	1	1	3	0	2
Tonsil	111	82	29	98	13	0	10	12	19	43	0	14
Oropharynx	43	30	13	39	4	0	2	3	3	21	0	10
Nasopharynx	62	41	21	43	19	0	3	3	8	17	4	8
Pryiform Sinus	38	32	6	32	6	1	2	4	5	17	0	3
Hypopharynx	32	26	6	28	4	0	0	3	3	16	0	6
Other Sites in Lip, Oral Cavity, Pharynx	33	25	8	25	8	0	1	3	3	10	8	0
Esophagus	524	371	153	424	100	11	39	70	80	74	9	141
Stomach	733	514	219	590	143	11	90	59	124	172	30	104
Small Intestine	142	83	59	127	15	4	10	15	16	18	38	26
Colon	1,544	838	706	1,026	518	126	184	179	150	177	10	200
Rectosigmoid Junction	198	120	78	138	60	12	20	29	18	21	0	38
Rectum	494	287	207	397	97	42	64	61	73	54	17	86
Anus and Anal Canal	74	34	40	56	18	7	5	18	12	3	1	10
Liver and Intrahepatic Bile Ducts	872	654	218	809	63	0	159	180	176	171	28	95
Gallbladder	102	34	68	80	22	4	8	16	10	29	2	11
Other and Unspecied Parts of Biliary Tract	178	84	94	158	20	4	15	37	28	40	3	31
Pancreas	774	398	376	655	119	5	57	135	107	255	13	83
Other Digestive Organs	17	9	8	12	5	0	0	1	0	1	10	0
Nasal Cavity and Middle Ear	27	21	6	20	7	0	1	2	0	1	14	2
Accessory Sinuses	53	36	17	46	7	1	2	0	2	18	19	4
Larynx	387	310	77	336	51	20	80	36	79	102	1	18
Trachea	6	5	1	5	1	0	0	0	0	0	5	0
Bronchus and Lung	2,894	1,686	1,208	2,268	626	5	342	129	528	751	35	478
Thymus	29	11	18	25	4	0	1	1	0	0	23	0
Heart, Mediastinum and Pleura	105	73	32	80	25	0	9	9	9	15	26	12
Other Respiratory and Intrathoraci	1	1	0	1	0	0	0	0	0	0	1	0
Bones, Joints and Articular Cartilage of Limbs	58	35	23	40	18	0	9	5	2	4	3	17
Other Bones, Joints and Articular Cartilage	77	50	27	54	23	0	6	3	1	4	22	18
Hematopoietic/Reticuloendothelial	3,287	1,953	1,334	2,161	1,126	0	1	1	1	4	2,151	3
Skin	1,111	648	462	435	676	43	89	56	59	46	64	78
Peripheral and Autonomic Nervous System	14	5	9	10	4	0	0	0	0	4	4	2
Retroperitoneum and Peritoneum	100	25	75	83	17	0	5	1	3	9	57	8
Connective, Subcut and Other Soft Tissues	301	187	114	232	69	0	28	23	42	37	59	43
Breast	4,021	33	3,987	3,100	921	366	996	891	271	144	10	422
Vulva	345	0	345	243	102	62	49	46	38	18	9	21
Vagina	119	0	118	75	44	26	19	11	4	6	2	7
Cervix Uteri	2,050	0	2,050	773	1,277	4	224	158	136	78	50	123
Corpus Uteri	1,146	0	1,146	1,034	112	15	584	130	116	73	48	68
Uterus, NOS	50	0	50	29	21	0	1	1	2	4	18	3
Ovary	662	0	662	440	222	0	98	25	176	94	9	38
Other and Unspecified Female Genital Organs	26	0	26	22	4	1	3	0	2	2	9	5

Continued

FIGURE 1A

TOTAL CANCER CASES 1981-2010 WESTCHESTER MEDICAL CENTER CANCER REGISTRY

PRIMARY SITE	TOTAL	SEX		CLASS OF CASE		STAGING ON ANALYTIC CASES ONLY						
		M	F	ANA	N-ANA	0	I	II	III	IV	None	UNK
Placenta	56	0	56	15	41	0	1	0	2	1	5	6
Penis	26	26	0	22	4	3	8	4	2	1	0	4
Prostate	2,463	2,463	0	2,026	437	7	201	1,339	142	146	1	190
Testis	211	211	0	171	40	2	60	18	11	2	49	29
Other Male Genital Organs	12	12	0	11	1	0	2	0	0	0	8	1
Kidney	967	623	344	787	180	0	315	120	103	129	31	89
Renal Pelvis	76	54	22	71	5	13	18	7	14	10	1	8
Ureter	64	41	23	58	6	13	14	9	10	6	1	5
Bladder	805	615	190	542	263	111	107	89	56	76	1	102
Other Urinary Organs	29	17	12	24	5	2	5	1	6	4	4	2
Eye and Adnexa	80	36	44	51	29	0	17	1	4	1	24	4
Meninges	463	143	320	157	306	0	1	0	0	1	155	0
Brain	1,215	669	546	922	293	0	57	39	62	162	587	15
Other Parts of Central Nervous System	209	101	108	100	109	0	4	1	1	3	89	2
Thyroid	452	121	331	373	79	1	227	42	31	19	20	33
Adrenal Gland	82	38	44	68	14	0	0	0	0	3	65	0
Other Endocrine Glands/Related	195	108	87	156	39	0	0	0	0	0	156	0
Other and Ill-Defined Sites	21	9	12	10	11	0	0	0	0	1	8	1
Lymph Nodes	1,745	1,026	719	926	819	0	144	189	129	299	42	123
Unknown Primary Site	509	253	256	321	188	0	0	0	0	1	319	1
TOTAL	33,113	15,680	17,430	23,554	9,559	937	4,484	4,288	2,930	3,590	4,407	2,918

Note: 3 cases excluded from Male/Female classification

FIGURE 2

**ALL SITES 2010
WESTCHESTER MEDICAL CENTER CANCER REGISTRY**

PRIMARY SITE	TOTAL	SEX		CLASS OF CASE			STAGING ON ANALYTIC CASES ONLY					
		M	F	ANA	N-ANA	0	I	II	III	IV	None	UNK
Hematopoietic and Reticuloendothelial Systems	141	79	62	111	30	0	0	0	0	1	110	0
Bronchus and Lung	79	39	40	66	13	0	11	2	8	38	0	7
Prostate	74	74	0	60	14	0	12	44	3	1	0	0
Liver and Intrahepatic Bile Ducts	63	52	11	54	9	0	20	10	5	11	4	4
Kidney	52	39	13	48	4	0	33	8	3	2	0	2
Breast	56	3	53	41	15	5	9	12	3	6	1	5
Corpus Uteri	44	0	44	41	3	0	31	1	3	3	3	0
Pancreas	46	19	27	40	6	1	5	12	2	15	0	5
Brain	43	28	15	39	4	0	0	0	0	0	39	0
Lymph Nodes	50	33	17	39	11	0	8	3	3	21	1	3
Colon	45	18	27	35	10	2	13	3	6	8	0	3
Thyroid	24	5	19	24	0	0	17	2	3	0	1	1
Bladder	30	20	10	23	7	2	6	6	2	7	0	0
Cervix Uteri	21	0	21	18	3	2	5	3	6	2	0	0
Meninges	20	6	14	18	2	0	0	0	0	0	18	0
Ovary	21	0	21	17	4	0	8	0	3	5	0	1
Stomach	16	8	8	12	4	0	6	2	0	4	0	0
Other Endocrine Glands and Related Structures	16	11	5	12	4	0	0	0	0	0	12	0
Unknown Primary Site	13	6	7	12	1	0	0	0	0	0	12	0
Larynx	10	8	2	9	1	0	1	0	5	2	0	1
Small Intestine	10	5	5	8	2	1	2	2	2	1	0	0
Rectum	9	7	2	8	1	0	2	1	3	0	1	1
Connective, Subcutaneous and Other Soft Tissues	9	5	4	7	2	0	1	2	1	1	1	1
Testis	8	8	0	7	1	0	1	0	0	0	6	0
Floor of Mouth	5	4	1	5	0	1	1	0	0	3	0	0
Esophagus	8	7	1	5	3	0	1	0	1	3	0	0
Other and Unspecified Parts of Biliary Tract	5	3	2	5	0	1	1	0	1	1	1	0
Skin	10	5	5	5	5	0	0	0	0	3	1	1
Renal Pelvis	5	3	2	5	0	0	2	0	1	1	0	1
Other and Unspecified Parts of Tongue	4	4	0	4	0	0	0	0	2	2	0	0
Nasopharynx	4	3	1	4	0	0	0	0	1	1	0	2
Bones, Joints and Articular Cartilage of Other and Unspecified Sites	6	6	0	4	2	0	2	0	0	0	1	1
Ureter	4	2	2	4	0	0	1	1	1	1	0	0
Spinal Cord, Cranial Nerves, and Other Parts of Central Nervous System	4	1	3	4	0	0	0	0	0	0	4	0
Base of Tongue	3	3	0	3	0	0	0	1	0	2	0	0
Anus and Anal Canal	4	4	0	3	1	0	0	1	0	0	0	2
Gallbladder	5	2	3	3	2	0	0	1	1	0	1	0
Accessory Sinuses	3	2	1	3	0	0	0	0	1	0	2	0
Bones, Joints and Articular Cartilage of Limbs	2	2	0	2	0	0	0	0	0	1	0	1
Eye and Adnexa	2	0	2	2	0	0	0	0	0	0	2	0
Adrenal Gland	2	0	2	2	0	0	0	0	0	2	0	0
Lip	1	1	0	1	0	0	0	0	0	0	0	1
Palate	1	1	0	1	0	0	0	0	0	0	0	1
Parotid Gland	1	1	0	1	0	0	0	0	0	1	0	0
Nasal Cavity and Middle Ear	1	1	0	1	0	0	0	0	0	1	0	0
Trachea	1	1	0	1	0	0	0	0	0	0	1	0
Heart, Mediastinum and Pleura	2	1	1	1	1	0	0	0	0	0	1	0
Retroperitoneum and Peritoneum	1	1	0	1	0	0	0	0	0	0	0	1
Vulva	2	0	2	1	1	0	0	0	0	0	0	1
Penis	1	1	0	1	0	0	0	1	0	0	0	0
Other and Unspecified Urinary Organs	1	1	0	1	0	0	0	0	0	1	0	0
Other and Unspecified Parts of Mouth	1	1	0	0	1	0	0	0	0	0	0	0
TOTAL	989	534	455	822	167	15	199	118	70	151	223	46

FIGURE 2A

**10 MOST FREQUENT PRIMARY SITES 2010
ANALYTIC CANCER CASES**

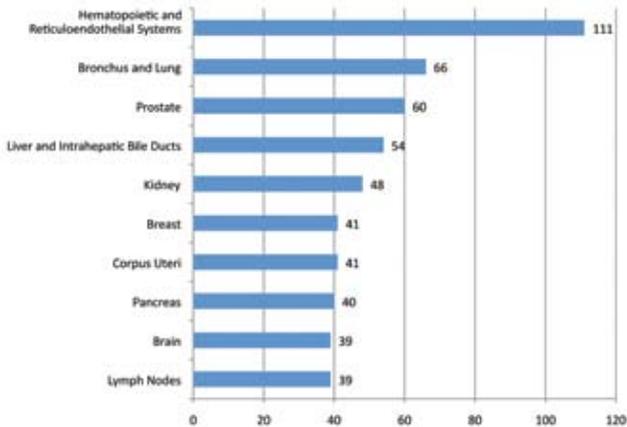
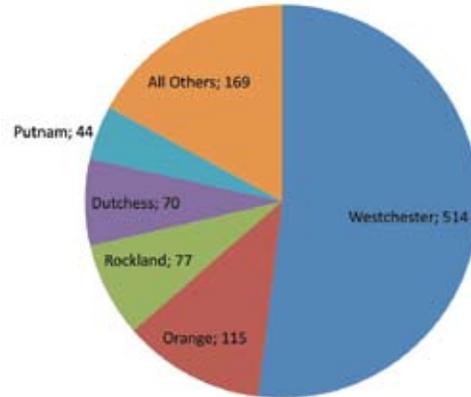


FIGURE 2B

**GEOGRAPHIC DISTRIBUTION BY COUNTY
TOTAL 2010 CASES: 989**



Glossary

Reference Date: Definite starting date of Cancer Registry data collection. All cancer cases diagnosed or treated at WMC after this date must be included in the database.

Accessioned: Entered into the Cancer Registry database by year first seen at WMC for each new primary cancer.

Analytic Case: Case which was first diagnosed and/or received all or part of first course of treatment at WMC.

Non-Analytic Case: Case seen at WMC for recurrent or metastatic disease, after all of the first course of treatment was completed elsewhere. Cases first diagnosed at autopsy.

First Course of Treatment: Initial cancer directed treatment(s) usually initiated or planned within four months after diagnosis.

Extent of Disease (Stage): Determined at the time of initial diagnosis. Stage assigned according to AJCC-TNM Staging System, or SEER Summary Staging.

In-Situ: Tumor meets all microscopic criteria for malignancy except invasion.

Regional: Tumor has spread by direct extension to immediately adjacent organs or tissue and/or metastasized to regional lymph nodes.

Metastases: Change in location of disease of its manifestation or spread from one organ or part to another, not directly connected.

Localized: Tumor is confined to the organ of origin.

Distant: Tumor has spread beyond immediately adjacent organs or tissues by direct extension and/or has either developed secondary or metastatic tumors or metastasized to distant lymph nodes or organs.

Unknown: Classification used when stage cannot be determined from information available or medical authority.

American Joint Committee on Cancer TNM Staging: Staging classification scheme based on the premise that cancer of similar histology or site of origin share similar patterns of growth and extension:

(**T**) Tumor, (**N**) Nodal involvement, and (**M**) Distant metastases.

SEER: Surveillance, Epidemiology and End Results, branch of NCI.

NCDB: National Cancer Data Base, project of American College of Surgeons and American Cancer Society.

NOS: Not Otherwise Specified.

Non-Reportable: Patients with a history of cancer only or seen for consult only, are excluded from the registry database in accordance with the American College of Surgeons' guidelines.

Palliative: Therapy that relieves symptoms such as pain without altering the disease course.



A focus on Pediatric Neuroblastoma

Neuroblastoma is the most common extracranial solid tumor in childhood accounting for 8-10% of all childhood cancers and for approximately 15% of cancer deaths in children. About half of the cases occur in children younger than 2 years of age. Annually about 650 cases are diagnosed in the US. Neuroblastoma arises from the sympathetic nervous system. About 65% arise in the abdomen, with over half of these arising in the adrenal gland. It may also arise from the sympathetic ganglia in the neck, chest and pelvis. Approximately 50% of patients present with localized or regional disease and approximately 35% of patients have regional lymph node spread at the time of diagnosis. When the disease arises from the superior cervical ganglion the patient develops Horner syndrome. Spinal cord compression due to the extension of tumor to epidural area is seen in about 5% to 15% of patients.

Age at presentation, stage and biological features of neuroblastoma determine the outcome. The biological features of neuroblastoma are defined by MYCN status, Shimada histopathology, and DNA index or tumor ploidy number in infants. Based on these features, infants and children with neuroblastoma are categorized as having low, intermediate and high risk with probabilities of prolonged disease free survival of 95-100%, 85-90% and <30%, respectively.

Survival rates for patients who have INSS (international neuroblastoma staging system) stage I disease, regardless of biologic factors, are excellent with surgery alone. Chemotherapy yields an excellent result and is only required when relapses occur. In biologically favorable localized or incompletely resected tumors, chemotherapy can be omitted (INSS stage 2A and 2B). Survival rate in this group of patients is greater than 95%. In this group of patients chemotherapy should be reserved for those who experience life or organ threatening symptoms at diagnosis, or for those who experience recurrent or progressive disease. Stage 4S neuroblastoma without MYCN amplification undergoes spontaneous regression in the majority of cases. As in limited stage disease patients, chemotherapy and radiotherapy can be instituted for those who have large tumors or massive hepatomegaly causing mechanical obstruction, respiratory insufficiency, or liver dysfunction.

Intermediate risk encompasses a wide spectrum of disease. Surgical resection and moderate dose multiagent chemotherapy constitute the mainstay of therapy. The prognosis for patients who have INSS stage 3, or infants with INSS stage 4 disease is highly dependent upon the tumor's histologic and biologic features. Survival rate is greater than 95% for those who have favorable histology tumors, who received moderate dose chemotherapy after surgical resection. Multiagent chemotherapy includes cisplatin/carboplatin, doxorubicin, etoposide and cyclophosphamide.

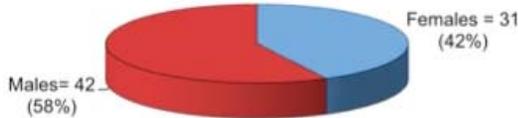
Long term survival for high risk neuroblastoma is poor with a rate of only 30-40%. Standard therapy for patients who have high risk neuroblastoma involves at least four components: induction, local control, consolidation with autologous stem cell transplant, and treatment of minimal disease with biologic agents. Induction includes multiagent chemotherapy, followed by surgical resection of the tumor. Following autologous stem cell transplantation, patients receive radiation therapy to the bulky sites of the tumor at presentation. Treatment of minimal disease includes, treatment with cis-retinoic acid and monoclonal antibodies directed against the neuroblastoma specific antigens, and co-administration of cytokines (e.g. granulocyte macrophage colony stimulating factor and interleukin-2) to enhance antibody dependent cellular cytotoxicity. This therapy significantly decreases risk for recurrence and improved overall survival for high risk neuroblastoma, with 2 year survival rate of around 70%.

About 60% of our patients are alive in our 27 years of experience. Due to small number of patients and variations in treatment strategies, dictated by the COG protocols, we are unable to produce statistical data. However, we did not experience serious adverse events and death, due to treatment complications in our patient population. Therefore, our care meets the standards of current recommendations and we believe, our results are at least comparable, if not better, than the outcome reported in nationwide statistics.

Oya Levendoglu-Tugal, MD
Pediatric Hematology/Oncology

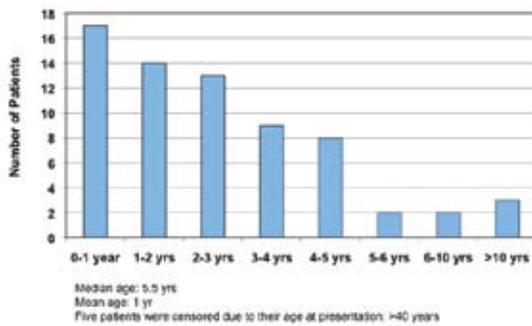
Pediatric Neuroblastoma Patients Diagnosed from 1982 to 2009

A. GENDER DISTRIBUTION n=73



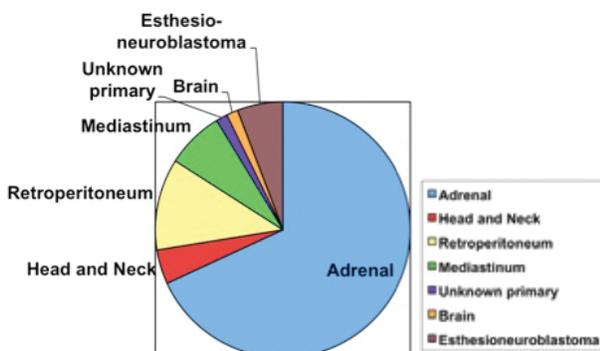
Neuroblastoma occurs slightly more frequently in boys than girls (ratio: 1.2:1).

B. AGE DISTRIBUTION n=68



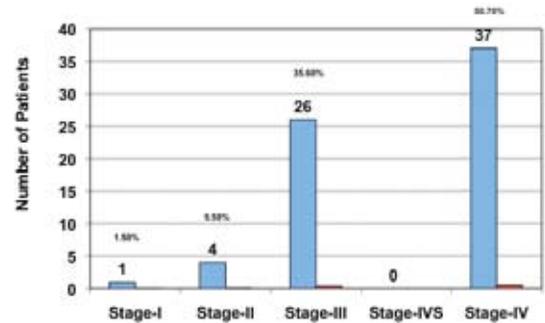
Forty percent of patients at diagnosis are under 1 year of age and less than 5% are over the age of 10 years.

C. TUMOR LOCATION n=68



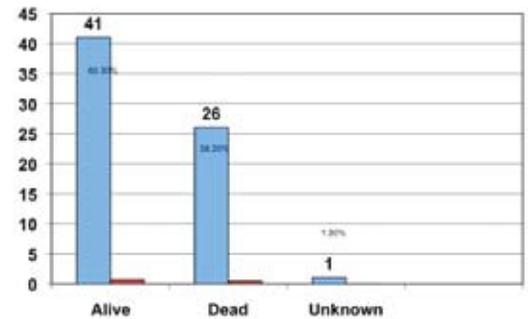
Neuroblastoma can arise anywhere along the sympathetic nervous system. The majority of tumors. About 65% arise in the abdomen, with over half of these arising in the adrenal gland. Additional sites of origin include the neck, chest, and pelvis.

D. TUMOR STAGE AT PRESENTATION n=68



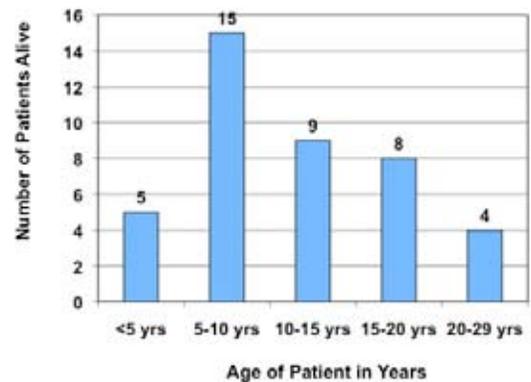
Approximately 50% of patients present with localized or regional disease and approximately 35% of patients have regional lymph node spread at the time of diagnosis.

E. PATIENT OUTCOMES AT 29 YEARS OF FOLLOW-UP n=68

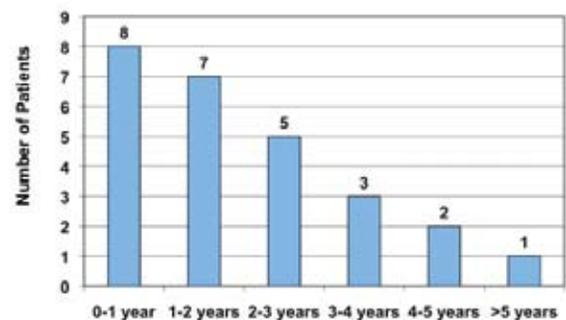


F. FOLLOW-UP OF LIVING PATIENTS BY AGE n=67*

*ONE PATIENT LOST TO FOLLOW-UP



G. TIME TO DEATH FROM DIAGNOSIS n=26



Neuroblastoma accounts for 15% of cancer deaths in children.

FIGURE 3

**TOTAL CANCER CASES 1981 - 2010
PEDIATRIC PATIENTS AGE 0 - 21 YEARS**

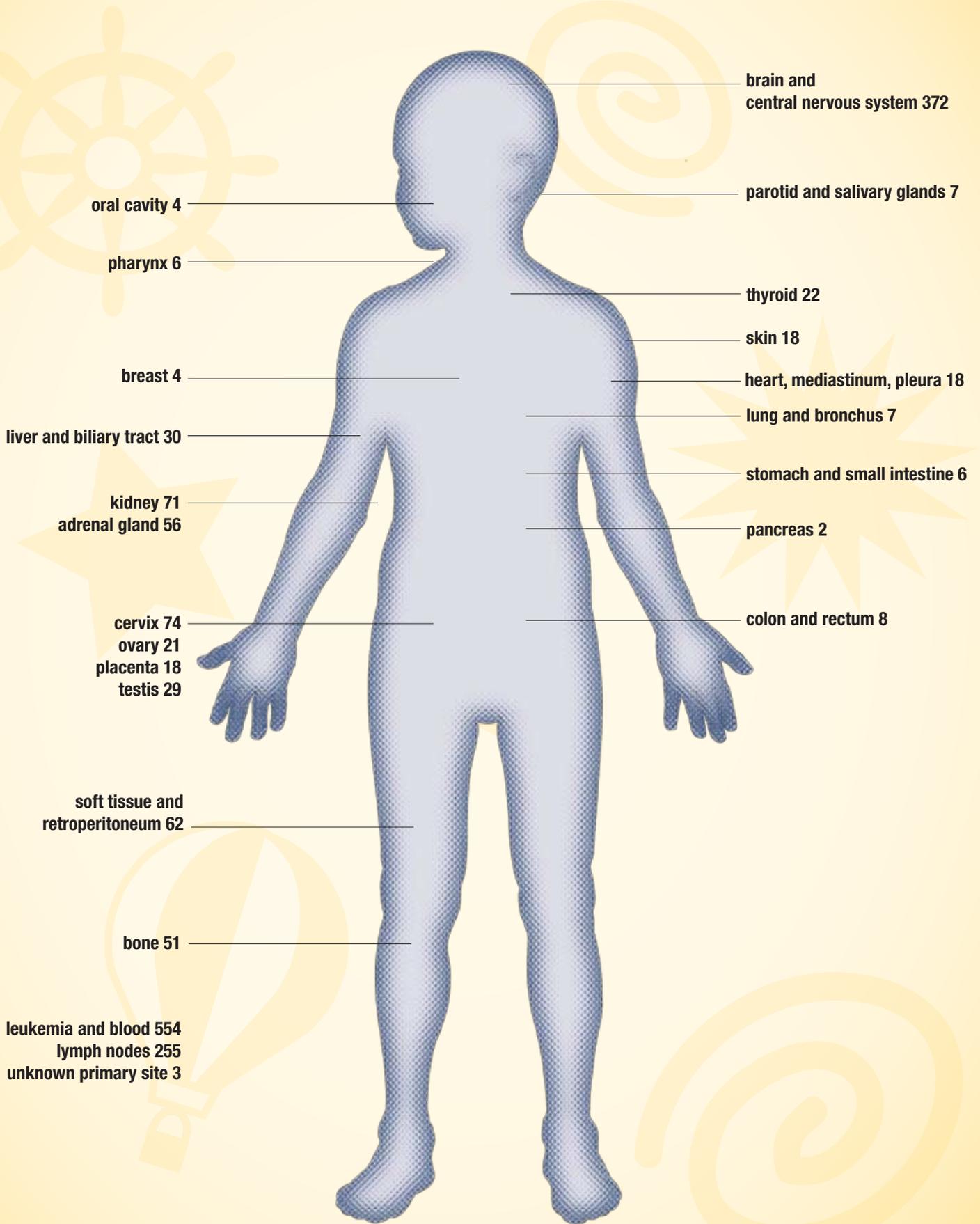


FIGURE 3a

**TOTAL CANCER CASES 1981 - 2010
PEDIATRIC PATIENTS AGE 0 - 21 YEARS**

PRIMARY SITE	TOTAL	SEX		CLASS OF CASE			STAGING ON ANALYTIC CASES ONLY						
		M	F	ANA	N-ANA	0	I	II	III	IV	None	UNK	
Base of Tongue	1	1	0	0	1	0	0	0	0	0	0	0	0
Other and Unspecified Parts of Tongue	1	1	0	1	0	0	1	0	0	0	0	0	0
Gum	1	1	0	0	1	0	0	0	0	0	0	0	0
Other and Unspecified Parts of Mouth	1	1	0	1	0	0	0	0	0	0	1	0	0
Parotid Glad	4	1	3	3	1	0	1	2	0	0	0	0	0
Tonsil	3	2	1	3	0	0	1	1	1	0	0	0	0
Oropharynx	1	1	0	1	0	0	0	1	0	0	0	0	0
Nasopharynx	5	4	1	4	1	0	0	1	0	2	1	0	0
Stomach	4	3	1	2	2	0	0	0	0	2	0	0	0
Small Intestine	2	1	1	2	0	0	0	0	0	1	0	1	0
Colon	7	3	4	4	3	0	0	2	0	0	1	1	0
Rectum	1	1	0	1	0	0	1	0	0	0	0	0	0
Liver and Intrahepatic Bile Ducts	30	17	13	29	1	0	2	2	0	5	18	2	0
Pancreas	2	0	2	1	1	0	0	0	0	0	0	1	0
Nasal Cavity and Middle Ear	2	2	0	2	0	0	0	0	0	0	2	0	0
Accessory Sinuses	3	2	1	3	0	0	0	0	0	1	2	0	0
Larynx	1	1	0	1	0	1	0	0	0	0	0	0	0
Trachea	1	1	0	1	0	0	0	0	0	0	1	0	0
Bronchus and Lung	7	2	5	7	0	0	1	0	0	0	5	1	0
Thymus	2	1	1	2	0	0	1	1	0	0	0	0	0
Heart, Mediastinum and Pleura	18	10	8	13	5	0	0	1	0	5	5	2	0
Other and Ill-Defined Sites within Respiratory System and Intrathoracic Organs	1	1	0	1	0	0	0	0	0	0	1	0	0
Bones, Joints and Articular Cartilage of Limbs	29	18	11	17	12	0	4	2	1	1	1	8	0
Bones, Joints and Articular Cartilage of Other and Unspecified Sites	22	14	8	17	5	0	1	1	1	0	6	8	0
Hematopoietic and Reticuloendothelial Systems	554	316	238	458	96	0	0	0	0	1	457	0	0
Skin	18	9	9	7	11	0	1	0	2	1	2	1	0
Peripheral Nerves and Autonomic Nervous System	9	3	6	8	1	0	0	0	0	4	4	0	0
Retroperitoneum and Peritoneum	11	3	8	10	1	0	0	0	0	3	7	0	0
Connective, Subcutaneous and Other Soft Tissues	51	35	16	43	8	0	5	2	11	4	12	9	0
Breast	4	0	4	2	2	0	0	1	0	1	0	0	0
Vulva	6	0	6	4	2	1	0	0	1	0	0	2	0
Vagina	3	0	3	2	1	1	0	0	0	0	1	0	0
Cervix Uteri	74	0	74	1	73	0	1	0	0	0	0	0	0
Ovary	21	0	21	16	5	0	7	0	4	1	2	2	0
Placenta	18	0	18	4	14	0	1	0	1	0	1	1	0
Prostate	3	3	0	3	0	0	0	0	2	0	1	0	0
Testis	29	29	0	27	2	1	7	2	1	1	11	4	0
Other and Unspecified Male Genital Organs	6	6	0	6	0	0	0	0	0	0	6	0	0
Kidney	71	32	39	69	2	0	14	3	4	7	23	18	0
Bladder	1	1	0	1	0	0	1	0	0	0	0	0	0
Other and Unspecified Urinary Organs	1	0	1	1	0	0	0	0	0	0	1	0	0
Eye and Adnexa	4	1	3	4	0	0	1	0	1	0	2	0	0
Meninges	13	7	6	6	7	0	0	0	0	0	6	0	0
Brain	322	178	144	252	70	0	18	20	13	21	178	2	0
Spinal Cord, Cranial Nerves, and Other Parts of Central Nervous System	37	20	17	27	10	0	1	0	0	0	25	1	0
Thyroid	22	2	20	20	2	0	17	0	0	0	2	1	0
Adrenal Gland	56	28	28	47	9	0	0	0	0	0	47	0	0
Other Endocrine Glands and Related Structures	38	21	17	32	6	0	0	0	0	0	32	0	0
Other and Ill-Defined Sites	4	1	3	2	2	0	0	0	0	0	2	0	0
Lymph Nodes	255	142	113	170	85	0	28	52	17	37	18	18	0
Unknown Primary Site	3	2	1	3	0	0	0	0	0	0	3	0	0
TOTAL	1,783	928	855	1,341	442	4	115	94	60	98	887	83	0

FIGURE 4

TOTAL CANCER CASES 2006 - 2010 PEDIATRIC PATIENTS AGE 0 - 21 YEARS

PRIMARY SITE	TOTAL	SEX		CLASS OF CASE			STAGING ON ANALYTIC CASES ONLY					
		M	F	ANA	N-ANA	0	I	II	III	IV	None	UNK
Nasopharynx	2	2	0	2	0	0	0	0	0	1	1	0
Colon	3	1	2	3	0	0	0	2	0	0	1	0
Liver and Intrahepatic Bile Ducts	9	4	5	8	1	0	0	0	0	2	6	0
Larynx	1	1	0	1	0	1	0	0	0	0	0	0
Heart, Mediastinum and Pleura	2	1	1	1	1	0	0	0	0	1	0	0
Bones, Joints and Articular Cartilage of Limbs	9	6	3	6	3	0	1	1	0	0	0	4
Bones, Joints and Articular Cartilage of Other and Unspecified Sites	7	4	3	7	0	0	1	1	0	0	2	3
Hematopoietic and Reticuloendothelial Systems	137	74	63	128	9	0	0	0	0	0	128	0
Skin	6	3	3	4	2	0	1	0	0	1	1	1
Retroperitoneum and Peritoneum	1	0	1	1	0	0	0	0	0	0	1	0
Connective, Subcutaneous and Other Soft Tissues	12	6	6	12	0	0	1	0	1	2	3	5
Breast	1	0	1	1	0	0	0	1	0	0	0	0
Ovary	3	0	3	3	0	0	2	0	1	0	0	0
Testis	7	7	0	6	1	1	0	0	0	0	5	0
Kidney	7	5	2	7	0	0	1	0	0	0	6	0
Bladder	1	1	0	1	0	0	1	0	0	0	0	0
Other and Unspecified Urinary Organs	1	0	1	1	0	0	0	0	0	0	1	0
Eye and Adnexa	1	0	1	1	0	0	0	0	0	0	1	0
Meninges	2	1	1	2	0	0	0	0	0	0	2	0
Brain	51	31	20	49	2	0	1	0	0	0	48	0
Spinal Cord, Cranial Nerves, and Other Parts of Central Nervous System	6	2	4	5	1	0	0	0	0	0	5	0
Thyroid	9	1	8	9	0	0	9	0	0	0	0	0
Adrenal Gland	6	3	3	6	0	0	0	0	0	0	6	0
Other Endocrine Glands and Related Structures	12	8	4	10	2	0	0	0	0	0	10	0
Lymph Nodes	47	29	18	41	6	0	9	13	5	12	1	1
Unknown Primary Site	2	1	1	2	0	0	0	0	0	0	2	0
TOTAL	345	191	154	317	28	2	27	18	7	19	230	14

FIGURE 5

TOTAL CANCER CASES 2010 PEDIATRIC PATIENTS AGE 0 - 21 YEARS

PRIMARY SITE	TOTAL	SEX		CLASS OF CASE			STAGING ON ANALYTIC CASES ONLY					
		M	F	ANA	N-ANA	0	I	II	III	IV	None	UNK
Nasopharynx	1	1	0	1	0	0	0	0	0	1	0	0
Liver and Intrahepatic Bile Ducts	2	1	1	2	0	0	0	0	0	0	2	0
Heart, Mediastinum and Pleura	1	0	1	0	1	0	0	0	0	0	0	0
Bones, Joints and Articular Cartilage of Limbs	1	1	0	1	0	0	0	0	0	0	0	1
Bones, Joints and Articular Cartilage of Other and Unspecified Sites	1	1	0	1	0	0	0	0	0	0	0	1
Hematopoietic and Reticuloendothelial Systems	33	22	11	31	2	0	0	0	0	0	31	0
Skin	1	1	0	1	0	0	0	0	0	1	0	0
Connective, Subcutaneous and Other Soft Tissues	2	1	1	2	0	0	1	0	0	1	0	0
Ovary	1	0	1	1	0	0	1	0	0	0	0	0
Testis	1	1	0	1	0	0	0	0	0	0	1	0
Kidney	1	1	0	1	0	0	1	0	0	0	0	0
Meninges	1	0	1	1	0	0	0	0	0	0	1	0
Brain	12	7	5	11	1	0	0	0	0	0	11	0
Spinal Cord, Cranial Nerves, and Other Parts of Central Nervous System	1	1	0	1	0	0	0	0	0	0	1	0
Thyroid	1	0	1	1	0	0	1	0	0	0	0	0
Other Endocrine Glands and Related Structures	3	2	1	1	2	0	0	0	0	0	1	0
Lymph Nodes	11	8	3	9	2	0	3	1	0	3	1	1
TOTAL	74	48	26	66	8	0	7	1	0	6	49	3



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