

Cancer Observatory

VOLUME III

Pediatric Tumors

Diego Rodrigues Mendonça e Silva, Viviane Sonaglio, Mariana Brait,
João Victor Alves de Castro, Felipe D'Almeida Costa, Maria Paula Curado





Cancer Observatory Pediatric Tumors

Hospital Cancer Registry
A.C. Camargo Cancer Center

2000 to 2023



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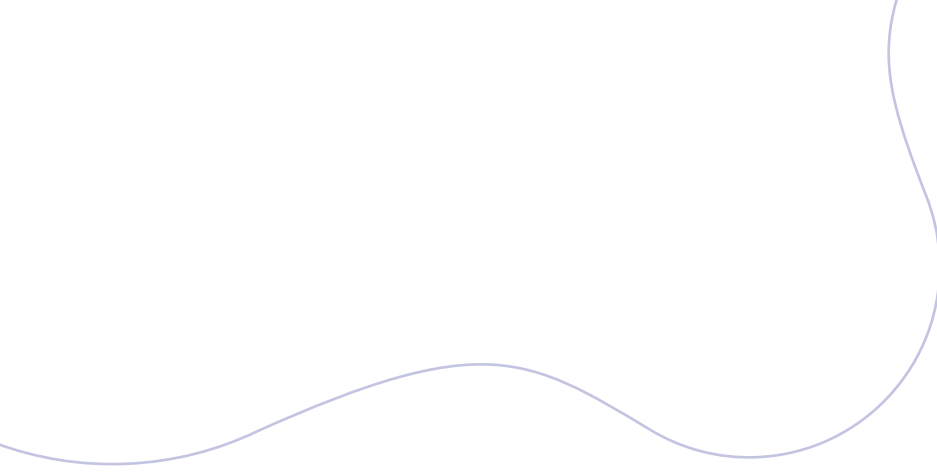
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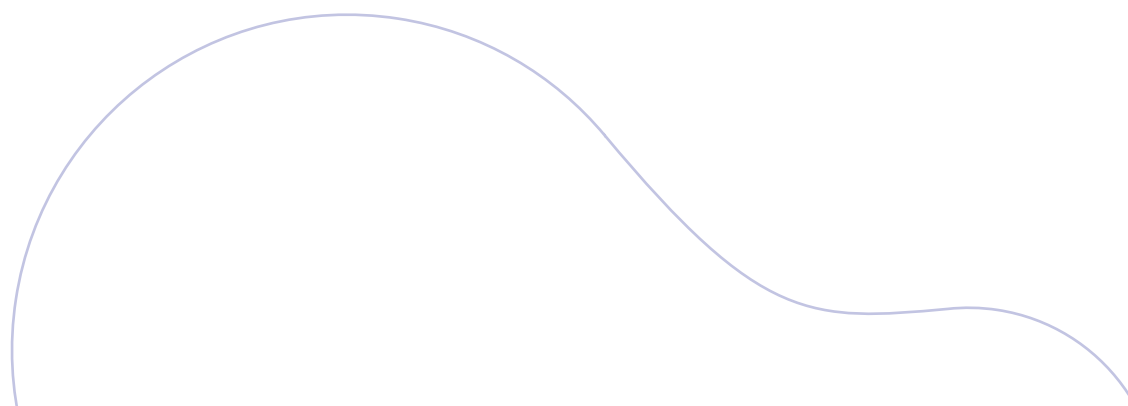
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Dr. Diego Rodrigues Mendonça e Silva
Hospital Cancer Registry Coordinator

Introduction



Pediatric oncology represents one of the greatest public and private health challenges in Brazil because of the complexity of childhood oncological diseases and the need for highly specialized diagnostic and treatment centers. It is estimated that childhood cancer corresponds to around 1 to 3% of all cancer cases, but it remains the biggest cause of death by disease for Brazilian children and adolescents.

In 1964, the A.C. Camargo Cancer Center, through Alois Bianchi, M.D., a renowned pediatrician, opened the first service specializing in pediatric oncology in the country, integrating surgery and a multidisciplinary approach involving clinical oncologists, radiotherapists, pathologists and, above all, pediatricians. This wide-ranging and integrated vision was revolutionary for the time, since it moved from a model of care centered only around the disease to one that also considered the child and their family.

Over the last few decades, pediatric oncology in Brazil has evolved considerably, with the consolidation of more effective treatment protocols, the strengthening of supportive therapies and the expansion of cooperative clinical research groups. These advances have allowed for greater standardization of treatment and have improved survival results. Nonetheless, regional inequalities persist, above all in access to early diagnosis, to hospital infrastructure and to innovative therapies, factors which reinforce the need for public policies and institutional partnerships to ensure equitable access to care.

Our current institutional commitment is to offer excellent care at every level of treatment—from the most common cancers to the most rare and difficult-to-diagnose ones. This approach is guided by a commitment to comprehensive care, by respect for childhood, and by attention to the specific needs of children and adolescents during treatment.

In this context, the Institution provides not just highly complex clinical care, but also integrates teaching, research and rehabilitation. The use of advanced technologies and the work of qualified multidisciplinary teams have made it possible to achieve results comparable to those at major international centers.

This legacy has its origin in the pioneering vision and leadership of Professor Alois Bianchi, who built the foundations of pediatric oncology in Brazil and who continues to inspire the specialty's future.

Viviane Sonaglio, M.D.
Leader of the Pediatric Tumors Reference Center

The Pediatric Tumors Reference Center



The A.C.Camargo Cancer Center has been a pioneer in pediatric oncology in Brazil since 1964. Today, we have a Reference Center exclusively dedicated to these patients. The Pediatric Reference Center (CR), created in 2022, is one of 13 Centers of Reference at the A.C.Camargo Cancer Center. We have a well-coordinated multiprofessional team, which specializes in cancer.

Structure and Specialized Services:

- Extensive care infrastructure, including emergency care, hospitalization and a bone marrow transplant unit.
- Advanced equipment for surgery, imaging diagnosis (such as PET-CT), anatomical pathology and linear accelerator treatment with the most modern techniques.
- Tumor board: medical meetings for multidisciplinary discussion of complex cases, optimizing diagnoses and treatments.
- Infrastructure and research teams, including a dedicated CR Research Nurse.
- Nurse navigators to track patients, assuring coordinated and integrated care.
- An environment without cross-infection, where children can play together.
- In addition to all the care we provide to pediatric patients, the Pediatric Tumors Center is supported by the Schwester Heine Specialized School, a national reference in Hospital Pedagogy, developed by Carmem Prudente and Genoveva Vello. For nearly four decades, the school has guaranteed children continued educational progress during cancer treatment, making it possible for them to join activities in their school of origin without disrupting their education.

Dedicated teachers personalize pedagogic care; each student has their activities adapted to their clinical condition and age group, in constant dialogue with the reference teaching institution. Resources for play are incorporated in the process, making learning lighter, inclusive, and more welcoming. Complementing this care, pediatrics has an integrated playroom within the school, providing a space for support, interaction and comfort for both students and their family members.

Cancer in children and adolescents behaves differently from that in adults, with faster tumor growth but better response to chemotherapy and higher chances of cure that can reach rates of above 80%. With our dedicated care to children and adolescents, our focus is to increase the effectiveness of treatment and offer a welcoming environment, respecting both children and their family members and their specific needs.

The A.C.Camargo Cancer Center Cancer Observatory

The Cancer Observatory is a publication that analyzes and disseminates information about the epidemiological profile and survival of cancer patients diagnosed and/or treated at the A.C.Camargo Cancer Center over time.

The Cancer Observatory's information source is the database of the HCR, in continuous use at the Institution since 2000. The database has records of more than 150,000 cases of primary tumors (unique and multiple, analytic and non-analytic), including non-melanoma skin cancer.

In the first volume of the Cancer Observatory, published in 2023, we described the profile of around 98,000 cases of cancer in patients treated by the A.C.Camargo Cancer Center between 2000 and 2020, including global survival for the most common cancers between 2000 and 2017. Access the A.C.Camargo Cancer Center site (www.accamargo.org.br) > Research and Innovation > Hospital Cancer Registry.

In volume II, published in 2024, we described the case profile of the Hematological Neoplasms Reference Center between 2000 and 2022 and the global probability of 5-year survival for the main groups of hematologic neoplasms. Access the A.C.Camargo Cancer Center (www.accamargo.org.br) > Research and Innovation > Hospital Cancer Registry.

In this volume, volume III, we analyze the profile of patients aged 0 to 18 who were diagnosed and treated at the Pediatric Tumors Reference Center between 2000 and 2023.

Hospital Cancer Registry

2.1. Concept

The Cancer Hospital Registry, HCR, is responsible for identifying, coding, validating and analyzing information about patients diagnosed and/or treated for cancer at a hospital unit (CACON, UNACON or General Hospital with oncology). The record of each new case contains sociodemographic information, clinical diagnostic data, and information about staging, treatment and patient follow-up (A.C.Camargo Cancer Center, 2023).

2.2. Objectives

- To identify and describe the cancer cases treated each year by the Institution;
- To describe the sociodemographic, epidemiological, and clinical characteristics of the patients;
- To disseminate oncology data across the institution's operational and strategic areas;
- To support research projects;
- To estimate the long-term overall survival probability.

The registry's structure

The HCR's team consists of administrative and/or health and data professionals who are trained and qualified to identify, classify and code cancer cases in accordance with the International Classification of Diseases for Oncology, 3rd edition (ICD-O3).

2.3. The HCR's working methods

The HCR reports all cases of cancer diagnosed and/or treated annually. A patient may have one or more primary cancers, which can occur at the moment of diagnosis, during treatment or in follow-up; all cases are recorded from the date of diagnosis. Cases are recorded around six months to a year after the current calendar year, which is considered the appropriate time to consolidate the cases between diagnosis and the start of planned treatments.

The steps to record cancer cases in the HCR are described below and presented in Figure 1:

1. Identification of the new case:

- Verification of the possible entry points for the cancer patient at the Institution, including departments of pathological anatomy, chemotherapy, radiation therapy, medical/oncology clinic.

2. Admission:

- Step to analyze the patient's clinical history, test reports to collect essential variables through the completion of an admission form and follow-up in SISRH© 2007 software, version 6.72, developed by the Fundação Oncocentro de São Paulo (FOSP) (Appendix).

3. Classification and coding:

- Step for the morphological classification and topographic coding of malignant neoplasms according to ICD-O3, version 2012.

4. Consistency:

- Verification of consistency and validation using IARCrgTools© software 2018 (IARC,2018).

5. Duplication:

- Verification of duplicate cases is performed using Link Plus 2007 software, version 2.0, from the Center for Disease Control and Prevention (CDC) (National Program of Cancer Registries, 2007).

6. Follow up:

- Patient follow-up is performed by tracking return visits to the Institution, the hospital death register and linking to the State of São Paulo death database, through a partnership with the SEADE Foundation (Fundação SEADE, 2023; Mendonça e Silva et al., 2024).

7. Consolidation:

- After the database has been consolidated, we perform a monthly back up and send the data quarterly to FOSP.

8. Dissemination:

- HCR data are disseminated through scientific articles, reports, scientific and executive presentations, and making the data available to research projects.

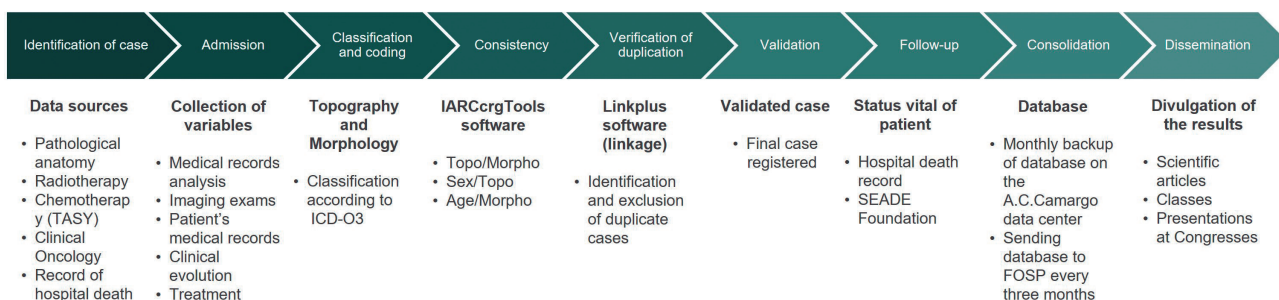


Figure 1. Flowchart of new cancer case registration from the HCR/A.C.Camargo Cancer Center, São Paulo, 2025^a.

The Cancer Observatory's Methods

3.1. Descriptive Analysis

We have included cases of tumors of uncertain behavior and pediatric malignancy (Table 1), in accordance with the International Classification of Childhood Cancer, Third Edition (ICCC-3) (Brazil, 1999; Steliarova-Foucher et al., 2005), for patients aged 0 to 18 who were diagnosed and treated between 2000 and 2023, extracted from the HCR/A.C.Camargo Cancer Center database on February 3, 2025.

The HCR's database was described in terms of the annual distribution of cases, including non-melanoma skin cancers, and the distribution by the Reference Center (CR).

Pediatric tumors were described in terms of distribution by sex, age group (0-4, 5-14 and 15-18 years old), and distributed into twelve groups in accordance with the ICCC-3 (Brazil, 1999; Steliarova-Foucher et al., 2005) (Table 1).

3.2. Survival Analysis

We included in the survival analysis groups of pediatric tumors recorded between 2000 and 2019.

Follow-up time was calculated as the difference between the date of diagnosis and the date of death (by whatever cause) or the date of latest information, with follow-up updated to December 31, 2024.

The probability of 5-year overall survival was distributed into groups for Leukemias and Lymphomas (group I and II), CNS Tumors (group III) and solid tumors (groups IV to X), and stratified by sex. Overall survival was also calculated for the ICCC-3's twelve main groups, as well as for groups I – Leukemias, II - Lymphomas, III - CNS and intracranial and intraspinal neoplasms, IV - Neuroblastoma, and IX –Soft tissue and other extraosseous sarcomas classed by age group for both sexes.

Survival curves were calculated using Kaplan-Meier method, compared with the log-rank test, with a significance level of $p < 0.05$, performed using IBM® SPSS Statistics, version 23.

Table 1. Groups of pediatric tumors based on the International Classification of Childhood Cancer, 3rd edition (ICCC-3) and morphological codes based on ICD-O3 (International Classification of Diseases for Oncology, 3^a edition), included in this study, 2000 to 2023.

Groups (ICCC-3)	Morphology (ICD-O3)
I – Leukemias, myeloproliferative diseases and myelodysplastic diseases	98013 Acute leukemia, *NOS 98053 Acute leukemia biphenotypic 98203 Lymphoid leukemia, NOS 98263 Burkitt cell leukemia 98323 Prolymphocytic leukemia, NOS 98353 Lymphoblastic leukemia, NOS 98363 B-cell lymphoblastic leukemia 98373 T-cell lymphoblastic leukemia 98403 Acute myeloid leukemia 98603 Myeloid leukemia, NOS 98613 Acute myeloid leukemia, NOS 98633 Chronic myeloid leukemia, NOS 98663 Acute promyelocytic leukemia, t(15-17)(q22;q21) 98723 Acute myeloid leukemia with minimal differentiation 99303 Myeloid sarcoma 99893 Myelodysplastic syndrome
II - Lymphomas and reticuloendothelial neoplasms	95903 Malignant lymphoma, NOS 95913 Malignant lymphoma, non-Hodgkin, NOS 96503 Classical Hodgkin lymphoma (CHL), NOS 96513 CHL, lymphocyte-rich 96523 CHL, mixed cellularity 96593 Hodgkin lymphoma, nodular lymphocyte predominant 96633 CHL, nodular sclerosis 96643 Hodgkin lymphoma, nodular sclerosis, cellular phase 96653 Hodgkin lymphoma, nodular sclerosis, grade I 96673 Hodgkin lymphoma, nodular sclerosis, grade II 96793 Mediastinal large B-cell lymphoma 96803 Diffuse large B-cell lymphoma, NOS 96873 Burkitt lymphoma 96903 Follicular lymphoma, pediatric type 96993 Nodal marginal zone lymphoma, pediatric 97003 Mycosis fungoides 97023 Peripheral T-cell lymphoma 97143 Anaplastic large cell lymphoma, ALK-positive 97193 NK/T-extranodal cell lymphoma, nasal type 97283 B-lymphoblastic lymphoma 97293 T-lymphoblastic lymphoma 97543 Disseminated Langerhans cell histiocytosis 97553 Histiocytic sarcoma 97573 Dendritic cell sarcoma

Groups (ICCC-3)	Morphology (ICD-O3)
III – Central nervous system (CNS) and intracranial and intraspinal neoplasms	80003 Malignant neoplasia 93501 Craniopharyngioma 93511 craniopharyngioma, adamantinomatous 93623 Pineoblastoma 93803 Malignant glioma 93823 Mixed glioma 93841 Subependymal giant cell astrocytoma 93903 Choroid plexus carcinoma 93913 Supratentorial ependymoma, NOS 93923 Anaplastic ependymoma 93941 Myxopapillary ependymoma 94003 Astrocytoma, NOS 94013 Anaplastic astrocytoma 94211 Diffuse astrocytoma, MYB or MYBL1 altered 94243 Pleomorphic xanthoastrocytoma 94403 Glioblastoma, NOS 94503 Oligodendroglioma, NOS 94703 Classic medulloblastoma 94713 Desmoplastic nodular medulloblastoma 94733 Primitive neuroectodermic tumor, NOS 94743 Large cell medulloblastoma 95051 Ganglioglioma 95053 Anaplastic ganglioglioma 95061 Central neurocytoma 95303 Malignant meningioma
IV - Neuroblastoma and other peripheral nerve tumors	86801 Paraganglioma, NOS 86803 Malignant paraganglioma 86931 Extra-supra-renal paraganglioma, NOS 87003 PheoHCRomocytoma 94903 Ganglioneuroblastoma, intermixed 95003 Neuroblastoma, NOS 95223 Olfactory neuroblastoma
V - Retinoblastoma	95103 Retinoblastoma 95113 Retinoblastoma, differentiated

VI – Kidney tumors	82603 Papillary carcinoma 83103 Clear cell carcinoma, NOS 83123 Renal cell carcinoma, NOS 85103 SMARCB1-deficient renal medullary carcinoma 89593 Malignant cystic nephroma 89603 Nephroblastoma, NOS 89633 Malignant rhabdoid tumor of the kidney 89643 Clear cell sarcoma of the kidney
VII – Liver tumors	81703 Hepatocellular carcinoma, NOS 81713 Hepatocellular carcinoma, fibrolamellar 89703 Hepatoblastoma, NOS
VIII – Malignant bone tumors	88013 Spindle cell sarcoma, undifferentiated 91803 Osteosarcoma, NOS 91813 Chondroblastic osteosarcoma 91823 Fibroblastic osteosarcoma 91833 Telangiectatic osteosarcoma 91863 Conventional osteosarcoma 92101 Osteochondromatosis, NOS 92203 Chondrosarcoma, NOS 92303 Malignant chondroblastoma 92403 Mesenchymal chondrosarcoma 92501 Giant cell tumor of bone, NOS 92603 Ewing sarcoma 93703 Conventional chordoma 93713 Chondroid cordoma
IX – Soft tissue and other extraosseous sarcomas	88003 Sarcoma, NOS 88013 Spindle cell sarcoma, undifferentiated 88023 Pleomorphic cell sarcoma, undifferentiated 88043 Epithelial cell sarcoma, undifferentiated 88053 Sarcoma, undifferentiated, NOS 88063 Desmoplastic small round cell tumor 88103 Fibrosarcoma, NOS 88113 Fibromyxosarcoma 88143 Infantile fibrosarcoma 88211 Extra-abdominal desmoid type fibromatosis 8241 Multicentric myofibromatosis 88251 Inflammatory myoblastic tumor 88303 Malignant fibrous histiocyoma 88323 Dermatofibrosarcoma protuberans, fibrosarcomatous 88333 Pigmented dermatofibrosarcoma protuberans 88523 Myxoliposarcoma 88903 Leiomyosarcoma, NOS

IX – Soft tissues and other extraosseous sarcomas (continuation)	89003 Rhabdomyosarcoma, NOS 89023 Mixed rhabdomyosarcoma 89103 Embryonal rhabdomyosarcoma 89123 Spindle cell/sclerosing rhabdomyosarcoma 89203 Alveolar rhabdomyosarcoma 89633 Extrarenal rhabdoid tumor 89913 Sarcoma, embryonal 90403 Synovial sarcoma, NOS 90413 Synovial sarcoma, monophasic 90433 Synovial sarcoma, biphasic 90443 Clear cell sarcoma 91203 Angiosarcoma 91301 Hemangioendothelioma, NOS 91333 Epithelioid hemangioendothelioma, NOS 91403 Kaposi sarcoma 91503 Malignant hemangiopericytoma 91611 Hemangioblastoma 91803 Osteosarcoma, NOS 92511 Giant cell tumor of soft parts, NOS 93643 Ewing Sarcoma 93653 Askin tumor 95401 Atypical neurofibroma 95403 Malignant peripheral nerve sheath tumor, NOS 95603 Malignant neurilemoma 95813 Alveolar soft part sarcoma
X - Germ Cell Tumors, Trophoblastic Tumors, and Gonadal Neoplasms	84421 Serous cystadenoma, borderline malignancy 84603 Serous papillary cystadenocarcinoma 84721 Mucinous cystic tumor of borderline malignancy 84803 Mucinous adenocarcinoma 86201 Granulosa cell tumor, adult type 86311 Sertoli-Leydig cell tumor 86501 Leydig cell tumor, NOS 90603 Dysgerminoma 90613 Seminoma 90642 Intratubular malignant germ cells 90643 Germinoma 90703 Embryonal carcinoma 90713 Yolk sac tumor 90801 Teratoma, NOS 90803 Immature teratoma, NOS 90813 Teratocarcinoma 90853 Malignant mixed germ cell tumors 91003 Choriocarcinoma (non-gestational)

**XI – Other malignant
epithelial neoplasms
and malignant
melanomas**

80102 Carcinoma in situ, NOS
80203 Undifferentiated carcinoma, NOS
80503 Papillary carcinoma, NOS
80702 Squamous cell carcinoma in situ, NOS
80703 Squamous cell carcinoma (SCC), NOS
80723 SCC, non-keratinizing, NOS
80772 Squamous intraepithelial neoplasm, grade III
80823 Lymphoepithelial carcinoma
80903 Basal cell carcinoma, NOS
80913 Basal cell carcinoma, superf. multifocal
80923 Infiltrating basal cell carcinoma, NOS
80943 Basosquamous carcinoma, NOS
80953 Metatypical carcinoma
80973 Basal cell carcinoma, nodular
81203 Transitional cell carcinoma, NOS
81402 Adenocarcinoma in situ, NOS
81403 Adenocarcinoma, NOS
81482 Glandular intraepithelial neoplasia, grade III
82403 Neuroendocrine tumor
82463 Neuroendocrine carcinoma, NOS
82493 Neuroendocrine tumor, grade 2
82603 Papillary carcinoma, NOS
82903 Oncocytic carcinoma
83103 Clear cell carcinoma, NOS
83303 Follicular carcinoma, NOS
83403 Papillary carcinoma, of the thyroid, follicular variant
83413 Papillary microcarcinoma, of the thyroid
83433 Papillary carcinoma, encapsulated
83503 Papillary carcinoma, diffuse sclerosing, of the thyroid
83703 Adrenal cortical carcinoma
84133 Eccrine adenocarcinoma
84303 Mucoepidermoid carcinoma
84521 Solid pseudopapillary tumor
84523 Solid pseudopapillary carcinoma
84803 Mucinous adenocarcinoma
85003 Infiltrating duct carcinoma, NOS
85103 Medullary carcinoma, NOS
85503 Acinar cell carcinoma
87202 Melanoma in situ
87203 Malignant melanoma, NOS
87213 Nodular melanoma
87422 Lentigo maligna
87443 Acral lentiginous melanoma
87613 Malignant melanoma in congenital melanocytic nevus

**XII – Other malignant
and unspecified
neoplasms**

80003 Malignant neoplasm
80023 Malignant tumor, small cell type
82463 Neuroendocrine carcinoma, NOS
89363 Gastrointestinal autonomic nerve tumor
89733 Pleuropulmonary blastoma
97511 Langerhans cell histiocytosis, NOS
97521 Unifocal Langerhans cell histiocytosis

*NOS, Not Otherwise Specified.

Pediatric Tumors

The International Classification of Childhood Cancer – Third Edition (ICCC-3) is a standardized system developed to organize tumors that affect children. The ICCC-3 differs from the classification used for adults because it prioritizes cellular and morphological characteristics, whereas, in adults, classification is generally based on the tumor's location of origin (Steliarova-Foucher, 2005).

This classification divides pediatric tumors into 12 main groups, subdivided into 47 subgroups, with additional divisions in some cases. The objective is to standardize the language across epidemiological studies and cancer registries in different countries, thereby permitting consistent international comparisons, which is essential, since pediatric tumors are relatively rare (Steliarova-Foucher, 2005).

Below, we present a summary of the 12 main groups that make up the ICCC-3, with highlights and, wherever possible, data from the Brazilian context (INCA, 2025) and based on the A.C.Camargo Cancer Center's Oncology Manual for Non-Oncologists (2025):

I. Leukemias, myeloproliferative diseases and myelodysplastic diseases

Pediatric hematological cancers include lymphoblastic leukemias, myeloid leukemias, chronic myeloproliferative neoplasms and myelodysplastic neoplasms.

- Lymphoblastic Leukemia (LBL): is the most common form in childhood, representing around 30% of all pediatric cancers, with greater frequencies in children between the ages of 2 and 5, and being more common in boys. In Brazil, there are an estimated 3,000 new cases annually.
- Acute Myeloid Leukemia (AML): corresponds to 15–20% of acute childhood leukemias. Children have better therapeutic results than adults.

II. Lymphomas and reticuloendothelial neoplasms

Lymphomas are the third most common neoplasms in childhood, after leukemias and Central Nervous System tumors. They represent 10–15% of pediatric cancers and are divided into:

- Hodgkin Lymphoma: more common in adolescents, generally evolving slowly and with a good prognosis.
- Non-Hodgkin Lymphoma (including Burkitt lymphoma): mainly in small children, with more aggressive behavior, requiring intensive treatment.

In Brazil, there are around 500 new cases annually in children and adolescents.

Treatment is based on combination chemotherapy and may include radiation therapy and targeted and immunotherapy (recurring or refractory tumors). The prognosis is generally favorable, especially with Hodgkin lymphoma.

III. Central Nervous System (CNS), intracranial and intraspinal neoplasms

Brain tumors represent around 20% of pediatric neoplasms. They can occur in any region of the CNS but are more frequent in the cerebellum and the brain stem in small children; they are predominantly supratentorial in adolescents. **The most common types of tumors in this group are:** medulloblastoma, ependymoma, astrocytoma and brain stem tumors. Symptoms vary depending on the location: headache, vomiting, changes to vision, motor or cognitive deficits and convulsions.

Treatment combines surgery, radiation therapy and chemotherapy, depending on the type and location.

IV. Neuroblastoma and other peripheral nerve tumors

A neuroblastoma is an extracranial solid tumor common in childhood, which is responsible for 8–10% of pediatric cancers and mainly affects children under 5 years old.

This type of cancer generally starts in the adrenal glands and causes abdominal distension. In advanced cases, it can lead to weight loss, fever, bone pain and irritability. In Brazil, it is estimated that there are 400 new cases a year. Treatment for neuroblastoma depends on the stage and risk, and may involve surgery, chemotherapy, radiation therapy and, in selected cases, immunotherapy.

V. Retinoblastoma

Retinoblastoma is a malignant intraocular tumor more common in childhood and originating in the cells of retina, affecting vision in one or both eyes. It is generally diagnosed before 5 years of age. It can be hereditary: 25–30% (bilateral or multifocal) or sporadic 70–75% (generally unilateral).

Treatment for this type of cancer includes systemic or intra-arterial chemotherapy, laser, cryotherapy, radiation therapy and, in advanced cases, enucleation.

VI. Kidney tumors

Among kidney tumors, the Wilms tumor, or nephroblastoma, is the most common type, occurring mainly in children under 5 years old. It makes up about 6% of childhood cancer cases and can affect one or both kidneys.

In Brazil, there are an estimated 400 new cases a year. There is a high rate of cure with early diagnosis. Treatment involves a combination of surgery, chemotherapy and, in some cases, radiation therapy.

II. Liver tumors

Hepatoblastoma is among the most common forms of liver tumor in childhood, predominating before the age of 3 and most common in boys.

Today, 70–80% of children can be cured, thanks to advances in imaging, surgery (including liver transplant) and chemotherapy.

VIII. Malignant bone tumors

The main types of malignant bone tumors are osteosarcoma and Ewing sarcoma.

The osteosarcoma is the most common one in childhood and adolescence and is associated with localized pain and bone changes, generally in the lower limbs. Changes to gait is one of the main complaints.

Ewing sarcoma is the second most common bone tumor in children (3% of pediatric tumors). It can affect bones and soft tissues.

In Brazil, there are an estimated 450 new cases of osteosarcoma and 200–250 of Ewing sarcoma a year.

IX. Soft tissue tumors and other extraosseous sarcomas

Soft part tumors and extraosseous sarcomas are malignant tumors originating in mesenchymal tissues, such as muscles, fat, blood vessels and conjunctive tissue.

In childhood, the most common soft tissue sarcoma is rhabdomyosarcoma, which makes up 4 to 5% of malignant pediatric tumors.

Advances in therapy have significantly improved survival rates for this type of cancer.

X. Germ Cell Tumors, Trophoblastic Tumors and Gonadal Neoplasms

Germ Cell Tumors (GCTs) neoplasms (benign and malignant) originating in germ cells, which give origin to the gametes (ova/testes). They can occur inside the ovaries or testicles; or outside of them (extragonadal), for instance in the sacrococcygeal region, retroperitoneum, mediastinum and the Central Nervous System. GCTs make up 3% of malignant pediatric tumors.

XI. Other malignant epithelial neoplasms and malignant melanomas

According to the ICCC-3, this group includes five distinct subgroups of tumors:

- Thyroid carcinoma: the most common endocrine tumor in adolescence, especially in girls.
- Adrenocortical carcinoma.
- Nasopharyngeal carcinomas.
- Malignant melanomas: the most aggressive kind of skin cancer. Although rare in children, it merits attention because of its aggressive behavior.
- Skin carcinomas: non-melanoma skin cancer, including basal cells and squamous cell carcinomas.

XII. Other malignant and unspecified neoplasms

This group includes all malignant neoplasms that have not been classified in the above groups..

Results for Pediatric Tumors

5.1. Descriptive results

From January 2000 to 2023, the A.C. Camargo Cancer Center's Hospital Cancer Registry recorded around 123,000 new analytic cases of cancer (without previous treatment) for all types of cancer, including multiple cases of non-melanoma skin cancer.

The Pediatric Tumors CR represented 910 cases) of the new cases treated by the A.C. Camargo Cancer Center between 2000 and 2023, reinforcing how rare this group of tumors is (Figure 2).

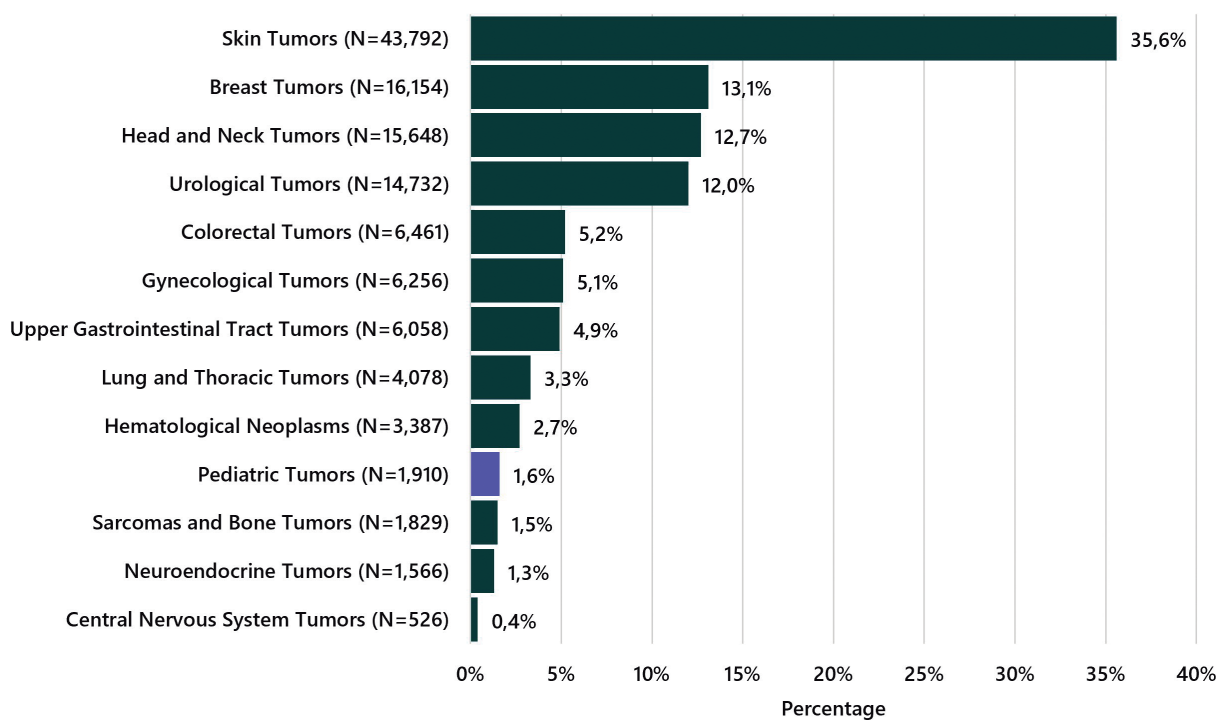


Figure 2. Proportional distribution of the 123,178 new cancer cases by Reference Center, HCR/A.C. Camargo Cancer Center, 2000 to 2023.

Pediatric tumors made up less than 2% of the total cases over this period. The number of new pediatric tumors ranged from (2000) to 54 cases (2023), with an average of 79 cases per year at the Institution (Figure 3).

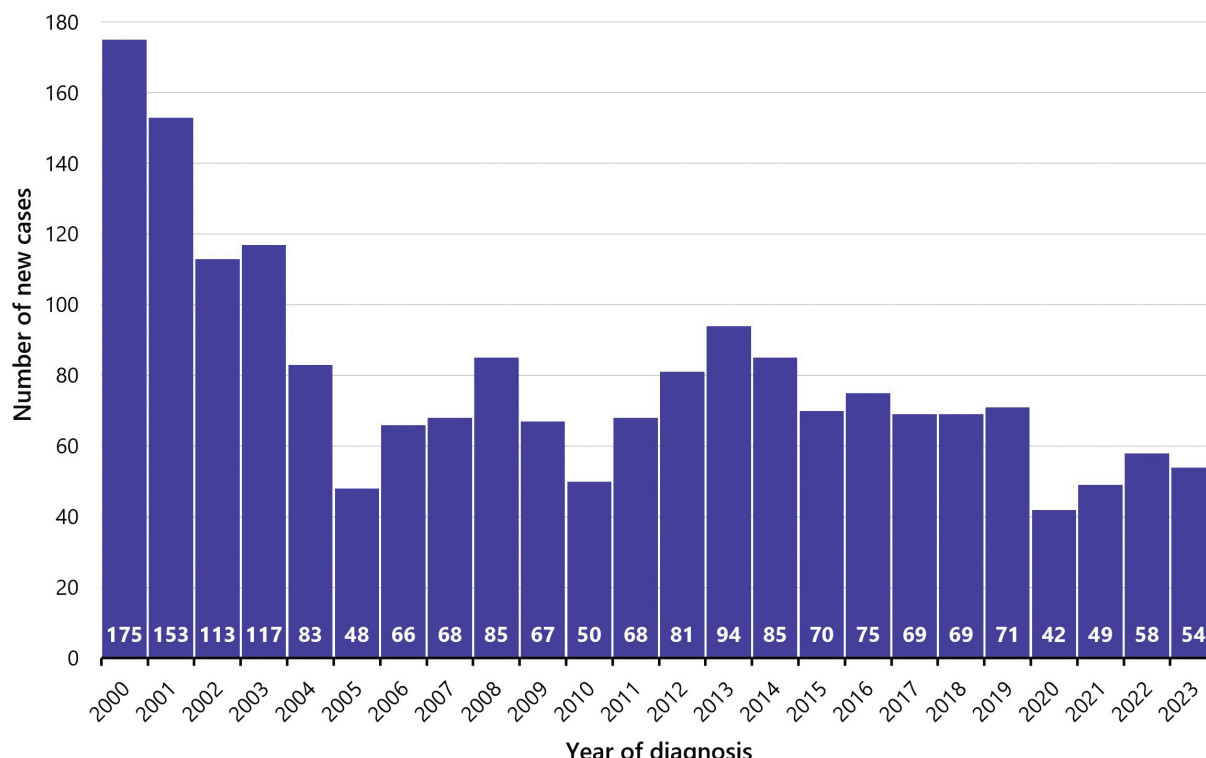


Figure 3. Distribution of the number of new pediatric cancer cases by year of diagnosis, HCR/A.C.Camargo Cancer Center, 2000 to 2023.

The number of new cases (unique or multiple tumors) treated by the UHS went down over the course of time, with stability in the number of cases treated by agreement or privately (non-UHS) (Figure 4).

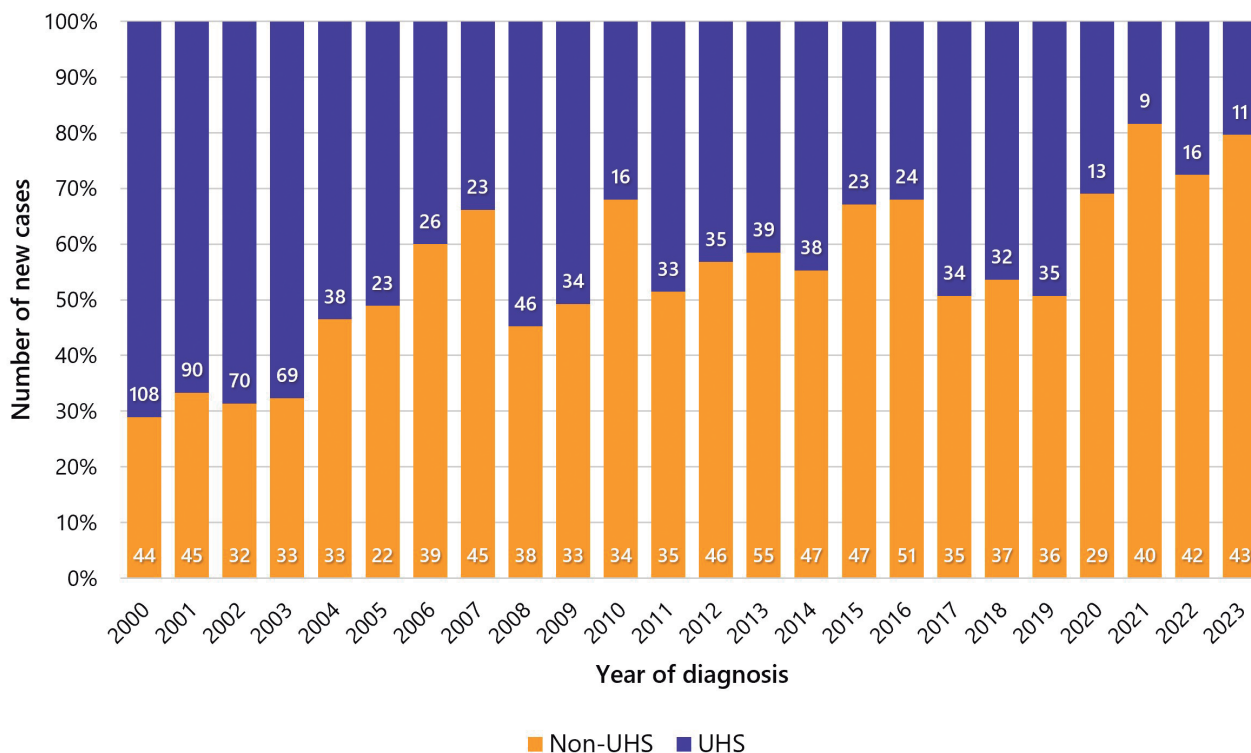


Figure 4. Distribution of the number of new pediatric cancer cases by year of diagnosis and category of care, HCR/A.C.Camargo Cancer Center, 2000 to 2023.

The distribution of pediatric tumors was 50.7% boys and 49.3% girls (Figure 5).

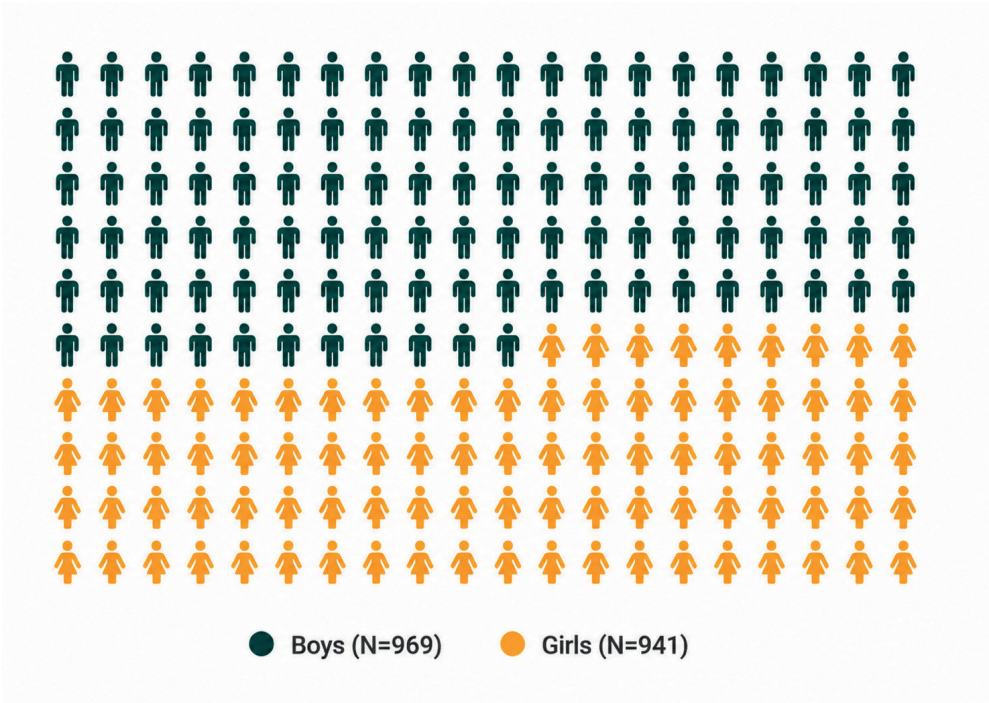


Figure 5. Distribution of the number of new pediatric cancer cases by sex, HCR/A.C.Camargo Cancer Center, 2000 to 2023.

Most cases occurred between ages 5 and 14 years of age for boys (41%) and girls (38%), followed by the 0 to 4 years old group, with equal distribution across both sexes (34%). There was a lower proportion of cases in adolescents aged 15 to 18 (Figure 6).

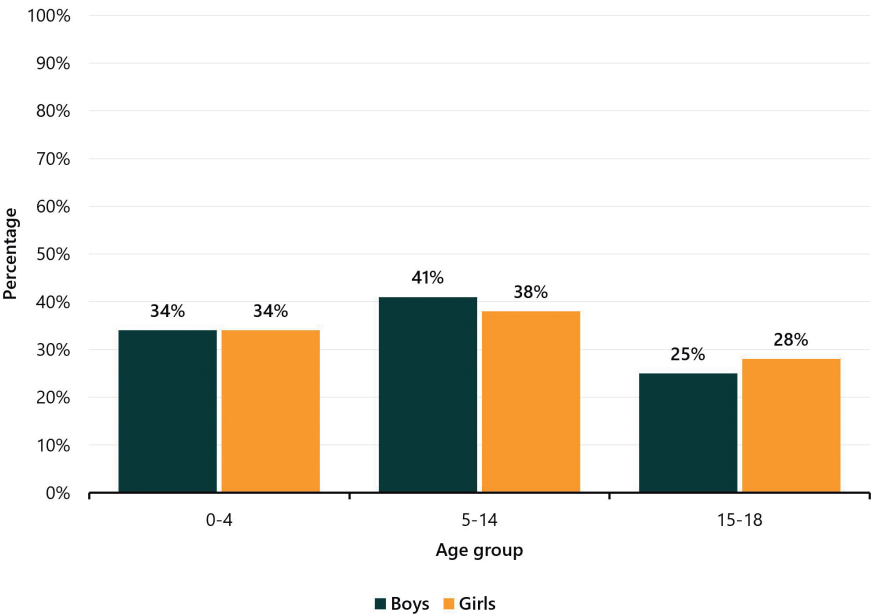


Figure 6. Distribution of the 1,910 new cases of pediatric cancer by sex, HCR/A.C.Camargo Cancer Center, 2000 to 2023.

The group of malignant epithelial neoplasms (group XI) made up 18% of the cases, followed by hematologic tumors: 13% leukemias (group I) and lymphomas (group II) (Figure 7). Out of the 344 cases in group XI, 152 cases (44%) were skin cancer (melanoma and non-melanoma), 117 cases (34%) were thyroid cancer and 75 other epithelial cancers (22%).

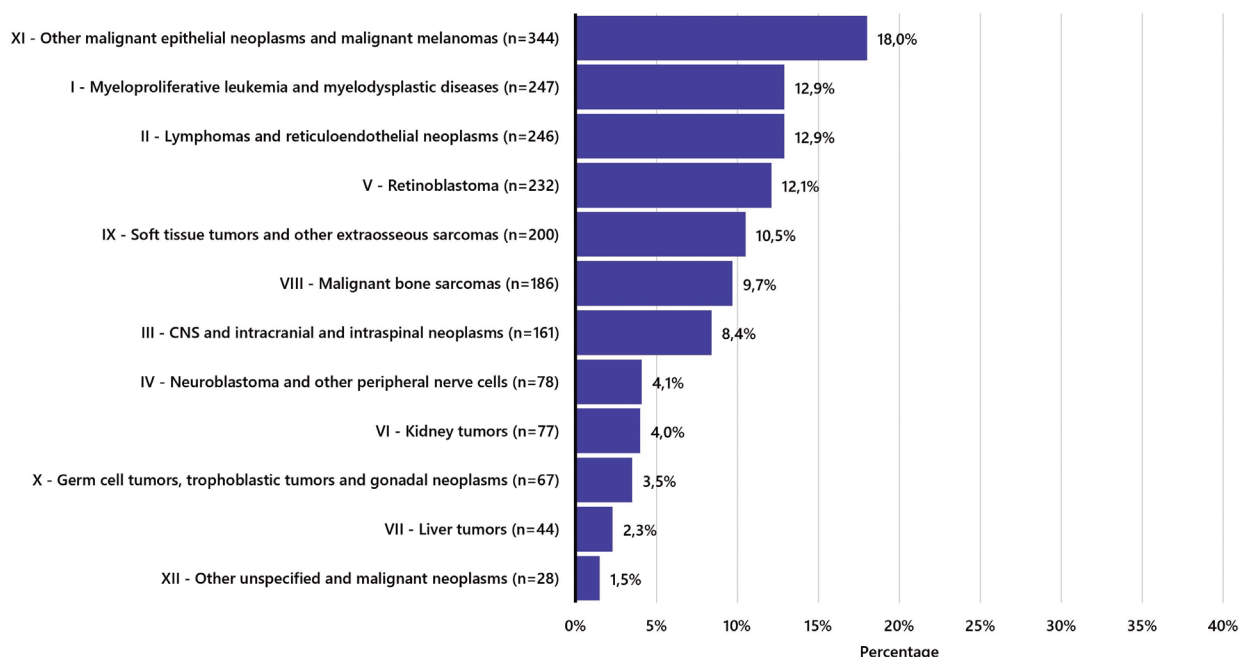


Figure 7. Distribution of 1,910 new cases of pediatric cancer by group according to the International Classification of Childhood Cancer, Third Edition (ICCC-3), HCR/A.C.Camargo Cancer Center, 2000 to 2023.

Table 1 describes the pediatric tumor groups by age group. And Table 2 shows the pediatric tumor groups by age group and sex.

Table 1. Distribution of the new pediatric cancer cases, by age group, according to the ICCC-3, HCR/A.C.Camargo Cancer Center, 2000 to 2023.

International Classification of Childhood Cancer – Third Edition (ICCC-3)	Total			
	0-4 n (%)	5-14 n (%)	15-18 n (%)	Total n (%)
I - Myeloproliferative leukemia and myelodysplastic diseases	101 (40.9)	109 (44.1)	37 (15.0)	247 (100.0)
II - Lymphomas and reticuloendothelial neoplasms	34 (13.8)	116 (47.2)	96 (39.0)	246 (100.0)
III - CNS and intracranial and intraspinal neoplasms	41 (25.5)	96 (59.6)	24 (14.9)	161 (100.0)
IV - Neuroblastoma and other peripheral nerve cells	57 (73.1)	17 (21.8)	4 (5.1)	78 (100.0)
IX - Soft tissue tumors and other extraosseous sarcomas	225 (97.0)	7 (3.0)	-	200 (100.0)
V - Retinoblastoma	50 (64.9)	25 (32.5)	2 (2.6)	232 (100.0)
VI - Kidney tumors	28 (63.6)	14 (31.8)	2 (4.5)	77 (100.0)
VII - Liver tumors	9 (4.8)	111 (59.7)	66 (35.5)	44 (100.0)
VIII - Malignant bone sarcomas	69 (34.5)	75 (37.5)	56 (28.0)	186 (100.0)
X - Germ cell tumors, trophoblastic tumors and gonadal neoplasms	15 (22.4)	24 (35.8)	28 (41.8)	67 (100.0)
XI - Other malignant epithelial neoplasms and malignant melanomas	14 (4.1)	148 (43.0)	182 (52.9)	344 (100.0)
XII - Other unspecified and malignant neoplasms	7 (25.0)	16 (57.1)	5 (17.9)	28 (100.0)

ICCC-3, International Classification of Childhood Cancer – Third Edition; HCR, Hospital Cancer Registry; CNS, Central Nervous System

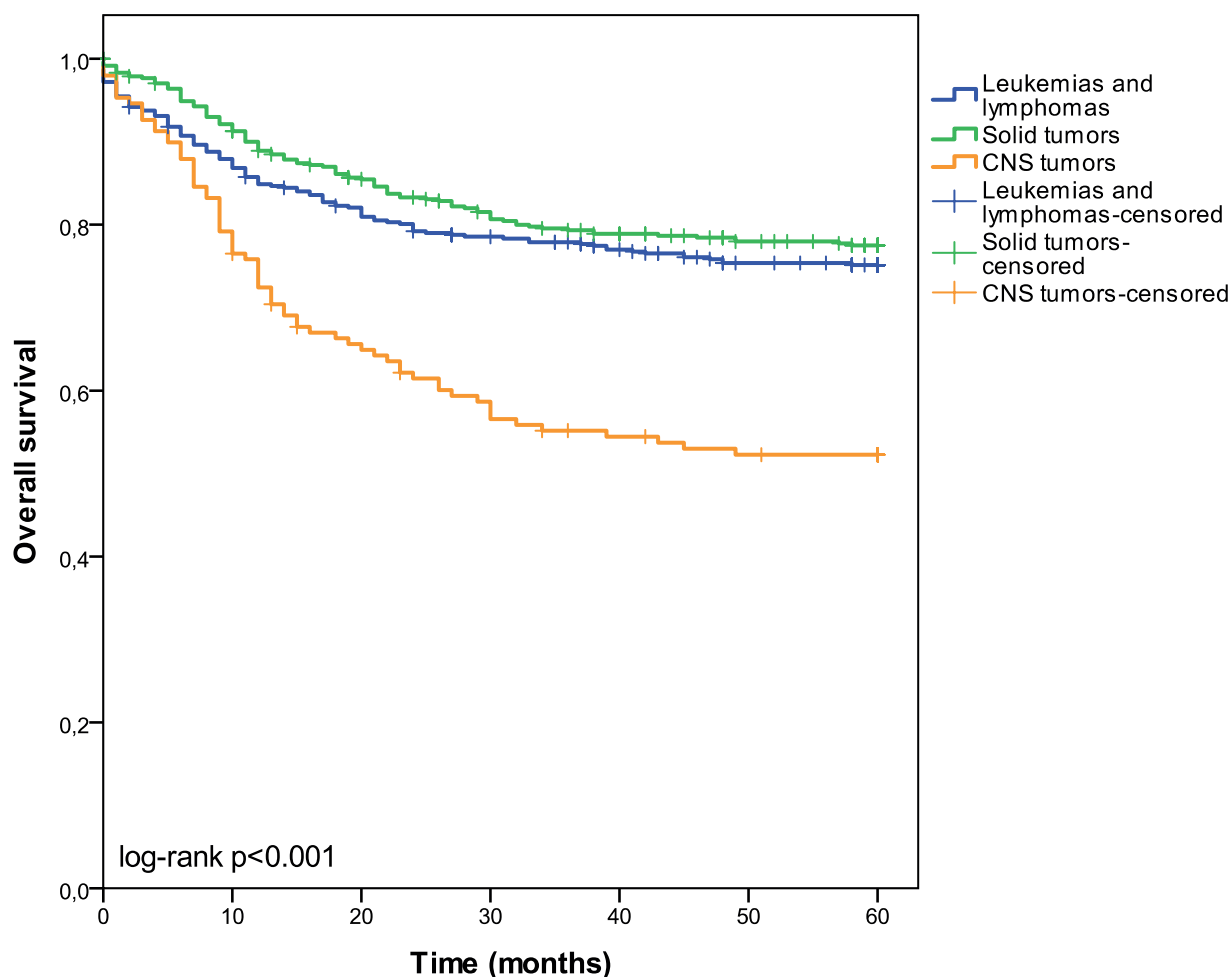
Table 2. Distribution of the new pediatric cancer cases, by sex and age group, according to the ICC-3, HCR/A.C.Camargo Cancer Center, 2000 to 2023.

International Classification of Childhood Cancer – Third Edition (ICC-3)	Boys				Girls			
	0-4 n (%)	5-14 n (%)	15-18 n (%)	Total n (%)	0-4 n (%)	5-14 n (%)	15-18 n (%)	Total n (%)
I - Myeloproliferative leukemia and myelodysplastic diseases	57 (42.7)	55 (41.1)	21 (15.8)	133 (100.0)	44 (38.6)	54 (47.4)	16 (14.0)	114 (100.0)
II - Lymphomas and reticuloendothelial neoplasms	19 (12.2)	82 (52.6)	55 (35.3)	156 (100.0)	15 (16.7)	34 (37.8)	41 (45.6)	90 (100.0)
III - CNS and intracranial and intraspinal neoplasms	19 (23.8)	52 (65.0)	9 (11.3)	80 (100.0)	22 (27.2)	44 (54.3)	15 (18.5)	81 (100.0)
IV - Neuroblastoma and other peripheral nerve cells	26 (70.3)	8 (21.6)	3 (8.1)	37 (100.0)	31 (75.6)	9 (22.0)	1 (2.4)	41 (100.0)
IX - Soft tissue tumors and other extraosseous sarcomas	116 (97.5)	3 (2.5)	-	119 (100.0)	109 (96.5)	4 (3.5)	-	113 (100.0)
V - Retinoblastoma	17 (63.0)	10 (37.0)	-	27 (100.0)	33 (66.0)	15 (30.0)	2 (4.0)	50 (100.0)
VI - Kidney tumors	22 (75.9)	6 (20.7)	1 (3.4)	29 (100.0)	6 (40.0)	8 (53.3)	1 (6.7)	15 (100.0)
VII - Liver tumors	6 (5.5)	64 (58.2)	40 (36.4)	110 (100.0)	3 (3.9)	47 (61.8)	26 (34.2)	76 (100.0)
VIII - Malignant bone sarcomas	33 (34.4)	35 (36.5)	28 (29.2)	96 (100.0)	36 (34.6)	40 (38.5)	28 (26.9)	104 (100.0)
X - Germ cell tumors, trophoblastic tumors and gonadal neoplasms	6 (20.7)	6 (20.7)	17 (58.6)	29 (100.0)	9 (23.7)	18 (47.4)	11 (28.9)	38 (100.0)
XI - Other malignant epithelial neoplasms and malignant melanomas	5 (3.6)	68 (49.3)	65 (47.1)	138 (100.0)	9 (4.4)	80 (38.8)	117 (56.8)	206 (100.0)
XII - Other unspecified and malignant neoplasms	2 (13.3)	9 (60.0)	4 (26.7)	15 (100.0)	5 (38.5)	7 (53.8)	1 (7.7)	13 (100.0)

ICC-3, International Classification of Childhood Cancer – Third Edition; HCR, Hospital Cancer Registry; CNS, Central Nervous System

5.2. Survival results

The results for five-year overall survival were 77.5% for solid tumors, 75.1% for leukemias and lymphomas and 52.3% for Central Nervous System (CNS) tumors (Figure 8).

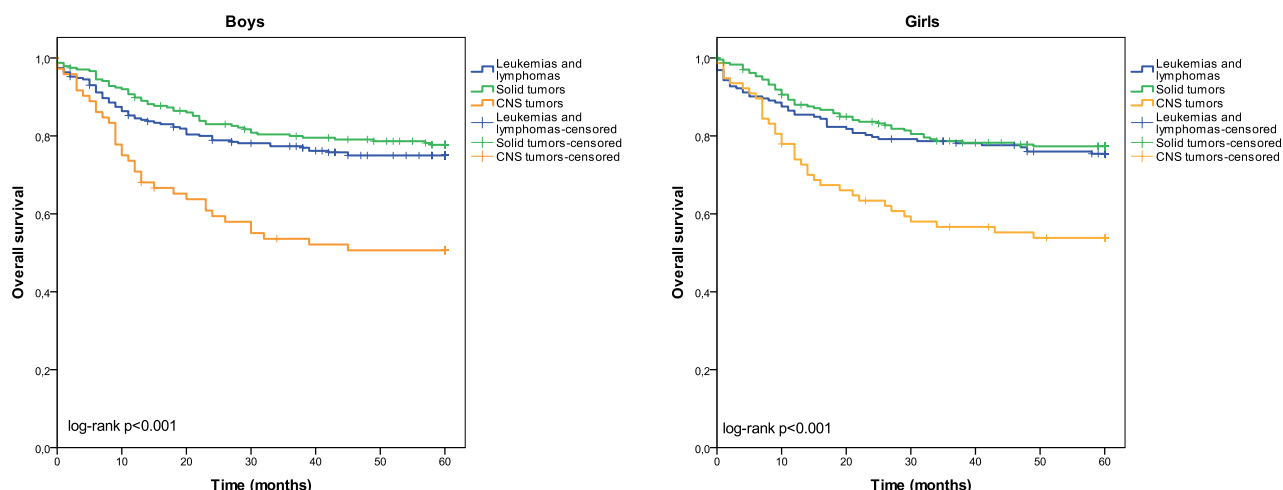


Pediatric tumors	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
Leukemias and Lymphomas	114/465	84.9	77.9	75.1
Solid tumors	104/474	88.9	79.3	77.5
CNS tumors	70/149	72.4	55.2	52.3

N, number of cases in the period, by type of tumor.

Figure 8. Estimated probability of 5-year survival for specific groups of pediatric tumors between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

The five-year overall survival for leukemias and lymphomas (75.0% versus 75.4%), solid tumors (77.7% versus 77.3%) and CNS tumors (50.6% versus 53.8%) were similar for boys and girls (Figure 9).



Pediatric tumors	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
Boys				
Leukemias and Lymphomas	67/272	84.5	77.3	75.0
Solid tumors	52/237	89.8	80.0	77.7
CNS tumors	35/72	70.8	53.6	50.6
Girls				
Leukemias and Lymphomas	47/193	85.4	78.7	75.4
Solid tumors	52/237	88.0	78.7	77.3
CNS tumors	35/77	74.0	56.7	53.8

N, number of cases in the period, by type of tumor.

Figure 9. Probability of 5-year survival for specific groups of pediatric tumors for boys and girls between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

The best results for overall survival out of the twelve main ICCC-3 groups were observed for retinoblastoma (group V) with a 90.8% survival at 5 years, followed by lymphomas (81.0%, group II), soft tissues (69.7%, group IX) and leukemias (69.5%, group I), excluding malignant epithelial neoplasms and malignant melanomas (group XI) (Table 3, Figure 10).

Table 3. Estimated overall survival probabilities at 1, 3 and 5 years for pediatric tumors by International Classification of Childhood Cancer, Third Edition (ICCC-3) group, HCR/A.C.Camargo Cancer Center, 2000 to 2019.

International Classification of Childhood Cancer – Third Edition (ICCC-3)	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
I - Myeloproliferative leukemia and myelodysplastic diseases	71/233	80.7	72.5	69.5
II - Lymphomas and reticuloendothelial neoplasms	43/232	89.1	83.4	81.0
III - CNS and intracranial and intraspinal neoplasms	70/149	72.4	55.2	52.3
IV - Neuroblastoma and other peripheral nerve cells	32/70	75.4	60.1	53.1
IX - Soft tissue tumors and other extraosseous sarcomas	21/229	93.0	90.8	90.8
V - Retinoblastoma	10/71	91.5	87.1	85.6
VI - Kidney tumors	16/39	71.6	61.0	57.8
VII - Liver tumors	63/165	86.6	69.3	61.0
VIII - Malignant bone sarcomas	51/175	88.9	71.6	69.7
X - Germ cell tumors, trophoblastic tumors and gonadal neoplasms	7/56	92.7	86.8	86.8
XI - Other malignant epithelial neoplasms and malignant melanomas	17/263	95.3	94.1	93.1
XII - Other unspecified and malignant neoplasms	4/25	84.0	84.0	84.0

ICCC-3, International Classification of Childhood Cancer – Third Edition; HCR, Hospital Cancer Registry; CNS, Central Nervous System

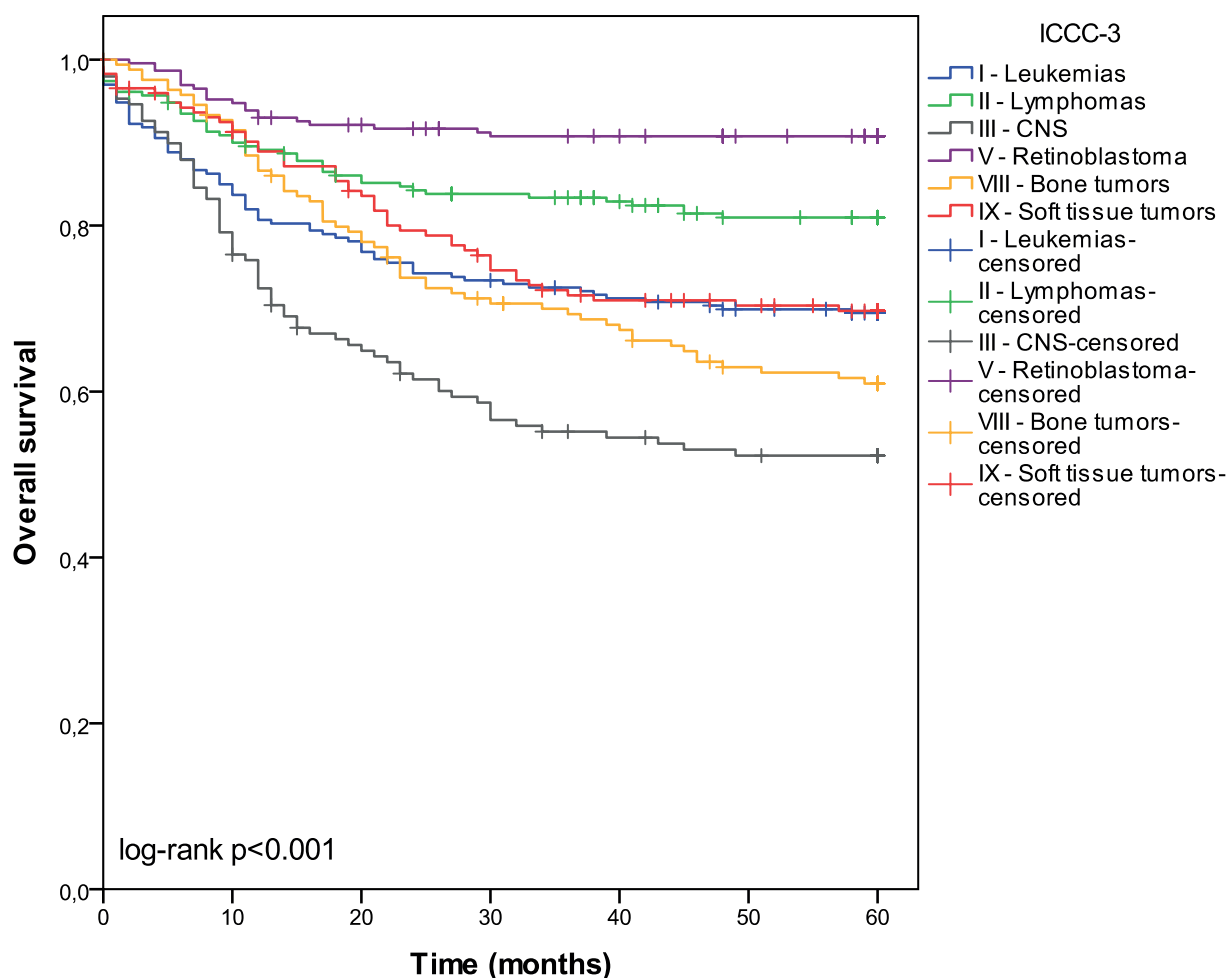
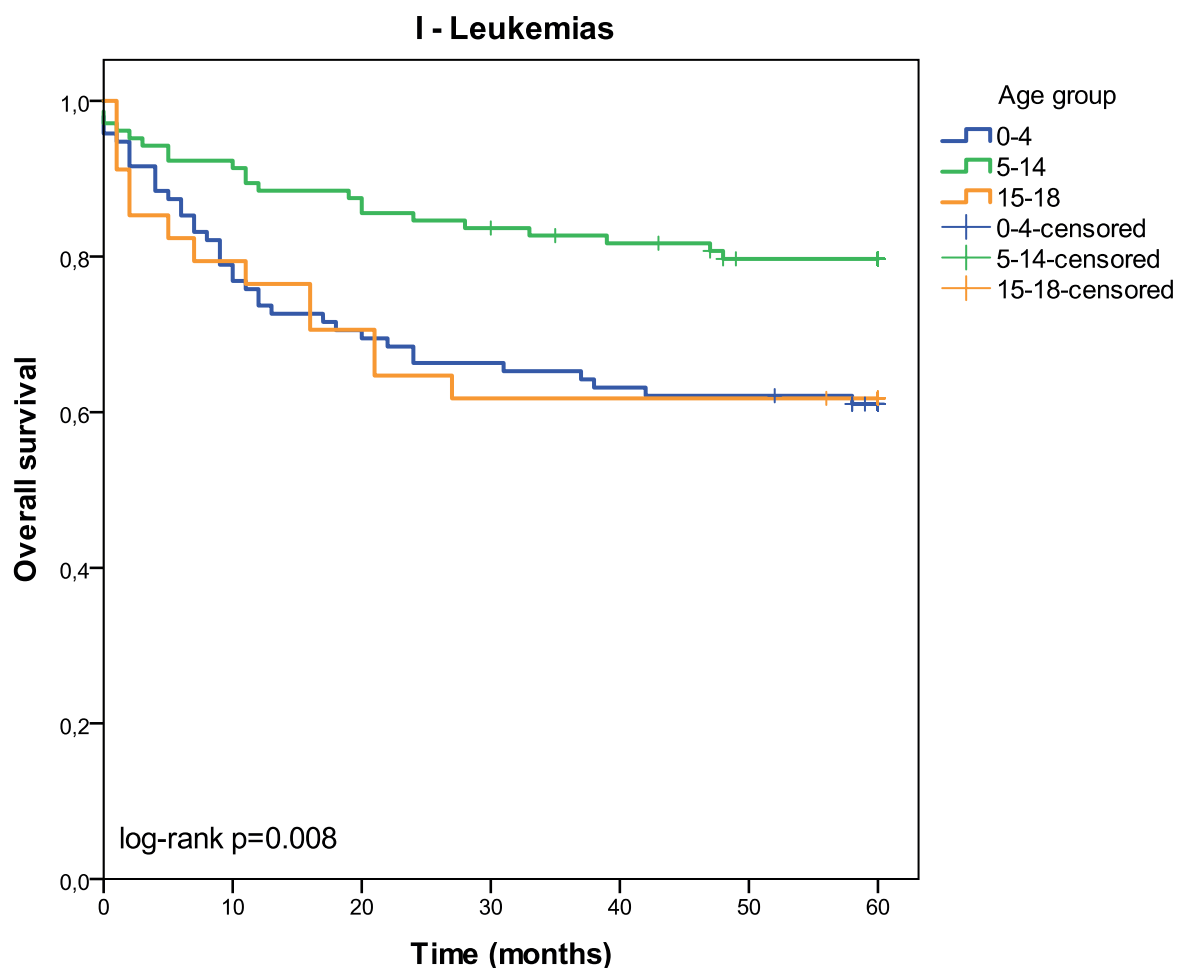


Figure 10. Estimated probability of global 5-year survival for pediatric tumors in selected groups from the International Classification of Childhood Cancer, Third Edition (ICCC-3), between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

In analyzing the survival by group and age group for both sexes, the probability of global 5-year survival for leukemias was similar for the age group 0-4 and 15-18 (61.0% and 61.8%, respectively) and better for the 5-14-year age group (79.7%, Figure 11).

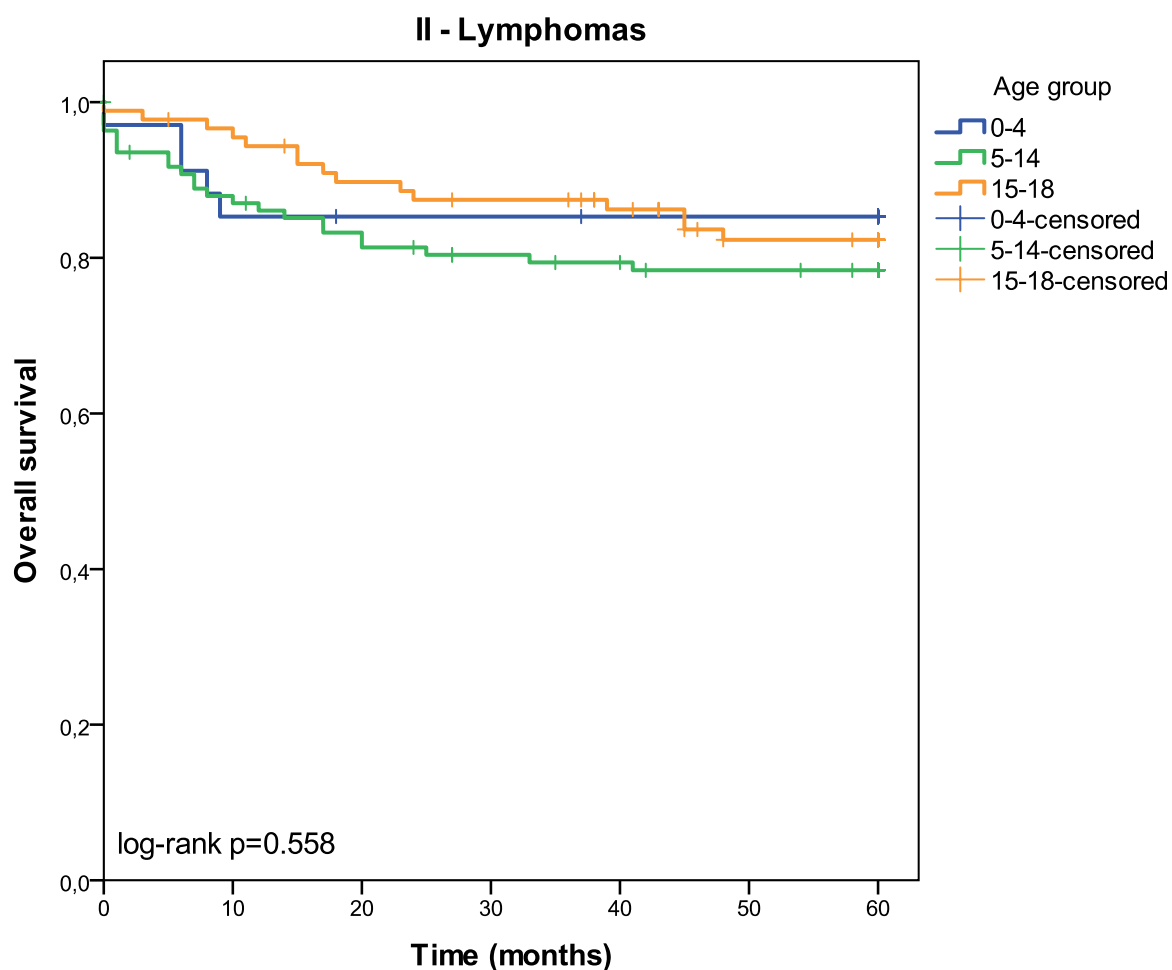


Age group – Group I	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
0-4 years	37/95	75.8	65.3	61.0
5-14 years	21/104	88.5	82.7	79.7
15-18 years	13/34	76.5	61.8	61.8

N, number of cases in the period, by age group.

Figure 11. Estimated probability of 5-year survival for leukemias (group I, International Classification of Childhood Cancer, Third Edition – ICCC-3) between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

The global 5-year survival for lymphomas was 85.3% for ages 0-4, 78.4% for ages 5-14 and 86.2% for ages 15-18 (Figure 12).

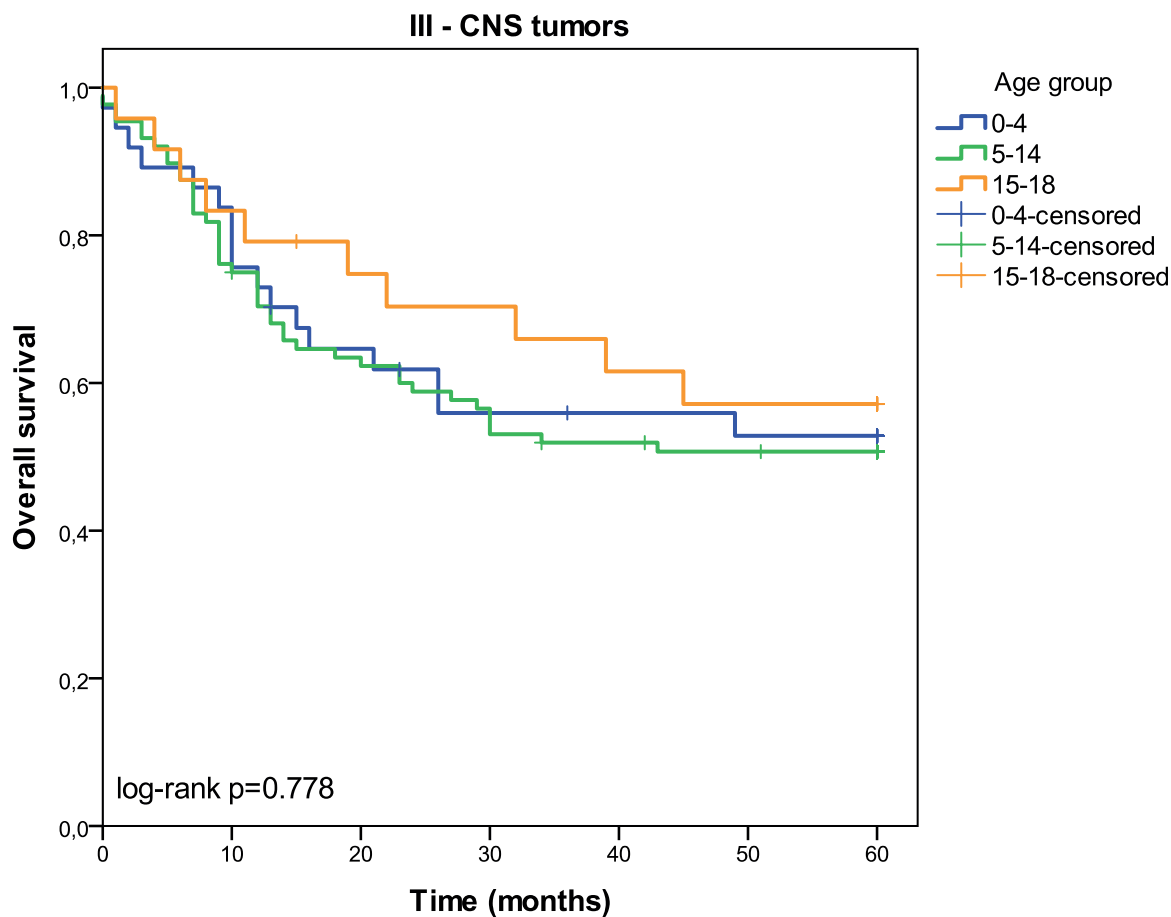


Age group – Group II	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
0-4 years	5/34	85.3	85.3	85.3
5-14 years	23/109	86.1	79.4	78.4
15-18 years	15/89	94.3	87.4	86.2

N, number of cases in the period, by age group.

Figure 12. Estimated probability of global 5-year survival for lymphomas (group II, International Classification of Childhood Cancer, Third Edition – ICCC-3) between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

For CNS tumors, the global 5-year survival was similar across the age group: 52.8% for ages 0-4, 50.7% for ages 5-14 and 57.2% for ages 15-18 (Figure 13).

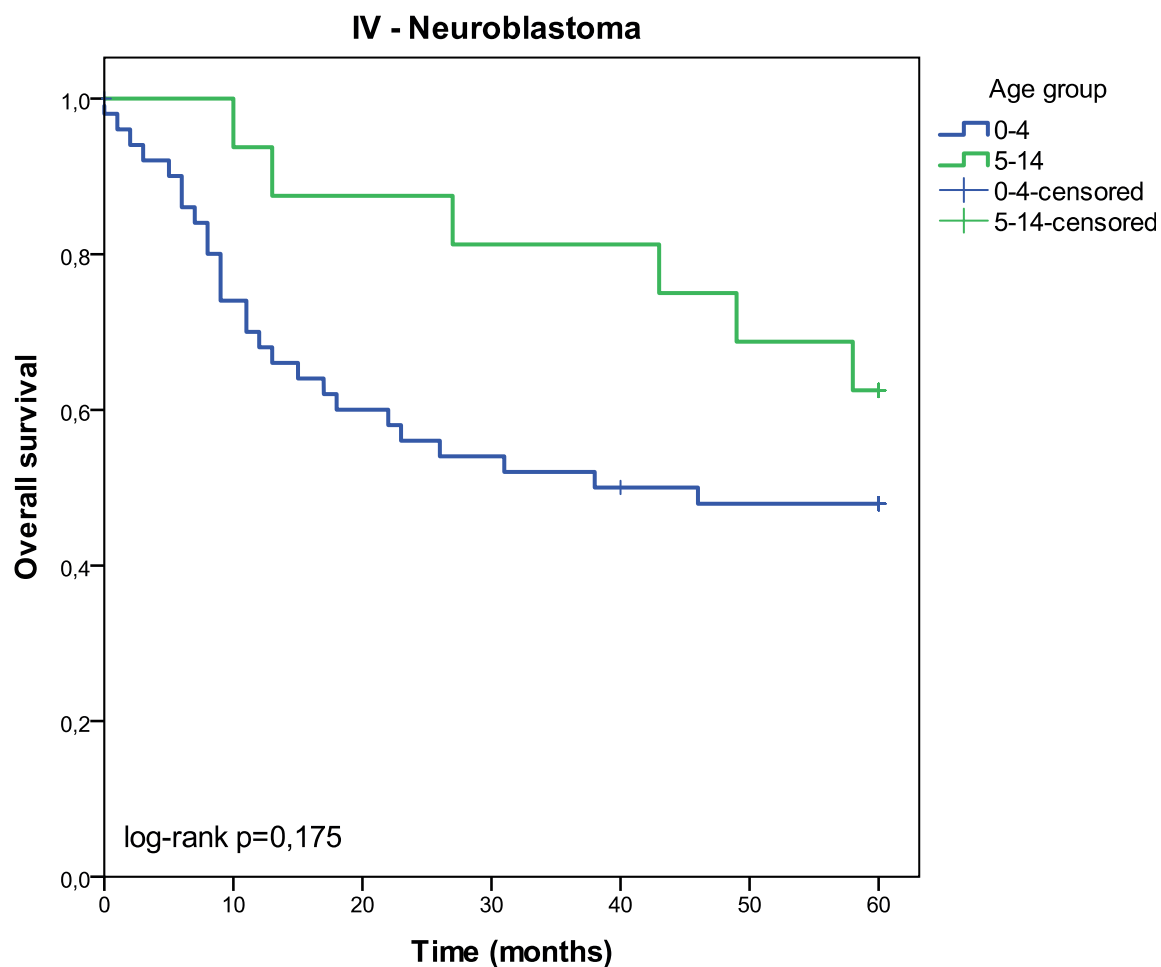


Age group – Group III	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
0-4 years	17/37	73.0	55.9	52.8
5-14 years	43/88	70.4	51.9	50.7
15-18 years	10/24	79.2	66.0	57.2

N, number of cases in the period, by age group.

Figure 13. Estimated probability of global 5-year survival for Central Nervous System (CNS) tumors (group III, International Classification of Childhood Cancer, Third Edition – ICC3-3) between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

For neuroblastomas, global 5-year survival was 47.9% for ages 0-4 and 62.5% for ages 5-14 for the period 2000 to 2019 (Figure 14).

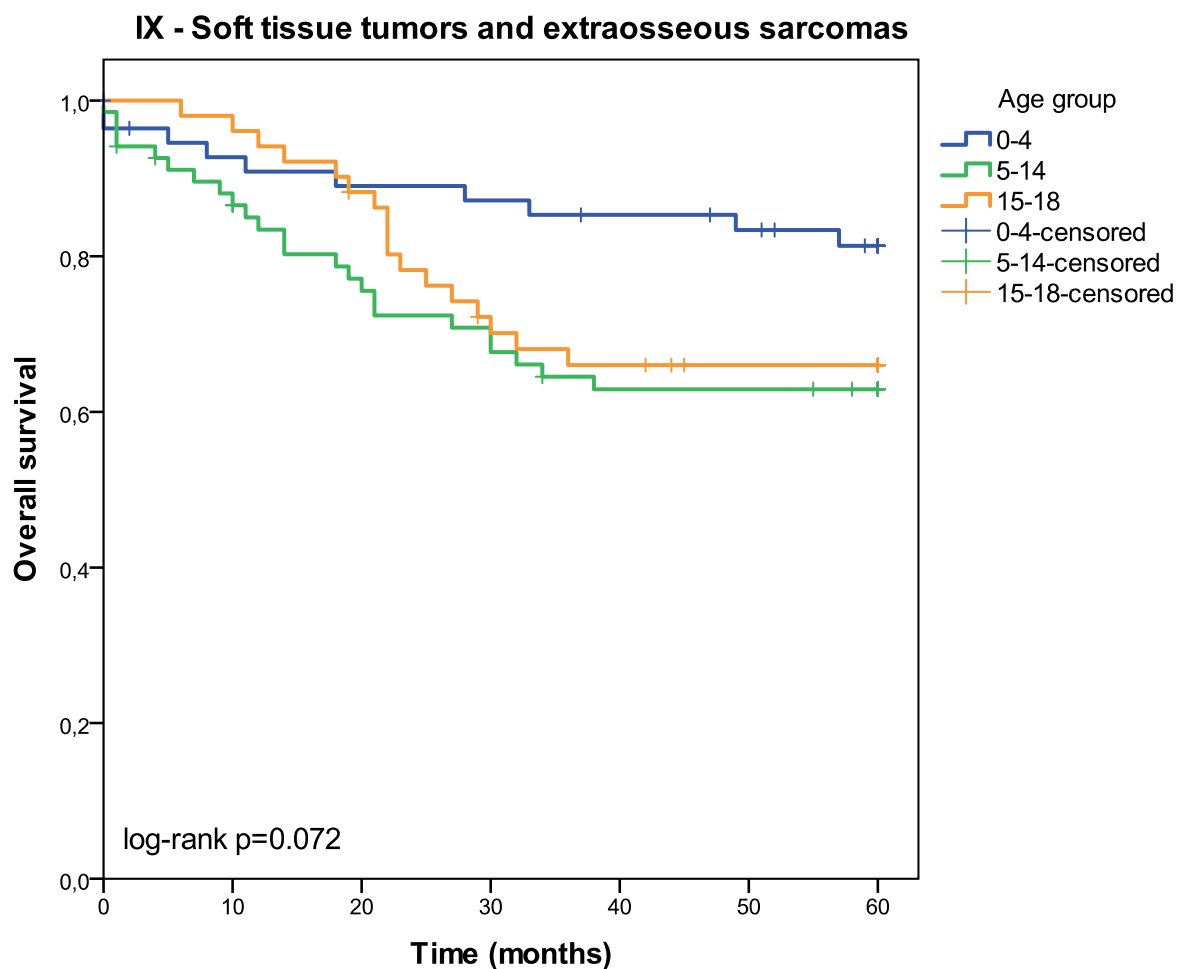


Age group – Group IV	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
0-4 years	26/51	68.0	52.0	47.9
5-14 years	6/16	93.8	81.3	62.5

N, number of cases in the period, by age group.

Figure 14. Estimated probability of global 5-year survival for neuroblastoma and other peripheral nerve tumors (group IV, International Classification of Childhood Cancer, Third Edition – ICCC-3) between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

The global 5-year survival for soft tissue tumors and other extraosseous sarcomas was 81.3% for ages 0-4, 62.9% for ages 5-14 and 66.0% for ages 15-18 (Figure 15).



Age group – Group IX	Deaths/N	Overall Survival (%)		
		1 year	3 years	5 years
0-4 years	10/56	90.9	85.3	81.3
5-14 years	24/68	83.4	64.5	62.9
15-18 years	17/51	94.1	66.0	66.0

N, number of cases in the period, by age group.

Figure 15. Estimated probability of global 5-year survival for soft tissue tumors and other extraosseous sarcomas (group IX, International Classification of Childhood Cancer, Third Edition – ICCC-3) between 2000 and 2019, HCR/A.C.Camargo Cancer Center.

Final Considerations

Between January 2000 and December 2023, the HCR of the A.C.Camargo Cancer Center recorded 1,910 cases of Pediatric Tumors, making up 1.6% of the total new cases of cancer treated by the Institution. This number reinforces the rareness of pediatric neoplasms.

Cancer in children and adolescents has characteristics that are distinct from cancer in adults, with more accelerated tumor growth and greater sensitivity to chemotherapy, which allows rates of cure to reach near 80%. These results reflect the positive impact of a multidisciplinary approach, updated therapeutic protocols and infrastructure dedicated to pediatric cancer care.

The most common types of pediatric tumors were leukemias, lymphomas and retinoblastomas. 5-year overall survival was similar for boys and girls, with small variations between them for leukemias and lymphomas (75.0% vs. 75.4%), solid tumors (77.7% vs. 77.3%) and Central Nervous System (CNS) tumors (50.6% vs. 53.8%).

Out of the twelve main groups in the International Classification of Childhood Cancer, Third Edition (ICCC-3), the best 5-year global survival indexes were observed for retinoblastomas (90.8%), followed by lymphomas (81.0%). By contrast, CNS tumors and neuroblastomas still present important challenges, with lower survival rates of 52.3% and 53.1%, respectively.

Since the middle of the 1960s, the A.C.Camargo Cancer Center has played a fundamental role in advancing pediatric oncology, recognizing the specificities of cancer in children and adolescents. Despite the complexity and rareness of this group of tumors, the commitment to the continuing education of multiprofessional teams, the capable performance of these teams, the commitment to research development in this area, and the incorporation of cutting-edge technologies have allowed the Institution to achieve results comparable to those of key international centers.

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Access to the HCR database

Access to the Hospital Cancer Registry makes it possible to understand the profile of patients who have been treated at the A.C.Camargo Cancer Center since 2000. The HCR database comprises sociodemographic, clinical and epidemiological information, as well as data about the morphological characteristics of the tumor, its clinical stage, treatment and Follow-up for vital status.

Access to this information is available on the A.C.Camargo's intranet through the Tabnet tool:

<https://tabnet-rhc.accamargo.org.br>



The anonymized database can be consulted via Tabnet-HCR, which allows for the construction of tables according to the available variables: diagnosis/previous treatment, Federative Unit (FU) of birth, FU or residence, age group, sex, educational level and information about the tumor (topography, morphology, clinical stage, treatment).

It can be consulted via the Institution's intranet (link above), and, publicly, together with the other HCRs in the State of São Paulo, via the FOSP site (<https://fosp.saude.sp.gov.br/>) or directly via Tabnet-FOSP. Access: (<http://200.144.1.68:8465/cgi-bin/dh?rhc/rhc-geral.def>).

Access to the A.C.Camargo Cancer Center's non-anonymized data should be requested for specific research projects, following approval by the Research Ethics Committee (REC). Requests should be sent by email to the HCR coordinator, accompanied by the REC's full approval letter, during the study's development period.

HCR data from any institution reflects the characteristics of the patients treated and diagnosed there; it does not represent overall incidence in the area. Thus, the HCR/A.C.Camargo exclusively describes the profile of patients treated at the A.C.Camargo Cancer Center.

Get in touch with us and support links

1. Get in touch with the HCR

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2. HCR on the A.C.Camargo Cancer Center site

<https://accamargo.org.br/pesquisa/registro-hospitalar-de-cancer>

3. List of active clinical studies at the A.C.Camargo Cancer Center

<https://accamargo.org.br/pacientes/estudos-clinicos/lista-de-estudos-clinicos>

4. Oncology Manual for Non-Oncologists, developed by the A.C.Camargo Cancer Center

<https://accamargo.org.br/form/manual-de-oncologia>

References

A.C. Camargo Cancer Center (org.). Manual de oncologia para não oncologistas [e-book]. 1. ed. São Paulo: A.C. Camargo Cancer Center; Fundação Antônio Prudente, 2025. 87p.

Disponível em: <https://accamargo.org.br/form/manual-de-oncologia>. Acesso em: 18 de agosto de 2025.

A.C. Camargo Cancer Center. Centro de Referência de Tumores Pediátricos, 2025. Disponível em: <https://accamargo.org.br/cancer-center/centro-de-referencia-de-tumores-pediatricos>. Acesso em: 18 de agosto de 2025.

A.C. Camargo Cancer Center; Mendonça e Silva D.R., Curado M.P., Fregnani J.H.T. Observatório do câncer: Registro Hospitalar de Câncer do A.C. Camargo Cancer Center 2000 a 2020. São Paulo: Fundação Antônio Prudente, 2023. Disponível em: https://accamargo.org.br/sites/default/files/2023/05/observatorio_cancer_v1.1.pdf.

A.C. Camargo Cancer Center; Mendonça e Silva D.R., Chaves H.V.S., Schmidt Filho J., da Silveira T.M.B., D'Almeida Costa F., Rúbia Ferreira C.R., Bezerra S.M., Curado M.P. Observatório do câncer, neoplasias hematológicas: Registro Hospitalar de Câncer do A.C. Camargo Cancer Center 2000 a 2022, volume II. São Paulo: Fundação Antônio Prudente, 2024. Disponível em: https://accamargo.org.br/sites/default/files/2024/09/observatorio_cancer_final_v2-2.pdf.

Brasil. Ministério da Saúde, Instituto Nacional de Câncer José Alencar Gomes da Silva. Registros hospitalares de câncer: planejamento e gestão. 2ª ed. Rio de Janeiro: INCA, 2010.

Brasil. Ministério da Saúde. Secretaria de Assistência à Saúde. Instituto Nacional do Câncer. Classificação internacional do câncer na infância, 1996. Rio de Janeiro: INCA, 1999.

Fundação SEADE. Gerência Demográfica. Vinculação determinística entre bases de dados. São Paulo: Fundação Seade, 2023. Disponível em: <https://spdemografico.seade.gov.br/wp-content/uploads/sites/18/2024/03/SP-Demografico-vinculacao-bases-de-dados-marco-2024-numero-1.pdf>. Acesso em: 15 de setembro de 2025.

Instituto Nacional do Câncer. Ministério da Saúde. Câncer infanto-juvenil. 2025. Disponível em: <https://www.gov.br/inca/pt-br/assuntos/cancer/tipos/infantojuvenil>. Acesso em: 18 de agosto de 2025.

Mendonça e Silva D., Waldvogel B.C., Perdião M.L., de Freitas R.M.V., Morais L.C.C., Curado M.P. FUNDAÇÃO SEADE. Vinculação de Base de Dados [online]. Incremento no tempo de seguimento dos pacientes acompanhados no A.C.Camargo Cancer Center, por meio da vinculação entre as bases de pacientes e de óbitos. SP Demográfico março 2024;24(1). Disponível em: <https://spdemografico.seade.gov.br/wp-content/uploads/sites/18/2024/03/SP-Demografico-vinculacao-bases-de-dados-marco-2024-numero-1.pdf>

National Program of Cancer Registries. Link Plus [Internet]. Atlanta: Centers for Disease Control and Prevention; 2007. Disponível em: <https://www.cdc.gov/national-program-cancer-registries/registry-plus/link-plus.html>. Acesso em: 15 de setembro de 2025.

Organização Mundial da Saúde. CID-O Classificação internacional de Doenças para Oncologia. 3ª Ed. EDUSP. São Paulo, 2012.

Secretaria de Estado da Saúde de São Paulo (SESSP). Fundação Oncocentro de São Paulo. Resolução SS-15, de 27 de janeiro de 2000. Disponível: <https://fosp.saude.sp.gov.br/fosp/diretoria-adjunta-de-informacao-e-epidemiologia/rhc-registro-hospitalar-de-cancer/resolucao-ss-15/>. Acesso em: 16 de setembro de 2025.

Secretaria de Estado da Saúde de São Paulo (SESSP). Fundação Oncocentro de São Paulo. Registro Hospitalar de Câncer: conceitos, rotinas e instruções de preenchimento. 2ª ed. São Paulo, 2013. Disponível em: https://fosp.saude.sp.gov.br/wp-content/uploads/ManualRHC_2013.pdf. Acesso em: 16 de setembro de 2025.

Steliarova-Foucher E., Stiller C., Lacour B., Kaatsch P. International Classification of Childhood Cancer, third edition. Cancer. 2005 Apr 1;103(7):1457-67.

WHO Classification of Tumours Editorial Board. Paediatric tumours [Internet]. Lyon (France): International Agency for Research on Cancer; 2022. (WHO classification of tumours series, 5th ed.; vol. 7). Disponível em: <https://tumourclassification.iarc.who.int/chapters/44>. Acesso em: 03 de setembro de 2025.



Secretaria de Estado da Saúde
Fundação Oncocentro de São Paulo
Registro Hospitalar de Câncer

FICHA DE ADMISSÃO

Data : 20/02/2013
pág.: 1 / 2

Instituição: _____ Número RHC: _____

IDENTIFICAÇÃO DO PACIENTE

Prontuário: _____ Categoria Atend.: ☐ 1. SUS / 2. Convênio / 3. Particular Data de Nascimento: ____/____/____

Sexo: ☐ 1. Masculino / 2. Feminino Documento: ☐ 1. PIS/PASEP / 2. RG / 3. Certidão de Nascimento 4. CPF / 5. Cartão SUS Nº: _____ Idade: _____

Nome: _____

Nome da mãe: _____

Escolaridade: ☐ 1. Analfabeto / 2. Ens. Fundamental incompleto / 3. Ens. Fundamental completo / 4. Ensino Médio completo / 5. Superior completo / 9. Ignorado

Estado/País de nascimento: _____

Residência atual

Logradouro: _____ Nº: _____

Complemento: _____ Tel.: _____ CEP: _____

Cidade: _____ UF: _____

SITUAÇÃO DO PACIENTE À ADMISSÃO

Data da primeira consulta: ____/____/____ Clínica do atendimento: _____

Diagnóstico/tratamento anterior: 1. sem diagnóstico/sem tratamento / 2. com diagnóstico/sem tratamento / 3. com diagnóstico/com tratamento / 4. outros

Instituição de origem: _____

INFORMAÇÕES SOBRE A DOENÇA

Data do 1º diagnóstico: ____/____/____

Base para realização do diagnóstico: 1. exame clínico / 2. recursos auxiliares não microscópicos / 3. confirmação microscópica / 9. sem informação

Caracterização do tumor principal

Localização primária: _____ Lateralidade : ☐ 0 - Não se aplica / 1 - Direita / 2 - Esquerda

Tipo histológico: _____

Estadio clínico:

S:			

 T:

G:			

 N:

--	--	--	--

 M:

--	--	--	--

 Outro estadiamento: _____

Estadio pós-cirúrgico: PT:

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 pN:

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 pM: _____

Metástases:



Secretaria de Estado da Saúde
Fundação Oncocentro de São Paulo
Registro Hospitalar de Câncer

FICHA DE ADMISSÃO

Data : 20/02/2013
pág.: 2 / 2

Instituição: _____ Número RHC: _____

EVENTOS DESSE ATENDIMENTO

Data de início do tratamento no hospital: ____ / ____ / ____

Tratamento recebido no Hospital:

- ☐ Nenhum
 ☐ Cirurgia
☐ Radioterapia
 ☐ Quimioterapia
 Hormonioterapia ☐ TMO
 Imunoterapia ☐ Outros

Fora do hospital antes da admissão:

- ☐ Nenhum
 ☐ Cirurgia
☐ Radioterapia
 ☐ Quimioterapia
 Hormonioterapia ☐ TMO
 Imunoterapia ☐ Outros
☐ Sem informação

Fora do hospital durante e/ou após admissão:

- ☐ Nenhum
 ☐ Cirurgia
☐ Radioterapia
 ☐ Quimioterapia
 Hormonioterapia ☐ TMO
 Imunoterapia ☐ Outros
☐ Sem informação

Razão para não realização do tratamento no hospital :

- ☐ 1. Recusa do tratamento/ 2. Doença avançada, Falta de condições clínicas/ 3. Outras doenças associadas
☐ 4. Abandono tratamento/ 5. Óbito por câncer/ 6. Óbito por outras causas, SOE/ 7. Outras/ 8. Não se aplica
☐ 9. Sem informação

Estado da doença ao final do tratamento:

- ☐ 1. Sem evidência da doença / 2. Remissão parcial / 3. Doença estável/ 4. Doença em progressão
☐ 5. Fora de possibilidade/ 6. Óbito por câncer/ 7. Óbito por outras causas, SOE/ 8. Tratamento não concluído
☐ 9. Não se aplica/ 10. Sem informação

Data do óbito: ____ / ____ / ____ Data de preenchimento: ____ / ____ / ____ Registrador: _____

OBSERVAÇÕES



Secretaria de Estado da Saúde
Fundação Oncocentro de São Paulo
Registro Hospitalar de Câncer

Data : 20/02/2013

FICHA DE SEGUIMENTO

Instituição:

Número RHC:

IDENTIFICAÇÃO DO PACIENTE

Prontuário: _____ Documento: ☐ 1. PIS/PASEP / 2. RG / 3. Certidão de Nascimento N°: _____
4. CPF / 5. Cartão SUS
Dt. Nascimento: ____ / ____ / ____ Sexo: ☐ 1. Masculino / 2. Feminino
Nome: _____

ÚLTIMA INFORMAÇÃO DO PACIENTE

Situação Atual: ☐ 1. Vivo com câncer / 2. Vivo, SOE / 3. Óbito por câncer / 4. Óbito, SOE

Data da Informação: ____ / ____ / ____

Tratamento Realizado no hospital: Nenhum Cirurgia Radioterapia Quimioterapia
Hormonioterapia TMO Imunoterapia Outros

Tratamento Realizado fora do hospital: ☐ Nenhum ☐ Cirurgia ☐ Radioterapia ☐ Quimioterapia ☐ Hormonioterapia
☐ TMO ☐ Imunoterapia ☐ Outros ☐ Sem informação

Recidiva: ☐ 1. Local / 2. Regional / 3. Não / 9. Sem Informação

Data da Recidiva/Metástase: ____ / ____ / ____

Metástase:

Data do Óbito: ____ / ____ / ____

Data do Preenchimento: ____ / ____ / ____

Registrador: _____

OBSERVAÇÕES



GABARITO DO ARQUIVO DBF

CAMPO	DESCRIÇÃO
IBGE	Código do município brasileiro, segundo o IBGE, onde reside o paciente
ESCOLARI	Escolaridade: 1 – Analfabeto 2 – Ensino Fundamental Incompleto 3 – Ensino Fundamental completo 4 – Ensino Médio Completo 5 – Ensino Superior 9 – Ignorado
IDADE	Idade do paciente
DTNASC	Data de nascimento
SEXO	Sexo do paciente: 1 – Masculino 2 – Feminino
UFNASC	Estado (UF) de nascimento
UFRESID	Estado (UF) da residência
DTOBITO	Data do óbito
DIAGPREV	Diagnóstico e tratamento anterior: 1 – Sem diagnóstico e sem tratamento 2 – Com diagnóstico e sem tratamento
CATATEND	Categoria de atendimento à admissão: forma do atendimento realizado no hospital, no momento da admissão, de acordo com: SUS Convênio Particular
(a partir de março/2013)	
SITUACAO	Estado atual após o primeiro tratamento: 01 – Sem evidência da doença 06 – Óbito por câncer 02 – Remissão parcial 07 – Óbito por outras causas 03 – Doença estável 08 – Tratamento não concluído 04 – Doença em progressão 09 – Não se aplica 05 – Fora de possibilidades terapêuticas 10 – Sem informação
NAOTRAT	Razão para a não realização do tratamento: 1 – Recusa do tratamento 6 – Óbito por outras causas 2 – Doença avançada, falta de condições clínicas 7 – Outras razões 3 – Outras doenças associadas 8 – Não se aplica 4 – Abandono do tratamento 9 – Sem informação 5 – Óbito por câncer
BASEDIAG	Base utilizada para o diagnóstico: 1 – Exame clínico 3 – Confirmação microscópica 2 – Recursos auxiliares não microscópicos 9 – Sem informação
TOPO	Topografia. Localização do tumor primário (CID-O, 2ª e 3ª edições)
MORFO	Morfologia. Tipo histológico do tumor primário (CID-O, 2ª e 3ª edições)
DTCONSULTA	Data da primeira consulta
DTDIA	Data do diagnóstico do tumor
EC	Estádio clínico (TNM, 5ª e 6ª edições)
T	Código T (TNM, 5ª e 6ª edições)



DTTRAT	Data de início do primeiro tratamento
TRATAMENTO	Tipo(s) de tratamento(s) proposto(s): A – Cirurgia B – Radioterapia C – Quimioterapia D – Cirurgia + Radioterapia E – Cirurgia + Quimioterapia F – Radioterapia + Quimioterapia G – Cirurgia + Radio + Químio H – Cirurgia+Radio+Químio+Hormônio I – Outras combinações de tratamento J – Nenhum tratamento realizado K – Sem informação do tratamento
META01	Localização da metástase (CID-O, 2ª e 3ª edições)
META02	Localização da metástase (CID-O, 2ª e 3ª edições)
META03	Localização da metástase (CID-O, 2ª e 3ª edições)
META04	Localização da metástase (CID-O 2ª e 3ª edições)
DTULTSEG	Data do último seguimento informado
A) SITULTSEG (até dez/2011)	Situação do paciente no último seguimento informado: 1 – Vivo com câncer 2 – Vivo, SOE 3 – Óbito por câncer 4 – Óbito, SOE 5 – Liberado de seguimento 9 – Sem informação
B) SITULTSEG (a partir de mar/2012)	Situação do paciente no último seguimento informado: 1 – Vivo com câncer 2 – Vivo, SOE 3 – Óbito por câncer 4 – Óbito, SOE 5 – Perda de seguimento
ANODIAG	Ano do diagnóstico do tumor
ECGRUP	Estadiamento TNM agrupado
TOPOGRUP	Topografia. Localização do tumor primário (CID-O, 2ª e 3ª edições), com 3 dígitos
CICI	Estadiamento Infantil – Grupo + Subgrupo
CICIGRU	Descrição do Estadiamento Infantil (CICI) – Grupo
CICISUBGRU	Descrição do Estadiamento Infantil (CICI) – Subgrupo
FAIXAETARI	Faixa etária (de 10 em 10 anos)
A) LATERALI	Localização (lateralidade) de tumores em órgãos, glândulas e cavidades em pares 1 – Direita 2 – Esquerda 3 – Indiferente
B) LATERALI (a partir de set/2011)	Localização (lateralidade) de tumores em órgãos, glândulas e cavidades em pares 1 – Direita 2 – Esquerda 3 – Não se aplica
DSCTOPO	Descrição da topografia. Localização do tumor primário (CID-O, 2ª e 3ª edições)
DSCMORFO	Descrição da morfologia. Tipo histológico do tumor primário (CID-O, 2ª e 3ª edições)



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