Cancer Council Queensland

Australian Government
Cancer Australia

Childhood cancer staging for population registries

according to the

Toronto Childhood Cancer Stage Guidelines[1]

Acknowledgements

This project was funded by Cancer Australia through an initiative to strengthen national data capacity for reporting cancer stage at diagnosis.

We also acknowledge and thank the Australasian Association of Cancer Registries, all Australian State and Territory Cancer Registries, the Australian Institute of Health and Welfare and the treating hospitals listed below for their support of the Australian Childhood Cancer Registry and of this project:

Lady Cilento Children's Hospital, Brisbane

Sydney Children's Hospital, Sydney

The Children's Hospital at Westmead, Sydney

John Hunter Hospital, Newcastle

Royal Children's Hospital, Melbourne

Monash Medical Centre, Melbourne

The Women's and Children's Hospital, Adelaide

Princess Margaret Hospital for Children, Perth

Royal Hobart Hospital, Hobart

Suggested citation

Aitken JF, Youlden DR, Moore AS, Baade PD, Ward LJ, Thursfield VJ, Valery PC, Green AC, Gupta S, Frazier AL. *Childhood cancer staging for population registries according to the Toronto Childhood Cancer Stage Guidelines*. Cancer Council Queensland and Cancer Australia: Brisbane, Australia; 2017. Available at https://cancerqld.blob.core.windows.net/content/docs/childhood-cancer-staging-for-population-registries.pdf.

Table of contents

List of tables

List of figures

Abbreviations

Abbreviation	
AJCC	American Joint Committee on Cancer
APCR	Australian Paediatric Cancer Registry
COG	Children's Oncology Group
CNS	Central nervous system
CSF	Cerebrospinal fluid
FIGO	International Federation of Gynaecological Oncologists
ICCC-3	International Classification of Childhood Cancer, Third Edition
ICD-O-3	International Classification of Diseases for Oncology – Third Edition
IDRF	Image-defined risk factors
INRGSS	International Neuroblastoma Risk Group Staging System
IRSS	International Retinoblastoma Staging System
M	Medulloblastoma
MIBG	Iodine-123 metaiodobenzylguanidine
MRI	Magnetic resonance imaging
MS	Metastatic special
MYCN	v-myc avian myelocytomatosis viral oncogene neuroblastoma derived homolog
NOS	Not otherwise specified
NWTSG	National Wilms tumour Study Group
PNET	Primitive neuroectodermal tumour
pPNET	Peripheral neuroectodermal tumour
RBC	Red blood cell count
RMS	Rhabdomyosarcoma
SEER	Surveillance, Epidemiology and End Results Programme
SIOP	International Society of Paediatric Oncology
STaR	Staging, Treatment and Recurrence project
TNM	Tumour, lymph nodes, metastasis
UICC	Union for International Cancer Control
WBC	White blood cell count
WHO	World Health Organisation

Introduction

The collection of internationally consistent information on childhood cancer stage by population-based cancer registries is essential for epidemiologic analysis, international benchmarking and meaningful comparisons of childhood cancer incidence and outcomes.

The tumour/node/metastasis (TNM) system is the standard staging system for most adult cancers, however, it is inadequate for documenting extent of disease in children. Disease-specific staging systems have been developed for childhood cancers but, for many diagnostic groups, two or more systems are in clinical use and there is no internationally uniform standard suitable for population-based cancer registration.[1]

The *Toronto Paediatric Cancer Stage Guidelines* for population cancer registries

A consensus meeting was convened in 2014 by the Union for International Cancer Control (UICC), the Dana-Farber Cancer Institute and the Hospital for Sick Children, Toronto to address the lack of consistent information on childhood cancer stage in population registries.[1] For each of a subset of the major childhood cancer diagnostic groups/subgroups, the meeting reviewed all disease-specific cancer staging systems currently in use and recommended the one most suitable for use by population-based cancer registries. The recommended staging systems are listed as the *Toronto Paediatric Cancer Stage Guidelines*.[1]

The *Guidelines* recommend disease-specific staging systems for Acute lymphoblastic leukaemia, Acute myeloid leukaemia, Hodgkin lymphoma, Non-Hodgkin lymphoma, neuroblastoma, Wilms tumour, rhabdomyosarcoma, Non-rhabdomyosarcoma soft tissue sarcoma, osteosarcoma, Ewing sarcoma, retinoblastoma, hepatoblastoma, germ cell tumours (testicular cancer and ovarian cancer), medulloblastoma and ependymoma.

Here we provide detailed descriptions of the staging systems recommended in the *Guidelines* to assist population cancer registries to collect internationally consistent and comparable information on childhood cancer stage at diagnosis using available medical records.

The *Guidelines* are endorsed by the UICC TNM Prognostic Factors project and are published in the UICC TNM Classification of Malignant Tumours 8th Edition.[2]

General principles of the *Toronto Paediatric Cancer Stage Guidelines*[1]

1. *The Guidelines are intended for use by population registries only.*

   The staging systems recommended in the *Toronto Paediatric Cancer Stage Guidelines* are intended for use by population cancer registries. They are not intended to replace staging systems in clinical use nor to conflict with the stage used by clinicians in determining the treatment and prognosis of individual patients.

2. *Stage is a measure of extent of disease at diagnosis.*

   The staging systems described are intended to be a measure of the anatomic extent of disease at diagnosis. Stage is one of many prognostic indicators. Other non-anatomical prognostic indicators that are important for patient management and risk assessment, such as tumour cytogenetics, may be collected by registries as resources permit, however, for most of the disease groups outlined here, these items do not form part of the recommended staging systems.

3. *The goal is to derive the best estimate of stage.*

   The criteria provided herein are intended to enable registries to derive the best estimate of stage at diagnosis using available data sources. There are limitations inherent in collecting the data items required for staging from medical records and assumptions may be required. However, the criteria provided here will enable a reasonable and consistent measure of stage suitable for epidemiological analysis and stratified comparisons at a population level.

4. *Resource-specific tiered staging systems are endorsed.*

   The *Guidelines* endorse a two-tiered approach that provides less detailed criteria for registries with limited resources and data access (Tier 1) and more detailed criteria for well-resourced cancer registries (Tier 2). Tier 2 stage categories may be collapsed to Tier 1 categories to preserve comparability across registries.

Table 1: The Toronto Paediatric Cancer Stage Guidelines[1]

Diagnostic group/subgroup	**Tier 1 staging system** (for low resource settings)	**Tier 2 staging system** (for high resource settings)
Acute lymphoblastic leukaemia[3]	CNS negative	CNS1
	CNS positive	CNS2 CNS3
Acute myeloid leukaemia[4]	CNS negative CNS positive	CNS negative CNS positive
Hodgkin lymphoma[5]	Ann Arbor-stage IA/B Ann Arbor-stage IIA/B Ann Arbor-stage IIIA/B Ann Arbor-stage IVA/B	Ann Arbor-stage IA/B Ann Arbor-stage IIA/B Ann Arbor-stage IIIA/B Ann Arbor-stage IVA/B
Non-Hodgkin lymphoma[6]	Limited	St Jude/Murphy-stage I St Jude/Murphy-stage II St Jude/Murphy-stage III
	Advanced	St Jude/Murphy-stage IV
Neuroblastoma[7]	Localized Locoregional Metastatic INRGSS-MS disease	INRGSS-localized L1 INRGSS-locoregional L2 INRGSS-metastatic M INRGSS-MS disease
Wilms tumour[8, 9]	Localized	Stage I/y-stage I Stage II/y-stage II Stage III/y-stage III
	Metastatic	Stage IV
Rhabdomyosarcoma[2]	Localized	TNM stage 1 TNM stage 2 TNM stage 3
	Metastatic	TNM stage 4
Non-rhabdomyosarcoma soft tissue sarcoma[2]	Localized	TNM stage 1 TNM stage 2 TNM stage 3
	Metastatic	TNM stage 4

Table 1 (cont.): The Toronto Paediatric Cancer Stage Guidelines[1]

Diagnostic group/subgroup	**Tier 1 staging system** (for low resource settings)	**Tier 2 staging system** (for high resource settings)
Osteosarcoma[2]	Localized Metastatic	Localized Metastatic
Ewings sarcoma[2]	Localized Metastatic	Localized Metastatic
Retinoblastoma[10]	Localized	IRSS Stage 0 IRSS Stage I IRSS Stage II
	Regional	IRSS Stage III
	Metastatic	IRSS Stage IV
Hepatoblastoma[2]	Localized Metastatic	Localized Metastatic
Testicular cancer[2]	Localized Regional Metastatic	TNM stage I TNM stage II TNM stage III
Ovarian cancer[11]	Localized	FIGO stage I
	Regional	FIGO stage II FIGO stage III
	Metastatic	FIGO stage IV
Medulloblastoma and other CNS embryonal tumours[12]	Localized	M0
	Metastatic	M1 M2 M3 M4
Ependymoma[12]	Localized	M0
	Metastatic	M1 M2 M3 M4

General rules of staging

1. Stage is defined as extent of disease at diagnosis and is based on evidence acquired before treatment (with the exception of Wilms tumour, see page 34).

2. For all diagnostic groups including Wilms tumour, the presence of distant metastases is assessed clinically or pathologically at diagnosis and before neoadjuvant therapy.

3. If the medical record is missing any of the data items required for staging, stage is assessed as unknown.

4. If the medical record is complete and there is no mention of a data item in the record, then it should be assumed that the item is negative/absent; for example:
   - if there is no mention in the medical record of metastases then assume '*no metastases';*
   - if there is no mention in the medical record of nodal involvement, then assume '*no nodal involvement'*.

5. For those diagnostic groups where TNM is a component of staging, refer to 'The General Rules of the TNM System'.[2]

1. Acute lymphoblastic leukaemia

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

1a1 - Precursor cell leukaemias: 9811-9818, 9835-9836, 9837*

* Updated for haematopoietic codes based on *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*.[14]

ICD-O-3 site codes:[15]

C000-C809

Acute lymphoblastic leukaemia
Tier 1 and Tier 2 are based on the extent of central nervous system (CNS) involvement. Tier 2 is the Children's Oncology Group (COG) staging system.[3]

Definitions and notes
<u>CSF reports</u> - If RBC <1/µL, record as RBC = 0. - If WBC <1/µL, record as WBC = 0. - If blasts are referred to as "occasional" or "seen" or similar wording, assume blasts are present. - If there is no mention of blasts, assume blasts are absent. <u>Clinical signs of CNS involvement are defined as</u> - Radiologic evidence of intracranial, intradural mass - Cranial nerve palsy (e.g. facial weakness, ptosis), brain/eye involvement or hypothalamic syndrome. Extra-ocular orbital masses, severe headaches and eye swelling (in the absence of signs of cranial nerve involvement) are not sufficient to constitute CNS involvement.

<table>
<tr><th colspan="2">Staging criteria for acute lymphoblastic leukaemia</th></tr>
<tr><th>TIER 1</th><th>TIER 2</th></tr>
<tr><td>CNS-

• No clinical signs of CNS involvement
and no blasts in CSF</td><td>CNS1

• No clinical signs of CNS involvement
And no blasts in CSF</td></tr>
<tr><td rowspan="2">CNS+

• Clinical signs of CNS involvement

or

• blasts in CSF</td><td>CNS2

• No clinical signs of CNS involvement
and blasts in CSF
and either:

WBC < 5/µL CSF

or

WBC ≥5/µL CSF *and* RBC ≥ 10/µL CSF
and WBC/RBC in CSF ≤ 2x WBC/RBC in blood</td></tr>
<tr><td>CNS3

• Clinical signs of CNS involvement

or

• Blasts in CSF
and WBC ≥ 5/µL CSF
and either:

RBC < 10/µL CSF

or

RBC ≥ 10/µL CSF
and WBC/RBC in CSF > 2x WBC/RBC in blood</td></tr>
</table>

Database entry codes for acute lymphoblastic leukaemia			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
CNS-	CNS-	**CNS1**	CNS1
CNS+	CNS+	**CNS2**	CNS2
		CNS3	CNS3
Unknown	X	**Unknown**	X

2. Acute myeloid leukaemia

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

1b - Acute myeloid leukaemias: 9840, 9861, 9865-9867, 9869-9874, 9891, 9895-9898, 9910-9911, 9920, 9931*

* Updated for haematopoietic codes based on *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*.[14]

ICD-O-3 site codes:[15]

C000-C809

Acute myeloid leukaemia
Tier 1 and Tier 2 are identical and are based on whether there is central nervous system (CNS) involvement.[4]

Definitions and notes
Traumatic and nontraumatic lumbar puncture - If RBC in CSF < 10/µL then lumbar puncture is "nontraumatic". - If RBC in CSF ≥ 10/µL then lumbar puncture is "traumatic". CSF reports - If blasts are referred to as "occasional" or "seen" or similar wording, assume blasts are present. - If there is no mention of blasts, assume blasts are absent. Clinical signs of CNS involvement are defined as - Radiologic evidence of intracranial, intradural mass - Cranial nerve palsy (e.g. facial weakness, ptosis), brain/eye involvement or hypothalamic syndrome. Extra-ocular orbital masses, severe headaches and eye swelling (in the absence of signs of cranial nerve involvement) are not sufficient to constitute CNS involvement.

Staging criteria for acute myeloid leukaemia	
TIER 1	**TIER 2**
CNS- • Lumbar puncture nontraumatic (see Definitions and notes) *and* no blasts in CSF *and* no clinical signs of CNS involvement	**CNS-** • Lumbar puncture nontraumatic (see Definitions and notes) *and* no blasts in CSF *and* no clinical signs of CNS involvement
CNS+ • Lumbar puncture traumatic or • Lumbar puncture nontraumatic *and* blasts in CSF or • Clinical signs of CNS involvement	**CNS+** • Lumbar puncture traumatic or • Lumbar puncture nontraumatic *and* blasts in CSF or • Clinical signs of CNS involvement

Database entry codes for acute myeloid leukaemia			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
CNS-	CNS-	**CNS-**	CNS-
CNS+	CNS+	**CNS+**	CNS+
Unknown	X	**Unknown**	X

3. Hodgkin lymphoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

2a - Hodgkin lymphoma: 9650-9655, 9659, 9661-9665, 9667

ICD-O-3 site codes:[15]

C000-C809

Hodgkin lymphoma
Tier 1 and Tier 2 are identical and follow the Ann Arbor staging system.[5]

Definitions and notes
Nodal regions, extra-lymphatic organs or sites Staging requires assessment of - the number of nodal regions involved, by anatomical location (i.e., above or below the diaphragm). Nodal regions are listed in Figures 1a and 1b. - the number of extra-lymphatic organs or sites involved, by anatomical location (i.e., above or below the diaphragm). Constitutional symptoms The suffix A or B is added to the stage according to the absence or presence of defined constitutional symptoms, as follows: A = no constitutional symptoms are recorded, or the medical record states there are no constitutional symptoms B = medical record states there are constitutional symptoms Constitutional symptoms are: • *Fevers.* Unexplained fever with temperature above 38 degrees C (100.4 degrees F). • *Night sweats.* Drenching sweats (e.g. those that require change of bedclothes). • *Weight loss.* Unexplained weight loss of more than 10% of usual body weight in the 6 months prior to diagnosis.

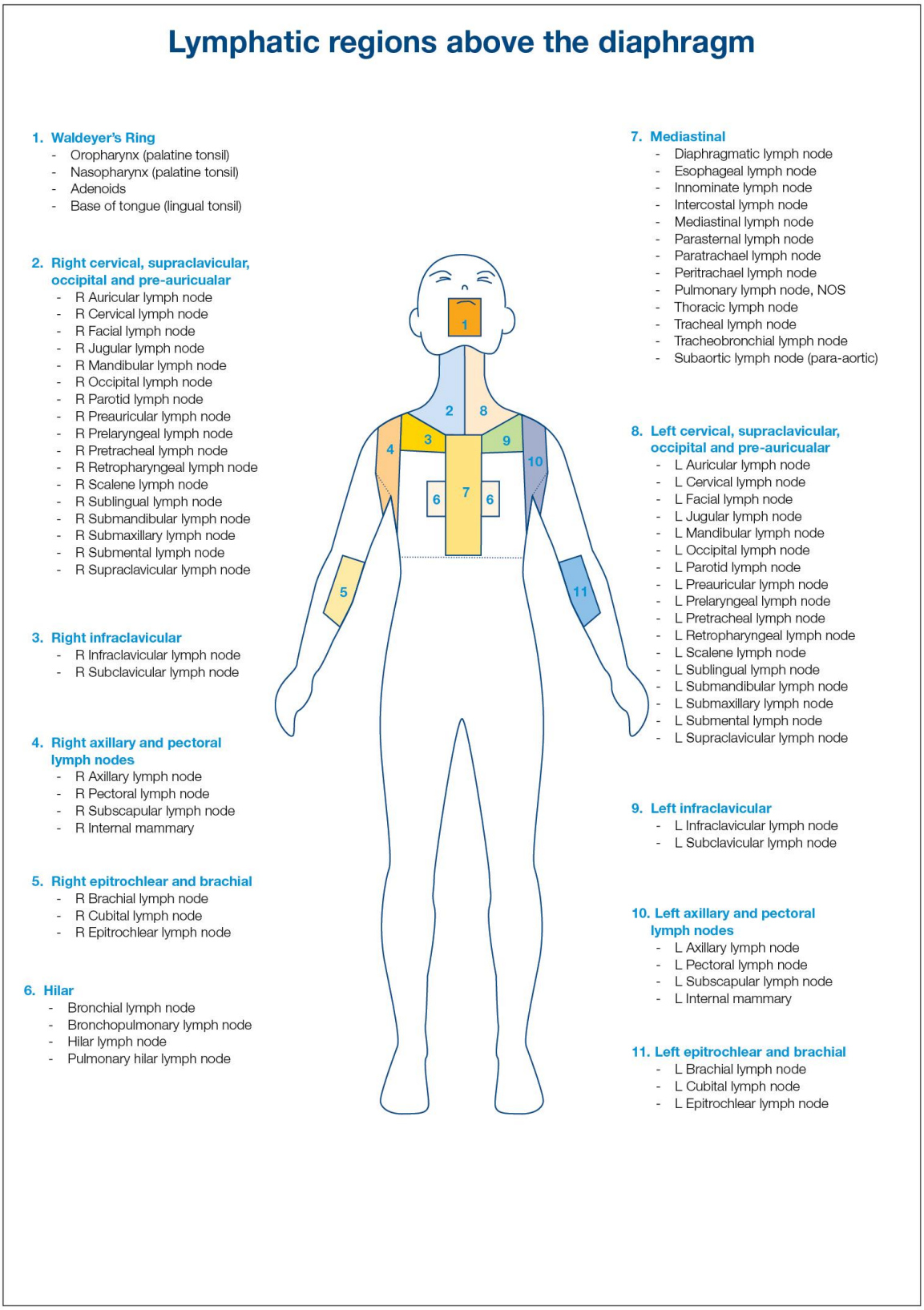

Figure 1a: Lymphatic regions above the diaphragm for the staging of Hodgkin's and Non-Hodgkin's Lymphoma

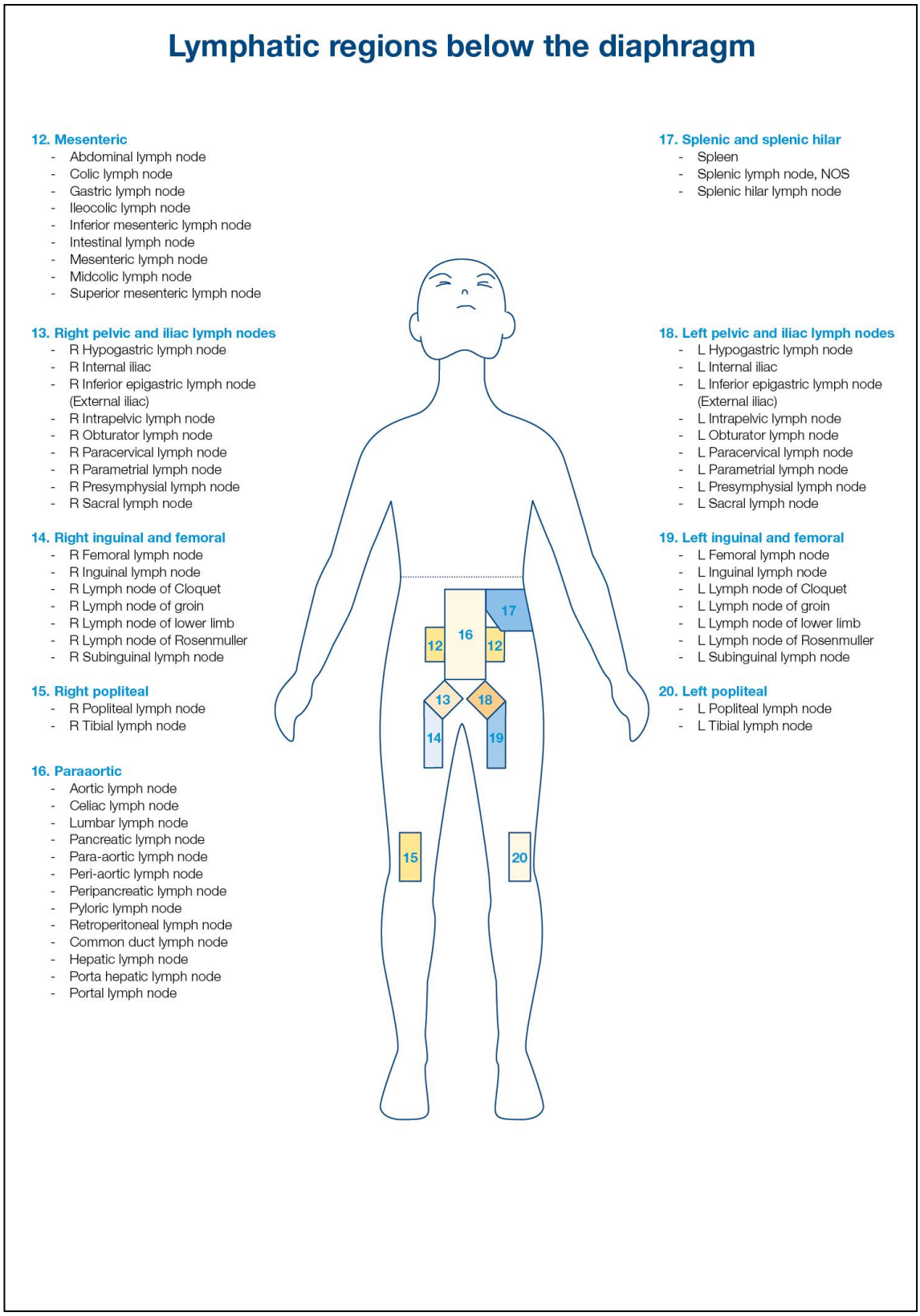

Figure 1b: Lymphatic regions below the diaphragm for the staging of Hodgkin's and Non-Hodgkin's Lymphoma

Staging criteria for Hodgkin lymphoma

Note:
The suffix **A** or **B** is added to the stage according to the absence or presence of defined constitutional symptoms, as follows:

A = no constitutional symptoms are recorded, or the medical record states there are no constitutional symptoms
B = medical record states there are constitutional symptoms

Constitutional symptoms are:

- *Fevers.* Unexplained fever with temperature above 38 degrees Celsius (100.4 degrees F).
- *Night sweats.* Drenching sweats (e.g. those that require change of bedclothes).
- *Weight loss.* Unexplained weight loss of more than 10% of usual body weight in the 6 months prior to diagnosis.

TIER 1	TIER 2
Stage I • Involvement of a single lymph node region or • Involvement of a single extra-lymphatic organ or site, without lymph node involvement.	**Stage I** • Involvement of a single lymph node region or • Involvement of a single extra-lymphatic organ or site, without lymph node involvement.
Stage II • Involvement of two or more lymph node regions on the SAME side (either above or below) of the diaphragm or • Localized involvement of a single extra-lymphatic organ or site in association with regional lymph node involvement (i.e. local extension from a lymph node area into a nearby organ), *with or without* involvement of other lymph node regions on the SAME side (either above or below) of the diaphragm.	**Stage II** • Involvement of two or more lymph node regions on the SAME side (either above or below) of the diaphragm or • Localized involvement of a single extra-lymphatic organ or site with associated regional lymph node involvement (i.e. local extension from a lymph node area into a nearby organ), *with or without* involvement of other contiguous lymph node regions on the SAME side (either above or below) of the diaphragm.
Stage III • Involvement of lymph node regions on BOTH sides (above and below) of the diaphragm. This may be accompanied by: - extra-lymphatic extension in association with adjacent lymph node involvement (i.e. local extension from a lymph node area into a nearby organ) and/or - involvement of spleen.	**Stage III** • Involvement of lymph node regions on OPPOSITE sides (above and below) of the diaphragm. This may be accompanied by: - extra-lymphatic extension in association with adjacent lymph node involvement (i.e. local extension from a lymph node area into a nearby organ) and/or - involvement of spleen.

Stage IV • Diffuse or disseminated involvement of one or more extra-lymphatic organs with or without associated lymph node involvement or • Isolated extra-lymphatic organ involvement in the absence of adjacent regional lymph node involvement, but in conjunction with disease in distant site(s). or • Any involvement of liver, bone marrow, lungs (except by direct extension from another site) or CSF.	**Stage IV** • Diffuse or disseminated (multifocal) involvement of one or more extra-lymphatic organs with or without associated lymph node involvement or • Isolated (non-contiguous) extra-lymphatic organ involvement in the absence of adjacent regional lymph node involvement, but in conjunction with disease in distant site(s). or • Any involvement of liver, bone marrow, lungs (except by direct extension from another site) or CSF.

Database entry codes for Hodgkin lymphoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Stage IA	1A	**Stage IA**	1A
Stage IB	1B	**Stage IB**	1B
Stage IIA	2A	**Stage IIA**	2A
Stage IIB	2B	**Stage IIB**	2B
Stage IIIA	3A	**Stage IIIA**	3A
Stage IIIB	3B	**Stage IIIB**	3B
Stage IVA	4A	**Stage IVA**	4A
Stage IVB	4B	**Stage IVB**	4B
Unknown	X	**Unknown**	X

4. Non-Hodgkin lymphoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

2b1* – Precursor cell lymphoma: 9727-9729

2b2 – Mature B-cell lymphomas (except Burkitt lymphoma): 9670-9671, 9673, 9675, 9678-9680, 9684, 9688-9691, 9695, 9698-9699, 9731-9735, 9737-9738, 9761-9762, 9764-9766, 9769, 9970; 9823**

2b3 – Mature T-cell and NK-cell lymphomas: 9702, 9705, 9714, 9716, 9717, 9724, 9767-9768; 9827**

2b4 – Non-Hodgkin lymphoma NOS: 9591, 9760

2c – Burkitt lymphoma: 9687

* Morphology codes 9811-9818 and 9837 are not included with 2b1, but are included with acute lymphoblastic leukaemia.

** Updated for haematopoietic codes based on *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*.[14]

ICD-O-3 site codes:[15]

C000-C809 (unless otherwise specified and excluding cutaneous lymphomas, C44_)

Non-Hodgkin lymphoma
Tier 2 follows the St Jude/Murphy staging system.[6]

Definitions and notes
<u>Nodal regions, extra-lymphatic organs or sites</u> Staging requires assessment of - the number of nodal regions involved, by anatomical location (i.e., above or below the diaphragm). Nodal regions are listed in Figures 1a and 1b (pages 20, 21). - the number of extra-lymphatic organs or sites involved, by anatomical location (i.e., above or below the diaphragm).

Staging criteria for non-Hodgkin lymphoma	
TIER 1	**TIER 2**
Limited • No involvement of CNS or bone marrow.	**Stage I** • Involvement of a single tumour mass or nodal area, excluding the abdomen and mediastinum.
	Stage II • A single tumour (extranodal) with regional node involvement or • Two or more nodal areas on the SAME side (either above or below) of the diaphragm or • Two or more single (extranodal) tumours, with or without regional node involvement, on the SAME side (either above or below) of the diaphragm or • A completely resected primary gastrointestinal tract tumour with or without involvement of associated mesenteric nodes only.
	Stage III • Tumours (extranodal) or nodal areas on OPPOSITE sides (above and below) of the diaphragm or • Any primary intrathoracic tumours (mediastinal, hilar, pulmonary, pleural, or thymic). or • Extensive* (unresectable) primary intra-abdominal disease or • Any paraspinal or epidural tumours regardless of other tumour sites.
Advanced • Involvement of CNS and/or bone marrow	**Stage IV** • Initial CNS and/or bone marrow involvement.

* Extensive disease typically exhibits spread to para-aortic and retro-peritoneal areas by implants and plaques in mesentery or peritoneum, or by direct infiltration of structures adjacent to the primary tumour. Ascites may be present, and complete resection of all gross tumour is not possible.

Database entry codes for non-Hodgkin lymphoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Limited	L	**Stage I**	1
		Stage II	2
		Stage III	3
Advanced	A	**Stage IV**	4
Unknown	X	**Unknown**	X

5. Neuroblastoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

4a – Neuroblastoma and Ganglioneuroblastoma; 9490, 9500

ICD-O-3 site codes:[15]

C000-C809

Neuroblastoma
Tier 2 follows the International Neuroblastoma Risk Group Staging System (INRGSS).[7] Tier 1 criteria are simplified proxies of Tier 2 that do not require assessment of image-defined risk factors for use in settings where cross-sectional imaging is not available.

Definitions and notes

Patients with multifocal primary tumours should be staged according to the greatest extent of disease as defined in the IDRF table.

Image-defined risk factors

Staging requires assessment of whether or not patients have none (Stage L1) or one or more (Stage L2) of the image-defined risk factors (IDRF) listed below. These are identified in reports of imaging at diagnosis, prior to any surgical resection.

- *Ipsilateral tumour extension within two body compartments*
  Neck-chest, chest-abdomen, abdomen-pelvis

- *Neck*
  Tumour encasing carotid and/or vertebral artery and/or internal jugular vein
  Tumour extending to base of skull
  Tumour compressing the trachea

- *Cervico-thoracic junction*
  Tumour encasing brachial plexus roots
  Tumour encasing subclavian vessels and/or vertebral and/or carotid artery
  Tumour compressing the trachea

- *Thorax*
  Tumour encasing the aorta and/or major branches
  Tumour compressing the trachea and/or principal bronchi
  Lower mediastinal tumour, infiltrating the costo-vertebral junction between T9 and T12

- *Thoraco-abdominal*
  Tumour encasing the aorta and/or vena cava

- *Abdomen/pelvis*
  Tumour infiltrating the porta hepatis and/or the hepatoduodenal ligament
  Tumour encasing branches of the superior mesenteric artery at the mesenteric root
  Tumour encasing the origin of the coeliac axis, and/or of the superior mesenteric artery
  Tumour invading one or both renal pedicles
  Tumour encasing the aorta and/or vena cava
  Tumour encasing the iliac vessels
  Pelvic tumour crossing the sciatic notch

- *Intraspinal tumour extension whatever the location provided that:*
  More than one third of the spinal canal in the axial plane is invaded and/or the perimedullary eptomeningeal spaces are not visible and/or the spinal cord signal is abnormal

- *Infiltration of adjacent organs/structures*
  Pericardium, diaphragm, kidney, liver, duodeno-pancreatic block, and mesentery

Staging criteria for neuroblastoma			
TIER 1		**TIER 2**	
Localized	Localized tumour not involving vital structures and confined to one body compartment	**Stage L1**	Localized tumour that does not involve any vital structures as defined by the list of IDRFs (i.e. there are no IDRFs) and the tumour must be confined within one body compartment, neck, chest, abdomen, or pelvis. An intraspinal tumour extension that does not fulfil the criteria for an IDRF is consistent with stage L1.
Locoregional	Locoregional tumour with spread	**Stage L2**	Locoregional tumour with one or more IDRFs. The tumour may be ipsilaterally contiguous within body compartments (ie, a left sided abdominal tumour with left-sided lung, bone or pleura involvement should be considered stage L2). However, a clearly left sided abdominal tumour with right-sided lung, bone or pleura (or vice versa) involvement is defined as metastatic disease.
Metastatic	Distant metastatic disease (except stage MS)	**Stage M**	Distant metastatic disease (ie, not contiguous with the primary tumour) except as defined for stage MS. Nonregional (distant) lymph node involvement is metastatic disease. However, an upper abdominal tumour with enlarged lower mediastinal nodes or a pelvic tumour with inguinal lymph node involvement is considered locoregional disease. Ascites and/or a pleural effusion, even with malignant cells, do not constitute metastatic disease unless they are remote from the body compartment of the primary tumour.
MS	Metastatic disease confined to skin, liver, and/or bone marrow in a patient less than 18 months (547 days). .	**Stage MS**	Metastatic disease confined to skin, liver, and/or bone marrow, in a patient less than 18 months (547 days). MIBG scintigraphy must be negative in bone and bone marrow.

Database entry codes for neuroblastoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage L1**	L1
Locoregional	LR	**Stage L2**	L2
Metastatic	M	**Stage M**	M
MS	MS	**Stage MS**	MS
Unknown	X	**Unknown**	X

6. Wilms tumour

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

6a1 – Nephroblastoma; 8959, 8960

ICD-O-3 site codes:[15]

C649

Wilms tumour
Two principle staging systems exist for Wilms Tumour.[8, 9] Both systems are based on findings at surgery (except for stage IV which is based on presence of distant metastases at diagnosis). The COG/National Wilms Tumour Study Group (NWTSG) staging system is based on findings at surgery for patients who have not received chemotherapy prior to surgery. The SIOP staging system is based on findings at surgery for patients who have received chemotherapy prior to surgery. The recommended staging system incorporates both systems; "y" designates SIOP stage (for patients who have received neo-adjuvant chemotherapy). It is noted that giving chemotherapy before surgery will shrink the tumour and will likely "downstage" the patient.

Definitions and notes
In cases of bilateral disease - the presence of synchronous disease should be noted - for purpose of staging, only the most advanced kidney should be recorded. At diagnosis, if diagnostic imaging reports on the status of the liver, lung, bone, brain and other sites and mention the words "suspicious", "highly suspicious", "possible" or "highly suspected", record as metastatic disease (stage IV) regardless of upfront surgery or chemotherapy.

Staging criteria for Wilms tumour based on findings at surgery for patients who <u>have not</u> received chemotherapy prior to surgery (Children's Oncology Group (COG) protocol)	
TIER 1	**TIER 2**
Localized Tumour confined to area of origin	**Stage I** Tumour is limited to the kidney and completely excised: • Renal capsule intact, not penetrated by tumour • No tumour invasion of veins or lymphatics of renal sinus • No nodal or haematogenous metastases • No prior biopsy • Negative margins
	Stage II Tumour extends beyond kidney but completely resected: • Tumour penetrates renal capsule • Tumour in lymphatics or veins of renal sinus • Tumour in renal vein with margin not involved • No nodal or haematogenous metastases • Negative margins
	Stage III Residual tumour or nonhaematogenous metastases confined to abdomen: • Involved abdominal nodes • Peritoneal contamination or tumour implant • Tumour spillage of any degree occurring before or during surgery • Gross residual tumour in abdomen • Biopsy of tumour (including fine-needle aspiration) prior to removal of kidney • Resection margins involved by tumour
Metastatic Distant metastases present at diagnosis	**Stage IV** Haematogenous metastases or spread beyond abdomen <u>at diagnosis</u>

Staging criteria for Wilms tumour based on findings at surgery for patients who <u>have</u> received chemotherapy prior to surgery (International Society of Paediatric Oncology (SIOP) protocol)	
TIER 1	**TIER 2**
Localized Tumour confined to area of origin	**Stage y-I** Tumour limited to kidney and completely resected: • Renal capsule may be infiltrated by tumour, but tumour does not reach the outer surface • Tumour may protrude or bulge into the pelvic system or ureter, but does not infiltrate • Vessels of renal sinus not involved
	Stage y-II Tumour extends beyond kidney but completely resected: • Tumour penetrates renal capsule into perirenal fat • Tumour infiltrates the renal sinus and/or invades blood and lymphatic vessels outside renal parenchyma but is completely resected • Tumour infiltrates adjacent organs or vena cava but is completely resected
	Stage y-III Incomplete excision of the tumour (gross or microscopic extension beyond the resection margins): • Involved abdominal lymph nodes, including necrotic tumour or chemotherapy-induced changes • Tumour rupture before or intraoperatively • Tumour has penetrated the peritoneal surface • Tumour thrombi present at resection margins • Surgical biopsy prior to resection (does not include needle biopsy)
Metastatic Distant metastases present at diagnosis	**Stage IV** Haematogenous metastases or spread beyond abdomen <u>at diagnosis</u>.

Database entry codes for Wilms tumour			
Children's Oncology Group (COG) protocol (prechemotherapy)			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage I**	1
		Stage II	2
		Stage III	3
Metastatic	M	**Stage IV**	4
Unknown	X	**Unknown**	X

Database entry codes for Wilms tumour			
International Society of Paediatric Oncology (SIOP) protocol (postchemotherapy)			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage y-I**	y1
		Stage y-II	y2
		Stage y-III	y3
Metastatic	M	**Stage IV**	4
Unknown	X	**Unknown**	X

7. Rhabdomyosarcoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

9a – Rhabdomyosarcomas: 8900-8905, 8910, 8912, 8920, 8991

ICD-O-3 site codes:[15]

C000-C809

Rhabdomyosarcoma
Tier 2 follows a modified TNM classification incorporating anatomic site of disease. [2]

Definitions and notes
Favourable and unfavourable anatomic sites of disease Favourable anatomic sites: - orbit - head and neck (excluding parameningeal tumours), - genitourinary sites (excluding bladder and prostate tumours) Unfavourable anatomic sites: - bladder - prostate - extremity - cranial - parameningeal - trunk - retroperitoneum - all other sites not noted as favourable T – Tumour size T0 = no evidence of primary tumour T1 = tumour confined to a single anatomic site T1a = tumour ≤ 5cm in greatest dimension T1b = tumour > 5cm in greatest dimension T2 = extension beyond anatomic site T2a = tumour ≤ 5cm in greatest dimension T2b = tumour > 5cm in greatest dimension Tx = primary tumour cannot be assessed N - Regional nodes N0 = regional lymph nodes not involved N1 = regional lymph nodes involved Nx = regional lymph nodes cannot be assessed (especially sites that preclude lymph node evaluation) M - Metastases M0 = no distant metastasis M1 = distant metastasis

Staging criteria for rhabdomyosarcoma			
TIER 1		**TIER 2**	
Localized	Tumour confined to the area of origin including the regional lymph nodes.	**Stage I**	Favourable sites: orbit, head and neck (excluding parameningeal tumours) and genitourinary sites (excluding bladder and prostate tumours) and Any T Any N M0
		Stage II	Unfavourable site and T1a, T2a N0 M0
		Stage III	Unfavourable site and T1a, T2a N1 M0 T1b, T2b Any N M0
Metastatic	Distant metastases present	**Stage IV**	Any site Any T Any N M1

Database entry codes for rhabdomyosarcoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage I**	1
		Stage II	2
		Stage III	3
Metastatic	M	**Stage IV**	4
Unknown	X	**Unknown**	X

8. Non-rhabdomyosarcoma soft tissue sarcoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

9b – Fibrosarcomas, peripheral nerve sheath tumors, and other fibrous neoplasms: 8810, 8811, 8813–8815, 8821, 8823, 8834–8835, 8820, 8822, 8824–8827, 9150, 9160, 9491, 9540–9571, 9580

9d – Other specified soft tissue sarcomas: 8587, 8710–8713, 8806, 8830–8833, 8836, 8840–8842, 8850–8858, 8860–8862, 8870, 8880, 8881, 8890–8898, 8921, 8963, 8982, 8990, 9040–9044, 9120–9125, 9130–9133, 9135, 9136, 9141, 9142, 9161, 9170–9175, 9180, 9210, 9220, 9231, 9240, 9251, 9252, 9260, 9364, 9365, 9373, 9581

9e – Unspecified soft tissue sarcomas: 8800-8805

ICD-O-3 site codes:[15]

C00.0–C39.9, C44.0–C76.8, C80.9 (unless otherwise specified)

Non-rhabdomyosarcoma soft tissue sarcoma
Tier 2 follows a modified TNM classification incorporating tumour grade.[2]

Definitions and notes
<u>T - Tumour</u> T0 No evidence of primary tumour T1 Tumour ≤ 5cm in greatest dimension T2 Tumour > 5cm and ≤ 10cm in greatest dimension T3 Tumour >10cm and ≤ 15cm in greatest dimension T4 Tumour >15cm in greatest dimension Tx Primary tumour cannot be assessed <u>N - Regional lymph nodes</u> N0 = regional lymph nodes not involved N1 = regional lymph nodes involved Nx = regional lymph nodes cannot be assessed (especially sites that preclude lymph node evaluation) <u>M - Metastases</u> M0 = no distant metastasis M1 = metastasis present <u>G – Grade</u> G1 = grade 1 (low/well differentiated) G2 = grade 2 (intermediate/moderately differentiated) G3 = grade 3 (high/poorly/undifferentiated) Gx = grade cannot be assessed

Staging criteria for non-rhabdomyosarcoma soft tissue sarcoma			
TIER 1		**TIER 2**	
Localized	Tumour confined to the area of origin including regional lymph nodes.	**Stage I**	Any T N0 M0 G1 or Gx
		Stage II	T1 N0 M0 G2 or G3
		Stage III	T2 or T3 or T4 N0 M0 G2 or G3 *or* Any T N1 M0 Any G (G1, G2, G3 or Gx)
Metastatic	Distant metastases present	**Stage IV**	Any T Any N M1 Any G (G1, G2, G3, Gx)

Database entry codes for non-rhabdomyosarcoma soft tissue sarcoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage I**	1
		Stage II	2
		Stage III	3
Metastatic	M	**Stage IV**	4
Unknown	X	**Unknown**	X

9. Osteosarcoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

8a – Osteosarcoma: 9180-9187, 9191-9195, 9200

ICD-O-3 site codes:[15]

C400-C419, C760-C768, C809

Osteosarcoma
Only two stages are recommended (localized or metastatic) for both Tier 1 and Tier 2.[2]

Definitions and notes
"Skip lesions", "skip metastases" or "seeding" in the same bone as the primary tumour are considered localized and not metastatic; if in a different bone to the primary tumour these are considered metastatic.

Staging criteria for osteosarcoma			
TIER 1		**TIER 2**	
Localized	Tumour confined to the area of origin including regional lymph nodes	**Localized**	Tumour confined to the area of origin including regional lymph nodes
Metastatic	Distant metastases present	**Metastatic**	Distant metastases present

Database entry codes for osteosarcoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Localized**	L
Metastatic	M	**Metastatic**	M
Unknown	X	**Unknown**	X

10. Ewing sarcoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

8c1 – Ewing Tumour and Askin Tumour of Bone: 9260, 9365

8c2 – pPNET of Bone: 9363-9364

ICD-O-3 site codes:[15]

C400-C419, C760-C768, C809 (unless otherwise specified)

Ewing sarcoma
Only two stages are recommended (localized or metastatic) for both Tier 1 and Tier 2.

Staging criteria for Ewing sarcoma			
TIER 1		**TIER 2**	
Localized	Tumour confined to the area of origin including regional lymph nodes.	**Localized**	Tumour confined to the area of origin including regional lymph nodes.
Metastatic	Distant metastases present	**Metastatic**	Distant metastases present

Database entry codes for Ewing sarcoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Localized**	L
Metastatic	M	**Metastatic**	M
Unknown	X	**Unknown**	X

11. Retinoblastoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

5 – Retinoblastoma: 9510-9514

ICD-O-3 site codes:[15]

C692

Retinoblastoma
Tier 2 follows the International Retinoblastoma Staging System (IRSS).[10] Tier 2 stage is determined after enucleation and is therefore a pathological classification.

Definitions and notes
In cases of bilateral disease: - the presence of synchronous disease should be noted - for purpose of stage, only the most advanced eye should be recorded.

Staging criteria for retinoblastoma			
TIER 1		**TIER 2**	
Localized	Intraocular	**Stage 0**	The tumour is confined to the globe. Enucleation has not been performed. (The patient is treated "conservatively" with either focal therapies or chemotherapy.)
		Stage I	Enucleation with negative margins
		Stage II	Enucleation with microscopic residual disease
Regional	Orbital extension or regional lymph nodes	**Stage III**	Regional extension: involvement of the orbit and/or preauricular or cervical lymph node extension
Metastatic	Distant metastases present	**Stage IV**	Distant metastatic disease

Database entry codes for retinoblastoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage 0**	0
		Stage I	1
		Stage II	2
Regional	R	**Stage III**	3
Metastatic	M	**Stage IV**	4
Unknown	X	**Unknown**	X

12. Hepatoblastoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

7a – Hepatoblastoma: 8970

ICD-O-3 site codes:[15]

C220

Hepatoblastoma
Only two stages are recommended (localized or metastatic) for both Tier 1 and Tier 2.[2]

Staging criteria for hepatoblastoma			
TIER 1		**TIER 2**	
Localized	Tumour confined to the liver including regional lymph nodes	**Localized**	Tumour confined to the liver including regional lymph nodes
Metastatic	Distant metastases present	**Metastatic**	Distant metastases present

Database entry codes for hepatoblastoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Localized**	L
Metastatic	M	**Metastatic**	M
Unknown	X	**Unknown**	X

13. Testicular cancer

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

10c – Malignant gonadal germ cell tumours: 9060–9065, 9070–9073, 9080–9085, 9090, 9091, 9100, 9101

ICD-O-3 site codes:[15]

C620-C629

Testicular cancer
Tier 2 follows a modified TNM classification.[2]

Definitions and notes for Tier 2	
T - Tumour	
The extent of primary tumour is usually classified after radical orchiectomy, and for this reason, a pathologic stage is assigned.	
pTx	Primary tumour cannot be assessed
pT0	No evidence of primary tumour (e.g. histologic scar in testis)
pT1	Tumour limited to the testis and epididymis without vascular/lymphatic invasion; tumour may invade into the tunica albuginea but not the tunica vaginalis
pT2	Tumour limited to the testis and epididymis with vascular/lymphatic invasion, or tumour extending through the tunica albuginea with involvement of the tunica vaginalis
pT3	Tumour invades the spermatic cord with or without vascular/lymphatic invasion
pT4	Tumour invades the scrotum with or without vascular/lymphatic invasion
* Note: Except for pT4, extent of primary tumour is classified by radical orchiectomy. Tx is used if radical orchiectomy has not been performed.	
N - Regional nodes	
Nx	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis with a lymph node mass 2cm or less in greatest dimension; or multiple lymph nodes, none more than 2cm in greatest dimension.
N2	Metastasis with a lymph node mass more than 2cm but not more than 5cm in greatest dimension; or multiple lymph nodes, any one mass greater than 2cm but not more than 5cm in greatest dimension
N3	Metastasis with a lymph node mass more than 5cm in greatest dimension

Definitions and notes for Tier 2	
pN - Pathologic regional nodes	
pNx	Regional lymph nodes cannot be assessed
pN0	No regional lymph node metastasis
pN1	Metastasis with a lymph node mass 2cm or less in greatest dimension and five or fewer positive nodes, none more than 2cm in greatest dimension
pN2	Metastasis with a lymph node mass more than 2cm but not more than 5cm in greatest dimension; or more than five nodes positive, none more than 5cm; or evidence of extranodal extension of tumour
pN3	Metastasis with a lymph node mass more than 5cm in greatest dimension
M – Distant metastasis	
M0	No distant metastasis
M1	Distant metastasis

Staging criteria for testicular cancer			
TIER 1		**TIER 2**	
Localized	Tumour confined to the testes	**Stage I**	Any T N0 M0
Regional	Tumour extension to regional lymph nodes: - Interaortocaval - Para-aortic (periaortic) - Paracaval - Preaortic - Precaval - Retroaortic - Retrocaval - Along spermatic cord	**Stage II**	Any T N1, N2, N3 M0
Metastatic	Distant metastases present	**Stage III**	Any T Any N M1

Database entry codes for testicular cancer			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage I**	1
Regional	R	**Stage II**	2
Metastatic	M	**Stage III**	3
Unknown	X	**Unknown**	X

14. Ovarian cancer

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

10c – Malignant gonadal germ cell tumours: 9060–9065, 9070–9073, 9080–9085, 9090, 9091, 9100, 9101

ICD-O-3 site codes:[15]

C569

Ovarian cancer
Tier 2 follows the FIGO staging system.[11]

Staging criteria for ovarian cancer			
TIER 1		**TIER 2**	
Localized	Tumour confined to ovaries	**Stage I**	Tumour confined to ovaries (one or both)
Regional	Tumour involves one or both ovaries with pelvic extension and/or spread to the peritoneum outside the pelvis and/or retroperitoneal lymph nodes	**Stage II**	Tumour involves one or both ovaries with pelvic extension (below the pelvic brim)
		Stage III	Tumour involves one or both ovaries with cytologically or histologically confirmed spread to the peritoneum outside the pelvis and/or metastasis to the retroperitoneal lymph nodes
Metastatic	Distant metastatic disease excluding peritoneal metastases	**Stage IV**	Distant metastasis (excludes peritoneal metastases)

Database entry codes for ovarian cancer			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**Stage I**	1
Regional	R	**Stage II**	2
		Stage III	3
Metastatic	M	**Stage IV**	4
Unknown	X	**Unknown**	X

15. Medulloblastoma and other CNS embryonal tumours

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

3c1 – Medulloblastomas: 9470-9472, 9474, 9480*

3c2 – PNET: 9473*

3c3 – Medulloepithelioma: 9501-9504*

3c4 – Atypical teratoid/rhabdoid tumour: 9508*

3e3 – Only pineoblastoma is included: 9362*

* Includes tumours with non-malignant behaviour for all morphology codes shown.

ICD-O-3 site codes:[15]

C700-C729, C753

Medulloblastoma
Tier 2 follows the M staging system.[12]

Staging criteria for medulloblastoma			
TIER 1		**TIER 2**	
Localized	Localized disease	**M0**	No visible disease on imaging (MRI brain and spine) beyond primary site of disease and no tumour cells in the cerebrospinal fluid (CSF)
Metastatic	Disease beyond local site (e.g., other lesions in brain or spine, tumour cells in CSF or distant metastases	**M1**	Tumour cells in the CSF
		M2	Visible metastasis in brain
		M3	Visible metastasis in spine or Visible metastasis in cervicomedullary (junction)
		M4	Metastasis outside of the central nervous system

Database entry codes for medulloblastoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**M0**	M0
Metastatic	M	**M1**	M1
		M2	M2
		M3	M3
		M4	M4
Unknown	X	**Unknown**	X

16. Ependymoma

ICCC-3 diagnostic group/subgroup and morphology codes:[13]

3a1 – Ependymomas: 9383, 9391-9394*

* Includes tumours with non-malignant behaviour for all morphology codes shown.

ICD-O-3 site codes:[15]

C710-C729

Ependymoma
Tier 2 follows the M staging system.[12]

Staging criteria for ependymoma			
TIER 1		**TIER 2**	
Localized	Localized disease	**M0**	No visible disease on imaging (MRI brain and spine) beyond primary site of disease and no tumour cells in the cerebrospinal fluid (CSF)
Metastatic	Disease beyond local site (e.g., other lesions in brain or spine, tumour cells in CSF or distant metastases	**M1**	Tumour cells in the CSF
		M2	Visible metastasis in brain
		M3	Visible metastasis in spine or Visible metastasis in cervicomedullary (junction)
		M4	Metastasis outside of the central nervous system

Database entry codes for ependymoma			
TIER 1		**TIER 2**	
Stage	**Code**	**Stage**	**Code**
Localized	L	**M0**	M0
Metastatic	M	**M1**	M1
		M2	M2
		M3	M3
		M4	M4
Unknown	X	**Unknown**	X

References

1. Gupta S, Aitken JF, Bartels U, Brierley J, Dolendo M, Friedrich P, Fuentes-Alabi S, Garrido CP, Gatta G, Gospodarowicz M, Gross T, Howard SC, et al. Paediatric cancer stage in population-based cancer registries: the Toronto consensus principles and guidelines. *The Lancet Oncology* 2016;**17**:e163-72.
2. Brierley J, Gospodarowicz M, Wittekind C, eds. *The TNM Classification of Malignant Tumours, 8th edition*. Hoboken, NJ: John Wiley and Sons Inc; 2017.
3. Winick N, Devidas M, Chen S, Maloney K, Larsen E, Mattano L, Borowitz MJ, Carroll A, Gastier-Foster JM, Heerema NA, Willman C, Wood B, et al. Impact of Initial CSF Findings on Outcome Among Patients With National Cancer Institute Standard- and High-Risk B-Cell Acute Lymphoblastic Leukemia: A Report From the Children's Oncology Group. *J Clin Oncol* 2017;**35**:2527-34.
4. Abbott BL, Rubnitz JE, Tong X, Srivastava DK, Pui CH, Ribeiro RC, Razzouk BI. Clinical significance of central nervous system involvement at diagnosis of pediatric acute myeloid leukemia: a single institution's experience. *Leukemia* 2003;**17**:2090-6.
5. Carbone PP, Kaplan HS, Musshoff K, Smithers DW, Tubiana M. Report of the Committee on Hodgkin's Disease Staging Classification. *Cancer Res* 1971;**31**:1860-1.
6. Murphy SB. Classification, staging and end results of treatment of childhood non-Hodgkin's lymphomas: dissimilarities from lymphomas in adults. *Semin Oncol* 1980;**7**:332-9.
7. Monclair T, Brodeur GM, Ambros PF, Brisse HJ, Cecchetto G, Holmes K, Kaneko M, London WB, Matthay KK, Nuchtern JG, von Schweinitz D, Simon T, et al. The International Neuroblastoma Risk Group (INRG) staging system: an INRG Task Force report. *J Clin Oncol* 2009;**27**:298-303.
8. Metzger ML, Dome JS. Current therapy for Wilms' tumor. *Oncologist* 2005;**10**:815-26.
9. Orkin S, Fisher D, Look A, Lux S, Ginsberg D, Nathan D. *Oncology of Infancy and Childhood*. Philadelphia, PA: Saunders; 2009.
10. Chantada G, Doz F, Antoneli CB, Grundy R, Clare Stannard FF, Dunkel IJ, Grabowski E, Leal-Leal C, Rodriguez-Galindo C, Schvartzman E, Popovic MB, Kremens B, et al. A proposal for an international retinoblastoma staging system. *Pediatr Blood Cancer* 2006;**47**:801-5.
11. Prat J. Staging classification for cancer of the ovary, fallopian tube, and peritoneum. *Int J Gynaecol Obstet* 2014;**124**:1-5.
12. Harisiadis L, Chang CH. Medulloblastoma in children: a correlation between staging and results of treatment. *Int J Radiat Oncol Biol Phys* 1977;**2**:833-41.
13. Steliarova-Foucher E, Stiller C, Lacour B, Kaatsch P. International Classification of Childhood Cancer, third edition. *Cancer* 2005;**103**:1457-67.
14. Swerdlow S, Campo E, Harris N, Jaffe E, Pileri S, Stein H, Thiele J, eds. *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues: WHO Classification of Tumours, Revised 4th Edition, Volume 2*. Lyon, France: WHO; 2008.
15. Fritz A, Percy C, Jack A, Shanmugaratnum K, Sobin L, Parkin DM, Whelan S, eds. *International Classification of Diseases for Oncology (ICD-O): Third edition*. Geneva, Switzerland: WHO; 2000.