TNM Atlas  SIXTH EDITION

The complete, authoritative TNM cancer classification and staging system—now illustrated with new, full-colour figures for fast, effective, anatomical referencing

Referring to “Tumour,” “Node,” and “Metastasis,” the TNM system is the most widely used means for classifying and staging the extent of cancer spread. Published in affiliation with the Union for International Cancer Control (UICC), TNM Atlas, Sixth Edition presents the illustrated version of the TNM Classification of Malignant Tumours, Seventh Edition, promoting the uniform application of the TNM classification in cancer practice.

Utilizing beautiful, full-colour medical artwork—illustrating the T and N categories in clear, easily understood graphics—this book aides in the practical application of the TNM classification system. It enables all disciplines involved in cancer classification, staging, and treatment to reach a more standardized understanding and documentation of the anatomical spread of tumours, and further enhances the dissemination and use of the TNM classification.

The TNM Atlas, Sixth Edition:
• Is based upon the very latest TNM Classification data available in TNM Classification of Malignant Tumours, Seventh Edition
• Features over 500 full-colour figures that clearly illustrate and highlight anatomical sites of cancer involvement
• Makes TNM classification even more clinically applicable in the day-to-day environment
• Is an extremely useful tool for clinical reference, teaching, discussion, and patient education

Based in Geneva, the UICC is one of the most widely affiliated cancer organisations in the world, with its core mission being cancer classification and control. Its TNM Atlas, Sixth Edition is a valuable reference for all medical, surgical, and radiation oncologists, anatomical and surgical pathologists, cancer registrars, oncology nurses and physician extenders, international cancer care centres, and governmental and NGOs dedicated to cancer control.

Companion website
www.wileyanduicc.com
Visit the companion website to find out more about:
• TNM Online
• TNM on your mobile
• Latest UICC books and journals

WILEY Blackwell
www.wiley.com/wiley-blackwell

ISBN 978-1-4443-3242-1
TNM Atlas
Illustrated Guide to the TNM Classification of Malignant Tumours
Companion website

www.wileyanduicc.com

Visit the companion website to find out more about:
TNM Online
TNM on your mobile
Latest UICC books and journals
TNM Atlas
Illustrated Guide to the TNM Classification of Malignant Tumours

SIXTH EDITION

EDITED BY
Ch. Wittekind
H. Asamura
L. H. Sobin

WILEY Blackwell
CONTENTS

Foreword to the First Edition, vii
Preface to the Sixth Edition, viii
Acknowledgements, ix
Contributors to the Sixth Edition, x
Contributors to the Fifth Edition, xi
Contributors to the Fourth Edition, xii
Contributors to the Third Edition, xiii
Contributors to the Second Edition, xiv
Preliminary Note, xv
Residual Tumour (R) Classification, xvi

HEAD AND NECK TUMOURS, 1
Lip and Oral Cavity, 8
Pharynx, 18
Larynx, 35
Nasal Cavity and Paranasal Sinuses, 46
Malignant Melanoma of Upper Aerodigestive Tract, 56
Major Salivary Glands, 59
Thyroid Gland, 64

DIGESTIVE SYSTEM TUMOURS, 72
Oesophagus including Oesophagogastric Junction, 73
Stomach, 81
Gastrointestinal Stromal Tumour (GIST), 88
Small Intestine, 91
Appendix – Carcinoma, 96
Appendix – Carcinoid, 101
Gastric, Small and Large Intestinal Carcinoid Tumours, 107
Colon and Rectum, 115
Anal Canal, 127
Liver – Hepatocellular Carcinoma, 135
Liver – Intrahepatic Bile Ducts, 141
Gallbladder, 145
Extrahepatic Bile Ducts – Perihilar, 151
Extrahepatic Bile Ducts – Distal, 155
Ampulla of Vater, 160
Pancreas, 167
LUNG AND PLEURAL TUMOURS, 173
Lung, 174
Pleural Mesothelioma, 185

BONE AND SOFT TISSUE TUMOURS, 193
Bone, 194
Soft Tissues, 197

SKIN TUMOURS, 201
Carcinoma of the Skin, 207
Carcinoma of the Skin of the Eyelid, 211
Malignant Melanoma of Skin, 216
Merkel Cell Carcinoma of Skin, 225

BREAST TUMOURS, 229

GYNAECOLOGICAL TUMOURS, 248
Vulva, 249
Vagina, 254
Cervix Uteri, 261
Uterus Endometrium, 271
Uterus – Uterine Sarcomas, 276
Ovary, 284
Fallopian Tube, 292
Gestational Trophoblastic Tumours, 298

UROLOGICAL TUMOURS, 301
Penis, 302
Prostate, 311
Testis, 319
Kidney, 337
Renal Pelvis and Ureter, 346
Urinary Bladder, 354
Urethra, 361
Adrenal Cortex Tumours, 372

HODGKIN LYMPHOMA, 376

NON-HODGKIN LYMPHOMAS, 390
Confronted with a myriad of T's, N's and M's in the UICC TNM booklet, classifying a malignancy may seem to many cancer clinicians a tedious, dull and pedantic task. But with a look at the *TNM Atlas* all of a sudden lifeless categories become vivid images, challenging the clinician’s know-how and investigational skills.

B. van der Werf-Messing, M.D.  
Professor of Radiology  
Chairman of the International TNM Committee of the UICC

Rotterdam, July 1982
This new sixth edition of the *TNM Atlas* incorporates the changes in the TNM System that are in the seventh edition of the *TNM Classification of Malignant Tumours*. The most important additions and modifications concern carcinomas of the oesophagus and the oesophagogastric junction, stomach, lung, appendix, biliary tract, skin, and prostate. There are several new classifications: upper aerodigestive mucosal melanoma, gastrointestinal stromal tumour, gastrointestinal carcinoids (neuroendocrine tumours), intrahepatic cholangiocarcinoma, Merkel cell carcinoma, uterine sarcomas, and adrenal cortical carcinoma.

The rules of classification and staging correspond with those appearing in the seventh edition of the *AJCC Cancer Staging Manual* (2009). Although the Atlas’s content follows the time-honoured approach of depicting the Ts,Ns, and Ms in graphic terms, the all-new design, layout, and full-colour artwork provide a refreshing approach to cancer staging. As Professor van der Werf-Messing stated in her Foreword to the First Edition over forty years ago, “all of a sudden lifeless categories become vivid images”.

---

ACKNOWLEDGEMENTS

The editors wish to express their thanks to all who contributed to this sixth edition by comments, questions and their critical interest.

The Editors have much pleasure in acknowledging the great help received from the members of the TNM Prognostic Factors Project Committee and the National Staging Committees Global Representatives and International Organizations listed on pages xv–xix of the *TNM Classification of Malignant Tumours, Seventh Edition*.

Professor Paul Hermanek has continued to provide encouragement and valuable criticism.

This publication was made possible by grants 1U58DP001819-01, HR/CCH 013713 and HR3/CCH417470 from the Centers for Disease Control and Prevention (CDC) (USA). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC.
CONTRIBUTORS TO THE SIXTH EDITION

Asamura, H. Tokyo, Japan  Lung Surgery
Sobin, L. H. Bethesda, USA  Pathology
Wittekind, Ch., Germany  Pathology
Löffler, Karin, Germany  Ophthalmology
CONTRIBUTORS TO THE FIFTH EDITION

Bootz, F., Leipzig, FRG  Head and Neck Surgery
Hermanek, P., Erlangen, FRG  Pathology
Howaldt, H.-P., Gießen, FRG  Head and Neck Surgery
Hutter, R. V. P., Livingstone, NJ, USA  Pathology
Paterok, E., Erlangen, FRG  Gynaecology
Sobin, L. H., Washington, DC, USA  Pathology
Wagner, G., Heidelberg, FRG  Documentation and Epidemiology
Wittekind, Ch., Leipzig, FRG  Pathology
CONTRIBUTORS TO THE FOURTH EDITION

Bootz, F., Leipzig, FRG
Hermanek, P., Erlangen, FRG
Howaldt, H.-P., Gießen, FRG
Hutter, R. V. P., Livingstone, NJ, USA
Paterok, E., Erlangen, FRG
Sobin, L. H., Washington, DC, USA
Wagner, G., Heidelberg, FRG
Wittekind, Ch., Leipzig, FRG

Head and Neck Surgery
Pathology
Head and Neck Surgery
Pathology
Gynaecology
Pathology
Documentation and Epidemiology
Pathology
CONTRIBUTORS TO THE THIRD EDITION

Baker, H. W., Portland, OR, USA
Beahrs, O. H., Rochester, MN, USA
Drepper, H., Münster-Handorf, FRG
Gemsenjäger, E., Basel, Switzerland
Genz, T., Berlin
Glanz, H., Marburg, FRG
Haase, J., Freiburg, FRG
Hermanek, P., Erlangen, FRG
Hutter, R.V.P., Livingstone, NJ, USA
Kindermann, G., München, FRG
Kleinsasser, O., Marburg, FRG
Lang, G., Erlangen, FRG
Naumann, G. O. H., Erlangen, FRG
Remagen, W., Basel, Switzerland
Scheibe, O., Stuttgart, FRG
Schmitt, H. P., Heidelberg, FRG
Sobin, L.H., Washington, DC, USA
Spiessl, B., Basel, Switzerland
Wagner, G., Heidelberg, FRG

Head and Neck Surgery
General Surgery
Maxillofacial Surgery
General Surgery
Gynaecology
Otorhinolaryngology
Thoracic Surgery
Pathology
Pathology
Gynaecology
Otorhinolaryngology
Ophthalmology
Ophthalmology
Pathology
General Surgery
Neuropathology
Pathology
Maxillofacial Surgery
Documentation and Epidemiology
CONTRIBUTORS TO THE SECOND EDITION

Adolphs, H. D., Höxter, FRG
Amberger, H, Heidelberg, FRG
Baumann, R. P, Neuchätel, Switzerland
Berger, H., Göttingen, FRP
Bokelmann, D. Essen, FRG
Brandeis, W. F. Heidelberg, FRG
Dold, U., Gauting, FRG
Drepper, H., Münster-Handorf, FRG
Drings, P., Heidelberg, FRG
Gemsenjäger, E., Basel, Switzerland
Haase, J., Basel, Switzerland
Heitz, Ph., Basel, Switzerland
Hermanek, P., Erlangen, FRG
Karrer, K., Wien, Austria
Kuehnl-Petzold, C., Freiburg i. Br., FRG
Liebenstein, J., Mannheim, FRG
Molitor, D., Bonn, FRG
Nidecker, A., Basel, Switzerland
Rohde, H., Köln, FRG
Scheibe, O., Stuttgart, FRG
Schmitt, A., Mannheim, FRG
Spiessl, B., Basel, Switzerland
Thomas, C., Marburg, FRG
Vogt-Moykopf, I., Heidelberg, FRG
Wagner, G., Heidelberg, FRG

Urology
General Surgery
Pathology
Dermatology
General Surgery
Paediatric Oncology
Internal Medicine
Maxillofacial Surgery
Internal Medicine
General Surgery
Thoracic Surgery
Pathology
Pathology
Oncological Epidemiology
Dermatology
Gynaecology
Urology
Radiology
General Surgery
General Surgery
Gynaecology
Maxillofacial Surgery
Pathology
Thoracic Surgery
Documentation and Epidemiology
The TNM System for describing the anatomical extent of disease is based on assessment of three components:

T – The extent of the primary tumour
N – The absence or presence and extent of regional lymph node metastasis
M – The absence or presence of distant metastasis

The addition of numbers to these three components indicates the extent of the malignant disease, thus:

T0, T1, T2, T3, T4 N0, N1, N2, N3 M0, M1

In effect, the system is a “short-hand notation” for describing the extent of a particular malignant tumour.

Each site is described under the following headings:

1) Anatomy
   Drawings of the anatomical sites and subsites are presented with the appropriate ICD-O topography numbers.

2) Regional Lymph Nodes
   The regional lymph nodes are listed and shown in drawings.

3) T/pT Clinical and Pathological Classification of the Primary Tumour
   The definitions for T and pT categories are presented. In the seventh edition (2010) of the TNM Classification the clinical and pathological classification (T and pT) generally coincide, therefore the same illustrations are valid for the T and pT classification.

4) N/pN Clinical and Pathological Classification of Regional Lymph Nodes
   The N and pN categories are presented in a fashion similar to the T and pT categories. Differences between N and pN definitions in the seventh edition arise in the case of carcinomas of the breast and penis and germ cell tumours of the testis.

5) M/pM Clinical and Pathological Classification of Distant Metastasis
   M localization is given only in selected cases because of its many possible variables.

Substantial Changes in the sixth edition compared to the fifth edition are marked by a bar at the left-hand side of the page. The same is true for new classifications of previously unclassified tumours.

RESIDUAL TUMOUR (R) CLASSIFICATION*

The absence or presence of residual tumour after treatment should be described by the symbol R.

TNM and pTNM describe the anatomical extent of cancer in general without considering treatment. They can be supplemented by the R classification, which deals with tumour status after treatment. The R classification reflects the effects of therapy, influences further therapeutic procedures and is a strong predictor of prognosis.

In the R classification, not only local-regional residual tumour is to be taken into consideration, but also distant residual tumour in the form of remaining distant metastases.

The definitions of the R categories are:

RX Presence of residual tumour cannot be assessed
R0 No residual tumour (Fig. 1a-c)
R1 Microscopic residual tumour (Fig. 2)
R2 Macroscopic residual tumour (Fig. 3a-c)

Fig. 1a-c

Note
*Some consider the R classification to apply only to the primary tumour and its local or regional extent. Others have applied it more broadly to include distant metastasis. The specific usage should be indicated when the R is used.
HEAD AND NECK TUMOURS

Introductory Notes

The following sites are included:
• Lip, oral cavity
• Pharynx: oropharynx, nasopharynx, hypopharynx
• Larynx: supraglottis, glottis, subglottis
• Nasal cavity and paranasal sinuses
• Malignant melanoma of upper aerodigestive tract
• Major salivary glands
• Thyroid gland

Carcinomas arising in the minor salivary glands of the upper aerodigestive tract are classified according to the rules for tumours of their anatomic site of origin, e.g., oral cavity.

Regional Lymph Nodes (Fig. 4)

The definitions of the N categories for all head and neck sites except nasopharynx, mucosal malignant melanoma of the upper aerodigestive tract and thyroid are the same. Midline nodes are considered ipsilateral nodes except in the thyroid.

These include
(1) Submental nodes
(2) Submandibular nodes
(3) Cranial jugular (deep cervical) nodes
(4) Medial jugular (deep cervical) nodes
(5) Caudal jugular (deep cervical) nodes
(6) Dorsal cervical (superficial cervical) nodes along the accessory nerve
(7) Supraclavicular nodes
(8) Prelaryngeal, pretracheal*, and paratracheal nodes
(9) Retropharyngeal nodes
(10) Parotid nodes
(11) Buccal nodes
(12) Retroauricular and occipital nodes

Note
*The pretracheal lymph nodes are sometimes known as “Delphian nodes”.

N/pN Classification – Regional Lymph Nodes

The definitions of the N categories for all head and neck sites except nasopharynx, mucosal malignant melanoma of the upper aerodigestive tract and thyroid are:

- **NX/pNX**: Regional lymph nodes cannot be assessed
- **N0/pN0**: No regional lymph node metastasis

**pN0**

Histological examination of a selective neck dissection specimen will ordinarily include 6 or more lymph nodes. Histological examination of a radical or modified radical neck dissection specimen will ordinarily include 10 or more lymph nodes. If the lymph nodes are negative, but the number ordinarily examined is not met, classify as pN0. When size is a criterion for pN classification, measurement is made of the metastasis, not of the entire lymph node.
N1  Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension (Fig. 5)
N2  Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension (Fig. 6)

Any head or neck primary except nasopharynx, malignant melanoma of upper aerodigestive tract and thyroid gland

Fig. 6
N2b Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension (Fig. 7)

Any head or neck primary except nasopharynx, malignant melanoma of upper aerodigestive tract and thyroid gland

Fig. 7
N2c  Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension (Fig. 8)

Any head or neck primary except nasopharynx, malignant melanoma of upper aerodigestive tract and thyroid gland

Fig. 8
N3 Metastasis in a lymph node more than 6 cm in greatest dimension (Fig. 9)

Note
Midline nodes are considered ipsilateral nodes.

Any head or neck primary except nasopharynx, malignant melanoma of upper aerodigestive tract and thyroid gland
LIP AND ORAL CAVITY (ICD-O C00, C02–06)

Rules for Classification

The classification applies only to carcinomas of the vermilion surfaces of the lips and of the oral cavity, including those of minor salivary glands. There should be histological confirmation of the disease.

Anatomical Sites and Subsites

Lip (Fig. 10)

1. External upper lip (vermillion border) (C00.0)
2. External lower lip (vermillion border) (C00.1)
3. Commissures (C00.6)
**Oral Cavity (Figs. 11, 12, 13)**

1. Buccal mucosa
   (i) Mucosa of upper and lower lips (C00.3, 4)
   (ii) Cheek mucosa (C06.0)
   (iii) Retromolar areas (C06.2)
   (iv) Bucco-alveolar sulci, upper and lower (vestibule of mouth) (C06.1)
2. Upper alveolus and gingiva (upper gum) (C03.0)
3. Lower alveolus and gingiva (lower gum) (C03.1)
4. Hard palate (C05.0)
5. Tongue
   (i) Dorsal surface and lateral borders anterior to vallate papillae (anterior two-thirds) (C02.0, 1)
   (ii) Inferior (ventral) surface (C02.2)
6. Floor of mouth (C04)
N – Regional Lymph Nodes

See Head and Neck Tumours.