



ORIGINAL ARTICLE

The IASLC Lung Cancer Staging Project: A Renewed Call to Participation



Dorothy J. Giroux, MS,^a Paul Van Schil, MD,^b Hisao Asamura, MD,^{c,*} Ramón Rami-Porta, MD,^{d,e} Kari Chansky, MS,^a John J. Crowley, PhD,^a Valerie W. Rusch, MD,^f Kemp Kernstine, MD, PhD,^g on behalf of the International Association for the Study of Lung Cancer Staging and Prognostic Factors Committee**

^aCancer Research And Biostatistics, Seattle, Washington

^bDepartment of Thoracic and Vascular Surgery, Antwerp University Hospital and University of Antwerp, Edegem, Belgium

^cDivision of Thoracic Surgery, Keio University School of Medicine, Tokyo, Japan

^dThoracic Surgery Service, Hospital Universitari Mútua Terrassa, Terrassa, Spain

^eNetwork of Centers of Biomedical Research in Respiratory Diseases (CIBERES), Lung Cancer Group, Terrassa, Spain

^fThoracic Surgery, Memorial Sloan-Kettering Cancer Center, New York, New York

^gCardiovascular and Thoracic Surgery, University of Texas Southwestern, Dallas, Texas

Received 19 December 2017; revised 14 January 2018; accepted 14 February 2018

Available online - 21 February 2018

ABSTRACT

Over the past two decades, the International Association for the Study of Lung Cancer (IASLC) Staging Project has been a steady source of evidence-based recommendations for the TNM classification for lung cancer published by the Union for International Cancer Control and the American Joint Committee on Cancer. The Staging and Prognostic Factors Committee of the IASLC is now issuing a call for participation in the next phase of the project, which is designed to inform the ninth edition of the TNM classification for lung cancer. Following the case recruitment model for the eighth edition database, volunteer site participants are asked to submit data on patients whose lung cancer was diagnosed between January 1, 2011, and December 31, 2019, to the project by means of a secure, electronic data capture system provided by Cancer Research And Biostatistics in Seattle, Washington. Alternatively, participants may transfer existing data sets. The continued success of the IASLC Staging Project in achieving its objectives will depend on the extent of international participation, the degree to which cases are entered directly into the electronic data capture system, and how closely externally submitted cases conform to the data elements for the project.

© 2018 International Association for the Study of Lung Cancer. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Keywords: Lung cancer; Lung cancer databases; Lung cancer staging; TNM classification

Introduction

The International Association for the Study of Lung Cancer (IASLC) established an international staging committee, now referred to as the Staging and Prognostic Factors Committee (SPFC), in 1997 to collect and combine lung cancer data sets to inform changes to the TNM staging system for lung cancer with representation worldwide and including all treatment modalities. The TNM staging system was developed by Pierre Denoix between 1943¹ and 1952,² and until the IASLC initiative,

*Corresponding author.

**See [Appendix 1](#) for the members of the International Association for the Study of Lung Cancer Staging and Prognostic Factors Committee and advisory boards and [Appendix 2](#) for the chairpersons and members of the subcommittees of the Lung Cancer Domain of the IASLC Staging and Prognostic Factors Committee.

Disclosure: Ms. Giroux, Dr. Crowley, and Ms. Chansky report grants from the International Association for the Study of Lung Cancer (IASLC) during the conduct of the study. Dr. Asamura reports lecture fees from Johnson and Johnson, Medtronic, and Taiho Pharmaceutical. Dr. Rusch reports grants from Genelux outside the submitted work. The remaining authors declare no conflict of interest.

Address for correspondence: Hisao Asamura, MD, Division of Thoracic Surgery, Keio University School of Medicine, 35 Schinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan. E-mail: hasamura@keio.jp or thymoma1983@gmail.com.

© 2018 International Association for the Study of Lung Cancer. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

ISSN: 1556-0864

<https://doi.org/10.1016/j.jtho.2018.02.012>

revisions to the lung cancer staging system had been based almost exclusively on a single data set established by Dr. Clifton Mountain at M. D. Anderson Cancer Center³ in the United States.

This first phase of the staging project resulted in a database of 81,495 evaluable lung cancer cases from 45 sources in 20 countries that were diagnosed from 1990 to 2000 and included all treatment modalities.⁴ This database was the foundation for the committee's core recommendations for changes to the staging system, which was published in 2007⁵⁻⁹ along with additional publications on SCLC,^{10,11} carcinoid tumors,¹² and prognostic factors for lung cancer in general¹³ and surgically managed NSCLC.¹⁴ In planning for future collaboration, a new international nodal map¹⁵ was proposed to resolve differences in the two maps in use at the time, and standard criteria were proposed to measure depth of pleural invasion.¹⁶ All of these recommendations were adopted by the Union for International Cancer Control (UICC) and the American Joint Committee on Cancer (AJCC) in 2009 in the seventh editions of their staging manuals for lung cancer.^{17,18} They were also published in the first edition of the *IASLC Staging Manual in Thoracic Oncology* and the *IASLC Staging Handbook in Thoracic Oncology*.^{19,20} A catalog of presentation slides describing the recommendations and the supportive data is also posted on the IASLC website for public use.

The second phase of the staging project began in 2009 with a call to participants to contribute data using a centralized, electronic data capture (EDC) system.²¹ Alternatively, participants were encouraged to collect the published data elements using their own platforms and still contribute standardized data sets in this way. These data elements were drafted in a series of meetings of the chair and subcommittee chairs in 2007-2008 and circulated among the full committee membership for review. Ultimately, a number of large national registries were combined with the EDC data to yield a database of 94,708 patients around the world with lung cancer diagnosed from 1999 to 2010. Approximately 6% of the cases in this second international database were submitted according to the prescribed data dictionary, including 4667 cases entered through the EDC and a database of 1427 from Memorial Sloan Kettering Cancer Center.²² From this second, international database, the IASLC SPFC developed recommendations toward the eighth edition of the TNM staging system. These recommendations were published in 2015, 2016, and 2017²³⁻³³ and were once again accepted by the UICC³⁴ and AJCC³⁵ in 2017 (with AJCC implementation effective in 2018) and included in the second edition of the *IASLC Staging Manual in*

Thoracic Oncology and the *IASLC Staging Handbook in Thoracic Oncology*.^{36,37}

Data Elements for the Project

The project is now entering its third cycle, with the goal of developing recommendations for the ninth edition of TNM. The population to be studied consists of patients with lung cancer newly diagnosed between January 1, 2011, and December 31, 2019. The data elements and other documentation describing the project, including application materials, a protocol to facilitate ethics review, and screenshots of the data entry screens, are posted online at <https://iaslc.crab.org/LC/LCStagingProject9Ed.pdf>. Briefly, data elements include patient characteristics; baseline laboratory values and results of pulmonary function tests and positron emission tomography; an indication of which clinical tests were used to establish pretreatment T, N, and M categories; clinical TNM category plus supporting evidence and pathologic TNM category; treatment; molecular markers; and survival.

Pretreatment TNM category is collected for all cases; postsurgical or pathologic TNM category is collected if resection of the primary tumor is attempted. T descriptors include size and degree of tumor extension, with further description of pretreatment carcinomatous lymphangitis and attributes of the primary tumor documented during the surgical procedure that are not currently T descriptors. Nodal station involvement is described by station by using the IASLC 2009 nodal map, with additional collection of the number of nodes sampled, the number of positive nodes, and the presence of extracapsular involvement. M descriptors qualify the presence of pleural/pericardial effusions, contralateral/bilateral lung nodules, and contralateral/bilateral pleural nodules and quantify metastatic lesions at specific distant sites. Genetic biomarkers, copy number alterations, and protein alterations identified at any time during the course of systemic treatment, as well as the specific systemic agents administered, are new data elements in the ninth edition effort, introduced by the recently created Molecular Taskforce Subcommittee of the SPFC.

In all, the database consists of 474 fields collected in 18 data forms. Although the majority of these fields are check boxes, entering a complete baseline form set can be expected to take 1 to 2 hours. This time estimate is based on the October 2017 release of the EDC system (before molecular forms were added) and reflects the experience of the first institutions in using the new system—primarily, the Cooperative Group of Bronchogenic Carcinoma III-Spanish Society of Pulmonology and Thoracic Surgery.

Areas of Focus for the Next Revision of the TNM Classification

The initial retrospective staging project was based exclusively on existing data sets that were not designed to address questions about lung cancer staging, and the limitations of this method of case selection have been described. For example, proposals for change regarding T descriptors were limited to tumor size, additional tumor nodules, and pleural effusion in the seventh edition recommendations partly because of a lack of detail in the data submitted to explore other questions regarding tumor extension.²² In the eighth edition database, many of the large staging-related data sets and registry data were pivotal in providing the empirical evidence on which the T1a, T1b, and T1c categories are based and provided context to the stage groupings analysis. However, with the exception of the Japanese series, these data sets were less informative to decisions regarding atelectasis (reclassified as T2 whether partial or total) or involvement of the main bronchus (reclassified as T2) or diaphragm (reclassified as T4), for example.²² They also generally lacked the distinction between single and multiple distant metastatic lesions necessary to explore the committee's predefined objectives regarding M descriptors. By contrast, the subset of cases that were directly entered through the EDC from Spain, China, and other countries in Europe and South America were fundamental to the eighth edition recommendations to subdivide extrathoracic metastases into M1b (single lesion) and M1c (multiple lesions), as these data suggested that the M1b category had a prognosis similar to that of the M1a category and significantly different from that of the M1c category.²⁵ For these reasons, increasing online registration through the EDC is the highest priority of the IASLC SPFC in terms of recruitment of cases in the ninth edition database.

The primary aim of the IASLC Lung Cancer Staging Project is to inform future revisions to the staging criteria. The research objectives related to the T, N, and M descriptors, as well as other nonanatomic considerations for staging and prognosis, are as outlined in [Table 1](#). Further implementation and evaluation of prognostic differences based on tumor size will be a special area of focus for the ninth edition, given the increasing emphasis on tumor size as a determinant of T classification and the new guidelines regarding the measurement and pathologic staging of adenocarcinoma in situ, minimally invasive adenocarcinoma, and lepidic predominant adenocarcinoma,³⁸ which were added to the WHO Classification in 2015.³⁹ Other burning questions for the ninth edition in particular include the assessment of the prognostic impact of single versus

multiple station involvement in N1 and N2 locations, skip N2 disease, and reassessment of newly implemented proposals regarding multiple lesions after increasing the follow-up for survival of these patients. Although criteria for complete resection in lung cancer were already published in 2005 by an IASLC working group specifically looking at residual (R) disease, the precise impact of the different R categories on survival has not been clearly established.⁴⁰ A recent publication⁴¹ and data presented at the presidential session of the 18th World Conference on Lung Cancer⁴² show that patients with uncertain resections have a poorer outcome than do patients with complete (R0) resections. Most patients in the uncertain category have inadequate lymph node dissection; so, particular attention should be paid to mediastinal staging and intraoperative lymph node evaluation. Guidelines for surgical evaluation during staging and definite treatment of lung cancer will be provided, with clarification of the description of the different lymph node stations for specific surgical purposes. Also, oligometastatic disease is currently a major topic of interest, with controversial opinions regarding the best management. More prospective data will provide useful information regarding refinement of the category M1b: is there a significant survival difference between patients with one, two, or three metastases in one specific distant organ? Are these survival rates comparable to the survival rates in patients with two or three distant metastases in two or three different organs? Finally, survival models should be developed that incorporate additional biomarker profiles and specific gene mutations as prognostic variables in addition to anatomic TNM and classic predictors of survival such as age, sex, and performance status. In this respect, the creation of prognostic groups combining anatomic and nonanatomic parameters will be one of the most challenging activities of the third phase of the IASLC Staging Project.

Call to Participation

At this time, the IASLC SPFC is issuing a call to participation to all who wish to contribute data to this effort to ensure that decisions regarding the staging of lung cancer are based on sound empirical evidence. The current time line for the project, as shown in [Table 2](#), allows recruitment of cases through 2019, with follow-up for survival through 2021, for the ninth edition recommendations to be developed in 2022. As in past years, these findings will be shared with the worldwide lung cancer community through a series of publications to be submitted to the *Journal of Thoracic Oncology*. The recommendations and supportive data will also be submitted to the UICC and AJCC for consideration in the next

Table 1. Study Objectives

Component	Objective
T	<ul style="list-style-type: none"> a) Assess the prognostic impact of tumor size b) Assess the classification capacity of each descriptor defining T status c) Study new conditions not included in the present T (e.g., differences between parietal pleura invasion and rib invasion)
N	<ul style="list-style-type: none"> a) Assess the prognostic impact of N status b) Assess the prognostic impact of <ul style="list-style-type: none"> i. Nodal extent (single vs. multiple station involvement in N1 and N2 locations) ii. Number of involved lymph nodes iii. Lymph node ratio (i.e., number of involved lymph nodes divided by the number of removed lymph nodes) iv. Nodal size (i.e., largest involved node within the relevant N category) v. Individual nodes involved in each nodal category c) Assess the prognostic impact of extracapsular extension d) Assess the prognostic impact of the N3 nodal location (i.e., contralateral mediastinum and ipsilateral or contralateral supraclavicular fossa)
M	<ul style="list-style-type: none"> a) Assess the prognostic impact of M status b) Assess the prognostic impact of <ul style="list-style-type: none"> i. Single metastasis in a single organ ii. Multiple metastases in a single organ iii. Multiple metastases in several organs
Other	<ul style="list-style-type: none"> a) Assess the prognostic impact of histologic type and grade b) Assess the reliability of staging methods utilized in clinical staging (for those tumors with pretreatment and postsurgical classification) c) Assess the prognostic impact of complete, incomplete, and uncertain resections according to the proposed definitions of the International Association for the Study of Lung Cancer d) Assess the prognostic impact of clinical factors, including comorbidity and pulmonary function tests e) Assess the prognostic impact of maximum standard uptake value (SUV_{max}) at the primary site and in any positive nodal sites for those patients with positron emission tomography scans in the pretreatment staging
Prognostic groups	<ul style="list-style-type: none"> a) Assess the prognostic relevance of individual molecular parameters b) Create prognostic groups based on the combination of anatomic and nonanatomic parameters, including molecular markers, clinical and epidemiological features, and other parameters, such as lung function tests, blood analyses and SUV_{max}

SUV_{max}, maximum standardized uptake value.

revisions of their staging manuals, which are expected to be published in 2024.

Contributing to the IASLC database is both personally and professional rewarding for those interested in improving lung cancer staging on account of the long-standing nature of this international project, which has proved to be very successful in the past two revisions of the TNM classifications of thoracic malignancies. Contributors are acknowledged in the appendix of every paper published by the committee. In addition, contribution of cases through the EDC system provides sites with the ability to download institutional data, with

range checks and data consistency checks having been applied.

Each institution that contributes data to the project will retain full access and publishing rights to its own data; however, the collective database is the property of the IASLC, and Cancer Research And Biostatistics is responsible for its management, storage, and analysis. Publications related to the objectives of the IASLC SPFC (i.e., publications providing recommendations for changes in the TNM classification for lung cancer) will be planned, researched, analyzed, and written by the members of the respective subcommittees and will

Table 2. Time Line

Year:	2018	2019	2020	2021	2022	2023	2024
Activity:	EDC case registration (retrospective to 2011)		Follow-up and preliminary analysis		Final data analysis	Publication of recommendations in the <i>Journal of Thoracic Oncology</i> Submission of recommendations to the UICC and AJCC	Publication of the ninth edition of the TNM classification by the UICC and AJCC

EDC, electronic data capture; UICC, Union for International Cancer Control; AJCC, American Joint Committee on Cancer.

follow the same authorship pattern used for the publications regarding the seventh and eighth edition proposals: chair of the subcommittee, members of the subcommittee in alphabetical order, chair of the IASLC SPFC on behalf of the committee, and participating institutions.

Readers with ideas on the inclusion of elements not included in the present data set should contact the chair of the IASLC SPFC, Hisao Asamura, MD (thymoma1983@gmail.com), and explain the rationale behind these proposals.

There are several ways to become a member of the IASLC SPFC: (1) by invitation (invitations are sent to specialists who have shown special interest in staging or who can contribute cases from their institutions or scientific societies, (2) by recommendation from an IASLC board member (these are usually included in point 1), (3) by application (the IASLC has a system of self-nomination to apply for membership on the IASLC different committees; the applications are reviewed by the IASLC and discussed with the chair of the SPFC and chairs of the respective subcommittees), and (4) by contacting the chair of the SPFC and expressing interest in participating.

In all cases, membership in the SPFC is subject to approval by the president and board of directors of the IASLC. Current active IASLC membership is generally required to serve on IASLC committees, though exceptional circumstances may be considered at the discretion of the SPFC chair.

To indicate your interest in contributing data to the project or to obtain more information, please send an email to webhelpIASLC@crab.org ([Supplementary Fig. 1](#)) with *IASLC Lung Cancer Staging Project* in the subject line.

Acknowledgments

We would like to extend our deepest gratitude to the dedicated contributors over the years for sending their data to explore these many fascinating questions and to improve our understanding of the important factors that influence the prognosis of our patients with lung cancer. The authors wish to thank Patricia Vigués and Ken Matheus for administrative assistance in the preparation of this manuscript.

Appendix 1

IASLC Staging and Prognostic Factors Committee

Hisao Asamura (chair), Keio University, Tokyo, Japan; Valerie Rusch (chair elect) Memorial Sloan Kettering Cancer Center, New York, New York; Ramón Rami-Porta (past chair), Hospital Universitari Mutua Terrassa, Terrassa, Spain; Luiz Henrique Araujo, Brazilian National

Cancer Institute, Rio de Janeiro, Brazil; Paul Beckett, Derby Teaching Hospital National Health Service Foundation Trust, Derby, England; David Beer, University of Michigan, Ann Arbor, Michigan; Pietro Bertoglio, Division of Thoracic Surgery, Sacro Cuore-Don Calabria Research Hospital and Cancer Care Centre, Negrar-Verona, Italy; Ricardo Beyruti, University of São Paulo Medical School, Sao Paulo, Brazil; Andrea Bille, Guy's Hospital, London, United Kingdom; Vanessa Bolejack, Cancer Research And Biostatistics, Seattle, Washington; Souheil Boubia, University Hospital, IBN Rochd, Casablanca, Morocco; Elisabeth Brambilla, Centre Hospitalier Universitaire, Grenoble, France, University of Grenobles Alpes, Grenoble, France; James D. Brierley, Department of Radiation Oncology, Princess Margaret Cancer Center, Toronto, Canada; A. K. Cangir, Ankara University Faculty of Medicine, Ankara, Turkey; David Carbone, The Ohio State University, Columbus, Ohio; Kari Chansky, Cancer Research And Biostatistics, Seattle, Washington; John Crowley, Cancer Research And Biostatistics, Seattle, Washington; Gail Darling, University of Toronto, Toronto, Canada; Frank Detterbeck, Yale University School of Medicine, New Haven, Connecticut; Xavier Benoit D'Journo, Aix-Marseille University, Marseille, France; Jessica Donnington, New York University School of Medicine, New York, New York; Wilfried Eberhardt, West German Cancer Centre, University Hospital Essen, Essen, Germany; John Edwards, Northern General Hospital, Sheffield, United Kingdom; Jeremy Erasmus, M. D. Anderson Cancer Center, Houston, Texas; Wentao Fang, Department of Thoracic Surgery, Shanghai Chest Hospital, Jiaotong University Medical School, Shanghai, People's Republic of China; Dean Fennell, Leicester Cancer Research Centre, Department of Genetics and Genome Biology, University of Leicester and University Hospitals of Leicester National Health Service Trust, Leicester, United Kingdom; Kwun Fong, University of Queensland Thoracic Research Centre, Brisbane, Australia; Françoise Galateau-Salle, Centre Hospitalier Universitaire, Caen, France; Oliver Gautschi, Cancer Center, Cantonal Hospital Lucerne, Lucerne, Switzerland; Ritu Gill, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts; Dorothy Giroux, Cancer Research And Biostatistics, Seattle, Washington; Jin Mo Goo, Seoul National University, Seoul, Republic of Korea; Seiki Hasegawa, Hyogo College of Medicine, Nishinomiya, Japan; Fred Hirsch, University of Colorado Denver School of Medicine, Denver, Colorado; Hans Hoffman, Technical University of Munich, Munich, Germany; Wayne Hofstetter, M. D. Anderson Cancer Center, Houston, Texas; James Huang, Memorial Sloan Kettering Cancer Center, New York, New York; Philippe Joubert, Quebec Heart and Lung Institute, Quebec, Canada; Kemp Kernstine, The University of Texas Southwestern Medical Center, Dallas,

Texas; Keith Kerr, University of Aberdeen, School of Medicine and Dentistry, Aberdeen, United Kingdom; Young Tae Kim, Seoul National University, Seoul, Republic of Korea; Hong Kwan Kim, Samsung Medical Center, Seoul, Republic of Korea; Hedy Kindler, The University of Chicago Medical Center, Chicago, Illinois; Yolande Lievens, Ghent University Hospital, Gent, Belgium; Hui Liu, Sun Yat-Sen University Cancer Center, Guangdong Sheng, People's Republic of China; Donald E Low, Virginia Mason Medical Center, Seattle, Washington; Gustavo Lyons, Buenos Aires British Hospital, Buenos Aires, Argentina; Heber MacMahon, University of Chicago, Chicago, Illinois; Mirella Marino, Regina Elena National Cancer Institute, Rome, Italy; Edith Marom, M. D. Anderson Cancer Center, Houston, Texas, and University of Tel Aviv, the Chaim Sheba Medical Center, Tel Aviv, Israel; José-María Matilla, Valladolid University Hospital, Valladolid, Spain; Jan van Meerbeeck, Antwerp University and Antwerp University Hospital, Antwerp, Belgium; Luis M. Montuenga, Center of Applied Medical Research, University of Navarra, Pamplona, Spain and Centro de Investigación Biomédica en Red de Cáncer, Spain; Andrew Nicholson, Royal Brompton and Harefield National Health Service Trust Foundation Trust and Imperial College, London, United Kingdom; Anna Nowak, University of Western Australia, Perth, Australia; Isabelle Opitz, University Hospital Zurich, Zurich, Switzerland; Meinoshin Okumura, Osaka University, Osaka, Japan; Raymond U. Osarogiagbon, Baptist Cancer Center, Memphis, Tennessee; Harvey Pass, New York University, New York, New York; Marc de Perrot, University of Toronto, Toronto, Canada; Helmut Prosch, Medical University of Vienna, Vienna, Austria; David Rice, M. D. Anderson Cancer Center, Houston, Texas; Andreas Rimner, Memorial Sloan Kettering Cancer Center, New York, New York; Enrico Ruffini, University of Torino, Torino, Italy; Shuji Sakai, Tokyo Women's Medical University, Tokyo, Japan; Paul Van Schil, Antwerp University and Antwerp University Hospital, (Edegem) Antwerp, Belgium; Navneet Singh, Postgraduate Institute of Medical Education and Research, Chandigarh, India; Amy Stoll-D'Astice, Cancer Research And Biostatistics, Seattle, Washington; Francisco Suárez, Clínica Santa María, Santiago, Chile; Ricardo M. Terra, University of Sao Paulo, Sao Paulo, Brazil; William D Travis, Memorial Sloan Kettering Cancer Center, New York, New York; Ming S. Tsao, Princess Margaret Cancer Centre, Toronto, Canada; Paula Ugalde, Quebec Heart and Lung Institute, Quebec, Canada; Shun-ichi Watanabe, National Cancer Center Hospital, Tokyo, Japan; Jacinta Wiens, IASLC, Aurora, Colorado; Ignacio Wistuba, The University of Texas M. D. Anderson Cancer Center, Houston, Texas; Yasushi Yatabe, Aichi Cancer Center Hospital, Nagoya, Japan.

Advisory Board to the Lung Cancer Domain

Liyan Jiang, Shanghai Chest Hospital, Shanghai, People's Republic of China; Kaoru Kubota, Nippon Medical School Hospital, Tokyo, Japan; Eric Lim, Imperial College and the Royal Brompton Hospital, London, United Kingdom; Paul Martin Putora, Kantonsspital St.Gallen, St. Gallen, Switzerland; Akif Turna, Istanbul Univ Cerrah-pasa Medical School, Istanbul, Turkey.

Advisory Board to the Thymic Tumor Domain

Pier Luigi Filosso, University of Torino, Torino, Italy; Kazuya Kondo, Tokushima University, Tokushima, Japan; Dong Kwan Kim, Asan Medical Center, Seoul, and University of Ulsan College of Medicine, Seoul, Republic of Korea; Giuseppe Giaccone, Lombardi Comprehensive Cancer Center, Georgetown University, Washington, D.C.; Professor of Medical Oncology and Pharmacology Conrad B. Falkson, Queen's University, Kingston, Ontario, Canada; Marco Lucchi, Division of Thoracic Surgery, Azienda Ospedaliero-Universitaria Pisana, Pisa, Italy.

Advisory Board to the Esophageal Cancer Domain

Eugene Blackwell, Cleveland Clinic, Cleveland, Ohio; Thomas Rice, Cleveland Clinic, Cleveland, Ohio.

Appendix 2: Chairpersons and Members of the Subcommittees of the Lung Cancer Domain of the IASLC Staging and Prognostic Factors Committee

IASLC Staging and Prognostic Factors Committee Chair

Hisao Asamura.

Lung Cancer Domain Chair

Paul Van Schil.

Lung Cancer Domain Vice Chair

Kemp Kernstine.

Lung Cancer Domain T Descriptors Subcommittee

Hisao Asamura (chair), A. K. Cangir, Hui Liu, Jessica Donnington, Wentao Fang, Gustavo Lyons, William Travis, Young Tae Kim, Shuji Sakai, Paula Ugalde, Pietro Bertoglio.

Lung Cancer Domain N Descriptors Subcommittee

James Huang (chair), Kemp Kernstine, Raymond U. Osarogiagbon, Francisco Suárez, Valerie Rusch, David Rice, Ricardo Beyruti, Hong Kwan Kim, Paul Van Schil, Shun-ichi Watanabe, Helmut Prosch, Edith Marom.

Lung Cancer Domain M Descriptors Subcommittee

Kwun Fong (chair), Navneet Singh, Dean Fennell, Wilfried Eberhardt, Yolande Lievens, Mirella Marino,

Jeremy Erasmus, Paul Martin Putora, Edith Marom, Francisco Suárez.

Lung Cancer Domain Ground Glass Opacities and Adenocarcinoma In Situ Subcommittee

William Travis (chair), Hisao Asamura, Shun-ichi Watanabe, Shuji Sakai, Yasushi Yatabe, Helmut Prosch, Hans Hoffman, John Edwards, Philippe Joubert, Ritu Gill, Jin Mo Goo, Andrew G. Nicholson, Young Tae Kim, Heber MacMahon, Frank Detterbeck, Edith Marom.

Lung Cancer Domain Neuroendocrine Tumors Subcommittee

Ming Tsao (cochair), Andrew G. Nicholson, (cochair), Wilfried Eberhardt, Ricardo Beyruti, Yasushi Yatabe, William Travis, José-María Matilla, Yolande Lievens, Frank Detterbeck, Eric Lim.

Lung Cancer Domain Stage Subcommittee

Hisao Asamura (chair), Ramón Rami-Porta, James Huang, Kwun Fong, William Travis, Ming Tsao, Shun-ichi Watanabe, Andrew G. Nicholson, Frank Detterbeck, John Edwards, James Brierley, Paul Van Schil, Kemp Kernstine, Edith Marom.

Lung Cancer Domain Lymph Node Chart Subcommittee

Shun-ichi Watanabe (chair), Hisao Asamura, Valerie Rusch, Ramón Rami-Porta, Hans Hoffman, Paul Van Schil, Kemp Kernstine, Raymond U. Osarogiagbon, Jin Mo Goo, Edith Marom.

Lung Cancer Domain Validation and Methodology Subcommittee

Frank Detterbeck (chair), James Brierley, Raymond U. Osarogiagbon, Paul Beckett, Mirella Marino, Hisao Asamura, Valerie Rusch, Eric Lim.

Lung Cancer Domain Prognostic Factors Subcommittee

Frank Detterbeck (chair), Andrew G. Nicholson, Kwun Fong, Young Tae Kim, James Huang, Jan van Meerbeeck, Ming Tsao.

Lung Cancer Domain R Factor Subcommittee

John Edwards (chair), Hans Hoffman, Souheil Boubia, Jun Nakajima, Paul Van Schil, Jessica Donnington, Elisabeth Brambilla, Edith Marom, Andrew G. Nicholson, Mirella Marino, Françoise Galateau, Bill Travis, Yasushi Yatabe, Ming Tsao.

Lung Cancer Domain Radiology and Imaging Subcommittee

Heber MacMahon (chair), Edith Marom, Jim Mo Goo, Ritu Gill.

Lung Cancer Domain Multiple Pulmonary Nodules Subcommittee

Frank Detterbeck (chair), Edith Marom, Andrew G. Nicholson, William Travis, Paula Ugalde, Ricardo M. Terra, Eric Lim.

Lung Cancer Domain Molecular Database Subcommittee

David Carbone (cochair), Fred Hirsch (cochair), Ignacio Wistuba, Keith Kerr, Elisabeth Brambilla, Oliver Gautschi, Yasushi Yatabe, Luiz Henrique Araujo, Harvey Pass, Ming Tsao, Ramón Rami-Porta, William Travis, Frank Detterbeck, Andrew G. Nicholson, Hisao Asamura, Philippe Joubert, Luis Montuenga, Ricardo M. Terra, Raymond U. Osarogiagbon, José-María Matilla, Dean Fennell, David Beer, Jacinta Wiens, Eric Lim.

Cancer Research And Biostatistics

John Crowley, Kari Chansky, Dorothy Giroux, Vanessa Bolejack, Amy Stoll-D'Astice, Hong Wei Wang, Katie Nishimura.

Supplementary Data

Note: To access the supplementary material accompanying this article, visit the online version of the *Journal of Thoracic Oncology* at www.jto.org and at <https://doi.org/10.1016/j.jtho.2018.02.012>.

References

1. Denoix PF. Enquete permanente dans les centres anticancereux. *Bull Inst Nat Hyg.* 1946;1:70-75.
2. Denoix PF. The TNM staging system. *Bull Inst Nat Hyg.* 1952;7:743.
3. Mountain CF, Dresler CM. Regional lymph node classification for lung cancer staging. *Chest.* 1997;111:1718-1723.
4. Goldstraw P, Crowley JJ. The International Association for the Study of Lung Cancer International staging project on lung cancer. *J Thorac Oncol.* 2006;1:281-286.
5. Rami-Porta R, Ball D, Crowley J, et al. The IASLC Lung Cancer Staging Project: proposals for the revision of the T descriptors in the forthcoming (seventh) edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2007;2:593-602.
6. Rusch VW, Crowley J, Giroux DJ, et al. The IASLC Lung Cancer Project: proposals for the revision of the N descriptors in the forthcoming seventh edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2007;2:603-612.
7. Postmus PE, Brambilla E, Chansky K, et al. The IASLC Lung Cancer Project: proposals for revision of the M descriptors in the forthcoming (seventh) edition of the TNM classification of lung cancer. *J Thorac Oncol.* 2007;2:686-693.
8. Goldstraw P, Crowley J, Chansky K, et al. The IASLC Lung Cancer Project: proposals for the revision of the TNM stage groupings in the forthcoming (seventh) edition of

- the TNM classification of malignant tumours. *J Thorac Oncol.* 2007;2:706-714.
9. Groome PA, Bolejack V, Crowley JJ, et al. The IASLC Lung Cancer Project: validation of the proposals for revision of the T, N, and M descriptors and consequent stage groupings in the forthcoming (seventh) edition of the TNM classification of malignant tumours. *J Thorac Oncol.* 2007;2:694-705.
 10. Shepherd FA, Crowley J, Van Houtte P, et al. The IASLC Lung Cancer Staging Project: proposals regarding the clinical staging of small cell lung cancer in the forthcoming (seventh) edition of the tumor, node, metastasis classification for lung cancer. *J Thorac Oncol.* 2007;2:1067-1077.
 11. Chansky K, Sculier JP, Crowley JJ, et al. The International Association for the Study of Lung Cancer Staging Project. Prognostic factors and pathologic TNM stage in surgically managed non-small cell lung cancer. *J Thorac Oncol.* 2009;4:792-801.
 12. Travis W, Giroux D, Chansky K, et al. The IASLC Lung Cancer Staging Project: proposals for the inclusion of broncho-pulmonary carcinoid tumors in the forthcoming (seventh) edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2008;3:1384-1390.
 13. Sculier JP, Chansky K, Crowley J, Van Meerbeeck J, Goldstraw P. International Staging Committee and Participating Institutions. The impact of additional prognostic factors on survival and their relationship with the anatomical extent of disease expressed by the 6th edition of the TNM classification of malignant tumors and the proposals for the 7th edition. *J Thorac Oncol.* 2008;3:457-466.
 14. Vallières E, Shepherd FA, Crowley J, et al. The IASLC Lung Cancer Staging Project. Proposals regarding the relevance of the TNM in the pathologic staging of small cell lung cancer in the forthcoming (seventh) edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2009;4:1049-1059.
 15. Rusch VW, Asamura H, Watanabe H, et al. The IASLC Lung Cancer Staging Project. A proposal for a new international lymph node map in the forthcoming seventh edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2009;4:568-577.
 16. Travis WD, Brambilla E, Rami-Porta R, et al. Visceral pleural invasion: pathologic criteria and use of elastic stains. Proposal for the 7th edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2008;3:1384-1390.
 17. Sobin L, Gospodarowicz M, Wittekind C, eds. *TNM Classification of Malignant Tumours*. 7th ed. Oxford, UK: Wiley-Blackwell; 2009:138-146.
 18. Edge SB, Byrd DR, Compton CC, Fritz AG, Greene FL, Trotti A, eds. *Cancer Staging Manual*. 7th ed. New York, NY: Springer; 2010:253-270.
 19. Goldstraw P, ed. *IASLC Staging Manual in Thoracic Oncology*. Orange Park, FL: Editorial Rx Press; 2009.
 20. Goldstraw P, ed. *IASLC Staging Handbook in Thoracic Oncology*. Orange Park, FL: Editorial Rx Press; 2009.
 21. Giroux DJ, Rami-Porta R, Chansky K, et al. The IASLC Lung Cancer Staging Project: data elements for the prospective project. *J Thorac Oncol.* 2009;4:679-688.
 22. Rami-Porta R, Bolejack V, Giroux D, et al. The IASLC Lung Cancer Staging Project: the new database to inform the eighth edition of the TNM classification of lung cancer. *J Thorac Oncol.* 2014;9:1618-1624.
 23. Rami-Porta R, Bolejack V, Crowley J, et al. Proposals for the revisions of the T descriptors in the forthcoming eighth edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2015;10:990-1003.
 24. Asamura H, Chansky K, Crowley J, et al. The International Association for the Study of Lung Cancer Lung Cancer Staging Project: proposals for the revision of the N descriptors in the forthcoming 8th edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2015;10:1675-1684.
 25. Eberhardt WE, Mitchell A, Crowley J, et al. The IASLC Lung Cancer Staging Project: proposals for the revision of the M descriptors in the forthcoming eighth edition of the TNM classification of lung cancer. *J Thorac Oncol.* 2015;10:1515-1522.
 26. Goldstraw P, Chansky K, Crowley J, et al. The IASLC Lung Cancer Staging Project: proposals for revision of the TNM stage groupings in the forthcoming (eighth) edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2016;11:39-51.
 27. Nicholson AG, Chansky K, Crowley J, et al. The International Association for the Study of Lung Cancer Lung Cancer Staging Project: proposals for the revision of the clinical and pathologic staging of small cell lung cancer in the forthcoming eighth edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2016;11:300-311.
 28. Detterbeck F, Chansky K, Groome P, et al. The IASLC Lung Cancer Staging Project: methodology and validation used in the development of proposals for revision of the stage classification of non-small cell lung cancer in the forthcoming (eighth) edition of the TNM classification of lung cancer. *J Thorac Oncol.* 2016;11:1433-1446.
 29. Chansky K, Detterbeck FC, Nicholson AG, et al. The IASLC Lung Cancer Staging Project: external validation of the revision of the TNM stage groupings in the eighth edition of the TNM classification of lung cancer. *J Thorac Oncol.* 2017;12:1109-1121.
 30. Detterbeck FC, Nicholson AG, Franklin WA, et al. The IASLC Lung Cancer Staging Project: summary of proposals for revisions of the classification of lung cancers with multiple pulmonary sites of involvement in the forthcoming eighth edition of the TNM classification. *J Thorac Oncol.* 2016;11:539-650.
 31. Detterbeck FC, Franklin WA, Nicholson AG, et al. The IASLC Lung Cancer Staging Project: background data and proposed criteria to distinguish separate primary lung cancers from metastatic foci in patients with two lung tumors in the forthcoming eighth edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2016;11:651-665.
 32. Detterbeck FC, Bolejack V, Arenberg DA, et al. The IASLC Lung Cancer Staging Project: background data and proposals for the classification of lung cancer with separate tumor nodules in the forthcoming eighth edition of the TNM classification for lung cancer. *J Thorac Oncol.* 2016;11:681-692.

33. Detterbeck FC, Marom EM, Arenberg DA, et al. The IASLC Lung Cancer Staging Project: background data and proposals for the application of TNM staging rules to lung cancer presenting as multiple nodules with ground glass or lepidic features or a pneumonic-type of involvement in the forthcoming eighth edition of the TNM classification. *J Thorac Oncol.* 2016;11:666-680.
34. Amin MB, Edge SB, Greene FL, et al., eds. *AJCC Cancer Staging Manual*. 8th ed. New York, NY: Springer; 2017.
35. Brierley JD, Gospodarowicz MK, Wittekind C. *TNM Classification of Malignant Tumours*. 8th ed. Oxford, UK: Wiley-Blackwell; 2017.
36. Rami-Porta R, ed. *IASLC Staging Manual in Thoracic Oncology*. 2nd ed. North Fort Myers, FL: Editorial Rx Press; 2016.
37. Rami-Porta R, ed. *IASLC Staging Handbook in Thoracic Oncology*. 2nd edition. North Fort Myers, FL: Editorial Rx Press; 2016.
38. Travis WD, Asamura H, Bankier A, et al. The IASLC Lung Cancer Staging Project: proposals for coding T categories for subsolid nodules and assessment of tumor size in part-solid tumors in the forthcoming eighth edition of the TNM classification of lung cancer. *J Thorac Oncol.* 2016;11:1204-1223.
39. Travis WD, Brambilla E, Burke AP, Marx A, Nicholson AG, eds. *WHO Classification of Tumours of the Lung, Pleura, Thymus and Heart*. Lyon, France: International Agency for Research on Cancer; 2015.
40. Rami-Porta R, Wittekind C, Goldstraw P International Association for the Study of Lung Cancer (IASLC) Staging Committee. Complete resection in lung cancer surgery: proposed definition. *Lung Cancer.* 2005;49:25-33.
41. Gagliasso M, Migliaretti G, Ardisson F. Assessing the prognostic impact of the International Association for the Study of Lung Cancer proposed definitions of complete, uncertain, and incomplete resection in non-small cell lung cancer surgery. *Lung Cancer.* 2017;111:124-130.
42. Edwards J, Chansky K, Shemanski L, et al. PL 02.06 The IASLC Lung Cancer Staging Project: analysis of resection margin status and proposals for R status descriptors for non-small cell lung cancer. *J Thorac Oncol.* 2017;12:S1605.