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## A harmonized European training syllabus for thoracic surgery: report from the ESTS-ERS task force†

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### Abstract

Training of European thoracic surgeons is subject to huge variations in terms of length of training, content of training and operative experience during training. Harmonization of training outcomes has been approached by creating the European Board of Thoracic Surgery, which has been accredited by the European Union of Medical Specialists (UEMS); however, a clear description of the content of training is lacking. Building on their recognized experience with curriculum building, task forces of the European Respiratory Society and the European Society of Thoracic Surgery agreed on a joint task force on training in thoracic surgery. The goal of this study is to report on the mission statement developed from the UEMS-driven survey, describe the Delphi method and the observed results and present the first large consensus-based syllabus. The working group is currently working on a description of the curriculum and assessment of learning outcomes.

**Keywords:** Surgical education • Training in thoracic surgery • Syllabus for thoracic surgery • Europe

### INTRODUCTION

Despite the considerable burden caused by European regulations in other domains, the many medical and surgical specialties of the member states of the European Union are subject to huge variations that result in disparities among training programmes for medical specialists. The immediate consequence is that dissimilar training curricula and competence profiles add to language barriers and adversely interfere with the mobility of healthcare professionals throughout Europe. Furthermore, imbalance in the qualifications of medical professionals could lead to inequities in the quality of care offered to patients.

The European Union of Medical Specialists (UEMS) has been aware of this problem for many years and has made a laudable

effort towards harmonization of competencies by initiating European Board certifications, which are organized by the different sections per specialty. Although board examinations thus far have had a relatively low impact on specialty certifications (part of the certificate of conclusion of training as a specialist in Switzerland and Poland), they merely represent a quality label signifying that the certified individual meets professional quality criteria to practice in Europe.

We face a paradoxical situation for training issues in thoracic surgery: although the European Board examination has been offered yearly for 2 decades, it offers neither a consensual definition of the content of the ideal training programme (syllabus) nor a consensual description of the training curriculum. A consensual description of expected professional attitudes and a consensual statement of learning outcomes and how to assess them are also lacking. The consensus on these issues needs to be broad

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based, taking into account the peculiarities and individual needs of each European country. All efforts towards cooperation between UEMS bodies, such as the Section of Thoracic Surgery and its specialty board, the European Accreditation Council for Continuous Medical Education, the Council for Medical Specialist Qualification and the Council for European Specialists Medical Assessment on the one side and the European scientific societies engaged in education on the other side, would be most welcome.

The European Respiratory Society (ERS) was the first to embrace an initiative to bridge the gap in training prerequisites by launching the HERMES initiative in 2006. HERMES stands for and was designed to establish, harmonized education in respiratory medicine for European specialists. For over 10 years, ERS has sought to define minimum standards to address the heterogeneity of training across Europe. Moving forward from HERMES, the ERS identified 4 pillars to focus on the delivery of high-quality education: curriculum, e-learning, programmes and assessment. Under the HERMES initiative, the ERS established a strong curriculum design method, which has been used by task forces across ERS projects. Considering the disparities in the training of pulmonary physicians, the first ERS task force intended to promote a harmonized curriculum for training in adult respiratory medicine [1, 2]. The ERS HERMES examination in adult respiratory medicine has been offered since 2008 [3]. This first, most successful task force opened the way to several satellite projects in subspecialties of respiratory medicine such as paediatric respiratory medicine [4], sleep medicine [5], critical care [6] and infectious diseases [7]. An interdisciplinary task force, including respiratory physicians, medical oncologists, radiation oncologists and thoracic surgeons, recently published the training curriculum for qualification in thoracic oncology [8]. Finally, a UEMS-driven survey initiated by the President of the Section of Thoracic Surgery, Toni Lerut, demonstrated similar disparities between different European training curricula. The discussions raised by this survey led to an agreement between the ERS and the European Society of Thoracic Surgeons (ESTS), giving birth to a joint task force at the end of 2014, cochaired by Dirk van Raemdonck and Gilbert Massard. The objective of the task force was to describe a harmonized European approach to thoracic surgical training that follows the established curriculum design methods of the ERS. In this article, the task force presents the European Syllabus for Thoracic Surgery (Supplementary Material S1), describes the problem statement and reports on the methods used.

## PROBLEM STATEMENT

The UEMS Section of Thoracic Surgery conducted a survey on training issues in 2013 under the guidance of Professor Antoon Lerut, president of the section, and completed by Professor Gilbert Massard, chairman of the European Board of Thoracic Surgery. This survey pooled results from 23 countries among the UEMS member states [i.e. European Union (EU), Norway and Switzerland]. The results may be summarized as follows (for details, see Supplementary Material Tables S2–S6):

- Disparities start with the certifying body: In almost half the countries, the ministry of health is in charge of certifying specialist training; however, in the remaining countries, other authorities

such as medical organizations, ministries of education or universities are involved (Supplementary Material, Table S1).

- The designation of the specialty and its domain differ considerably. According to current regulations, thoracic surgery describes itself as a monospecialty in 13 countries, as a mixed cardiothoracic diploma in 8 (Scandinavia, UK and Ireland, France, Greece), but does not exist in Belgium and Luxembourg (Supplementary Material, Table S2)!
- It is therefore not surprising that the length and content of training are variable. Whereas the median duration is 6 years, the range extends from 5 (e.g. Spain, Italy) to 10 years (Switzerland). Exposure to pure thoracic surgery during training ranges from 2 to 5 years. Exposure to cardiac surgery is obviously mandatory in countries preparing for a cardiothoracic diploma. In countries where thoracic surgery is a monospecialty, some, such as Portugal and Rumania, include exposure to cardiac surgery in the curriculum, whereas others do not (Supplementary Material, Table S3).
- Another conflicting issue is the number of operations that a person must perform as the first operating surgeon during the training period. Since its inception, the EBTS has required 100 operations, which is close to the median number of 120 operations required in the UEMS member states. However, the range extends from 35 to 560 operations! Nine countries have not yet defined any minimal requirement of surgical experience (Supplementary Material, Table S4).
- Finally, the number of officially recognized training programmes per capita is subject to huge variability, ranging from 1/0.6 million to 1/6.1 million inhabitants (median 1/1.6) (Supplementary Material, Table S5).

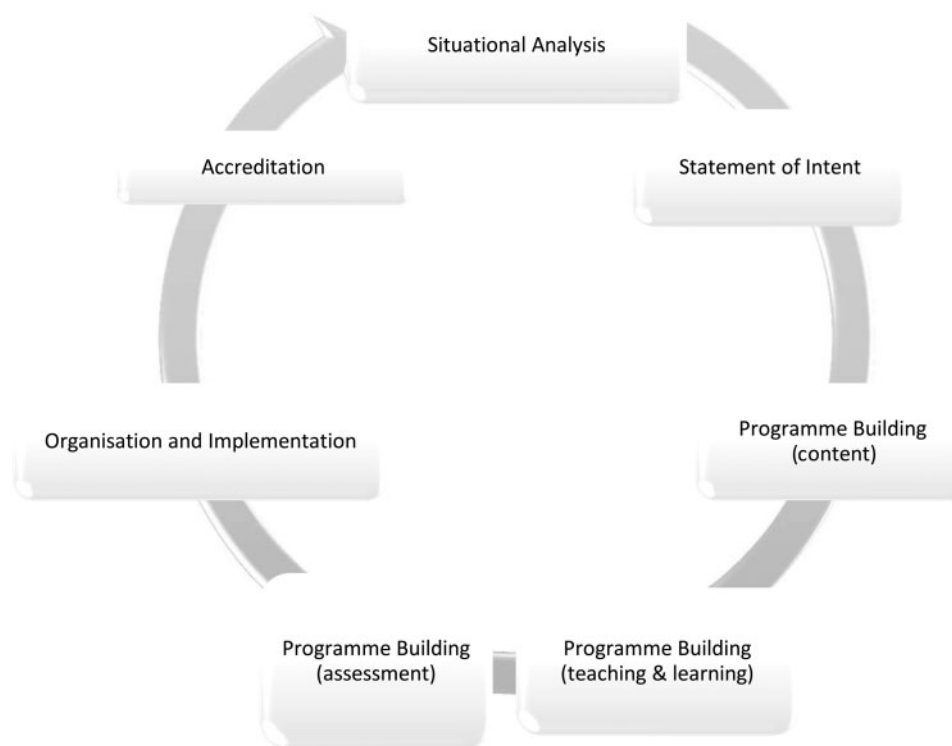
Another disastrous area with reference to specialist training is that the authors are not aware of any serious attempt in any UEMS member state to match the number of graduating trainees with job opportunities, i.e. with the demographics of the profession or with regional sanitary needs.

These weaknesses do not detract from the fact that the trainees are globally satisfied with their training. The technical aspects of the training as well as instruction in preoperative evaluation and management of the patient on the ward were well received. However, 50% of those queried would like to have easier access to training opportunities in advanced surgical skills (trachea, chest wall and extracorporeal membrane oxygenation). Training in academic competence (writing articles and access to basic and translational research) is considered unsatisfactory by half of the trainees [9].

## TARGET AUDIENCE

The first objective of this task force was to set up a proposal for a harmonized syllabus on a consensus basis designated for European thoracic surgical trainees to be followed in a second step by a thorough description of the training curriculum. The results of these processes are expected to favour European mobility during and after training.

The task force also kept in mind the need for the structured continuous professional development of established thoracic surgeons. It is expected that requirements for lifelong learning will be formalized during the coming years in most European countries and that a properly defined syllabus will represent the



**Figure 1:** Curriculum building according to Prideaux. Reproduced with permission from [12] from BMJ Publishing Group Ltd.

backbone of a curriculum leading to recertification and learning new technologies.

Some modules may also be of interest to allied healthcare workers: nurses and physiotherapists involved in the care of thoracic surgical patients and operating room nurses, among others.

Finally, there are obvious overlaps of some modules with other surgical specialties, such as general and digestive or abdominal surgery, trauma surgery, head and neck surgery and paediatric surgery. At the level of the UEMS, we have thus far implemented multidisciplinary groups working on certification for upper gastrointestinal surgery and transplant surgery with the set up of the corresponding modules by our working group. Beyond the initial expectations limited to the European continent, the thoracic oncology task force also observed that harmonized training programmes might raise interest across the Atlantic Ocean [10, 11]!

## EUROPEAN RESPIRATORY SOCIETY METHODOLOGY FOR CURRICULUM DESIGN

Any ERS project whose aim is to harmonize training should follow the steps outlined in Fig. 1 to ensure a methodologically consistent approach to curriculum design [12].

After stating the problem, our first step was to outline the current training structure across countries. With this information, the task force then defined the target audience and an overall vision for training and certification for thoracic surgeons. The definition of a consensus-based syllabus setting the content of training formed the next step of the process along with building the content through a consensus-based process. The next step was a thorough description of the training curriculum, centred on learning outcomes and assessment in terms of knowledge,

skills and attitudes. Once these prerequisites were set, tools and modalities for specialty assessments were prepared. Further potential developments to standardize training include accreditation of training programmes, organization of continuous professional development and recertification. At any step, the project may be implemented with learning tools, sharing of modules with neighbouring specialties and dissemination to national societies or official bodies such as ministries, universities or professional organisations.

In this report, we described how the thoracic surgery syllabus was developed, knowing that the task force is currently continuing to work on the curriculum design.

To obtain a broad-based consensus, the task force edited a first draft that was submitted to successive Delphi rounds until consensus was achieved.

## The Delphi method

The Delphi method is defined as a group facilitation technique that seeks to obtain a consensus among 'experts' through a series of structured questionnaires [13]. It is also understood as a group communication process that conducts detailed examinations and discussions on any issue of disagreement [14]. Every participant responded to a questionnaire (online survey tool: Survey Monkey) that was returned to the ERS office; individual data were collected, edited with appropriate statistics and presented to the task force for more detailed discussions.

Consensus was assessed as follows:

- Panellists were asked to state whether they considered the module to be mandatory, optional or not needed. The percentages of responses for each descriptor were detailed to facilitate analysis. Consensus was defined by obtaining 80% or more responses.

**Table 1:** Level of training of respondents

Level of training	Delphi round 1 (%) <sup>a</sup>	Delphi round 2 (%) <sup>a</sup>
Trainee	22.7	13.5
Certified <5 years	14.3	16.9
Certified >5 years	56.1	56.1
Other	6.9	9.5
Respondents	335	148

<sup>a</sup>This question was skipped by some respondents.

A decision tree was followed to facilitate the discussion and modification of the 1st syllabus draft according to the results. The 2nd syllabus draft was edited and sent out for Delphi round 2 [15].

- Responders were then asked to rank each item from 0 (strongly disagree) to 5 (strongly agree). The median described the central tendency of the responses, and the mode described the most frequent response. An interquartile range of 1 or less was used as an indicator of consensus. The interquartile range measures the dispersion for the median and comprises the middle 50% of the responses. Agreement rates were described by the percentage of the upper scale of responses (agree and strongly agree together).

The results of Delphi round 1 were reviewed by the task force, the draft syllabus was modified accordingly, and only those who responded to Delphi round 1 were invited to participate in Delphi round 2.

## Identification of panellists

The task force agreed on panellist groups and interacted with the ERS, the ESTS, the Federation of European Respiratory Societies and the UEMS through its Section of Thoracic Surgery, all of whom acted as gatekeepers to identify potential participants and to give access to contact information.

The panellist groups were segmented as follows:  
Expert Group

1. Federation of European Respiratory Societies nominated experts in thoracic surgery
2. ESTS Council
3. ESTS Learning Affairs Committee
4. National presidents of thoracic surgery societies
5. ESTS National Regents
6. UEMS Section of Thoracic Surgery National Representatives
7. EACTS Thoracic Domain Trainee Group
8. ESTS full trainee members Public Group
9. ERS Members: Assembly 8, Scientific Group for Thoracic Surgery (8.01)
10. ESTS Members

The expert group was accordingly composed of colleagues recognized on the basis of academic affiliation or involved in the leadership of national or European scientific societies. The trainee group was composed of junior members of ESTS. The public groups were broadly based on invitation of all members of ESTS and of the ERS assembly for thoracic surgery.

Prior notice was given to Delphi panellists that continued commitment was expected from all participants, that they would

be questioned about the same topic over and over again and that they would use a modified questionnaire each time. The goal of establishing a consensus-based syllabus for training in thoracic surgery all over Europe was clearly stated. Panellists were informed that they were expected to complete each of the successive surveys within a 2-week period.

## RESULTS FROM THE DELPHI ROUNDS

### Initiation by qualitative round

The task force created the first draft of the syllabus during a face-to-face meeting in Lisbon in February 2015. The latter was subsequently translated into a well-structured on-line questionnaire (Survey Monkey) and submitted to the groups of panellists for the first Delphi round.

The domain of thoracic surgery was defined according to the 'European guidelines on structure and qualification of general thoracic surgery' [16]. The ESTS textbook (which was readily available) was then used to develop the content. It was determined that the logical ordering of content that is already obvious to the specialist is not necessarily the most appropriate way for a trainee to learn the subject. However, everyone in the meeting agreed that the content should be ordered in such a way as to help trainees learn most effectively [17]. In addition, it was felt that, for the sake of clarity, knowledge about diseases and disorders and pure technical surgical skills should be listed separately.

Finally, the group drafted 56 modules with a total of 406 items under each module. The modules were divided into 3 parts: generalities on the care of thoracic patients, diseases and disorders (knowledge modules) and surgical procedures (skills modules).

### Characteristics of respondents

Round 1 included 334 respondents representing 36 countries: 284 were from the European Union and 50 were from the rest of the world. The top responding countries were (i) Italy, (ii) Spain, (iii) the UK, (iv) Germany and (v) Turkey and France. For round 2, only 148 of respondents in Delphi round 1 completed the survey. The top responding countries were (i) Spain, (ii) Italy, (iii) the UK, (iv) Denmark and (v) Greece.

More than half of the respondents had been certified for more than 5 years, and this proportion remained stable over the 2 Delphi rounds. Trainees accounted for 20%, and recently certified surgeons for 15% (Table 1). The lower percentage of trainees and recently graduated respondents in Delphi 2 is partly explained by incomplete questionnaires in which the respondents skipped this question. Eighty-four participants in Delphi round 1 and 57 participants in round 2 were European Board certified.

In Delphi round 1, academically oriented surgeons and consultants at public institutions were evenly distributed, whereas in Delphi round 2, the distribution was altered in favour of non-academic public consultants. Colleagues from private institutions participated at an anecdotal level (Table 2).

Two-thirds of respondents practiced surgery as a monospecialty. Less than 10% of the surgeons with cardiothoracic practices participated in the survey, whereas 15% had mixed thoraco-abdominal practices. The proportions remained stable between Delphi rounds 1 and 2 (Table 3).

**Table 2:** Appointment of respondents

Type of appointment	Delphi round 1 (%)	Delphi round 2 (%) <sup>a</sup>
Academic position	30.4	27
Consultant at public hospital	36.4	49.3
Consultant at private hospital	5.4	5.4
Trainee	21.8	12.2
Other	6	6.1
Respondents	335	148

<sup>a</sup>This question was skipped by some respondents.

**Table 3:** Current mode of practice

Mode of practice	Delphi round 1 (%)	Delphi round 2 (%)
Thoracic surgery as a monospecialty	68.4	68.9
Cardiothoracic surgery	9.9	9.5
Thoracic and vascular surgery	3.3	2.0
Thoracic and abdominal surgery	15.5	16.9
Other	3	2.7
Respondents	335	148

**Table 4:** Spectrum of procedures performed

Procedures performed	Delphi round 1 (%)	Delphi round 2 (%)
Thyroid	52.2	41.2
Oesophagus	55.2	45.9
Lung transplant	25.4	20.3
Paediatric thoracic	30.7	18.9

More than half of the participants were practicing thyroid surgery, and oesophageal surgery was equally popular in this survey. Twenty-five percent performed lung transplants and 30% performed paediatric thoracic operations, with a slight drop only in Delphi round 2 (Table 4).

Table 5 compares the response rates in the main panellist groups. Participation rates observed in Delphi round 1 match those found in previous ERS projects, where the public exhibited the weakest response rate. The response rate rose steeply in Delphi round 2, where only responders to Delphi round 1 were invited (Table 5).

## Results of Delphi 1 and further directions

Results from Delphi round 1 are displayed in Tables 6–8. Full consensus or a majority was obtained for 66.1% of the modules. Eighty-five percent of the items reached consensus with an interquartile range below 1, whereas 71.2% reached an agreement rate above 80%. There were a total of 100 specific comments for the modules and items. During a face-to-face meeting, the task force discussed each non-consensus issue, taking into account the feedback received from the respondents.

**Table 5:** Response rate per panellist group

Panellist group	Delphi round 1 (%)	Delphi round 2 (%)
Expert	57.5	37
Public	15.8	48
Trainee	34.2	42

**Table 6:** Level of consensus regarding modules reached after the 1st Delphi round

Results	Modules (n)	Percent
Consensus	9	16.1
Majority	28	50
Bipolarity	0	0
Plurality	6	10.7
Disagreement	13	23.2
Total modules	56	100

The members of the task force and the respondents found the whole syllabus draft too long. Accordingly, the original 56 modules were regrouped into 26. The organization of the syllabus in 3 parts (basic principles, diseases, procedures) was validated. Results of Delphi round 1 were used to classify the modules as mandatory or optional. The new streamlined syllabus draft was submitted to a Delphi round 2 survey to determine whether the respondents thought that the module assignment should be mandatory or optional.

## Results of Delphi round 2

Table 7 shows the favourable swing of the interquartile range, and Table 8 shows the satisfactory progression of the agreement rate; the 80% agreement rate moved from 71% in Delphi round 1 to 77% in Delphi round 2. The percentage of non-consensus items decreased from 14.5% to 10%. There were still 31 specific comments for the modules and items.

## Delphi round 3 and final syllabus draft

The results were again discussed during a face-to-face meeting of the task force; each non-consensus item (agreement level <70%) and corresponding specific comments were discussed. A group consultation took place: decisions were made either to keep (and rephrase if necessary) or delete these items. This decision process, considered the 3rd Delphi round, was documented and resulted in a final syllabus draft, which was perceived to be well designed to accommodate further curriculum development with learning outcomes, learning resources and assessment tools.

## DISCUSSION

The work of the current task force is the first attempt within the European community to establish a syllabus for thoracic surgery

**Table 7:** Level of consensus obtained on items by interquartile range

Results	Delphi round 1		Delphi round 2	
	Items (n)	Percent	Items (n)	Percent
IQR $\leq 1$	347	85.5	382	89.9
IQR $> 1$	59	14.5	43	10.1
Total	406	100	425	100

IQR: interquartile range.

based not only on the opinions of selected experts but also on a broad-based consensus. The task force, which included individuals with proven credentials in specialist education, drafted a syllabus that was then revised by a larger group of presumed specialty training experts and by a public group of practising thoracic surgeons. The task force was well aware that a considerable number of younger surgeons have complained about items they felt were missing during their training [18] and even more markedly in the early years of independent practice [19]. Therefore, trainee members of ESTS were invited to participate in the Delphi rounds, and the junior representative on the ESTS Committee for Learning Affairs was invited to join the task force.

The partnership between ESTS and ERS has functioned effectively. Whereas the ESTS has a clear vision of training issues, ERS has mastered the Delphi method, which has been successfully used by 8 previous task forces to design curricula prior to the present project. Support from ERS staff and from educational scientists with time-honoured experience has been most valuable. In addition, this task force is engaged in the second cooperative project with other European societies following the thoracic oncology task force [8].

The participation rate was excellent among the group of experts and satisfactory in the trainee group; the 15% response rate observed in the public group for Delphi round 1 may seem low, but it is in line with those from other ERS task forces and with figures related to any type of on-line inquiry [6, 20]. The participation rate was higher for those who graduated more than 5 years ago in comparison to more recent graduates. Nevertheless, it would be most valuable to collect the feedback of recently graduated thoracic surgeons, knowing that several reports describe various kinds of frustrations at the onset of independent practice related to gaps in training. We should remember the low response rate from colleagues in private practice, especially when the latter claim accreditation for training and try to get residents involved. It is remarkable that the participation rate between Delphi rounds 1 and 2 increased in all categories, keeping in mind, however, that only responders to Delphi round 1 were invited to participate in Delphi round 2.

As mentioned previously, the final syllabus comprises 26 modules divided into 3 parts: generalities, diseases and disorders and procedures (Supplementary Material S1). We intentionally separated knowledge and pure skills because the time points of learning and learning processes differ. The results should be of interest to the thoracic surgical community for at least 2 reasons. First, the syllabus is an exhaustive catalogue of the content of our specialty. Second, it stratifies the mandatory modules that represent the compulsory core content common to all European thoracic surgeons and optional modules, which represent subspecialty domains depending on local or national traditions.

**Table 8:** Level of consensus obtained on items by percentage of agreement

Agreement rate range (%)	Delphi round 1		Delphi round 2	
	Items (n)	Percent	Items (n)	Percent
<50	1	0.2	1	0.2
51–59	11	2.7	7	1.6
60–69	43	10.6	28	6.6
70–79	63	15.5	60	14.2
>80	289	71.2	329	77.4
Total	406	100	425	100

Consensus is based on an interquartile range of  $\leq 1$  and corresponds to an agreement rate  $> 70\%$ , according to the distinction between consensus and agreement [15]. Non-consensus items have an interquartile range of  $> 1$ .

This syllabus addresses both specialty training and continuous medical education. As such, the initial programme of the knowledge track followed at the ESTS campus has been reorganized according to the syllabus. Educational events at ESTS conferences will be monitored according to the syllabus to ensure that tracks are provided for both trainees and certified surgeons in their process of continuous professional development. For the coming years, the topics to be covered by the European Board of Thoracic Surgery examination will be visible to both examiners and applicants and will be represented by the mandatory modules. The same may apply to recertification in the future. Although the syllabus is definitely a guide for teachers establishing learning programmes or events for specialist training or continuous professional development, it may also be used as a guide to self-directed learning and to check for the completeness of the learning process. The syllabus could easily be integrated into an on-line logbook. Another example is to use the syllabus for an on-line learning tool. The American Board of Thoracic Surgery, the Joint Council for Thoracic Surgical Education and the Thoracic Surgery Directors Association have collaborated to establish an on-line curriculum. Interim evaluation indicated that this tool has been so far of maximal benefit to residents with initially intermediate scores [21]. Obviously, the latter need help to supplement their learning process with information that they might not find within their training programme. Several modules may also serve to achieve interdisciplinary consensus. For example, the modules on oesophageal diseases and procedures have been shared with a UEMS interdisciplinary working group on foregut surgery, which was developed by the Section of Thoracic Surgery and by the Division of Foregut Surgery from the surgical section. Similarly, the modules on respiratory failure and lung transplants were disseminated to a UEMS interdisciplinary working group to establish the certification in multiorgan transplants (Section of Thoracic Surgery and Division of Transplant Surgery from the Division of Surgery). Initiators of and participants in previous ERS task forces were surprised to note that beyond the expected interdisciplinary exchange in Europe the ERS Thoracic Oncology Project was welcomed by the North American thoracic surgical community [10, 11].

The task force has now moved to the second step of the project, which is the development of a structured training curriculum. Module by module, the learning objectives for each item will be detailed, learning resources will be explained and assessment tools will be discussed. There will be recommendations on the timing of

the learning process within the training period. The curriculum is a fundamental part of the project. The draft curriculum should guide the trainee's portfolio, which is part of a final assessment of skills and competence. The curriculum also represents the link between learning objectives and accreditation of training programmes—which naturally should enable any trainee to fulfil his or her curriculum requirements in a reasonable amount of time.

## Limitations

This project has some limitations. First, these recommendations were formulated by an expert task force, based on a broad-based consensus from the European thoracic surgical community. Putting the recommendations into practice depends on the same community, which should now encourage their dissemination to national scientific or professional societies, to medical schools and to ministries of higher education. However, we should be aware that a definite harmonization of specialist training relies not only on the will of European scientific or professional societies but also depends on European political decisions. Second, as demonstrated by a survey conducted by both the associations of American thoracic surgery directors and the thoracic surgery residents, an existing, well-defined directory does not prevent variations in training content between different training programmes [22]. Further, it does not level interindividual differences, especially when one considers the gender of trainees and young graduates [23]. Finally, although we cannot expect training programmes to teach everything, especially in terms of innovative techniques or treatments, we should expect a framework for an evaluation of new options [24].

Regardless of these limitations, the motivation of the task force is to eventually provide a guide for both teachers and learners to facilitate the best possible training—which remains one of the pillars for quality of care and patient safety. The group is aware that regardless of any syllabus, the main driving force in the learning process is still the motivation and energy of the learner.

## SUPPLEMENTARY MATERIAL

Supplementary material is available at *EJCTS* online.

**Conflict of interest:** none declared.

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