

The characteristics of Greek training and experience in pulmonary endoscopic techniques: Is it time for changes?

Grigoris Stratakos,¹
Nikolaos Charokopos,²
Charalampos Dimitropoulos,³
Michael Leotsinidis,³
Dimitrios Vassos,³
Adamantia Liapikou,⁵
Spiros Zakinthinos⁵

¹1st Department of Pneumology Medicine, Medical University of Athens, Athens Hospital of Thoracic Disease "Sotiria"

²Department of Pneumology Medicine, General Hospital of Pyrgos

³9th Department of Pneumology Medicine, Athens Hospital of Thoracic Disease "Sotiria"

⁴Department of Hygiene, Medical University of Patras

⁵1st Department of Intensive Care, Medical University of Athens, Hospital "Evangelismos"

Key words:

- endoscopic techniques
- interventional pulmonology
- training

Correspondence to:

G. Stratakos, MD
Lecturer of Pneumology Medicine, University of Athens
Head of Interventional Thoracic Endoscopy Unit
1st Department of Pneumology Medicine, University of Athens
Athens Hospital of Thoracic Disease "Sotiria"
Mesogeion Ave. 152, Athens
Tel. 6971 015992
e-mail: grstrat@hotmail.com

SUMMARY.

OBJECTIVES. This study aimed to report the characteristics of the training in pulmonary endoscopy provided in Greece and to evaluate quantitative and qualitative parameters of interventional endoscopy performance among Greek pneumonologists. **METHOD.** A specially designed questionnaire was completed by 171 specialists and fellows in pulmonology and the responses were analyzed. **RESULTS.** An age difference in endoscopic skills was observed; 97% of the respondents aged <50 years had been trained in flexible bronchoscopy, compared with 86% of those aged >50 years ($p=0.016$). In spite of a high rate of training, 65% of respondents reported performing less than 50 bronchoscopies per year. In addition, 21% were familiar with the technique of transbronchial needle aspiration (TBNA), but only 19% of them performed over 30 procedures per year. Other advanced diagnostic techniques including endobronchial ultrasound (EBUS), auto-fluorescence and medical thoracoscopy are performed by a small minority of pulmonologists while therapeutic techniques (i.e. rigid bronchoscopy, electrocautery, cryotherapy and laser therapy) by very few (5-12%). The majority of respondents would welcome additional training, not only in advanced interventional techniques but also in standard bronchoscopy; 94% agreed that they would benefit from the publication of practice guidelines on endoscopic techniques, and 71% supported the instruction in endoscopy of all pulmonologists during their fellowship. **CONCLUSIONS.** The endoscopic training provided to Greek pneumonologists could be improved considerably and initiatives should be taken in order to upgrade and unify both the teaching of endoscopic techniques and the services provided. *Pneumon 2011, 24(1):48-55.*

The introduction of videobronchoscopy in the late 1980's has greatly improved the quality of endoscopic images and has rendered possible

the recording and filing of digital data, significantly enhancing the training opportunities for new pulmonologists. Since then, a variety of diagnostic bronchoscopic techniques have been introduced. Examples include transbronchial needle aspiration (TBNA), which expands the range of the bronchoscope beyond the main bronchi to the mediastinum, endobronchial ultrasound (EBUS), which produces new imaging data on the airway and parenchyma, autofluorescence bronchoscopy (AFB) for the early diagnosis of bronchogenic carcinoma, and electromagnetic navigation-assisted biopsy.

New endoscopic therapeutic techniques, such as electrocautery, laser therapy, endobronchial cryotherapy, photodynamic and argon-plasma therapy, tracheobronchial stent placement, balloon dilatation and others have contributed to the therapeutic management of airway obstruction by benign or malignant tumours. The application of most of these techniques has become possible using rigid bronchoscopy, which has been enriched with new technology and simpler methods. Nowadays the interventional pulmonologist can effectively manage many disorders of the main airways, avoiding major surgical intervention.

Finally, medical thoracoscopy has been recognized as a particularly useful tool in the diagnostic evaluation of pleural diseases.

The field of "interventional pulmonology" covers all these novel techniques, which have broadened the diagnostic and therapeutic abilities of pulmonologists considerably. These advances have led to international acceptance and widespread implementation of interventional pulmonary procedures. It should be stressed, however, that the safe and efficacious use of these methods requires advanced training and appropriate experience¹⁻³.

Over recent years in Greece, a considerable number of young pulmonologists have shown interest in advanced endoscopic techniques. They attend training programmes abroad and they institute and staff thoracic endoscopy centres in both the National Health Service (NHS) and the private setting, and they actively participate in relevant conferences and educational meetings.

On the other hand, the overall training in endoscopic techniques during fellowship is characterized by great diversity among the different Greek hospitals. Specific guidelines are not followed and it is questionable whether pulmonary fellows are given uniform opportunities to advance their skills and competence.

Similar concerns have been raised about the quality

and competence of medical training and the utilization of current knowledge and experience in endoscopic techniques throughout Europe and the USA⁴⁻⁷.

The aim of this study was to record the quantitative and qualitative characteristics of the training in endoscopic techniques provided in Greece, and to document the rates of performance of interventional bronchoscopy and thoracoscopy among Greek pneumonologists, and their procedural methods.

METHOD

The study was conducted by members of the Hellenic Thoracic Society (HTS) endoscopy workgroup and addressed a randomly selected group of Greek specialists in pulmonology of all ages and fellows of pulmonology who had concluded their third year of fellowship, in the following manner.

During the Panhellenic Conference of Pulmonology in 2009, at the time periods 11-12 am and 5-6 pm, approximately one fourth of the enrolled conventioners, randomly selected, were asked to respond to a questionnaire consisting of 32 multiple choice questions, edited by the authors and based on relevant international studies, designed to evaluate practice in endoscopic techniques^{5,6}.

The same questionnaire was sent by e-mail to all members enlisted in the HTS and to all members of the HTS endoscopy workgroup.

Questionnaires were also distributed to all clinics of the largest hospital of thoracic disease in Greece, the "Sotiria" Hospital, where they were completed by any pulmonologist who showed interest.

In all instances, the completed questionnaires were anonymous and the participants were asked to assert that they had not responded to the same questionnaire before, in order to avoid double enrollment. Statistical analysis of the results and comparison between subgroups of the participants was performed using SPSS Version 17. Further figure-related data processing was based on the chi-square test or Fisher's exact test. The level of statistical significance was set at $p < 0.05$.

RESULTS

Questionnaires were completed in by 171 members of the HTS from a total number of 1,200 enrolled members (sample percentage 14.25%).

Who filled in the questionnaires?

Of the questionnaires, 100 were filled in at the conference, from the 120 participants approached (acceptance rate 83%), of the 900 pulmonologists who attended the conference. The remaining 71 questionnaires were completed either by e-mail or by visits to clinics of "Sotiria" Hospital (35/110 e-mails and 36/50 questionnaires, respectively).

Of the 171 people who took part in the study (97 male and 74 female), 127 (74.2%) were pulmonology specialists, of whom 9 were ICU doctors, while 44 (25.7%) were pulmonology fellows who had concluded at least the third year of fellowship (Table 1). Eighteen of those who responded by e-mail were members of the HTS endoscopy workgroup.

Among the specialists, 75/127 (59%) were employed in the NHS or in the health insurance schemes (2 participants) and 52/127 (41%) were employed at private health centres or clinics. Regarding the age distribution, 80 of the participants (46.8%) were aged <40 years, 41 (24%) between 40 and 50 years and 50 (29.2%) >50 years.

What is their training and experience?

When asked about their training, 160 (93.6%) of respondents answered that they had been trained in standard bronchoscopy, while 11 (2 fellows and 9 specialists) had not received any formal training (Table 2A). In terms of age, 97% of the participants aged <50 years reported having been trained in flexible bronchoscopy, in contrast to those aged >50 years, only 86% of whom have had relevant training ($p = 0.016$) (Table 2B).

Although the vast majority of the respondents had been trained in flexible bronchoscopy, 58/160 (36.25%)

TABLE 1. Demographic data on the pulmonologists responding to the questionnaire (n = 171)

	n (%)
Male	97 (56.7%)
Female	74 (43.3%)
Age<39 years	80 (46.8%)
Age 40-49 years	41 (24%)
Age>50 years	50 (29.2%)
Pulmonology specialists	127 (74.2%)
Pulmonology fellows	44 (25.7%)
NHS physicians	75 (59%)
Private practitioners	52 (41%)

TABLE 2A. Reported standard training in endoscopic techniques, according to status of pulmonologists (n = 171)

Endoscopic techniques	Pulmonology		Total n=171
	specialists n=127	Fellows n=44	
Flexible bronchoscopy	118 (92.9%)	42 (95.45%)	160 (93.6%)
Rigid	20 (15.7%)	2 (4.5%)	22 (12.8%)
Laser	10 (7.8%)	1 (2.25%)	11 (6.4%)
Stent	15 (11.8%)	2 (4.5%)	17 (9.9%)
Electrocautery	14 (11%)	3 (6.8%)	17 (9.9%)
Cryotherapy	9 (7%)	2 (4.5%)	11 (6.4%)
EBUS	6 (4.7%)	2 (4.5%)	8 (4.6%)
TBNA	29 (22.8%)	7 (15.9%)	36 (21%)
Fluorescence	13 (10.2%)	1 (2.25%)	14 (8.1%)
Medical thoracoscopy	11 (8.6%)	3 (6.8%)	14 (8.1%)

EBUS=endobronchial ultrasound, TBNA= transbronchial needle aspiration

TABLE 2B. Training in endoscopic techniques according to age of pulmonologists (n = 171).

Endoscopic techniques	Age		
	<39 years n=80	40-49 years n=41	>50 years N=50
Flexible bronchoscopy	77 (96.2%)	40 (97.5%)	43 (86%)*
Rigid	23 (28.8%)	9 (22%)	13(26%)
Laser	2 (2.5%)	3 (7.3%)	6 (12%)*
Stent	6 (7.5%)	4 (9.7%)	7 (14%)
Electrocautery	7 (8.7%)	4 (9.7%)	6 (12%)
Cryotherapy	6 (7.5%)	3 (7.3%)	2 (4%)
EBUS	3 (3.7)	3 (7.3%)	2 (4%)
TBNA	14 (17.5%)	12 (29.2%)	10 (20%)
Fluorescence	5 (6.2%)	3 (7.3%)	6 (12%)
Medical thoracoscopy	5 (6.2%)	6 (14.6%)	3 (6%)

* $p < 0.05$ vs age <39 years

EBUS=endobronchial ultrasound, TBNA= transbronchial needle aspiration

reported performing less than 10, and 104/160 (65%) less than 50 bronchoscopies yearly! (Table 3) The highest rate was recorded by pulmonology specialists employed in the

TABLE 3. Number of bronchoscopies performed per year according to status of pulmonologists (among those who have had training in bronchoscopy).

No. bronchoscopies/ year	Status				
	Pulmonology specialists			Fellows n=42	Total n=160
	NHS (n=75)	Private (n=43)	Total (n=118)		
0	11 (14.6%) *	23 (53.4%)	34 (28.8%)	2 (4.7%)	36 (22.5%)
<10	3 (4%)	9 (20.9%)	12 (10.1%)	10 (23.8%)	22 (13.7%)
10-29	8 (10.6%)	1 (2.3%)	9 (7.6%)	12 (28.5%)	21 (13.1%)
30-50	12(16%)	2 (4.6%)	14 (11.8%)	11 (26.2%)	25 (15.6%)
>50	41 (54.6%)*	8 (18.6%)	49 (41.5%)	7 (16.6%)	56 (35%)

* p<0.05 vs private practice

NHS, 54.6% of whom perform >50 bronchoscopies per year, with a statistically significant difference compared to private practitioners ($p = 0.0003$). The majority of respondents (90/160, 56.5%) stated that a minimum of 50 bronchoscopies per year is required by any pulmonologist in order to preserve competency.

In terms of fellowship training, 42 respondents (57%) reported performing less than 30 bronchoscopies per year, while 26.2% had performed over 30 and only 16.6% over 50 bronchoscopies in the last year (Table 3). When asked, however, how many bronchoscopies are required to acquire competency, 57.3% stated over 50 and 30.4% stated 30-50 bronchoscopies per year.

How is a bronchoscopy performed?

Prior to a bronchoscopy, chest X-rays are requested by 146 (85.4%) of the respondents, complete blood count by 124 (72.5%), coagulation test by 156 (91.2%), spirometry by 29 (17%), arterial blood gas values by 117 (68.4%), biochemical profile by 70 (46.2%) and chest computed tomography (CT) by 95 (55.6%).

Recorded use of atropine and oxygen during bronchoscopy is displayed in Table 4. Atropine use prior to bronchoscopy was reported by 118 (69%) pulmonolo-

TABLE 4. Use of atropine and oxygen during bronchoscopy (n = 171).

	Atropine	Oxygen
Use	No. physicians (%)	No. physicians (%)
Always	55 (32.2%)	91 (53.2%)
Sometimes	63 (36.8%)	60 (35.2%)
Never	34 (19.9%)	1 (0.6%)
I don't know	19 (11.1%)	19 (11.1%)

gists, while 19 (11.1%) declared ignorance of the use of atropine or oxygen during bronchoscopy. Only 53.2% of the participants considered oxygen administration necessary during bronchoscopy.

Experience in interventional techniques

When asked about their training in advanced interventional diagnostic bronchoscopic techniques, those participants who had received supplementary training had been instructed mainly in TBNA. Although almost all (170/171) characterized TBNA as a useful method, only 36 (21%) maintained that they have sufficient competency and only 16% of the fellows had been trained in the technique (Table 2A).

Only 63 of the participants responded to the question on the number of TBNA procedures performed each year and of them, only 19% perform >30 per year and the rest perform considerably fewer (Table 5).

TABLE 5. Number of transbronchial needle aspirations (TBNA) performed during the past year, according to pulmonology status, among participants trained in the technique (n = 63).

TBNA No/year	Private practice	NHS		Total n=63
	Specialists n=11	Specialists n=39	Fellows n=13	
<10	9 (81.8%)	23 (58.9%)	11 (84.6%)	43 (68.2%)
10 – 29	0	6 (15.3%)	2 (15.4%)	8 (12.7%)
30 – 50	0	2 (5.1%)	0	2 (3.2%)
>50	2 (18.2%)	8 (20.5%)	0	10 (15.8%)

The sensitivity rates of TBNA recorded by the participants are displayed in Table 6. Specifically, mostly low sensitivity was reported by 54 respondents (52% record sensitivity <50%) and only 7/54 (13%) record diagnostic sensitivity >75%.

The training rates in therapeutic bronchoscopic techniques were much lower (rigid bronchoscopy 12.8%, stent placement 9.9%, electrocautery 9.9%, laser therapy 6.4%, etc) and in thoracoscopy 8.1%. Only 15.7% of specialized pulmonologists and 4.5% of fellows reported having been trained in rigid bronchoscopy.

The age group that appeared to be most highly trained in TBNA (29.2%), EBUS (7.3%) and thoracoscopy (14.6%) is the 40-49 year group, although this difference was not statistically significant.

Are changes in training required?

Regarding the participants' beliefs about their provided training, 99/171 (57.9%) stated that they would like to have

TABLE 6. Rates of sensitivity of transbronchial needle aspirations (TBNA) reported by participants trained in the technique (n = 54).

Diagnostic sensitivity of TBNA (%)	Specialists (n=41)	Fellows (n=13)	Total (n=54)
<25	10 (24%)	3 (23%)	13 (24%)
25 - 50	9 (22%)	6 (46%)	15 (28%)
51 - 75	16 (39%)	3 (23%)	19 (35%)
>75	6 (14%)	1 (7.6%)	7 (13%)

additional training in TBNA and 91/171 (53.2%) in EBUS, followed by 65/171 (38%) who would like to be trained in tracheobronchial stent placement and thoracoscopy. It is surprising that 88/171 (51.5%) reported wanting to have additional training in standard (conventional) bronchoscopic techniques, such as bronchoalveolar lavage (BAL) and transbronchial biopsy (Table 7). The vast majority of participants (93.7% of specialists and 91% of fellows) stated that they would benefit from the publication of guidelines on endoscopic methods. Finally, 71% of the respondents believe that interventional endoscopic techniques should be taught to all pulmonologists and 56% that they should be available at all hospitals.

DISCUSSION

This is the first study examining the level of training and experience in endoscopic techniques among randomly selected Greek pneumonologists (specialists and fellows). Naturally, as all studies based on questionnaires, it has a number of serious limitations. Firstly, the responses rely on the memory of the participants and may be inaccurate. The formulation of the questions may not be understood by all participants, resulting in confusion. The questionnaires are not always filled in fully. Younger physicians appear to be more willing to answer and tend to emphasize their lack of training, compared to older and more experienced doctors, which may have influenced the results of the study, and since the questionnaires are anonymous, their accuracy and sincerity

TABLE 7. Expressed desire of respondents for additional training in standard and interventional endoscopic techniques, according to status (n = 171).

Technique	Private	NHS		Total (n=171)
	Specialists (n=52)	Specialists (n=75)	Fellows (n=44)	
Flexible, BAL, Transbronchial etc	28 (53.8%)	28 (37.3%)	32 (72.7%)	88 (51.5%)
TBNA	23 (44.2%)	44 (58.6%)	32 (72.7%)	99 (57.9%)
Rigid	9 (17.3%)	14 (18.6%)	17 (22.7%)	40 (23.4%)
Laser	13 (25%)	23 (30.6%)	12 (27.2%)	48 (28%)
Stent	10 (19.2%)	33 (44%)	22 (50%)	65 (38%)
Electrotherapy	6 (11.5%)	16 (21.3%)	13 (29.5%)	35 (20.5%)
Cryotherapy	4 (7.6%)	20 (26.6%)	11 (25%)	35 (20.5%)
EBUS	16 (30.7%)	46 (61.3%)	29 (65.9%)	91 (53.2%)
Fluorescence	7 (13.4%)	25 (33.3%)	14 (31.8%)	46 (26.9%)
Medical thoracoscopy	11 (21.1%)	30 (40%)	23 (52.2%)	64 (37.4%)

BAL= bronchoalveolar lavage, EBUS= endobronchial ultrasound, TBNA= transbronchial needle aspiration

cannot be confirmed. The participation of both NHS and private pulmonologists involves the differences in working conditions, abilities, cost and burden. The questionnaire did not include any questions about the physician's geographic place of work (Athens, Thessaloniki or rural areas), therefore comparison of data from urban and rural areas was not possible. Among the physicians who registered with the HTS by e-mail and answered the questionnaire through the internet, 18 were members of the endoscopy workgroup and by definition have a considerable level of training and experience in endoscopic techniques, which can be seen in the results of the study.

Despite all these limitations, this is the only study to record real data on a specific area of interest in pulmonology and it was possible to derive a number of clear messages that should be considered as priorities when planning training initiatives during the fellowship in pulmonology.

Who filled in the questionnaires?

Even though the sample was rather small (171 physicians or 14.25% of all those registered in the HTS), it was random and representative of that population in terms of age, sex, occupational practice and experience. A percentage of 46.8% were young pulmonologists aged less than 40 years, and 59% of the participants were employed in the NHS and 41% were in private practice. However, taking a closer look at the ages of the physicians, 24% were aged between 40-50 years and only 29% over 50 years. The fact that 71% of respondents were aged <50 years is also a limitation of the study, but it is also rather realistic, since this is the most active group of physicians in terms of education, participation in medical conferences, following of updates, use of the internet and registration by e-mail and pursuit of postgraduate training in new techniques, and this is the group willing to complete such questionnaires.

Analysis of the results of the study has raised a series of issues that need to be further investigated.

What is their training and experience?

Despite the fact that 94% of the participants answered that they have been trained in bronchoscopy, almost half of them (49.3%) perform fewer than 30 bronchoscopies per year, which is internationally considered the minimum number required by an endoscopist in order to preserve competency³. The majority of respondents maintained that ideally they should be able to perform

over 50 endoscopies per year. It is not surprising that this goal is achieved mainly by physicians in the NHS, rather than private pulmonologists.

Almost 88% (150/171) supported the criterion that a minimum of 30 bronchoscopies per year is required during fellowship in order to complete training, but only 40% (18/44) of fellows actually achieved this goal. According to the 2003 Guidelines of the American College of Chest Physicians (ACCP), the number of procedures required during fellowship has been raised to 100 and the number required in order to preserve competency is 25 per year³. It is obvious that there is further room for improvement in training in Greece, and probably specific training goals during fellowship should be defined, including definition of a minimum number of bronchoscopies that the physician must have performed before completing fellowship.

How is bronchoscopy performed?

The practice techniques of Greek pneumonologists are characterized by diversity and often inconsistency with international guidelines. According to their responses, almost half (47%) do not supply oxygen during a bronchoscopy or are uncertain whether they should, while 45% consider chest CT unnecessary prior to the procedure. However, according to standard practice, both of these conditions are routinely required for ensuring a safe and effective bronchoscopy^{1,2}. Conversely, a significant percentage (32.2%) inject the patient with atropine during preparation, despite the fact that this is neither recommended nor documented as useful and safe by any recent study¹⁻⁴. Similar studies in the UK recently revealed equally significant variability in bronchoscopy practices and noncompliance with published guidelines on safety and effectiveness^{5,7}. In addition, atropine is still used by a considerable percentage (29%) of British pulmonologists during patient preparation for bronchoscopy, despite scientific evidence supporting the opposite⁶. A relevant Japanese study⁸ also recorded variability in practice, but patient safety during the examination was not evaluated.

Experience in interventional techniques

In the area of advanced diagnostic interventional techniques, only one of five respondents (21%) reported familiarity with the use of TBNA, of whom only 19% perform > 30 examinations per year. The diagnostic sensitivity of TBNA reported by the participants, which in practice reflects their conviction of its effectiveness, is substantially lower than the widely accepted limit of 75%.

The percentage of pulmonologists who perform TBNA internationally is extremely small. In a study of the ACCP in 1990⁴, only 12% of the participants used this method, whereas in a similar study by the American Association for Bronchology (AAB) 10 years later, this percentage did not exceed 26%⁵. The reasons for the limited use of TBNA are primarily related to lack of competence and fear of complications.

Age-related analysis of the participants revealed that physicians aged between 40-50 years are the most highly trained, since approximately 30% can perform TBNA, 15% thoracoscopy, 7% EBUS, etc. It is possible, however, that these percentages reflect the working conditions in tertiary and major hospitals located in large urban areas, where many members of the HTS endoscopy workgroup are employed, rather than the overall picture in Greece.

Are changes in training required?

Taking into account the deficiencies reported in this study, it is not surprising that a considerable number of fellows, and especially young pulmonologists, expressed the need for additional training in conventional bronchoscopy (51.5%), but also in TBNA (58%), EBUS (53%), rigid bronchoscopy, stent placement and thoracoscopy.

In a recent study by the ACCP examining the level of satisfaction of American pulmonary fellows with training in endoscopic techniques⁹, although they reported satisfaction with training in standard fiberoptic bronchoscopy, they revealed inadequate training in interventional techniques and advanced technologies. The presence at the training centre of an interventional pulmonologist, and the meeting of ACCP requirements on the minimum number of endoscopic procedures, were significantly associated with the belief that adequate training and procedural competency are provided by that centre⁹.

Could the publication of guidelines improve the quality of endoscopic procedures and the training provided? The respondents in this study agree with this measure by a vast majority. Perhaps such guidelines may be able to promote understanding between instructors and trainees and create a common scientific basis in training. However, is that enough?

The application of complete structured training programmes and evaluation tests during fellowship, such as those provided by the World Association of Bronchology (www.bronchology.org) would probably contribute to the uniformity of training and integration of clear and accepted practices during performance of such procedures.

Quality validation of endoscopic centres and pulmonary teaching clinics would promote the same goals.

The institution of a logbook for each trainee recording the number of endoscopic procedures during fellowship would possibly ensure uniformity in teaching opportunities and subjectivity of provided teaching. New digital and electronic technologies that allow teaching from a distance could also be used.

Should all pulmonary fellows be trained in interventional techniques, as suggested by the 71% of participants?

Probably yes, since interventional procedures such as TBNA are not accompanied by serious difficulties or risks and do not require special circumstances, while relieving the patient of an unnecessary thoracoscopy or thoracotomy. Even pulmonologists who are unable to perform these procedures themselves under their own working conditions should be familiar with them and be able to recognize the indications and contraindications, in order to refer their patients to specialized centres.

Naturally, not all pulmonary clinics can or should provide training in advanced and more elaborate interventional techniques such as rigid bronchoscopy, stent placement, laser therapy or EBUS, thoracoscopy, etc¹⁰. Referral centres of excellence should be instituted, to which patients can be referred, where they can be examined and treated, while at the same time young physicians interested in endoscopic techniques can be trained. Their presence would also advance the quality and credit of respiratory medicine and provide new pulmonologists the opportunity of staff referral to centres for interventional endoscopy in this country. Similar suggestions on the upgrading of endoscopic training for Greek pneumonologists have been made by other authors in an earlier review of bronchoscopic experience¹¹.

The ACCP has also suggested introduction of one additional year of interventional pulmonology training during fellowship⁵. Other medical specialties such as gastroenterology, cardiology and radiology have benefited from the introduction of interventional subspecialties and the institution of referral centres with substantial experience which are able to preserve a high level of skill and competence.

CONCLUSIONS

The conclusions derived from the analysis of the questionnaire are not considered reassuring, since, first of all, the quality of the bronchoscopies performed

appears to be often below the desired level of safety and effectiveness. Advanced interventional diagnostic techniques are used by very few pulmonologists, and therapeutic techniques by almost none. Endoscopy training in fellowship is diverse and often insufficient.

Common demands of young pulmonologists and pulmonary fellows are the extension of their training in endoscopic techniques, the introduction of guidelines and the institution of centres of excellence, where severely compromised patients can be referred for high quality investigation and treatment and at which new interventional endoscopists can be trained.

The implementation of minimum teaching requirements or goals during pulmonary fellowship, together with quality validation of the laboratories and clinics could possibly contribute to the provision of medical services and specialty teaching of the highest quality.

REFERENCES

1. British Thoracic Society Bronchoscopy Guidelines Committee, a Subcommittee of the Standards of Care Committee of the British Thoracic Society. British Thoracic Society guidelines on diagnostic flexible bronchoscopy *Thorax* 2001;56:(suppl 1) i1-i21.
2. ERS/ATS statement on interventional pulmonology. Bolliger CT, Mathur PN presidents. *Eur Respir J* 2002;19:356-373.
3. Ernst A, Silvestri GA, Johnston D. for the ACCP Interventional Chest/Diagnostic Procedures Network Steering Committee. Guidelines from the American College of Chest Physicians. *CHEST* 2003;123:1693-1717.
4. Prakash UB, Offord KP, Stubbs SE. Bronchoscopy in North America: the ACCP survey. *Chest* 1991;100:1668-1675.
5. Colt HG, Prakash UBS, Offord KP. Bronchoscopy in North America: Survey by the American Association for Bronchology, 1999. *J Bronchol* 2000;7:8-25.
6. Honeybourne D, Neumann CS. An audit of bronchoscopy practice in the United Kingdom: a survey of adherence to national guidelines *Thorax* 1997;52:709-713.
7. Smyth CM, Stead RJ. Survey of flexible fibreoptic bronchoscopy in the United Kingdom. *Eur Respir J* 2002;19: 458-463.
8. Niwa H, Tanahashi M, Kondo T, et al. Bronchoscopy in Japan: a survey by the Japan society for Respiratory Endoscopy in 2006. *Respirology* 2009;14:282-9.
9. Pastis NJ, Nietert PJ, Silvestri GA. Fellows' Perspective of Their Training in Interventional Pulmonary Procedures. *J Bronchol* 2005;12:88-95.
10. Janssen J, Noppen M. Interventional Pulmonology. *Eur Respir J* 2006;27:1084-85.
11. Papagiannis A, Ioannidis G, Xrysanthopoulou G, Kontakiotis T. An audit for fiberoptic bronchoscopy practice in a private hospital. *Pneumon* 2007;20:56-62.