

## Bronchoscopy in Brazil

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**Background:** During recent years, bronchoscopy has evolved considerably. Numerous clinical investigations, symposia, congresses and training courses have demonstrated the renewed interest in respiratory endoscopy. However, it is unknown whether this has modified bronchoscopy practice.

**Objective:** Obtain information regarding the opinions and practices of pulmonologists who perform diagnostic and therapeutic bronchoscopy in Brazil.

**Method:** A survey consisting of 56 questions was mailed to 576 pulmonologists associated with the SBPT-DER.

**Results:** A total of 111 questionnaires (19.2%) were returned and analyzed. All respondents were familiar with flexible fiberoptic bronchoscopy, but only 45% had performed rigid bronchoscopy. Less than 15% of the responders had performed any therapeutic bronchoscopic procedure.

**Conclusions:** The majority of respondents (87.3%) thought that pulmonary societies and specialized training centers should initiate and disseminate informative materials and programs to optimize and perfect the practice of respiratory endoscopy, including therapeutic bronchoscopy, in Brazil.

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**Key Words:** Bronchoscopy. Survey. Bronchoscopy practice.

\* Study carried out in the Departamento de Endoscopia Respiratória (DER, Department of Respiratory Endoscopy) of the Sociedade Brasileira de Pneumologia e Tisiologia (SBPT, Brazilian Society of Pulmonology and Phthisiology)  
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## INTRODUCTION

During recent years, bronchoscopy practice has evolved considerably. The use of fiberoptic bronchoscopy, either for diagnostic purposes or for therapeutic procedures such as endoscopic resection using laser therapy, endobronchial stent placement, brachytherapy, electrocautery, cryotherapy and other invasive procedures, has increased worldwide as well as in our country.<sup>1</sup>

Although the use of all these techniques in daily clinical practice has been increasing progressively, the societies involved have yet to establish guidelines for standardizing the clinical application of these relatively new techniques in our milieu. Nevertheless, guidelines for the use of bronchoscopy have been laid down by various organizations in other countries.<sup>2-9</sup>

Despite the publication of these guidelines and directives, the certification of new pulmonologists in respiratory endoscopy has usually depended on their training at the postgraduate level as well as on the prior training and proficiency of their instructors.<sup>10</sup> This has resulted in considerable heterogeneity in the training of professionals and in the application of the various endoscopic techniques. Due to the rapid, constant changes in the many different endoscopic procedures, it has been difficult to create directives that encompass all of the techniques. In addition to these difficulties, a significant number of endoscopists resist adopting the norms established in the directives established by the various societies.<sup>10,11</sup>

The objective of this survey, conducted under the auspices of the *Departamento de Endoscopia Respiratória* (DER, Department of Respiratory Endoscopy) of the *Sociedade Brasileira de Pneumologia e Tisiologia* (SBPT, Brazilian Society of Pulmonology and Phthisiology), was to evaluate the use of diagnostic and therapeutic endoscopy in our milieu and, based on the data collected, seek to draft directives for the application and execution of these methods in our country.

## METHODS

A questionnaire was mailed to each of the 576 members of the DER of the SBPT. The questionnaire is available in full on the DER webpage (direct access at [www.endoscopiarespiratoria.com.br](http://www.endoscopiarespiratoria.com.br)) or via the SBPT site ([www.sbpt.org.br](http://www.sbpt.org.br)).

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### Abbreviations used in this paper:

BAL – Bronchoalveolar lavage  
DER – Departamento de Endoscopia Respiratória (Department of Respiratory Endoscopy)  
SBPT – Sociedade Brasileira de Pneumologia e Tisiologia (Brazilian Society of Pulmonology and Phthisiology)

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An introductory letter, sent via e-mail, preceded the mailing of the questionnaires. The respondents were asked to return the questionnaires to the secretary of the SBPT using the postage-paid, pre-addressed envelope enclosed. Neither the questionnaires nor the envelopes required the respondent to provide personal data.

The questionnaire comprised 56 questions regarding demographics, general instruction, training, instruction and practice in the use of rigid and flexible bronchoscopy, diagnostic and therapeutic bronchoscopy, preparation of patients for the exam, type of monitoring used, use of sedation, cleaning of the apparatus, and the most frequent situations in which bronchoscopy is indicated.

## RESULTS

Of the 576 questionnaires mailed, a total of 111 (19.2%) were returned.

Since some questionnaires were incomplete, the results were analyzed based on the total number of responses to each question.

Most (79; 71.2%) of the respondents were pulmonologists between the ages of 31 and 50. Among the remaining 32 respondents (28.8%), there were thoracic surgeons, bronchoesophagologists, intensivists, allergists and pediatricians. Of the 111 respondents, 88 (79.3%) were males and 23 (20.7%) were females.

A total of 51 (45.9%) of all the respondents held the title of specialist: 30 (27%) were certified in respiratory endoscopy and 21 (18.9%) were specialists in peroral endoscopy.

Seventy-seven (69.4%) of the respondents reported working in private clinics, 48 (43.2%) in public hospitals and 48 (43.2%) in university hospitals.

None lived in a city with a population of less than 50,000 inhabitants. Most (57; 51.8%) lived in cities of more than 1,000,000 inhabitants.

Figure 1 shows the geographic distribution, by region, of the respondents.

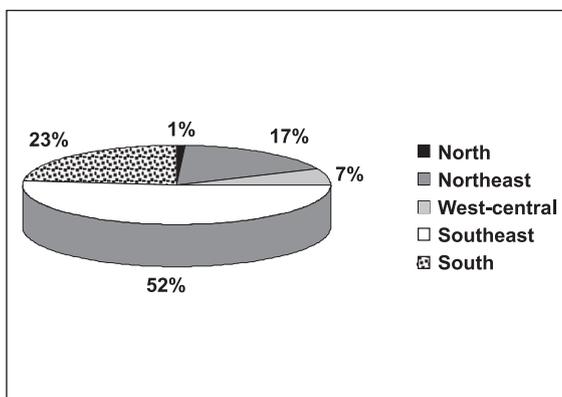


Figure 1. Distribution by geographic region

### Flexible bronchoscopy

In analyzing the questions concerning fiberoptic bronchoscopy, we observed that, in the last 12 months, 25 (22.6%) of the respondents had performed or directly supervised from 1 to 50 exams, 23 (20.7%) from 51 to 100, 13 (11.7%) from 101 to 150, 12 (10.8%) from 151 to 200, 17 (15.3%) from 201 to 300, and 21 (18.9%) more than 300.

Sixty-nine (62.7%) respondents had been performing bronchoscopy for over 10 years.

Of the 111 respondents, only 2 (1.8%) reported not having assistants during the exam; 52 (46.9%) reported having 1 assistant (physician, resident, nurse or nursing assistant), 37 (33%) reported having 2 assistants, 17 (15.3%) reported having 3 assistants, and 3 (2.7%) reported having 4 or more assistants. Sixty-one (64%) of the respondents consider 2 to be the ideal number of assistants.

The route most commonly used by 96 (86.5%) of the respondents for the introduction of the bronchial fiberscope is the nasal route.

All respondents routinely request that some imaging method (chest X-ray or computed tomography) be used prior to the exam; 21 (18.9%) request assessment of prothrombin time and activity; 18 (16.2%) request arterial blood gas analysis; and 16 (14.4%) request hemogram. Less than 10% of the respondents request electrocardiogram, spirometry, biochemistry or other exams.

The principal situation in which bronchoscopy was indicated was that which called for the investigation of a lung mass or nodule (56.7%),

followed by pulmonary infiltrates suspected of being of infectious origin (33.3%). The responses to questions regarding other conditions, such as infiltrates suspected of being of non-infectious origin, cough, wheezing, atelectasis and hemoptysis, showed that bronchoscopy is employed in less than 8% of such cases.

Ninety-one (82%) of the respondents observe the patient for a period of less than 2 hours following bronchoscopy, whereas 20 (18%) observe the patient for more than 2 hours. Only 32.4% of the respondents reported observing the patient in a recovery room after the procedure.

Sixty-two (56.9%) of the respondents reported that physical cleaning of the apparatus followed by a 20-minute disinfection with glutaraldehyde is routinely performed; 44 (40.4%) carry out physical cleaning followed by a 30-minute disinfection with glutaraldehyde; and 3 (2.7%) carry out only the physical cleaning of the apparatus.

Eighty (72.7%) respondents reported having 1 or 2 apparatuses available in their clinic.

For 52 (47.3%) respondents, the number of exams performed in the last 5 years had increased; for 43 (39.1%), it had remained stable, and for 15 (13.6%), it had decreased. Sixty-three (57.3%) respondents expected that the number of exams would increase in the next 5 years; 41 (37.3%) expected that it would remain stable; and 6 (5.4%) expected that it would decrease.

### Rigid bronchoscopy

Sixty-two (55.8%) respondents reported that they perform rigid bronchoscopy, and 49 (44.2%) reported that they do not. Among those who do, 36 (58%) have done so for more than ten years. Five (8%) respondents who perform rigid bronchoscopy have not performed or directly supervised any rigid bronchoscopy exams in the last 12 months; 30 (48.3%) have performed between 1 and 10; 11 (17.7%) between 11 and 20; 8 (12.9%) between 21 and 30; and 6 (9.6%) more than 30.

### Diagnostic Procedures

Forty-four (40%) respondents reported having performed or supervised between 1 and 50 bronchoalveolar lavage (BAL) procedures within the last 12 months; 20 (18.2%), between 51 and 100;

TABLE 1  
Number of respondents performing therapeutic procedures

Procedure	Respondents (n) %
Laser therapy	9 - 8.2%
Electrocautery	28 - 23.9%
Brachytherapy	11 - 10.2%
Stent	22 - 20%

11 (10%), between 101 and 150; and 31 (28.2%) 151 or more. Only 4 (3.6%) respondents reported not having performed this procedure within the last 12 months.

Sixty-four (58.2%) respondents reported not having performed or directly supervised transbronchial needle aspiration in the last 12 months; 25 (22.7%) had performed between 1 and 10; 10 (9%) between 11 and 20; and 11 (10%) more than 20.

Four (3.6%) respondents reported not having performed or supervised any bronchial biopsies in the last 12 months; 10 (9.1%) had performed between 1 and 10; 11 (10%) between 11 and 20; 11 (10%) between 21 and 30; 11 (10%) between 31 and 40; 10 (9.1%) between 41 and 50; 11 (10%) between 51 and 60; and 42 (38%) more than 60.

Fifteen (13.7%) respondents reported not having performed or supervised any transbronchial biopsies in the last 12 months; 26 (23.8%) had performed between 1 and 10; 16 (14.7%) between 11 and 20; 12 (11%) between 21 and 30; 11 (10.1%) between 31 and 40; 10 (9.2%) between 41 and 50; and 19 (17.5%) more than 51.

Among those who performed transbronchial biopsies, 56 (58.3%) had never used fluoroscopy during the procedure; 23 (24%) had rarely used it; 12 (12.5%) sometimes used it; and 3 (3.2%) routinely or always used it. A majority (26; 53.1%) of this group reported using fluoroscopy most often in radiology centers, whereas 23 (46.9%) reported using fluoroscopy on the surgical ward or in the area designated for bronchoscopy.

The majority of respondents (74; 73.7%) reported using chest X-ray as the means of testing for pneumothorax after transbronchial biopsy, in comparison to 3 (3%) who reported using the fluoroscope itself and 24 (23.7%) who reported using no radiological tests unless the clinical exam suggested such a complication.

Only 1 (0.9%) respondent reported performing endobronchial ultrasounds.

TABLE 2  
Number of therapeutic procedures performed or directly supervised within the last 12 months

Number of Procedures	Laser therapy n (%)	Electrocautery n (%)	Brachytherapy n (%)	Stent n (%)
1 to 10	6 (66.6)	20 (71.4)	9 (81.8)	15 (68.2)
11 to 20	3 (33.3)	2 (7.1)	-	5 (22.7)
21 to 30	-	4 (14.3)	1 (9.1)	-
31 to 40	-	1 (3.6)	1 (9.1)	2 (9.1)
41 or more	-	1 (3.6)	-	-

TABLE 3  
Use of sedation, atropine, oxygen and venous access in order to perform the exam

Frequency	Sedation		Atropine n (%)	Oxygen n (%)	Venous access n (%)
	Flexible n (%)	Rigid n (%)			
Always	48 (44.0)	50 (79.0)	14 (12.7)	64 (58.2)	76 (69.1)
Routinely	41 (37.6)	8 (12.7)	12 (10.9)	15 (13.6)	13 (11.8)
Sometimes	12 (11.0)	2 (3.2)	16 (14.5)	24 (21.8)	10 (9.1)
Rarely	7 (6.4)	2 (3.2)	30 (27.3)	7 (6.4)	9 (8.2)
Never	1 (0.9)	1 (1.6)	38 (34.0)	-	2 (1.8)

TABLE 4  
Use of general anesthesia in flexible, rigid and invasive bronchoscopy

Frequency	Fiberoptic bronchoscopy <i>n</i> (%)	Rigid bronchoscopy <i>n</i> (%)	Invasive bronchoscopy <i>n</i> (%)
Always	2 (1.8)	36 (57.1)	21 (41.2)
Routinely	5 (4.5)	12 (19.0)	13 (25.5)
Sometimes	17 (15.5)	8 (12.7)	7 (13.7)
Rarely	61 (55.5)	4 (6.4)	7 (13.7)
Never	25 (22.7)	3 (4.8)	3 (5.9)

Bronchoscopy for bronchial hygiene therapy represented less than 20% of the exams performed by 70 (63.6%) of the respondents and more than 80% of those performed by 4 (3.6%).

#### *Therapeutic procedures*

Tables 1 and 2 show the responses concerning the practice of therapeutic procedures such as laser therapy, electrocautery, brachytherapy and endobronchial stent placement.

Among the bronchoscopists who reported performing laser therapy, 8 (72.7%) prefer the use of rigid bronchoscopes; 7 (77.8%) perform the procedure in surgical centers; and 6 (66.7%) always or routinely admit the patient to the hospital for an overnight stay.

Of the 21 respondents who reported performing stent placement, 12 (57.4%) perform it on an inpatient basis. Eleven (52.4%) repeat the endoscopy for control 2 weeks later. Seven (33.3%) perform a second bronchoscopy 2 to 4 months later; 1 (4.8%) 4 to 6 months later; and 2 (9.5%) only repeat the procedure if the chest X-ray shows some alteration or if the patient presents symptoms.

The stent most commonly used was the Dumon stent, followed by the Montgomery, Wallstent, Polyflex and Gianturco stents.

#### *Care before and during bronchoscopy*

As a means of monitoring patient status during the procedure, 106 (96.4%) of the respondents reporting routine use of pulse oximetry; 98 (89%) heart rate monitoring; 34 (30.9%) blood pressure monitoring; 45 (40.9%) cardioscope; and 2 (1.8%) capnograph.

Table 3 shows the use of sedation, atropine, oxygen and venous access during bronchoscopy.

The most commonly used sedatives, in order of frequency, were midazolam, propofol, IV

meperidine, IV fentanyl, and IV diazepam.

Table 4 shows the frequency at which exams are performed under general anesthesia.

#### *Bronchoscopy instruction*

The questions concerning bronchoscopy instruction were partially answered by 110 respondents. Ninety-six (87.3%) believe that rigid bronchoscopy should be routinely taught during the training in respiratory endoscopy. Ninety-six (87.3%) believe that transbronchial biopsy should be routinely taught. Eighty-six (78.2%) believe that transbronchial needle aspiration should be routinely taught. Seventy-three (66.4%) believe that invasive bronchoscopy (laser therapy, electrocautery and stent placement) should be routinely taught. Among this group of respondents, only 27 (24.8%) had been trained to perform transbronchial needle aspiration during their course of study.

A majority of the 110 respondents (51; 46.4%) believe that the minimum number of flexible bronchoscopies needed to fully train a pulmonologist in the use of the method is between 81 and 120. A majority (61; 55.9%) also believes that a physician should perform, on average, 21 to 60 exams a year in order to stay in practice.

The area in which there was the most divergence of opinions was that of professional proficiency in rigid bronchoscopy. Three (2.83%) of the respondents opined that from 1 to 10 exams are sufficient to fully train a bronchoscopist; 18 (17%) stated that from 11 to 20 were required; 14 (13.2%) from 21 to 30; 19 (17.9%) from 31 to 40; 18 (17%) from 41 to 50; and 34 (32.1%) more than 51.

#### DISCUSSION

Most (71.2%) of the respondents were pulmonologists, 79.3% were male and 71.2% were

between the ages of 31 and 50 and resided in mid-sized or large cities. Women represented 20.7% of the respondents; a higher percentage than that found in a previous survey carried out by Colt *et al.*<sup>12</sup> The percentage of respondents in the present study (19.2%) was lower than in other such studies published by professional societies over the last 20 years. However, this is the first time that this type of survey has been carried out in our country<sup>10-14</sup>. The questionnaires were mailed with the return postage prepaid in order to facilitate their return, and the addressees were not required to identify themselves since that might have affected the veracity of the responses.

Fifty-six per cent of the respondents had performed more than 100 exams in the previous year, a higher percentage than the one found by Colt *et al.*<sup>12</sup> in the most recent survey by the American Association for Bronchology, and the majority is optimistic about increasing this number in the years to come.

Except for imaging exams, the request rate for other exams was less than 20%. The order of frequency of the principal situations in which bronchoscopy is indicated is similar to that found by Colt *et al.*<sup>12</sup> These findings, in our opinion, may be attributed to the fact that those authors conducted an indiscriminate mailing of questionnaires to 2500 members of the American College of Chest Physicians, regardless of whether they were endoscopists or not, whereas our questionnaire was mailed only to professionals associated with the DER.

The practice of using rigid bronchoscopy was reported by 44.6% of the respondents. This is still a high percentage if compared to other surveys<sup>10-15</sup>. The majority has had more than 10 years of experience, and 50% either performed or supervised from 1 to 10 exams in the preceding year.

The diagnostic procedure most often performed was BAL and transbronchial needle aspiration was the least often performed. Most (58.3%) of respondents in our field perform transbronchial biopsy without using fluoroscopy. This percentage is similar to that found by Simpson *et al.*<sup>15</sup>, who determined that 57% of the respondents did not use fluoroscopy.

Bronchoscopy for bronchial hygiene is rarely used in our milieu (< 20%). Fiberoptic bronchoscopy-

guided bronchial hygiene therapy is especially recommended for intensive care patients who are orotracheally intubated and on mechanical ventilation. In recent years, respiratory physiotherapy in intensive care units has progressed enormously and is probably most responsible for the decrease in the endoscopic treatment of these patients.

We found that laser therapy was practiced in a proportion similar to that found by Colt *et al.*<sup>12</sup>

Twenty per cent of respondents had either performed or supervised a stent placement procedure with the last year. This percentage is approximately four times higher than that found in other surveys, whereas the percentage of brachytherapy practice was three times higher.<sup>12</sup>

We determined that less than 8% of the respondents never or rarely used sedation prior to performing flexible bronchoscopy, and that this percentage is even lower for rigid bronchoscopy. This is also lower than the 10% found by Colt *et al.*<sup>12</sup> Atropine was always or routinely used by 23.6% of the respondents, lower than the 29% found by Simpson<sup>15</sup> in a survey carried out in the United Kingdom.

Oxygen was always used during the exam by 58.2% of the respondents; a lower percentage than that found in either of the last two surveys published.<sup>13,15</sup>

In order to perform the exam, 69.1% of the respondents reported using the puncture technique for gaining venous access. This percentage is also lower than the 87% and 80% recently published.<sup>13,15</sup> Despite the fact that the use of oxygen and the puncture technique is still not in common practice, it already represents the conduct of the majority.

Most respondents agree that an approximate minimum of 100 broncofibroscopies is needed to fully train a professional in performing this procedure and that, on average, a minimum of 40 exams a year is needed for professionals to maintain their proficiency. These data can be superimposed on the ones recommended and recently published in the guidelines of the American College of Chest Physicians.<sup>16</sup> The DER of the SBPT carried out this pioneering survey in our country aiming to draft directives that may orient, in the future, the practice of diagnostic and therapeutic bronchoscopy in our milieu.

We know that, for the completion of this questionnaire, we relied on the memory and interpretation of the respondents and that many important issues were not addressed. Some of these issues were even suggested by the DER members: the most commonly found complications, the use of topical anesthesia, material available for emergencies, the use of antibiotic prophylaxis, and other issues that may be addressed in future surveys.

During recent years, there have been many advances in respiratory endoscopy in our milieu. However, these advances differed significantly in the different areas of the country. Efforts still need to be made in order to improve the utilization of the various endoscopic procedures, especially in the field of interventional bronchoscopy. The emergence of directives and guidelines for respiratory endoscopy will unquestionably raise interest in the subject as well as develop standardization for the several endoscopic procedures, both diagnostic and therapeutic, thereby improving bronchoscopic practice even more. Likewise, taking into account the innumerable innovations that have been developed in this area, such as endoscopic ultrasound, techniques of early detection of lung cancer, autofluorescence bronchoscopy, new endobronchial stents and new methods of clearing bronchial obstructions, as well as the improvement in knowledge and training of the many professionals involved in the use of the method, we can foresee the progress of respiratory endoscopy in our milieu and the potential benefits of future surveys of this kind.

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#### REFERENCES

1. Prakash UBS. Advances in bronchoscopic techniques. *Chest* 1999; 116:1403-8.
2. Committee on Bronchoesophagology of the American College of Chest Physicians. Standards for training in endoscopy. *Chest* 1976; 69:665-6.
3. Guidelines for competency and training in fiberoptic bronchoscopy. Section on Bronchoscopy. American College of Chest Physicians. *Chest* 1982;81:739-45.
4. Greve JJ, Adamson J, Caldwell EJ, Edsall JR, Sugg WC, Zavala DC. Guidelines for bronchoscopy. *ATS News* 1983; Winter.
5. Sokolowsky JW, Burghwer LW, Jones FL. Guidelines for fiberoptic bronchoscopy. *ATS News* 1986; Spring.
6. Guidelines for fiberoptic bronchoscopy in adults. American Thoracic Society. Medical Section of the American Lung Association. *Am Rev Respir Dis* 1987; 136:1066-70.
7. National Institutes of Health workshop summary. Summary and recommendations of a workshop on the investigative use of fiberoptic bronchoscopy and bronchoalveolar lavage in individuals with asthma. *J Allergy Clin Immunol* 1985;76:145-7.
8. Summary and recommendations of a workshop on the investigative use of fiberoptic bronchoscopy and bronchoalveolar lavage in asthmatics. *Am Rev Resp Dis* 1985; 132:180-2.
9. Summary and recommendations of a workshop on the investigative use of fiberoptic bronchoscopy and bronchoalveolar lavage in asthmatics patients. *Chest* 1985;88:136-8.
10. Prakash, U.B.S.; Offord, K.P.; Stubbs, S.E. Bronchoscopy in North America: the ACCP survey. *Chest* 1991.100:1668-75.
11. Prakash, U.S.B.; Stubbs, S.E. The Bronchoscopy Survey: some reflections. *Chest* 1991;100:1660-7.
12. Colt HG, Prakash UBS, Offord KP. Bronchoscopy in North America - Survey by the American Association for Bronchology, 1999. *J Bronchol* 2000; 7: 8-25.
13. Honeybourne D, Neumann CS. An Audit of Bronchoscopy Practice in the United Kingdom: a Survey of Adherence to National Guidelines. *Thorax* 1997; 52: 709-13.
14. Honeybourne D. Survey of Flexible Fibreoptic Bronchoscopy in the UK. *Eur Respir J* 2000; 20: 789.
15. Simpson FG, Arnold AG, Purvis A, Belfield PW, Muers MF, Cooke NJ. Postal Survey of Bronchoscopy Practice by Physicians in the United Kingdom. *Thorax* 1986; 41: 311-7.
16. Ernst, A, Silvestri, GA, Johnstone, D. Interventional Pulmonary Procedures. Guidelines from the American College of Chest Physicians. *Chest* 2003; 123:1693-1717.