

THE BRONCHOSCOPY EDUCATION PROJECT

Appendix: Bronchoscopy Assessment tools

Subject: Introduction to Flexible Bronchoscopy Competency Program

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A non-profit organization dedicated to education,
and the global dissemination of knowledge*
www.Bronchoscopy.org



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The **Bronchoscopy Education Project** is a uniform curriculum designed to provide bronchoscopy educators with competency-oriented tools and materials that can be incorporated in whole or in part into various training programs. Materials can be used to train student bronchoscopists and assess progress along the learning curve from novice to competent practitioner.

This project is based on **FIVE** key concepts:

1. Mandatory reading, including review of open-access web-based materials in the form of video clips, photo atlases, and written manuals provides a uniform foundation of theoretical and practical knowledge.
2. Step-by-step instruction, simulation scenarios, training models, and small group workshops allow technical skill and experiential knowledge acquisition for existing and newly introduced technologies and procedures.
3. Checklists using a uniform template enhance procedural standardization, patient safety, and implementation across procedural platforms.
4. Patient-centered practical approach exercises help practitioners rationalize the various components of the decision-making process (strategy and planning; equipment, techniques and results; outcomes and quality improvement), thus reinforcing their acquisition of cognitive, technical, affective and experiential knowledge.
5. Assessment tools, readily applied in the clinical as well as simulation setting enhance learning, and document progression along the learning curve from novice to competent practitioner.

The Bronchoscopy Education Project includes three parts, to be completely developed by Bronchoscopy International and a host of international experts. As they come to completion, these components, designed using a uniform template and development philosophy, will be disseminated and implemented at the national and international level with the added endorsement and collaboration of university medical centers, regional physician groups, national societies, and international organizations.

A series of *Train the Trainers* seminars are being conducted to familiarize a cadre of bronchoscopy educators with general educational philosophies and methodologies, and to provide opportunities to learn and practice various elements of

The Bronchoscopy Education Project. We assume this cadre of educators will use some or all project materials in future regional or institution-based teaching programs. As a result of this work, it is our hope to facilitate the work of our professional colleagues by providing a uniform instructional framework that can be expanded, researched, and improved upon, and to alleviate patients from the burdens of procedure-related training. Increasingly knowledgeable and competent bronchoscopists will thus enhance their practice through a more rapid implementation of new technologies, and a better use of existing ones, all to the benefit of our patients.

Part I: *Introductory Course in Flexible Bronchoscopy.* This course addresses bronchoscopic inspection, lavage, brushing, endobronchial biopsy, transbronchial lung biopsy and conventional transbronchial needle aspiration.

Part II: *Endobronchial Ultrasound and EBUS-Transbronchial Needle Aspiration.* This course addresses Endobronchial Ultrasound physics, equipment (processors, bronchoscopes, needles, radial and linear array transducers), techniques including EBUS-TBNA, mediastinal anatomy, lung cancer staging according to universally accepted IASLC guidelines, and EBUS-radiographic-bronchoscopic correlations.

Part III: *Introduction to Interventional Flexible Bronchoscopy.* This course addresses flexible bronchoscopic resection techniques including electrosurgery and Nd:YAG laser, foreign body removal techniques and instrumentation, difficult airway management including difficult intubation and hemoptysis, flexible bronchoscopic stent and airway valve insertion, bronchoscopic techniques of electromagnetic navigation, and bronchial thermoplasty.

Train the Trainers Seminars: These hands-on seminars are specifically designed to familiarize participants with materials and techniques necessary for teaching each of the three other components of **The Bronchoscopy Education Project**. Each seminar targets mastery of didactic and associated reading materials, and provides opportunity to practice using checklists, assessment tools, practical approach patient-centered exercises, and simulation or role playing exercises. Debriefing and 360 degree feedback techniques are employed to foster teamwork, provide individual intrinsic value, and enhance individual as well as group performance.



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Welcome to this **Appendix of the Bronchoscopy Education Project**. These competency-oriented tools can be used to help bronchoscopists progress along the learning curve from novice to competent practitioner. Material can be incorporated in whole or in part, as needed by each program. Tools can be used to assess progress, but can also be used as study guides by students or practitioners wishing to enhance their skills.

These assessment tools can be used in addition to items found in the Bronchoscopy Education Project training manual. These tools are therefore complementary to the standardized curriculum (schedule, content, checklists, training models, and train-the-trainers instruction) pertaining to the *Introductory Course in Flexible Bronchoscopy*. This course addresses bronchoscopic inspection, lavage, brushing and endobronchial biopsy, transbronchial lung biopsy and conventional transbronchial needle aspiration.

Work is in progress for programs pertaining to (a) endobronchial ultrasound, (b) interventional flexible bronchoscopy, and (c) rigid bronchoscopy. Specific assessment tools are being developed and validated for these procedures. They will be incorporated into this appendix at a later date or published separately.

Material is also available at www.bronchoscopy.org. We invite your comments as you use these and other materials.

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* For copies of assessment tools and answer grids, please contact Henri Colt MD at hcolt@uci.edu.

[§] Assessment Tools created by Mohsen Davoudi MD and Henri Colt MD

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Bronchoscopy Skills and Tasks Assessment Tool (BSTAT)

- Items 1-10 may be scored separately.
- A passing score of 100 is expected to reflect competency.
- Scores >100 should initiate instructor-learner feedback
- Assessments may be performed in models or in patients.
- Knowledge of nomenclature (common language) for bronchoscopic findings can be assessed using the quiz. Recognition of findings can also be assessed during a bronchoscopic inspection, in which case instructors may prefer to use each quiz as a learning guide.
- The combined use of the 10 items pertains to technical skills needed to climb the learning curve from novice to competent bronchoscopist able to independently perform flexible bronchoscopy with lavage, brushing and endobronchial biopsy.
- This assessment tool is complementary to other methods of assessment such as practical approach exercises, checklists, logbooks of numbers of procedures performed, and outcomes.

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Bronchoscopy Skills and Tasks Assessment Tool (BSTAT)

Student: _____ Training Year _____

Faculty _____ Date _____

Educational Item* Items 1-10 each scored separately	Satisfactory Yes/No
1. Identification of Right sided anatomy (2 points each, target 20 points) <input type="checkbox"/> RB1 apical <input type="checkbox"/> RB2 posterior <input type="checkbox"/> RB3 anterior <input type="checkbox"/> RB4 lateral <input type="checkbox"/> RB5 medial <input type="checkbox"/> RB6 superior <input type="checkbox"/> RB7 mediobasal <input type="checkbox"/> RB8 anterobasal <input type="checkbox"/> RB9 laterobasal <input type="checkbox"/> RB10 posterobasal	Yes / No Score ____/20
2. Identification of Left sided anatomy (2 points each, target 16 points) <input type="checkbox"/> LB1+2 apical/posterior <input type="checkbox"/> LB3 anterior <input type="checkbox"/> LB4 superior <input type="checkbox"/> LB5 inferior <input type="checkbox"/> LB6 superior <input type="checkbox"/> LB8 anterobasal <input type="checkbox"/> LB9 laterobasal <input type="checkbox"/> LB10 posterobasal	Yes / No Score ____/16
3. Identify and enter RB 4+5+6 on demand (All three segments must be entered to earn 5 points, no partial points given, target 5 points) <input type="checkbox"/> RB 4+5+6	Yes / No Score ____/5
4. Identify and enter LB 8+9+10 on demand (All three segments must be entered to earn 5 points, no partial points given, target 5 points) <input type="checkbox"/> LB 8+9+10	Yes / No Score ____/5
5. Posture/Hand positions/Equipment safety (3 points each, target 9 points) <input type="checkbox"/> Body posture <input type="checkbox"/> Hand positions <input type="checkbox"/> Equipment handling	Yes / No Score ____/9
6. Scope centered and kept in midline (5 points, no partial points given) <input type="checkbox"/> Scope centered in airway lumen	Yes / No Score ____/5
7. Airway wall trauma avoided (5 points, no partial points given) <input type="checkbox"/> Airway wall trauma avoided	Yes / No Score ____/5
8. Nomenclature: secretions descriptions (1 point each, target 10 points) <input type="checkbox"/> Image 1 <input type="checkbox"/> Image 2 <input type="checkbox"/> Image 3 <input type="checkbox"/> Image 4 <input type="checkbox"/> Image 5 <input type="checkbox"/> Image 6 <input type="checkbox"/> Image 7 <input type="checkbox"/> Image 8 <input type="checkbox"/> Image 9 <input type="checkbox"/> Image 10	Yes / No Score ____/10
9. Nomenclature: Mucosal descriptions (1 point each, target 10 points) <input type="checkbox"/> Image 1 <input type="checkbox"/> Image 2 <input type="checkbox"/> Image 3 <input type="checkbox"/> Image 4 <input type="checkbox"/> Image 5 <input type="checkbox"/> Image 6 <input type="checkbox"/> Image 7 <input type="checkbox"/> Image 8 <input type="checkbox"/> Image 9 <input type="checkbox"/> Image 10	Yes / No Score ____/10
10. Tasks: (5 points each, target 15 points) <input type="checkbox"/> BAL <input type="checkbox"/> Mucosal biopsy <input type="checkbox"/> Brush	Yes / No Score ____/15

* The combined use of the 10 items pertains to technical skills needed to climb learning curve from novice to advanced beginner to intermediate to competent bronchoscopist able to perform flexible bronchoscopy with lavage, brushing and endobronchial biopsy independently.

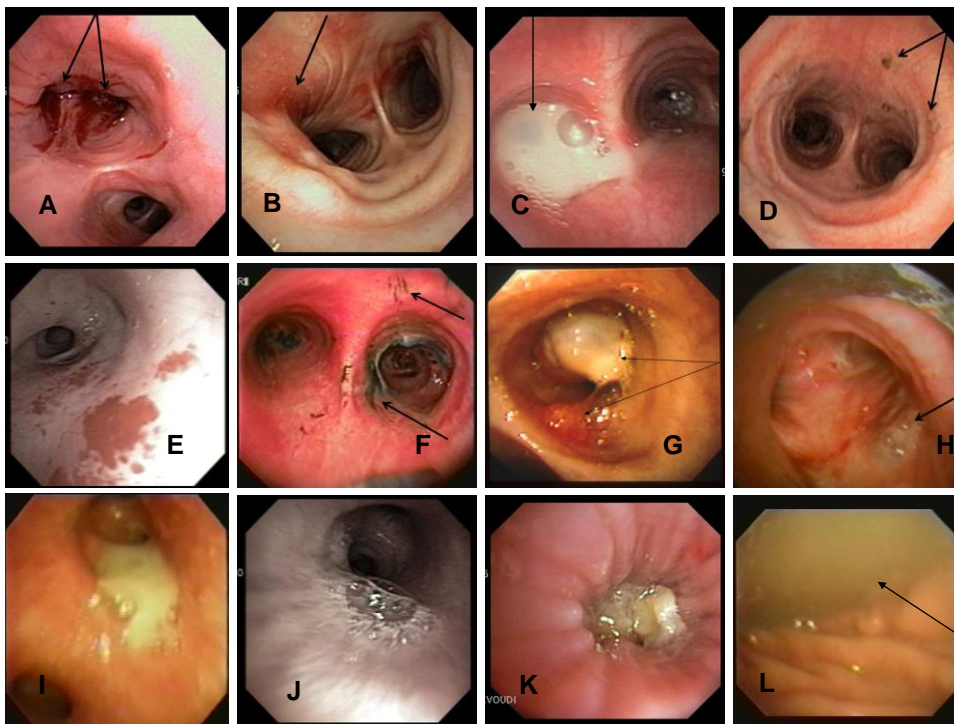
FINAL GRADE

PASS

FAIL

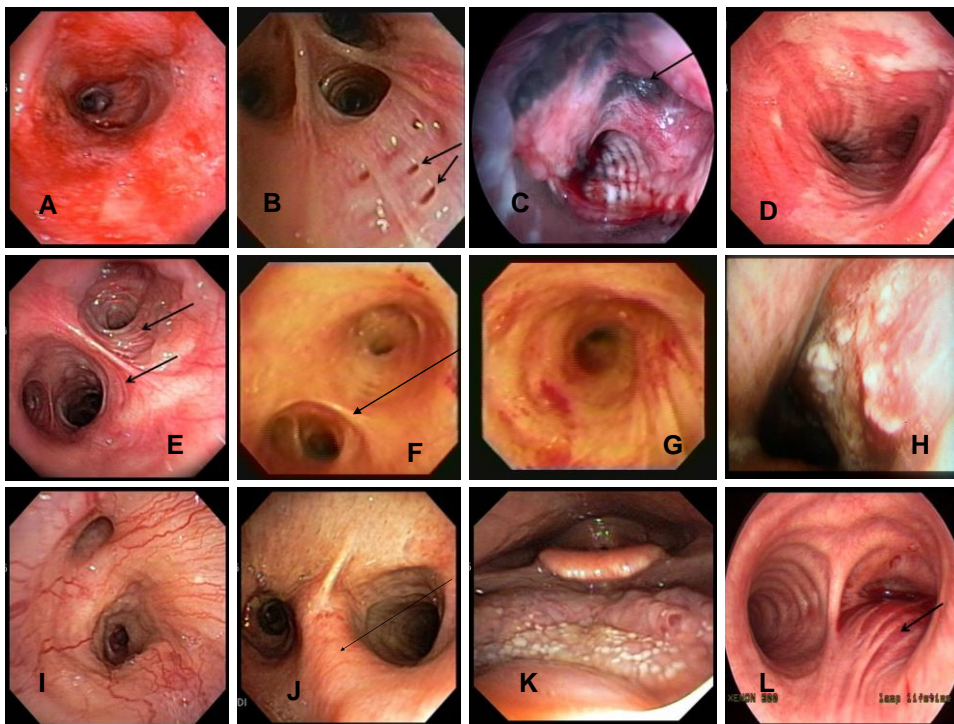
SCORE _____/100

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Match the photo (A-L) to the corresponding 10 secretion descriptions (Only one response per description)

_____	_____	_____	_____
Sooty-burns	Bloody	Necrotic debris	Yellow purulent
_____	_____	_____	_____
White creamy	Normal clear	Tar-stained smoker's phlegm	Frothy covering TE fistula
_____	_____	NO RESPONSE	
Pink frothy edema	Scope trauma		



Match the photo (A-L) to the corresponding 10 mucosal descriptions (Only one response per description)

_____	_____	_____	_____
Exophytic cancer	Necrotic tracheitis	Bronchial pits	Chronic bronchitis
_____	_____	_____	_____
Hypervascularity	Tumor infiltrated carina	Extrinsic compression	Anthracosis
_____	_____	NO RESPONSE	
Oral candidiasis	Acute bronchitis		



Bronchoscopy Skills and Tasks TBLB/TBNA Assessment Tool (BSTAT-TBLB/TBNA)*

- Items 1-10 may be scored separately.
- A passing score of 100 is expected to reflect competency.
- Scores >100 should initiate instructor-learner feedback
- Assessments may be performed in models or in patients.
- Knowledge of nomenclature (common language) for bronchoscopic findings can be assessed using the quiz. Recognition of findings can also be assessed during a bronchoscopic inspection, in which case instructors may prefer to use each quiz as a learning guide.
- The combined use of the 10 items pertains to technical skills needed to climb the learning curve from novice to competent bronchoscopist able to independently perform flexible bronchoscopy with lavage, brushing and endobronchial biopsy.
- This assessment tool is complementary to other methods of assessment such as practical approach exercises, checklists, logbooks of numbers of procedures performed, and outcomes.

*While it is understood that some institutions may not perform conventional, we believe this skill should still be learned in case EBUS is unavailable. Institutions wishing to exclude training in conventional TBNA may choose to use only the TBLB portion of this assessment tool, using a passing score of 50 as a reflection of competency

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**Bronchoscopy Skills and Tasks Assessment Tool, for Transbronchial Lung Biopsy
and Transbronchial Needle Aspiration (BSTAT-TBLB/TBNA)**

Student: _____ Training Year _____

Faculty _____ Date _____

Educational Item* Items 1-10 each scored separately	Satisfactory Yes/No
1. TBLB: Airway inspection without trauma (no partial points) <input type="checkbox"/> Complete inspection done properly	Yes / No Score ____/5
2. TBLB technique (no partial points) <input type="checkbox"/> Wedge scope into target segment <input type="checkbox"/> Visualize target with fluoroscopy <input type="checkbox"/> Advance forceps under fluoroscopy guidance to target <input type="checkbox"/> Open forceps at target <input type="checkbox"/> Advance and close forceps at target <input type="checkbox"/> Remove forceps from scope	Yes / No Score ____/10
3. TBLB Complications: Pneumothorax (no partial points) <input type="checkbox"/> Perform panoramic view of hemithorax using fluoroscopy <input type="checkbox"/> Recognize signs and symptoms <input type="checkbox"/> Demonstrate easy access to small or large bore chest tube	Yes / No Score ____/10
4. TBLB: Complications: Bleeding (no partial points) <input type="checkbox"/> Scope wedged into target segment <input type="checkbox"/> Move patient into lateral decubitus safety position <input type="checkbox"/> Access upper airway with oral suction <input type="checkbox"/> Demonstrate access and use of bite block and endotracheal tube	Yes / No Score ____/10
5. TBLB: Decision making (5 points each , target score 15 points) <input type="checkbox"/> Image 1 <input type="checkbox"/> Image 2 <input type="checkbox"/> Image 3	Yes / No Score ____/15
6. TBNA: Airway inspection and imaging interpretation (5 points each) <input type="checkbox"/> Complete inspection done properly <input type="checkbox"/> Imaging studies correctly interpreted	Yes / No Score ____/10
7. TBNA Technique - Jab (no partial points) <input type="checkbox"/> Advance catheter towards target area <input type="checkbox"/> Advance needle to target area without airway trauma <input type="checkbox"/> Jab needle through airway wall at target region while scope is fixed at nose or mouth <input type="checkbox"/> Move needle back and forth inside node while suctioning <input type="checkbox"/> Release suction prior to needle withdrawal from target region <input type="checkbox"/> Retract needle into the catheter <input type="checkbox"/> Observe that needle is completely retracted inside catheter <input type="checkbox"/> Withdraw catheter from scope	Yes / No Score ____/10
8. TBNA Technique-Hub against wall (no partial points) <input type="checkbox"/> Advance catheter towards target area <input type="checkbox"/> Touch catheter to target area without airway trauma <input type="checkbox"/> Penetrate airway wall with needle while holding scope firmly <input type="checkbox"/> Move needle back and forth inside node while suctioning <input type="checkbox"/> Release suction prior to needle withdrawal from target region <input type="checkbox"/> Retract needle into the catheter <input type="checkbox"/> Observe that needle is completely retracted inside catheter <input type="checkbox"/> Withdraw catheter from scope	Yes / No Score ____/10
9. TBNA Technique -Piggyback: (no partial points) <input type="checkbox"/> Secure catheter and scope simultaneously with one hand <input type="checkbox"/> Advance scope and catheter as a single unit to target region <input type="checkbox"/> Penetrate airway wall at target region <input type="checkbox"/> Move needle back and forth inside node while suctioning <input type="checkbox"/> Release suction prior to needle withdrawal from target region <input type="checkbox"/> Retract needle into the catheter <input type="checkbox"/> Observe that needle is completely retracted inside catheter <input type="checkbox"/> Withdraw catheter from scope	Yes / No Score ____/10
10. TBNA: Decision making: (5 points each, target 10 points) <input type="checkbox"/> Image 4 <input type="checkbox"/> Image 5	Yes / No Score ____/10

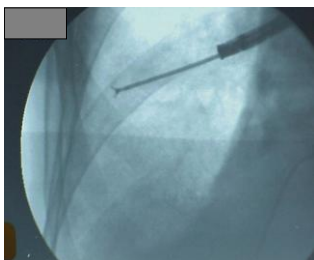
* The combined use of the 10 items pertains to technical skills needed to climb learning curve from novice to advanced beginner to intermediate to competent bronchoscopist able to perform flexible bronchoscopy with transbronchial lung biopsy and transbronchial needle aspiration independently.

FINAL GRADE PASS FAIL **SCORE** _____/100

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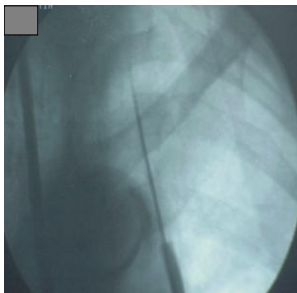
ITEM 5: Choose One best answer for each question

1. The target region is most likely (A) RB1, (B) RB6, (C) RB9, (D) RB10,



Answer _____

2. The target region is the (A) apical-posterior segment left upper lobe, (B) Lingula, (C) Right upper lobe



Answer _____

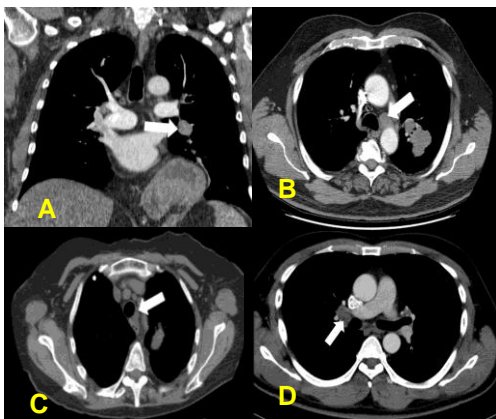
3. Which region should be biopsied in this immuno-suppressed patient with suspected fungal disease ?



Answer _____

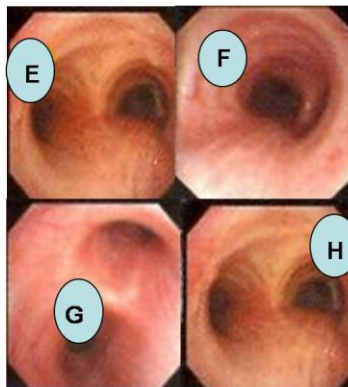
ITEM 10: Choose One best answer for each question

4. During conventional TBNA, which of the following lymph nodes will likely offer the highest diagnostic yield for nonsmall cell lung cancer ?



Answer _____

5. Where is the node located (needle insertion site E, F,G, or H)?



Answer _____

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Bronchoscopy Self Assessment Tool (BSAT)

- Items 1-10 may be assessed separately.
- There is no “passing score” for this assessment tool.
- The purpose of this assessment tool is to initiate instructor-learner feedback and to identify areas that warrant further reinforcement.
- Assessments may be performed in models or in patients.
- Assessments may be performed before and after a series of training sessions or clinical procedures.
- This assessment tool is complementary to other methods of assessment such as BSTAT and BSTAT-TBLB/TBNA, EBUS-STAT, practical approach exercises, checklists, logbooks of numbers of procedures performed, and outcomes.

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Bronchoscopy Self Assessment Tool (BSAT)

Please answer each question by writing the number that most closely represents your experience with the Bronchoscopy Education Program using the following scale.

1	2	3	4	5
Not comfortable		Comfortable		Very comfortable

1. I am able to identify airway anatomy _____
2. I am able to identify airway mucosal abnormalities _____
3. I am able to describe secretions and other airway abnormalities _____
4. I am able to maneuver the flexible bronchoscope _____
5. I am able to do a BAL through the flexible bronchoscope _____
6. I am able to use a brush through the flexible bronchoscope _____
7. I am able to use a forceps to perform an endobronchial biopsy _____
8. I am able to use a forceps to perform a transbronchial biopsy _____
9. I am able to perform a conventional transbronchial needle aspiration _____
10. I would now feel comfortable performing this case in a patient _____

Anatomy	Abnormalities	Technique	Equipment	Interpretation of findings
---------	---------------	-----------	-----------	----------------------------

I would like to learn more about (circle all that apply above)

1	2	3	4	5
Poor	Below average	Average	Good	Excellent

Using the above scale please rate this training program as _____

I have the following comments

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User Instructions for Bronchoscopy Assessment Tools (including quiz answer grids)

- BSTAT
- BSTAT-TBLB/TBNA
 - BSAT

Scoring Recommendations for Bronchoscopy Assessment Tools (BSTAT, BSTAT-TBLB/TBNA, BSAT)

The goal of these assessment tools is to be able to monitor a student's progress along the learning curve from *novice* (Score < 60) to *advanced beginner* (Score 60-79), *intermediate* (score 80-99), and *competent* (score 100). The instructor should be able to ascertain, by observing the student's performance (For BSTAT tools, this could be done on a once or twice a year basis) that each of the ten elements in each tool are covered satisfactorily. Repeated testing will demonstrate increases in knowledge and technical skill acquisition as the student climbs the learning curve from novice to advanced beginner, intermediate and competent bronchoscopist for the procedure being assessed.

To maximize objective scoring, each task has been defined explicitly in this user manual for each checklist and assessment tool. Participation in specially-designed Train-the-Trainers courses being currently organized is encouraged to assist with standardization and to help instructors use this program to its fullest potential.

Scores can be plotted on a graph, and each institution/program can obviously choose its own cut-offs for a PASS grade, although we recommend that a final PASS grade be achieved with a score of 100, in order for the student to be judged competent to perform bronchoscopy independently. In the absence of a large pilot study demonstrating standard normograms as is done for high-stakes testing, consensus of world renowned experts was obtained to delineate cut-off scores for the following four categories.

Category	Score
Novice	< 60
Advanced Beginner	60-79
Intermediate	80-99
Competent	100

Specific instructions marked by an asterisk (*) are provided for each of the tools.

Instructions: To administer the BSTAT, trainees are asked to perform a complete diagnostic flexible bronchoscopy, while at all times stating what they are doing and where they are navigating in the airway. Thus, items 1, 2, 5, 6, and 7 are scored. They are then asked to go from the neutral position at the main carina to segments RB-4,5, 6 and LB-8,9,10, and items 3 and 4 are scored. Items 8 and 9 are scored using the associated quiz images. Finally, item 10 is scored while the trainee performs a BAL, brushing and mucosal biopsy. The BSTAT-TBLB/TBNA is also administered with a full diagnostic bronchoscopy, followed by a conventional TBNA and TBLB procedure (not necessarily all in the same patient, if assessment is being done in a patient). Items 5 and 10 are quiz-based images.

User Instructions

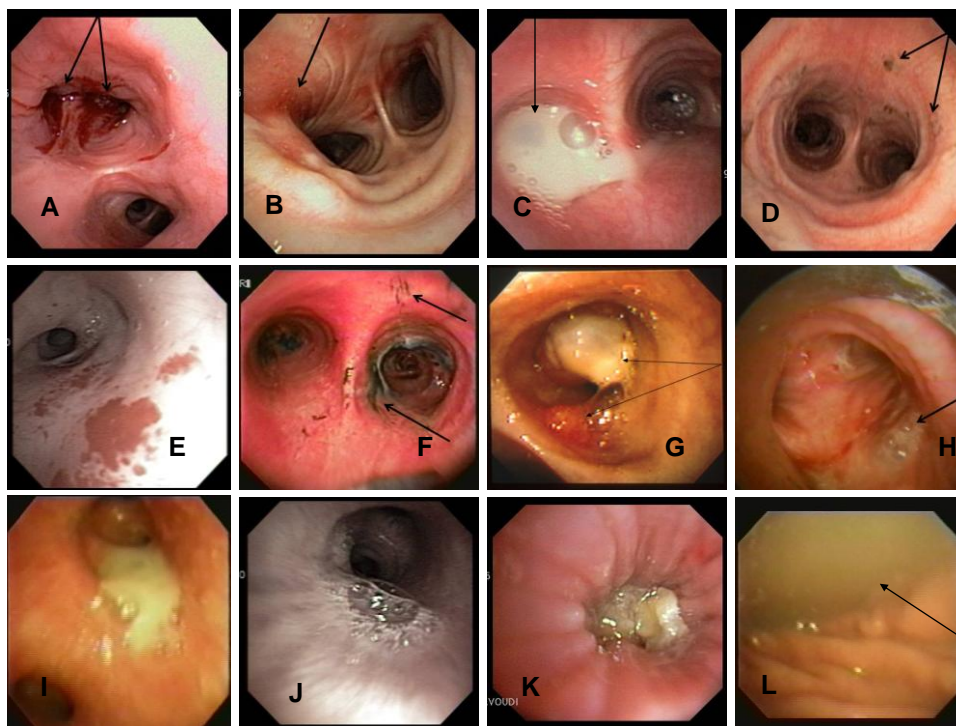
Bronchoscopy Skills and Tasks Assessment Tool (BSTAT)

Educational Item* Items 1-10 each scored separately	Satisfactory Yes/No
1. Identification of Right sided anatomy (2 points each, target 20 points) <input type="checkbox"/> RB1 apical <input type="checkbox"/> RB2 posterior <input type="checkbox"/> RB3 anterior <input type="checkbox"/> RB4 medial <input type="checkbox"/> RB5 lateral <input type="checkbox"/> RB6 superior <input type="checkbox"/> RB7 mediobasal <input type="checkbox"/> RB8 anterobasal <input type="checkbox"/> RB9 laterobasal <input type="checkbox"/> RB10 posterobasal *Each segment correctly identified AND entered scores TWO points.	Yes / No Score ____/20
2. Identification of Left sided anatomy (2 points each, target 16 points) <input type="checkbox"/> LB1+2 apical/posterior <input type="checkbox"/> LB3 anterior <input type="checkbox"/> LB4 superior <input type="checkbox"/> LB5 inferior <input type="checkbox"/> LB6 superior <input type="checkbox"/> LB8 anterobasal <input type="checkbox"/> LB9 laterobasal <input type="checkbox"/> LB10 posterobasal *Each segment correctly identified AND entered scores TWO points	Yes / No Score ____/16
3. Identify and enter RB 4+5+6 on demand (All three segments must be entered to earn 5 points, no partial points given, target 5 points) <input type="checkbox"/> RB 4+5+6 * All THREE of these segments must be identified and entered correctly using appropriate flexion/extension of the bronchoscope in order to obtain FIVE points. No partial points are given. This is an “All or None” exercise.	Yes / No Score ____/5
4. Identify and enter LB 8+9+10 on demand (All three segments must be entered to earn 5 points, no partial points given, target 5 points) <input type="checkbox"/> LB 8+9+10 All THREE of these segments must be identified and entered correctly using appropriate manipulation of the bronchoscope in order to obtain FIVE points. No partial points are given. This is an “All or None” exercise.	Yes / No Score ____/5
5. Posture/Hand positions/Equipment safety (3 points each, target 9 points) <input type="checkbox"/> Body posture <input type="checkbox"/> Hand positions <input type="checkbox"/> Equipment handling *Procedures are taught different ways. In general however, students should be able to refrain from moving around the patient, they should avoid placing their hands into a patients eyes or exerting too much pressure onto a patient’s head. The scope should be kept relatively straight, and should not be twisted at the insertion site. The hand holding the scope should be relaxed, and assistant should be able to easily access the hand being used to hold and manipulate accessory instruments. The bronchoscopist should be able to protect the scope from trauma (biting, slamming against a cart, dropping onto the floor). For each of the items, THREE points (or none) are given.	Yes / No Score ____/9
6. Scope centered and kept in midline (5 points, no partial points given) <input type="checkbox"/> Scope centered in airway lumen In general, the scope should be kept centered so that it does not rub up against the airway wall. This is especially important when inserting the scope to the larynx, passing the vocal cords, and examining segmental bronchi. A scope that is not well-centered decreases overall visualization and may cause airway wall trauma or cough. If the scope is centered in the airway throughout most of the	Yes / No Score ____/5

procedure, a score of FIVE points is achieved. No partial points are given. This is an “All or None” exercise.	
<p>7. Airway wall trauma avoided (5 points, no partial points given)</p> <p><input type="checkbox"/> Airway wall trauma avoided</p> <p>* In general, airway wall trauma causes erythema, swelling or cough. During the procedure, the scope should be kept “off the wall” using careful manipulation of the lateral as well as flexion/extension function of the scope and appropriate identification and entry into segmental bronchi. If airway wall trauma is avoided during most of the procedure, a score of FIVE points is achieved. No partial points are given. This is an “All or None” exercise.</p>	Yes / No Score ____/5
<p>8. Nomenclature: secretions descriptions (1 point each, target 10 points)</p> <p><input type="checkbox"/> Sooty-burn <input type="checkbox"/> Bloody <input type="checkbox"/> Necrotic debris <input type="checkbox"/> Yellow purulent <input type="checkbox"/> White creamy <input type="checkbox"/> Normal clear <input type="checkbox"/> Tar-stained smoker’s phlegm <input type="checkbox"/> Frothy covering TE fistula <input type="checkbox"/> Pink frothy edema <input type="checkbox"/> Scope trauma</p> <p>* This is a written test for which 1 point is given for each correct answer; to be used with associated slide-show.</p>	Yes / No Score ____/10
<p>9. Nomenclature: Mucosal descriptions (1 point each, target 10 points)</p> <p><input type="checkbox"/> Exophytic cancer <input type="checkbox"/> Necrotic tracheitis <input type="checkbox"/> Bronchial pits <input type="checkbox"/> Chronic bronchitis <input type="checkbox"/> Hypervascularity <input type="checkbox"/> Tumor infiltrated carina <input type="checkbox"/> Extrinsic compression <input type="checkbox"/> Anthracosis <input type="checkbox"/> Oral candidiasis <input type="checkbox"/> Acute bronchitis</p> <p>*This is a written test for which 1 point is given for each correct answer; to be used with associated slide-show.</p>	Yes / No Score ____/10
<p>10. Tasks: (5 points each, target 15 points)</p> <p><input type="checkbox"/> BAL <input type="checkbox"/> Mucosal biopsy <input type="checkbox"/> Brush</p> <p>* This is an “All or None” exercise for which FIVE points are given to each of the 3 items if performed correctly. No partial points are given within each item.</p>	Yes / No Score ____/15

* The combined use of these 10 items pertains to technical skills needed to climb learning curve from novice to advanced beginner to intermediate to competent bronchoscopist able to perform flexible bronchoscopy with BAL, brushing and mucosal biopsy.

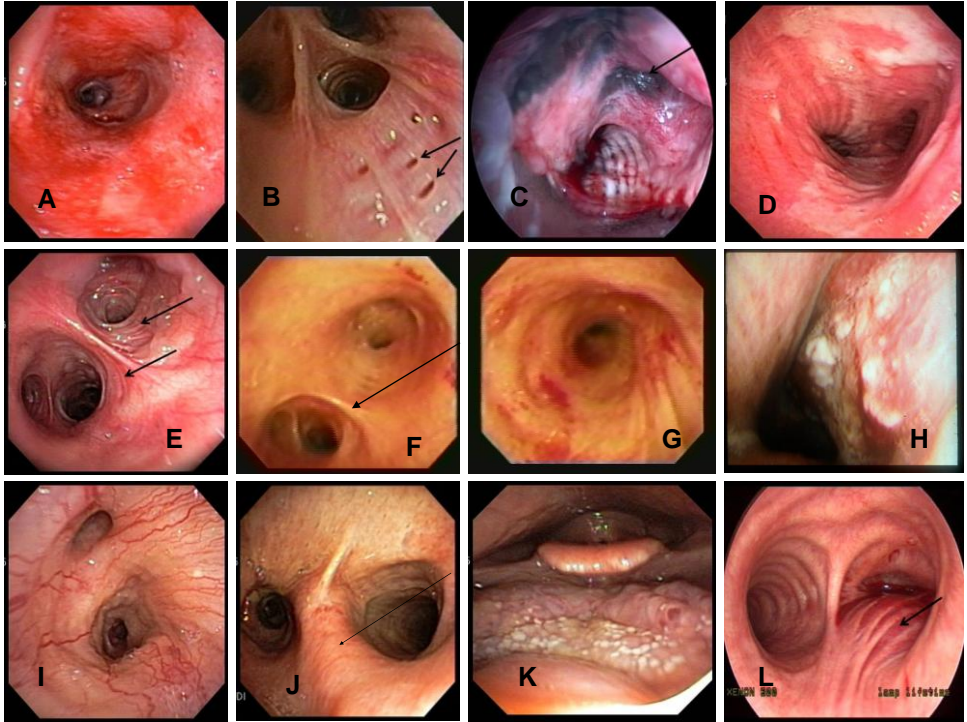
FINAL GRADE PASS FAIL **SCORE** _____/100



Match the photo (A-L) to the corresponding 10 secretion descriptions (Only one response per description)

__F__ Sooty-burns	__A__ Bloody	__K__ Necrotic debris	__I__ Yellow purulent
__C__ White creamy	__J__ Normal clear	__D__ Tar-stained smoker's phlegm	__H__ Frothy covering TE fistula
__B__ Pink frothy edema	__E__ Scope trauma	NO RESPONSE	

Bronchoscopy Skills and Tasks
Answers



Match the photo (A-L) to the corresponding 10 mucosal descriptions (Only one response per description)

<p>__H__</p> <p>Exophytic cancer</p>	<p>__D__</p> <p>Necrotic tracheitis</p>	<p>__B__</p> <p>Bronchial pits</p>	<p>__E__</p> <p>Chronic bronchitis</p>
<p>__I__</p> <p>Hypervascularity</p>	<p>__J__</p> <p>Tumor infiltrated carina</p>	<p>__L__</p> <p>Extrinsic compression</p>	<p>__C__</p> <p>Anthracosis</p>
<p>__K__</p> <p>Oral candidiasis</p>	<p>__A__</p> <p>Acute bronchitis</p>	<p>NO RESPONSE</p>	

User Instructions

Bronchoscopy Skills and Tasks Assessment Tool, for Transbronchial Lung Biopsy and Transbronchial Needle Aspiration (BSTAT-TBLB/TBNA)

Educational Item* Items 1-10 each scored separately	Satisfactory Yes/No
<p>1. TBLB: Airway inspection without trauma (no partial points) <input type="checkbox"/> Complete inspection done properly *It goes without saying that the student should be able to perform inspection bronchoscopy and be able to identify and enter all bronchial segments.</p>	<p>Yes / No Score ____/5</p>
<p>2. TBLB technique (no partial points) <input type="checkbox"/> Wedge scope into target segment <input type="checkbox"/> Visualize target with fluoroscopy <input type="checkbox"/> Advance forceps under fluoroscopy guidance to target <input type="checkbox"/> Open forceps at target <input type="checkbox"/> Advance and close forceps at target <input type="checkbox"/> Remove forceps from scope *Many techniques exist for TBLB, but the instructor should focus on certain universal principles. The student should be able to wedge and unwedge the scope, and go through the various motions for TBLB including use of expiration and inspiration. Proper use of fluoroscopy requires a passing grade on the fluoroscopy test. Communication is key with instructions such as open and close forceps. If all six steps are completed satisfactorily, the student receives 10 points.</p>	<p>Yes / No Score ____/10</p>
<p>3. TBLB Complications: Pneumothorax (no partial points) <input type="checkbox"/> Perform panoramic view of hemithorax using fluoroscopy <input type="checkbox"/> Recognize signs and symptoms <input type="checkbox"/> Demonstrate easy access to small or large bore chest tube *The student should be able to demonstrate the ability to respond quickly to this adverse event. Team communication is key, and the instructor should ascertain that the student is able to give appropriate instructions to nursing staff.</p>	<p>Yes / No Score ____/10</p>
<p>4. TBLB: Complications: Bleeding (no partial points) <input type="checkbox"/> Scope wedged into target segment <input type="checkbox"/> Move patient into lateral decubitus safety position <input type="checkbox"/> Access upper airway with oral suction <input type="checkbox"/> Demonstrate access and use of bite block and endotracheal tube *The student should be able to demonstrate the ability to respond quickly to this adverse event. Team communication is key, and the instructor should ascertain that the student is able to give appropriate instructions to nursing staff.</p>	<p>Yes / No Score ____/10</p>
<p>5. TBLB: Decision making (5 points each , target score 15 points) <input type="checkbox"/> Image 1 <input type="checkbox"/> Image 2 <input type="checkbox"/> Image 3 *The written test also serves as the answer sheet; to be used with associated slide-show. Tests should be collected. Students can be given their scores, but should not be provided with the correct answers so that they can take the test at a later date</p>	<p>Yes / No Score ____/15</p>
<p>6. TBNA: Airway inspection and imaging interpretation (5 points each) <input type="checkbox"/> Complete inspection done properly <input type="checkbox"/> Imaging studies correctly interpreted Imaging studies should be reviewed prior to bronchoscopy. Instructor should be certain that the student can justify the procedure and has formulated a plan.</p>	<p>Yes / No Score ____/10</p>
<p>7. TBNA Technique - Jab (no partial points)</p>	<p>Yes / No</p>

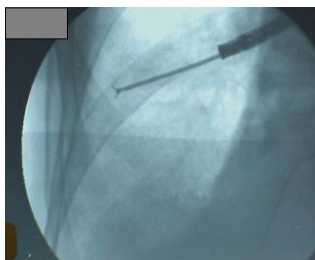
<p><input type="checkbox"/> Advance catheter towards target area <input type="checkbox"/> Advance needle to target area without airway trauma <input type="checkbox"/> Jab needle through airway wall at target region while scope is fixed at nose or mouth <input type="checkbox"/> Move needle back and forth inside node while suctioning <input type="checkbox"/> Release suction prior to needle withdrawal from target region <input type="checkbox"/> Retract needle into the catheter <input type="checkbox"/> Observe that needle is completely retracted inside catheter <input type="checkbox"/> Withdraw catheter from scope *While there are many ways to perform TBNA these universal principles and instructions are well described by experts. The student should understand these principles and be able to perform each of the three techniques because each one may be necessary in a different setting. The student should be using appropriate safety measures in regards to needle in, needle out instructions, handling the needle catheter, and while withdrawing the catheter from the scope. No partial points are given for any of the techniques.</p>	<p>Score ____/10</p>
<p>8. TBNA Technique-Hub against wall (no partial points) <input type="checkbox"/> Advance catheter towards target area <input type="checkbox"/> Touch catheter to target area without airway trauma <input type="checkbox"/> Penetrate airway wall with needle while holding scope firmly <input type="checkbox"/> Move needle back and forth inside node while suctioning <input type="checkbox"/> Release suction prior to needle withdrawal from target region <input type="checkbox"/> Retract needle into the catheter <input type="checkbox"/> Observe that needle is completely retracted inside catheter <input type="checkbox"/> Withdraw catheter from scope</p>	<p>Yes / No Score ____/10</p>
<p>9. TBNA Technique -Piggyback: (no partial points) <input type="checkbox"/> Secure catheter and scope simultaneously with one hand <input type="checkbox"/> Advance scope and catheter as a single unit to target region <input type="checkbox"/> Penetrate airway wall at target region <input type="checkbox"/> Move needle back and forth inside node while suctioning <input type="checkbox"/> Release suction prior to needle withdrawal from target region <input type="checkbox"/> Retract needle into the catheter <input type="checkbox"/> Observe that needle is completely retracted inside catheter <input type="checkbox"/> Withdraw catheter from scope</p>	<p>Yes / No Score ____/10</p>
<p>10. TBNA: Decision making: (5 points each, target 10 points) <input type="checkbox"/> Image 4 <input type="checkbox"/> Image 5 *The written test also serves as the answer sheet; to be used with associated slide-show. Tests should be collected. Students can be given their scores, but should not be provided with the correct answers so that they can take the test at a later date</p>	<p>Yes / No Score ____/10</p>

* The combined use of these 10 items pertains to technical skills needed to climb learning curve from novice to advanced beginner to intermediate to competent bronchoscopist able to perform flexible bronchoscopy with transbronchial lung biopsy and transbronchial needle aspiration independently.

FINAL GRADE **PASS** **FAIL** **SCORE** _____/100

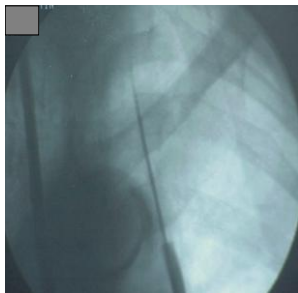
ITEM 5: Choose One best answer for each question

1. The target region is most likely (A) RB1, (B) RB6, (C) RB9, (D) RB10,



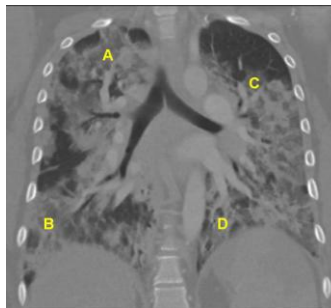
Answer C

2. The target region is the (A) apical-posterior segment left upper lobe, (B) Lingula, (C) Right upper lobe



Answer A

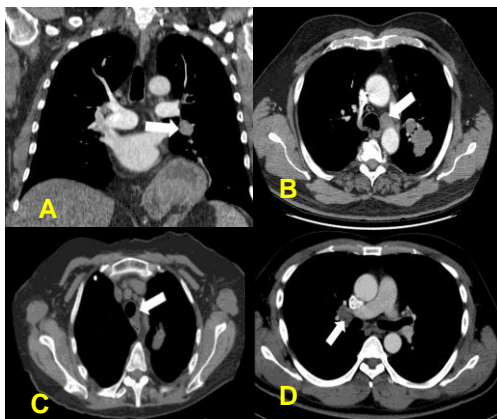
3. Which region should be biopsied in this immuno-suppressed patient with suspected fungal disease ?



Answer B

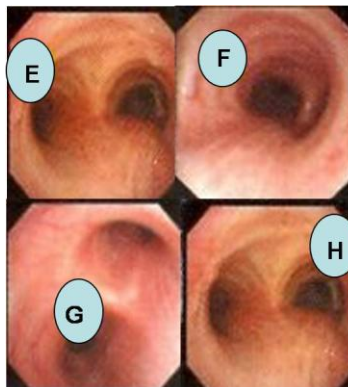
ITEM 10: Choose One best answer for each question

4. During conventional TBNA, which of the following lymph nodes will likely offer the highest diagnostic yield for nonsmall cell lung cancer ?



Answer B

5. Where is the node located (needle insertion site E, F,G, or H)?



Answer E

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User Instructions

Bronchoscopy Self Assessment Tool (BSAT)

The purpose of this assessment tool is to provide bidirectional feedback between learner and instructor. There are no wrong answers. Well performed, this interaction will allow opportunities to ascertain strengths and weaknesses of a training program and educational methodologies. In addition, an open discussion will allow both learner and instructor to identify the learner's zones of proximal development and reflective capacity¹. Educators may wish to ask learners to complete the BSAT prior to the encounter, and to then review each element of the questionnaire with the learner in order to identify which areas might warrant additional concentration.

	1	2	3	4	5
	Not comfortable		Comfortable		Very comfortable
1.	I am able to identify airway anatomy				___
2.	I am able to identify airway mucosal abnormalities				___
3.	I am able to describe secretions and other airway abnormalities				___
4.	I am able to maneuver the flexible bronchoscope				___
5.	I am able to do a BAL through the flexible scope				___
6.	I am able to use a brush through the flexible bronchoscope				___
7.	I am able to use biopsy forceps through the scope				___
8.	I would now feel comfortable performing this case in a patient				___

Anatomy	Abnormalities	Technique	Equipment	Interpretation of findings
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I would like to learn more about (circle all that apply above)

	1	2	3	4	5
	Poor	Below average	Average	Good	Excellent

Using the above scale please rate this training program as _____

I have the following comments

¹ The constructivist psychologist Lev Vygotsky (1896-1934) believed that learning and development depend on social interaction. Focusing primarily on how children learn, he described a zone of proximal development (ZPD) as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (L.S. Vygotsky: *Mind in Society: Development of Higher Psychological Processes*, p. 86, John-Steiner, Cole, Scribner, and Souberman Editors, Harvard University Press, 1980). Tinsley and Lebak expanded on this theory, describing a zone of reflective capacity in which adults increased their ability for critical reflection through feedback, analyses, and evaluation of one another's work in a collaborative working environment (Lebak, K. & Tinsley, R. Can inquiry and reflection be contagious? Science teachers, students, and action research. *Journal of Science Teacher Education*;2010:21;953-970).

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Essential Bronchoscopist Questions to post-tests Modules 1-6

The following post-tests are multiple choice, single BEST answer.

While many programs consider 70% correct responses a passing grade, the student's "target" score should be 100%.

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Post-module test questions: Module 1

- Question 1: In addition to Shigeto Ikeda and Gustav Killian, a critical figure in the history of bronchoscopy education and practice is:
- A. Sir William Osler
 - B. *Chevalier* Jackson
 - C. Laennec
 - D. William Harvey
- Question 2: Which of the following should be required of every patient undergoing flexible bronchoscopy?
- A. Coagulation profile
 - B. Serum chemistries, especially blood urea nitrogen and creatinine
 - C. Electrocardiogram
 - D. Review of known or suspected allergies to medications
- Question 3: Among which of the following settings has flexible bronchoscopy been shown to be of greatest value ?
- A. Patient with hemoptysis and a nonlocalizing chest radiograph
 - B. Patient with smoking history, cough, weight loss, and lung mass on chest radiograph
 - C. Patient with a peripheral lung nodule less than 1 cm in diameter
 - D. Prior to thoracentesis in a patient with suspected malignant pleural effusion
- Question 4: Scenarios where airway management might be difficult and could therefore warrant bronchoscopic assistance include each of the following except ?
- A. An 18 year old male with status asthmaticus and altered mental status who just vomited his dinner.
 - B. Pregnant 30 year old obese woman with third degree facial burns.
 - C. Edentulous male undergoing cardiopulmonary resuscitation
 - D. Elderly trauma victim wearing neck brace
- Question 5: In regards to handling the flexible bronchoscope, which of the below is considered correct technique?
- A. Moving the scope between the left hand and the right hand during the procedure.
 - B. Keeping the scope in the middle of the airway lumen as much as possible during the procedure.
 - C. Twisting the scope at its insertion point at the mouth or the nares in order to direct it into an upper lobe bronchus.
 - D. Moving the thumb downwards to flex the distal aspect of the insertion tube.

Question 6: Which of the following statements pertaining to local anesthetics is false ?

- A. Lidocaine and Bupivacaine are both esters
- B. Amides, as Mepivacaine, as well as esters, such as Tetracaine can cause laryngeal edema.
- C. Bilateral nasal administration of anesthetic causes partial posterior pharyngeal anesthesia by affecting the Sphenopalatine nerve fibers.
- D. Administration of lidocaine with epinephrine can decrease swelling of the nasal mucosal membranes.
- E. Many side effects of topical anesthetics are dose related, but anaphylaxis is not.

Question 7: Which of the following statements about upper airway anatomy is incorrect?

- A. In adults, the glottic opening (also called the rima glottides) is more narrow than the cricoid.
- B. An omega epiglottis is elongated , curved and is seen in adults but also in many infants.
- C. The arytenoid cartilages lie superior to the corniculate cartilages at the posterior commissure of the larynx.
- D. The adult trachea cross-sectional area, usually about 2.8 cm², increases with age
- E. The recurrent laryngeal nerve supplies motor and sensory innervation of the intrinsic muscles of the larynx.

Question 8: Which of the following adverse effects of bronchoscopy is probably most frequent ?

- A. Biopsy-induced pneumothorax
- B. Bronchoalveolar lavage induced hypoxemia
- C. Pain, discomfort or anxiety during insertion of the bronchoscope and passage into the lower airways
- D. Cardiac arrhythmias

Question 9: Which of the following statements about the trachea is incorrect?

- A. The cervical segment (extrathoracic) ends at the manubrium and encompasses about the first six tracheal rings.
- B. The U-shaped trachea is probably the most frequent shape found.
- C. A man's cross sectional tracheal area is usually about 40 percent larger than a woman's.
- D. Saber sheath tracheas have a small transverse diameter, which means that the distance between the left and right lateral walls of the trachea is short.
- E. In women, the lower limit of normal for transverse and sagittal diameters is about 10 mm.

Question 10: Which of the following statements about radiation exposure during fluoroscopy is correct?

- A. The patient's radiation exposure is increased as the anode tube is placed closer to the patient.
- B. The bronchoscopist's radiation exposure makes wearing a protective lead garment unnecessary.
- C. The patient's radiation exposure increase when the anode tube is further from the patient.
- D. Radiation exposure is a measure of resolution, and can be adjusted by changing the size of the image on the fluoroscopy screen.

Post-module test questions: Module 2

- Question 1: Which of the following parts of a bronchoscope is most easily damaged?
- A. The universal cord
 - B. The eyepiece or video control handle
 - C. The insertion tube
 - D. The control handle
- Question 2: Which of the following drugs can be safely used for effective topical anesthesia in a patient with an allergy to Lidocaine?
- A. Atropine
 - B. Fentanyl
 - C. Tetracaine
 - D. Glycopyrolate
- Question 3: Dynamic bronchoscopy might be most helpful in patients with:
- A. Suspected tuberculosis and upper lobe infiltrates
 - B. Suspected tracheobronchomalacia
 - C. A large obstructing endobronchial lesion noted on computed tomography scan
 - D. Ipsilateral lung mass and pleural effusion
- Question 4: Which of the following best helps prevent obstruction by dried secretions in patients with indwelling Montgomery T-tubes?
- A. Placing the proximal part of the tube within 1 centimeter of the vocal cords
 - B. Keeping the external limb of the T-tube capped, except for suctioning.
 - C. Scheduling frequent and routine flexible bronchoscopy for suctioning
 - D. Keeping the external limb of the T-tube uncapped.
- Question 5: All of the following statements about flexible bronchoscopy in the intensive care unit setting are correct EXCEPT ?
- A. Bronchoscopy can be helpful to remove secretions in mechanically ventilated patients.
 - B. Bronchoscopy can help resolve radiographic lobar atelectasis in mechanically ventilated patients.
 - C. Bronchoscopy should be routinely used instead of chest percussion and tracheal aspiration to remove secretions in intubated patients.
 - D. When scoping through the mouth, a bite block is essential to prevent scope damage, even in patients who are intubated orally.

Question 6: Which of the following anatomic descriptions is correct ?

- A. The trachea extends from C6 to T5, in a downward and backward direction, and, near the tracheal bifurcation, deviates slightly to right.
- B. The trachea extends from C6 to T5, in a downward and forward direction, and, near the tracheal bifurcation, deviates slightly to right
- C. The trachea extends from C6 to T5, in a downward and backward direction, with the thyroid gland surrounding the anterolateral portion between the fourth and sixth cartilage rings.
- D. The trachea extends from C6 to T5, in a downward and backward direction, with the thyroid gland surrounding the anterolateral portion between the first and third cartilage rings.

Question 7: Viewing the vocal cords from below might be useful in all of the following cases EXCEPT?

- A. To exclude a peristomal or subglottic source of bleeding in a patient with a tracheostomy.
- B. To fully evaluate laryngeal function in a patient with a tracheostomy being decanulated .
- C. To examine the subglottis and vocal cord function in a patient with suspected tracheal stenosis and a tracheostomy.
- D. To remove subglottic granulation tissue using laser

Question 8: Once in the airway, the flexible bronchoscope:

- A. Occupies less than 5% of the normal airway diameter
- B. Results in increased functional capacity, especially if there is also an endotracheal tube in place
- C. Decreases airway resistance, especially if there is also an endotracheal tube in place
- D. Occupies more than 20% of the normal airway diameter

Question 9: High level disinfection does all of the following EXCEPT ?

- A. Inactivate all bacterial spores.
- B. Inactivate all fungi
- C. Destroy all viruses
- D. Destroy all vegetative organisms.

Question 10: Which of the following best describes a complex tracheal stricture?

- A. Circumferential narrowing 3 cm below the vocal cords, extending along a distance of 2, without associated tracheomalacia.
- B. Partially circumferential web-like stricture 3 cm below the vocal cords along the anterior wall of the trachea in a site of previous and well healed tracheostomy.
- C. Bottleneck stricture 2 cm below the cords with asymmetric narrowing of the trachea and a second partial web at the distal margin of the bottleneck stenosis.
- D. Circumferential narrowing of the trachea to 3 mm by fibrous tissue 2 cm below the vocal cords, extending along a distance of 0.5 cm.

Post-module test questions: Module 3

Question 1: Which of the following best describes Midazolam?

- A. Ten times more potent than diapepam
- B. Sedation and anxiolysis usually occurs within 2 minutes of administration
- C. Complete recovery of motor performance and consciousness often takes two hours
- D. Risk for apnea is greatest when used alone compared to when used with other sedating agents.
- E. Larger doses can cause seizures even in healthy patients

Question 2: Repeated trauma to the larynx during attempts at bronchoscopically-assisted endotracheal intubation most likely to cause which of the following?

- A. Laryngospasm, vomiting, and cardiac arrhythmias
- B. Hoarseness, vocal cord paralysis, and arytenoid luxation
- C. Laryngeal edema, aspiration, and fever
- D. Pain, gagging, and diarrhea

Question 3: When using Glutraldehyde for high-level disinfection, a 10 minute immersion results in which of the following?

- A. 50% eradication of mycobacteria
- B. 85% eradication of mycobacteria
- C. 99.8% eradication of mycobacteria
- D. Complete eradication of mycobacteria

Question 4: All of the following statements about scattered radiation are correct EXCEPT?

- A. It is caused by increased voltage
- B. It can be reduced by decreasing the anode tube milliamperage
- C. It decreases the quality of the fluoroscopic image.
- D. It is caused by increased tissue thickness

Question 5: All of the following statements about topical Lidocaine are true EXCEPT ?

- A. The maximum dose recommended for flexible bronchoscopy is about 300 mg.
- B. Systemic effects include restlessness, seizures, numbness, and hypotension.
- C. It is less potent but longer acting than Tetracaine.
- D. Peak concentration is usually reached within 30 minutes of airway application.

- Question 6: Which of the following statements best relates to patients with a saber-sheath trachea?
- A. It may be found in up to 5 percent of elderly men.
 - B. The majority of patients with saber sheath trachea also have asthma
 - C. It is characterized by an increased transverse distance and decreased sagittal diameter of the trachea..
 - D. Differential diagnosis might include extrinsic compression, relapsing polychondritis, Wegener's Granulomatosis, and Klebsiella Rhinoscleromata.
- Question 7: All of the following statements describing the "proper" way to dictate or write a bronchoscopy note are correct EXCEPT?
- A. Consistently use the same concise and precise terminology.
 - B. Tell a story that everyone can read and understand the same way .
 - C. Consistently comment on airway patency, mucosal appearances, secretions, and location of specimens obtained.
 - D. Referring to the amount and effects of conscious sedation can usually be avoided.
- Question 8: The bronchus intermedius usually measures:
- A. Less than 1.0 cm.
 - B. More than 2.5 cm.
 - C. Between 1.0 and 2.5 cm.
 - D. It is a misnomer because it immediately becomes the middle lobe and lower lobe bronchus.
- Question 9: All of the following statements about bronchoalveolar lavage are true EXCEPT?
- A. Delayed onset fever, chills and myalgias are best treated with an antipyretic or other anti-inflammatory medication.
 - B. Radiographic infiltrates in the area of lavage are rarely visible after the procedure.
 - C. BAL may cause or increase hypoxemia
 - D. Careful technique is essential to obtain a true alveolar sample rather than a simple bronchial wash.
- Question 10: Which of the following statements about oral airways is MOST correct?
- A. They help keep the scope in the midline, facilitating exposure of laryngeal structures.
 - B. They help maintain an open pharynx and larynx.
 - C. They prevent the patient from biting the bronchoscope.
 - D. They facilitate maneuverability of the scope and endotracheal intubation.

Post-module test questions: Module 4

Question 1: The average internal diameter of the left or right main bronchi, is about:

- A. 5 -10 mm
- B. 10-16 mm
- C. 14-18 mm
- D. 12-20 mm

Question 2: Endobronchial metastases are unlikely in which of the following illness?

- A. Colon cancer
- B. Malignant melanoma
- C. Gastric cancer
- D. Breast cancer
- E. Renal carcinoma

Question 3: LC-1 corresponds to which of the following?

- A. The minor carina between the lingula and the anterior segment of the upper division bronchus
- B. The minor carina between the lingual and the apical segment of the upper division bronchus
- C. The minor carina between the lingula and the lower lobe bronchus
- D. The minor carina between the superior segment and the lower lobe bronchus

Question 4: All of the following statements about bronchoalveolar lavage are true EXCEPT?

- A. Cellular and noncellular components from the epithelial surfaces of the lower respiratory tract are recovered.
- B. A 100 ml lavage samples approximately 10×10^6 alveoli
- C. Fluid return is decreased in smokers and in the elderly
- D. Procedures should be atraumatic, harmonious and result in no more than 10% bronchial squamous cells
- E. It is appropriate to call BAL a “bronchioloalveolar lavage”.

Question 5: Generally accepted precautions for bronchoscopy in patients with thrombocytopenia include all of the following EXCEPT ?

- A. Administration of IVIG infusions for patients with Idiopathic Thrombocytopenic Purpura.
- B. Platelet transfusions to increase platelet count so that it is at least greater than 20,000, and higher if biopsies are being performed.
- C. Considering passage through the mouth (using a bite-block of course).
- D. Bronchoscopy, even without biopsy, should be avoided, especially if patients have severe thrombocytopenia (counts below 20,000 platelets)

Question 6: The nomenclature RC-2 corresponds to which of the following?

- A. The minor carina between RB 2 and the Bronchus Intermedius.
- B. The minor carina between RB 4, 5 and the lower lobe bronchus.
- C. The minor carina between RB 6 and the bronchus intermedius.
- D. The minor carina between RB 6 and the lower lobe bronchus.

Question 7: Which of the following airway abnormalities is least likely to be due to chronic bronchitis?

- A. Mucosal pitting.
- B. Band formation and traction of longitudinal fibers.
- C. Erythema and pallor.
- D. Raised red areas of mucosal thickening and edema.

Question 8: In a 62 year old patient with cough, weight loss, pleural effusion, volume loss, and a suspected history of tuberculosis, bronchoscopy might be helpful for which of the following?

- A. To discover possible bronchial strictures that might help explain the radiographic images.
- B. To obtain specimens for diagnostic purposes .
- C. To help exclude other potential diagnoses such as cancer.
- D. All of the above.
- E. None of the above. The patient should undergo thoracentesis or closed-needle pleural biopsy

Question 9: Which of the following endobronchial findings best describes early superficial invasive cancer ?

- A. Pale mucosa with lack of luster.
- B. Red or granular lesions with increased friability.
- C. Easy friability
- D. Answers a and b
- E. Answers a and c.

Question 10: Which of the following anatomic structures lies directly adjacent to the anterior wall of the bronchus intermedius at the level of the take off of the right upper lobe bronchus?

- A. The right pulmonary artery.
- B. The right pulmonary vein.
- C. The right pulmonary artery and pulmonary vein.
- D. The esophagus
- E. The thoracic duct.

Post-module test questions: Module 5

- Question 1: Which of the following nomenclatures pertain to the left lower lobe posterobasal segment, and the carina between the left upper lobe and left lower lobe bronchus?
- A. LB 8 and LC-2
 - B. LB 10 and LC-2
 - C. LB 9 and LC-2
 - D. None of the above
- Question 2: A small malignant endobronchial abnormality is noted in the bronchus intermedius 0.5 cm beyond the right upper lobe bronchial orifice. Transcarinal needle aspirations are positive. CT scans reveal no other organ involvement. Which of the following best describes this patient's clinical TNM stage?
- A. T3 N1 M0
 - B. T3 N2 M0
 - C. T2 N2 M0
 - D. T1 N2 M0
 - E. None of the above
- Question 3: Which of the following best describes the safety position during bronchoscopy?
- A. Turning the patient onto the left position to facilitate suctioning.
 - B. Turning the patient onto the lateral decubitus position, bleeding side down in case of bronchoscopically-induced bleeding.
 - C. Turning the patient onto the lateral decubitus position, left side down, in case of vomiting during bronchoscopy.
 - D. Tilting the bed into the reverse Trendelenberg position in case of bronchoscopically-induced bleeding.
- Question 4: Which of the following best explains why airway lacerations and tracheoesophageal fistulas are easily missed during bronchoscopic examination?
- A. Airway mucosa might swell and easily obliterate the lesion.
 - B. The fistulous tract might be partially obliterated with esophageal wall mucosa
 - C. The bronchoscopist has failed to perform a careful and diligent inspection
 - D. The fistulous tract spontaneously opens and closes and can sometimes only be discovered after probing suspicious appearing areas using forceps.
 - E. All of the above

Question 5: Which of the following best describes endobronchial abnormalities caused by sarcoidosis?

- A. Mucosal nodularity, bronchial strictures, or hyperemia.
- B. Mucosal edema, hypertrophy, or small raised whitish lesions.
- C. Both a and b
- D. Both a and b are correct, but airway abnormalities are nonspecific and can also be seen with other diseases.

Question 6: A procedure is appropriately considered “nondiagnostic” when ?

- A. Inspection and representative tissue samples and/or washings do not provide a diagnosis.
- B. Tissue samples are obtained, but are not representative (for examples, bronchoscopic lung biopsies reveal no pathology, and contain only bronchial mucosa, but no bronchioles or alveoli).

Question 7: Which of following statements about bronchoscopy-related pneumothorax (during bronchoscopic lung biopsy) is CORRECT?

- A. Pneumothorax occurs more frequently when large alligator forceps are used rather than small cup forceps.
- B. The overall incidence of bronchoscopy-related pneumothorax is about the same as that of percutaneous needle aspiration-related pneumothorax.
- C. The reported incidence is 1-4 %.
- D. Small-bore chest insertion is almost always warranted.

Question 8: The inflated balloon size of a 6 Fr balloon catheter is approximately:

- A. 6 mm.
- B. 7 mm .
- C. 10 mm.
- D. 12 mm.

Question 9: A transbronchial needle aspiration directed posteriorly and medially 1 cm beyond the origin of the right or left lower lobe bronchus risks entering which of the following anatomic structures ?

- A. The pulmonary veins.
- B. The pulmonary arteries.
- C. The esophagus
- D. The heart

Question 10: Bronchoscopic airway stents should be considered in each of the following settings EXCEPT?

- A. Severe extrinsic compression of the left main bronchus in a patient with fibrosing mediastinitis, dyspnea, and cough.
- B. Severe extrinsic compression of the trachea in a patient with thyroid cancer.
- C. Recurrent tracheal and right main bronchial obstruction in a patient with recurrent tumor three months after laser resection..

- D. Central obstruction but no known functional airways distal to the obstruction as evidenced longstanding complete atelectasis on chest radiographs and absence of ventilation on nuclear imaging studies.
- E. Complex benign tracheal stricture in a patient with significant comorbidities.

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Post-module test questions: Module 6

Question 1: A 74 year old patient with subglottic tracheal stenosis and recent tracheal stent insertion (silicone stent 14 mm in diameter and 50 mm in length) presents with dyspnea and cough. A chest radiograph reveals distal migration. The patient is in severe and acute respiratory distress requiring intubation. All of the following are acceptable EXCEPT:

- A. Proceed with laryngoscopic intubation using a #6 cuffless endotracheal tube
- B. Proceed with bronchoscopy-assisted intubation. Select tube size dependent on airway caliber
- C. Proceed with an awake bronchoscopy-assisted intubation Select tube size dependent on airway caliber.
- D. Immediately paralyze the patient and proceed with laryngoscopic intubation using a #6 cuffless endotracheal tube

Question 2: Which of the following statements about airway stents is FALSE?

- A. In general, metal stents should be avoided in most settings of benign airway strictures.
- B. Silicone stents are prone to migration and obstruction by retained secretions
- C. Radiation therapy cannot be delivered because it has adverse effects on airway stents.
- D. A patient with an indwelling airway stent and new symptoms such as fever, cough, or dyspnea should be rapidly evaluated for possible stent-related complications.
- E. Stent-related granulation tissue formation is usually treated by laser or electrosurgical resection.

Question 3: Which of the following statements about photodynamic therapy is FALSE?

- A. Therapy has been FDA approved for treatment of early stage lung cancer.
- B. Patients must be protected from artificial light for up to 6 weeks after treatment.
- C. Tissue necrosis may cause airway obstruction and often necessitates flexible bronchoscopy for pulmonary toilet purposes.
- D. Skin photosensitivity should be avoided by wearing protective clothing and eyewear for up to 6 weeks after treatment.

Question 4: The esophagus usually lies:

- A. Within 3 mm behind the posterior wall of the trachea and left main bronchus.
- B. Directly behind the take off of the right main bronchus
- C. Directly behind the trachea but anterior to the origin of the left main bronchus
- D. Posterior and to the right of the distal third of the trachea.

Question 5: Increased yield from transbronchial needle aspiration is most likely to result from:

- A. Multiple passes and on-site examination by an expert cytopathologist.
- B. Luck.
- C. Applying suction while the needle is being removed from the lymph node.
- D. Using the jab and thrust techniques.

Question 6: Techniques of transbronchial needle aspiration are commonly referred to as all of the following, EXCEPT:

- A. Jabbing method.
- B. Piggy-back method
- C. Cough method
- D. Hub-against-the-wall method
- E. Blind-insertion method

Question 7: ATS nodal station 4 R is accessed by:

- A. Transbronchial needle aspiration 2-4 intercartilaginous spaces posterolateral to the trachea.
- B. Transbronchial needle aspiration 2-4 intercartilaginous spaces anterolateral to the trachea.
- C. Transbronchial needle aspiration 2-4 intercartilaginous spaces lateral to the trachea.
- D. Transbronchial needle aspiration posterolateral to the trachea at the level of the carina.

Question 8: Which of the following anatomic structures lies immediately adjacent to the anterior wall of the left main bronchus and left upper lobe bronchus?

- A. Left pulmonary artery
- B. Aorta
- C. Left pulmonary veins
- D. Esophagus

Question 9: Transbronchial needle aspiration of ATS station 7 is best performed by:

- A. Inserting the needle in a relatively horizontal fashion against the medial wall of the right main bronchus across from and just proximal to the take off of the right upper lobe bronchus.
- B. Inserting the needle in a relatively vertical fashion against the medial wall of the right main bronchus across from and just proximal to the take off of the right upper lobe bronchus.
- C. Inserting the needle through the posterior wall of lower third of the trachea at the level of the carina.
- D. Inserting the needle directly into the carina in a straight vertical direction.

Question 10: All of the following are important to prevent damage to the flexible bronchoscope during transbronchial needle aspiration, EXCEPT:

- A. Making certain that the needle has been withdrawn into its sheath before the sheath is withdrawn into the bronchoscope.
- B. Straightening the bronchoscope before needle removal.
- C. Practice.
- D. Avoiding excessive flexion or extension of the tip of the bronchoscope at any time that the needle is being passed through the bronchoscope.
- E. Avoid using the histology needle.



Essential Bronchoscopist Answers to post-tests

Post-tests are multiple choice, single BEST answer.

While many programs consider 70% correct responses a passing grade, the student's "target" score should be 100%.

ANSWERS FOR POST TESTS MODULES I - VI

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ANSWERS TO MODULE I POST-TEST

- Answer 1: B
- Answer 2: D
- Answer 3: D
- Answer 4: C
- Answer 5: B
- Answer 6: A
- Answer 7: C
- Answer 8: C
- Answer 9: B
- Answer 10: A

ANSWERS TO MODULE II POST-TEST

- Answer 1: C
- Answer 2: C
- Answer 3: B
- Answer 4: B
- Answer 5: C
- Answer 6: A
- Answer 7: D
- Answer 8: B
- Answer 9: A
- Answer 10: C

ANSWERS TO MODULE III POST-TEST

- Answer 1: A
- Answer 2: A
- Answer 3: C
- Answer 4: B
- Answer 5: C
- Answer 6: A
- Answer 7: D
- Answer 8: C
- Answer 9: B
- Answer 10: A

ANSWERS TO MODULE IV POST-TEST

- Answer 1: B
- Answer 2: C
- Answer 3: A
- Answer 4: D
- Answer 5: D
- Answer 6: B
- Answer 7: D
- Answer 8: D
- Answer 9: D
- Answer 10: A

ANSWERS TO MODULE V POST-TEST

- Answer 1: B
- Answer 2: C
- Answer 3: B
- Answer 4: E
- Answer 5: D
- Answer 6: B
- Answer 7: C
- Answer 8: D
- Answer 9: A
- Answer 10: D

ANSWERS TO MODULE VI POST-TEST

- Answer 1: A
- Answer 2: C
- Answer 3: B
- Answer 4: A
- Answer 5: A
- Answer 6: E
- Answer 7: B
- Answer 8: C
- Answer 9: A
- Answer 10: E

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