



Presenters:

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Objectives

- Outline procedures used to ensure that examinations remain current.
- Describe specifics of the Computer Adaptive Test (CAT) format.
- Discuss and review available reports and resources.



Part I

Ensuring that Examinations Remain Current



At the heart of the BOC Credentials are the Examination Committees and Qualification Work Groups.



Examination Committees

- Blood Banking
- Clinical Chemistry
- Cytogenetics
- Cytotechnology
- Hematology
- Histotechnology
- Joint Generalist
- Laboratory Management
- Medical Laboratory Assistant
- Microbiology
- Molecular Biology
- Pathologists' Assistant
- Phlebotomy



Qualification Work Groups

- Apheresis
- Cytometry
- Immunohistochemistry
(Histology Exam Committee)
- Laboratory Informatics
- Laboratory Safety

Committee and Work Group Composition

- Include technicians, technologists, laboratory scientists, supervisors, educators, and physicians
- Geographic distribution considered
- Work setting important



Composition

The dedicated volunteers on these committees and work groups are appointed based not only on their clinical competence, geographic location and work setting, but most of all by their desire to improve the profession through credentialing of laboratory professionals



- Generally 6-8 people per committee
- Members serve two, 3 year terms
- Theoretically 1-2 people rotate off or their first term expires each year
- Guests can be invited
- An educator is always on a committee if there is an educational program associated with the discipline
- One member from the blood bank, chemistry, hematology, microbiology and molecular biology committees comprise the **Joint Generalist** committee

Responsibilities

- Meet annually
- Plan, develop and maintain examination databases
- Determine accuracy and relevancy of test items
- Confirm and set standards for each examination
- Perform job or practice analyses

About Exam Databases

- Most BOC exams consist of 100 questions.
- Each exam database contains hundreds of items.
- Thus, the number of different 100 question exams that can be administered from a 300 or greater question database is countless.



Examination Items

- Write examination items
 - assign classification according to content outline
 - determine taxonomy
 - provide references
- Review examination items provided by each committee member
 - assess clarity, accuracy, content, structure and appropriate classification
 - determine if references are listed

Accuracy and Relevancy of Exam Items

Review statistics to evaluate how each item performed on the exam

- Assess items that do not adequately differentiate high and low ability examinees
- Revise or delete items as necessary
- Review performance of experimental (field test) items for inclusion in the exam database

Standard setting or Benchmarking

- Determine pass point for the examination (standard setting)
- Standard Setting activity



A patient who is group AB Rh negative needs 2 units of Fresh Frozen Plasma. Which of the following units of plasma would be acceptable for transfusion?

- Group O Rh negative
- Group A Rh negative
- Group B Rh positive
- Group AB Rh positive

Which of the following is an abnormal crystal described as a hexagonal plate?

- Cystine
- Tyrosine
- Leucine
- Cholesterol

A urine culture from a patient with a urinary tract infection yields a yeast with the following characteristics:

- failure to produce germ tubes
- hyphae not formed on cornmeal agar
- urease-negative
- assimilates trehalose

The most likely identification is:

- Saccharomyces cerevisiae*
- Cryptococcus laurentii*
- Candida pseudotropicalis*
- Candida glabrata*

Consider the following ABO typing results:

Patient's Cells +		Patient's Plasma +				
Anti-A	Anti-B	A ₁ Cells	B Cells	Screening Cell I	Screening Cell II	Auto Control
4+	0	1+	4+	0	1+	0

What is the **most likely** cause of this discrepancy?

- A. A₂ with an Anti-A₁
- B. B. Cold allo-antibody
- C. C. Cold auto-antibody
- D. D. Acquired A phenomenon

#6

The erythrocyte sedimentation rate (ESR) can be falsely elevated by:

- A. tilting the tube
- B. refrigerated blood
- C. air bubbles in the column
- D. specimen being old

The precision of an instrument is validated by:

- A. running the same sample multiple times
- B. performing serial dilutions MCV
- C. processing unknown specimens
- D. monitoring normal and abnormal controls

If a fasting glucose was 90 mg/dl, which of the following 2-hour postprandial glucose results would most closely represent normal glucose metabolism?

- A. 55 mg/dl
- B. 100 mg/dl
- C. 180 mg/dl
- D. 260 mg/dl

An adult diabetic with renal complications has the following results:

sodium	133 mEq/L (133 mmol/L)
glucose	487 mg/dl (26.8 mmol/L)
BUN	84 mg/dl (30.0 mmol/L)
creatinine	5 mg/dl (442.0 mmol/L)

On the basis of these results, the calculated serum osmolality is:

- A. 266 mOsm/kg
- B. 290 mOsm/kg
- C. 323 mOsm/kg
- D. 709 mOsm/kg

Which of the RBC indices is a measure of the amount of hemoglobin in individual red blood cells?

- A. MCHC
- B. MCV
- C. Hct
- D. MCH

A *Staphylococcus aureus* isolate has an MIC of 4 µg/mL to oxacillin. There is uncertainty as to whether this represents an oxacillin (heteroresistant) resistant strain or a hyperproducer of β-lactamase.

Strain	Oxacillin	Amoxicillin-clavulanic acid
strain A	susceptible	susceptible
strain B	susceptible	resistant
strain C	resistant	susceptible
strain D	resistant	resistant

Based on the above results for oxacillin and amoxicillin-clavulanic acid, which strain is **heteroresistant**?

- A. strain A
- B. strain B
- C. strain C
- D. strain D

Practice Analyses & Exam Content

- Knowledge questions ask how significant is knowledge of the “following” to effectively perform a job
- Task questions assess if the test is currently performed/used, not performed/used and whether or not knowledge (basic or advanced) is needed of the concept /protocol to perform the job

Perform Practice Analyses

- Practice Analysis is performed to define the practice and to validate the certification program
- Define questions to be on a survey
 - Two sections on survey: knowledge questions and testing (task) questions
- Evaluate and discuss survey responses
 - Suggest theories or tasks to retain or remove

Practice Analysis Example

Survey question asks if respondents perform peripheral blood smear evaluations to describe and grade red blood cells according to size, color, shape and inclusions.

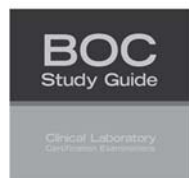


Practice Analysis Example - continued

- Hematology Content Outline lists “Differentials and Morphology Evaluation” as a subtest area
- BOC Study Guide includes the question:

A red blood cell about 5 µm in diameter that stains bright red and shows no central pallor is a:

 - a. Spherocyte
 - b. Leptocyte
 - c. Microcyte
 - d. Macrocyte



Example of topic removed from exam because of the practice analysis results:

A screening test for paroxysmal nocturnal hemoglobinuria is:

- a. heat instability test
- b. sucrose hemolysis
- c. osmotic fragility
- d. dithionite solubility

(BOC Study Guide, hematology #118, pg. 164)

Part II

About Computer Adaptive Testing (CAT)

Format:	Multiple Choice Questions
Units:	Both SI & conventional
# Questions:	100 Questions (All exams except PBT & DPT) PBT - 80 questions
Duration:	2½ hours (All exams except PBT & DPT) PBT & DPT 2 hours
Methodology:	Computer Adaptive Testing (CAT)
Exam Blueprint:	The exam is administered according to the content percentages stated on the content outline.
Review:	Review questions after all test questions have been answered.

Computer Adaptive Testing (CAT)

- ASCP BOC has been using criterion-referenced CAT since 1993
- Each BOC CAT exam administers questions according to the examination content guideline
- Exam questions are administered based on item difficulty and according to the content guideline but not in groupings of content areas.
- All exams include experimental or field test questions
- Time allotted for the exam is adequate to complete all of the exam questions

Computer Adaptive Testing (CAT)

- When a person answers a question correctly, the next test question has a slightly higher level of difficulty.
- The difficulty level of the questions presented to the examinee continues to increase until a question is answered incorrectly.
- Then, a slightly easier question is presented.
- The test is tailored to the individual's ability level.
- Each question in the exam pool is calibrated for difficulty and categorized by content area.

1. A reliable test for distinguishing *Staphylococcus aureus* from the other staphylococci is: coagulase. (Correct)
**After a correct answer, questions of slightly higher difficulty are given.*
2. Which of the following casts is most likely to be found in healthy people? Hyaline casts. (Correct)
**After a correct answer, questions of slightly higher difficulty are given.*
3. The characteristic erythrocyte found in pernicious anemia is: microcytic. (Incorrect)*
**After an incorrect answer, questions of slightly easier difficulty will be given.*

Examples

The following slides illustrates two examples of individual's performance during a CAT test.

Remember: The premise of CAT testing is to quickly assess an individual's ability by administering well-targeted items.

The exam committees annually reviews the exam database questions for:

- Currency and relevancy
- Statistical performance

Example 1:

	A	B	C	D	An:
Count	70	144	26	99	Answer = 2
%	.21	.42	.08	.29	Dif = .17
Avg Ability	.21	.22	.26	.19	SE = .11
					Pt. Meas = .08**
					In mnsq = 1.01
					Displace = .35
-Item does not adequately differentiate high and low ability examinees**					

Example 2:

	A	B	C	D	An:
Count	23	28	321	11	Answer = 3
%	.06	.07	.84	.03	Dif = -1.33
Avg Ability	-.02	.17	.06	-.02	SE = .14
				NULL!	Pt. Meas = .26
					In mnsq = .98
					Displace = .00

Example 3:

	A	B	C	D	An:
Count	10	5	89	269	Answer = 4
%	.03	.01	.24	.72	Dif = -.60
Avg Ability	-.60	-.07	.13	.63	SE = .12
	NULL!	NULL!			Pt. Meas = .31
					In mnsq = .98
					Displace = .00

Part III

Information for Program Directors

Program Director's Guide to Certification

When to apply:

- No earlier than 4-6 weeks prior to end of program
- Testing Availability:
 - Year-round (excluding major holidays)
- Application should be processed within 45 days
 - Will get email notification to view Admission Notice
 - Have three months to schedule the exam.
- Remind students to read the website carefully
 - Exam appointment cancellation policy
 - Exam Fees
 - Sites: Pearson Center locations near you

Information needed for the application:

- First and last name (matching valid ID)
- Email address
- Name of program
 - Drop down menu
- Program Beginning and Ending Dates
- Route
- Program director name and information
- Current email address / update as needed

- Reasons students don't certify immediately after graduation:
 1. Current job doesn't require it.
 2. Fear of failure
 3. Delaying so they have more time to study
 4. Planning to go to graduate school or medical school.



- Reasons students should certify soon after program completion
 1. Will never be as knowledgeable in all areas again
 2. May want a job requiring certification/licensure
 3. May want to work part-time while in graduate school
 4. Might not get into graduate or medical school
- Soon but not too soon!

- Impact of Time Lapse on ASCP Board of Certification Medical Laboratory Scientist (MLS) and Medical Laboratory Technician (MLT) Examination Scores
 - KAREN A. BROWN, JOANN P. FENN, VICKI S. FREEMAN,
 - PATRICK B. FISHER, JONATHAN R. GENZEN,
 - NANCY GOODYEAR, MARY LUNZ HOUSTON,
 - MARY ELIZABETH OBRIEN, PATRICIA A. TANABE
- CLS 2015: 28(3):145-150
- Lab Medicine 2015: 46(3):53-8

- MLS and MLT exams
- 20 month period
 - April 12, 2013 to December 30, 2014
 - Divided into four quarters for analysis
- 6037 MLS candidates
- 3920 MLT candidates

Quarter	% Taking Exam	% Passing	% Failing
1	80.2	91.1	8.9
2	14.0	73.6	26.4
3	3.4	69.6	30.4
4	2.2	68.1	31.9

Quarter	% Taking Exam	% Passing	% Failing
1	57.6	88.5	11.5
2	29.4	74.5	24.5
3	8.2	69.2	30.8
4	4.8	72.2	27.8

- **STUDY! STUDY! STUDY!**
- No substitute for knowing the material thoroughly
- Notes and charts
- Review must be comprehensive
- Study Guides
 - Review Books
 - Practice exams



MLS Content Outline

- Based on national practice analyses
- Test items all link to the content outlines
- See also the categorical technologist exam content outlines:
 - Blood Bank (BB)
 - Chemistry (C)
 - Hematology (H)
 - Microbiology (M)

- ASCP BOC exams are delivered in Pearson Professional Centers (PPCs).
- Over 200 PPCs in the US and territories.



- Identification – 2 forms
 - Valid Driver's License with photo & signature
 OR
 - Valid State ID with photo & signature
 AND
 - Second personal ID containing your signature
- Admission letter
 - first and last name on IDs must match the admission letter.



- Report 30 minutes prior to scheduled time
- Digital photo, signature and palm vein scan is collected



Palm Vein Scan is a highly accurate form of identification and works by scanning the veins inside of your hand to create a digital template.



Exam Workstation



Proctor Station

- Sessions are audio and video recorded
- Proctors will address questions or concerns

- Bring a silent, non-programmable calculator
- Dry erase board will be provided.



- Personal belongings (placed in lockers)
 - Hats, scarves, gloves and coats
 - No large jewelry or other accessories
 - Provisions made for specific religious/cultural apparel
- Cell phones
- Books / Papers
- Dictionaries
- Reference materials
- Friends who know all the answers



How should a student approach a computer adaptive test?

- Answer each question to the best of your ability when it is presented
- Don't try to figure out whether the questions are getting harder or easier

Exam Time

- The clock begins once the first question is presented.
- Examinees may leave the workstation but the clock will continue to count down.
- Will need to check-in again by palm-vein scan.

- Organize your time
- Don't spend too much time on any one question
- Read the question carefully
- Questions are straightforward, not tricky
- Stay calm - don't panic if you don't know an answer
- Answer each question as presented
- Ability to review and change answers at the end of the exam



Should you change your answers during review?

- Yes if:
 - Realize you misread the stem or distractors
 - Remember / reminded during exam
 - One item clues another
- No if:
 - Just guessing the first time & no reason to change
 - Second guessing yourself



- Preliminary pass or fail status when you have completed the exam
- Passing Score Report:
 - Retain for Certification Number
- Scaled scores
 - Minimum passing score is 400
 - Ensures that the level of difficulty is the same for all test takers
 - Final score sent within a week (if all documentation is received)
- STUDENTS need to send transcripts showing degree completion



What if you fail?

- Review scaled scores major content areas on the score report
- Re-application information is provided
- Five attempts under one route
- **Tests are reliable**
 - **Add time to study**
 - Need to prepare differently / better



Not ethical for examinees to share / reveal exam content.

- Applicants sign a pledge on their application.
- Examinees agree to statements in a BOC pledge before they may begin their exam.

Both pledges include the following:

- “..I agree not to retain, copy, reveal or disclose any part of these exam materials.”
- Test questions are the exclusive property of the BOC and are protected by copyright law.

- What's new
- 2017 User Guide in e-links
 - Add link
- Single Sign on for PPR and EEV

I have an account with ASCP :

Login to ASCP using your username and password now.

Username or ASCP ID: Required

Password: Required

Remember my login information

Forgot Username/Password

- Search by Completion Date or Exam Date range

We wish to express our appreciation for your cooperation in keeping individual records confidential and in working with the Board of Certification to maintain our standard of excellence.

IMPORTANT: Program Performance Report (PPR) data is NOT to be shared with the public. The Program Performance Report is a paid subscription service meant for Program Directors and Program Administrators ONLY.

The PPR (including the histograms, individual student data and subtest means) is not public information, and it is inappropriate to publicize this data in recruitment efforts. However, Program Directors can provide the scaled score comparisons for "First Time Examinees from the Total Population" (contained within the "Program and National Scaled Score Comparisons" section) as an outcomes measure for accreditation purposes.

*Exam Date for this report begins January 1, 2016.

*Program End date cannot be prior to January 1, 2011, and only students who tested after December 31, 2015 will display on this report.

Date Type* Select a Date Type

Select Program & School: Select a Program & School

Start Date* mm/dd/yyyy

End Date* mm/dd/yyyy

- Changing programs or date range

Board of Certification Program Performance Report Summary
 School Code: [] Exam Code: **MLS** Go To Program Performance Report (PPR)
 Date Type: **EXAM** Start Date: 1/1/2016 End Date: 8/31/2016
Medical Laboratory Scientist
 []
USA
 This Program Performance Summary includes the following parts:
 First time individual student scaled scores
 Program and National scaled score comparisons
 Repeater individual student scaled scores
 Distribution of examinee scaled scores
 We wish to express our appreciation for your cooperation in keeping individual records confidential and in working with the Board of Certification to maintain our standard of excellence.
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- Program Completion Date or Exam Date

Board of Certification Program Performance Report Summary
 School Code: **026005** Exam Code: **MLS** Go To Program Performance Report (PPR)
 Date Type: **EXAM** Start Date: 1/1/2016 End Date: 8/31/2016

Board of Certification Program Performance Report Summary
 School Code: **026005** Exam Code: **MLS** Go To Program Performance Report (PPR)
 Date Type: **PROGRAM** Start Date: 1/1/2016 End Date: 8/31/2016

- Subtest scores are going away

Mean Scaled Scores by Subtest For First Time Examinees

CYCLE: Annual 20XX	BBNK	CHEM	HEMA	IMMU	LO	MICR	UA
Program Mean Scaled Scores:	599	527	522	447	616	491	519
University Based Program Mean Scaled Scores:	500	498	505	490	512	496	492
This Cycle Mean Scaled Scores:	503	502	508	497	517	497	501

CYCLE: Annual 20XX	PROGRAM	UNIV	NATIONAL
BLOOD BANK			
ABO and Rh	635	520	523
Antibody screen and identification	746	520	520
Crossmatch and special tests	563	550	550
Blood donation, transfusion therapy, transfusion reactions and hemolytic disease of the newborn (HDN)	513	504	510

- Why are subtests going away?
- Questions presented are determined by
- Content outline
 - e.g. 17-22% BB for MLS
- Individual ability / item difficulty
- Not by subtests
 - e.g. ABO and Rh
- Number of items within subtests vary for each test taker

More information in the User's Guide
 What about the major content areas?
 Are those useful?

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Yes – with some cautions

- **Cautions**
- Number of students
- Number of faculty involved in each area



Helpful for:

- Overall assessment of program - consistent pattern over time
- Faculty, Clinical Instructors, Advisory Boards



