New York Blood Center Enterprises

innovation • experience • expertise

Education & Training in the Blood Bank

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Wednesday, June 29, 2022
HAABB

Objectives:

At the end of this presentation, the learner will be able to…

1. Discuss learner-centered principles, including examples of how to employ learner-centered principles in education and training in the blood bank.
2. Describe the importance of the alignment of learning objectives, instructional approaches, and assessment methods.
3. List strategies that can be employed to improve education and training in the blood bank at your facility.

Overview

- Introduction
  - Why talk about education & training in the blood bank?
- Educational concepts that might be useful
  - What do educators know that blood bankers might not?
- Practical tips for your facility
  - What can you do to improve education & training where you work?

Education vs Training

Education

- *Gaining theoretical knowledge*
- Applies to: MLS and SBB students, residents, fellows, blood bank technologists (continuing education), new hires
- Examples:
  - What causes ABO discrepancies?
  - What is the GATA mutation?

Training

- *Developing specific skills (following the SOP)*
- Applies to: MLS and SBB students, new hires
- Examples:
  - How do you prepare a 3-5% RBC solution?
  - What is the plasma:cell ratio in performing routine antibody screens?

Pat on the Back

You're doing a fine job!

https://pusparaniology.wordpress.com/2013/03/30/indonesia-seharusnya-suka-memuji/pat-on-the-back-300x300-scaled5951/

Overview

- Introduction
  - Why talk about education & training in the blood bank?
- Educational concepts that might be useful
  - What do educators know that blood bankers might not?
- Practical tips for your facility
  - What can you do to improve education & training where you work?

Learner-Centered Principles

- Active participation/experiential learning
- Variety of activities/Multiple delivery modes
- Social aspect of learning/cooperative learning
- Teacher as facilitator rather than authority
- Intrinsic motivation/self-direction
- Relevant problem/authentic context
- Application of new knowledge
- Self-appraisal/Reflection on learning
- Multiple assessment formats

Associated with…

- ✓ Better academic performance
- ✓ Increased personal satisfaction
- ✓ Accelerated personal & professional growth

Learner-Centered vs Teacher-Centered

ELEMENTS	TEACHER-CENTERED	STUDENT-CENTERED
KNOWLEDGE	Transmitted from Instruction	Constructed by Students
STUDENT PARTICIPATION	Passive	Active
ROLE OF LECTURER	Leader/Authority	Facilitator/Partner in Learning
ROLE OF ASSESSMENT	Few Tests, Mainly for Grading	Many Tests, for Ongoing Feedback
EMPHASIS	Learning Correct Answers	Developing Deeper Understanding
ASSESSMENT METHOD	One-Dimensional Testing	Multidimensional Testing
ACADEMIC CULTURE	Competitive, Individualistic	Collaborative, Supportive

https://co.pinterest.com/pin/111534528261335279/

Learner-Centered Instruction	Description/Example
Problem-based learning	• Case examples with Q&A • Learner works through case from receiving requisition to issuing blood

Flipped classroom	• Students learn theory through self-directed work outside of class
	  • Online modules
	  • Handout
	  • Video
	  • Reading
	• Classroom time spent on active learning & application

Self-directed learning	• Learner determines objectives, strategy to acquire knowledge, etc. • Teacher as facilitator

What is a learning objective?

After this presentation (course, module, rotation, etc.), the learner will be able to…

What makes a good learning objective?

Learner-centered:

Objectives are NOT
“what I will talk about today”…

What makes a good learning objective?

Objectives are NOT
"what I will talk about today"…

Learner-centered:

- ***My first objective is that I will talk about common characteristics of Dombrock antibodies.***

What makes a good learning objective?

Objectives are NOT
"what I will talk about today"…

Learner-centered:

- ~~*My first objective is that I will talk about common characteristics of Dombrock antibodies.*~~
- ***(At the end of this presentation, the learner will be able to…) Discuss common characteristics of Dombrock antibodies.***

What makes a good learning objective?

Measurable:

- ***At the end of this presentation, the trainee will know about ABO discrepancies.***

What makes a good learning objective?

Measurable:

- ~~*At the end of this presentation, the trainee know about ABO discrepancies.*~~
- ***(At the end of this presentation, the trainee will be able to…)* List five common causes of ABO discrepancies.**

Learning Objectives: Why are these words so important?

REMEMBER	UNDERSTAND	APPLY	ANALYZE	EVALUATE	CREATE
Count	Associate	Add	Analyze	Appraise	Categorize
Define	Compute	Apply	Arrange	Assess	Combine
Describe	Convert	Calculate	Breakdown	Compare	Compile
Draw	Defend	Change	Combine	Conclude	Compose
Identify	Discuss	Classify	Design	Contrast	Create
Label	Distinguish	Complete	Detect	Criticize	Drive
List	Estimate	Compute	Develop	Critique	Design
Match	Explain	Demonstrate	Diagram	Determine	Devise
Name	Extend	Discover	Differentiate	Grade	Explain
Outline	Extrapolate	Divide	Discriminate	Interpret	Generate
Point	Generalize	Examine	Illustrate	Judge	Group
Quote	Give examples	Graph	Infer	Justify	Integrate
Read	Infer	Interpolate	Outline	Measure	Modify
Recall	Paraphrase	Manipulate	Point out	Rank	Order
Recite	Predict	Modify	Relate	Rate	Organize
Recognize	Rewrite	Operate	Select	Support	Plan
Record	Summarize	Prepare	Separate	Test	Prescribe
Repeat		Produce	Subdivide		Propose
Reproduce		Show	Utilize		Rearrange
Select		Solve			Reconstruct
State		Subtract			Related
Write		Translate			Reorganize
		Use			Revise
					Rewrite

https://spscoursedesign.commons.gc.cuny.edu/analysis-for-design-and-understanding-learning-outcomes/

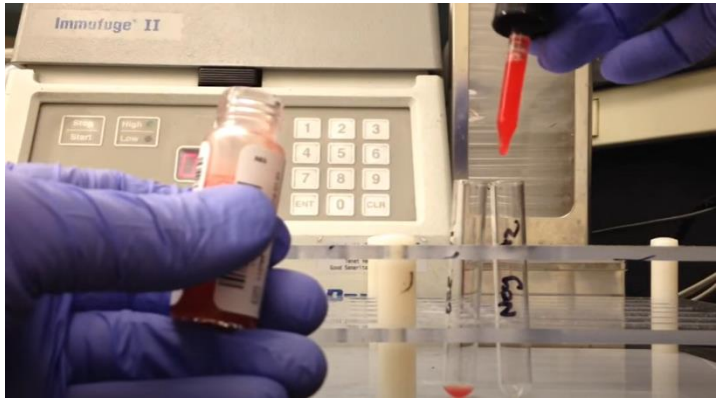
Domains of Learning

- Psychomotor
  - Skills
- Cognitive
  - Knowledge
- Affective
  - Attitudes/appreciation

http://digitalinstructionalgames.weebly.com/learning-domain-addressed.html

Psychomotor Domain

- Can the learner…
  - Make a 3-5% RBC solution?
  - Test a screen in gel?
  - Prepare an acid eluate?



How do we learn in this domain?

- Observation
- Read written procedure
- Practice

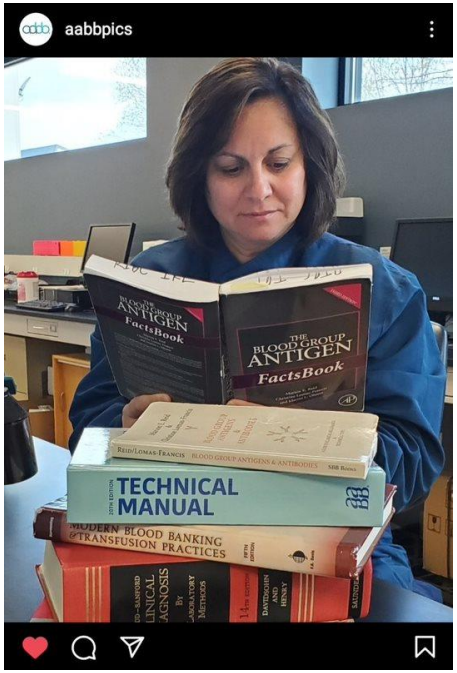
Extremely important for:

- New hires in the blood bank
- MLS students
- Technologist learning new assay

https://www.youtube.com/watch?v=8zwREsu9VWM

Cognitive Domain

Extremely important for:
- All learners!



- Does the learner know…
  - The clinical significance of anti-Fy^{a}?
  - The expected serologic reactivity of a patient with warm autoimmune hemolytic anemia?
  - How to correctly interpret results of a panel?

How do we learn in this domain?

- Lecture, reading
- Case studies
- Discussion

Affective Domain

- Can the learner describe…
  - The importance of following SOPs exactly?
  - The impact of blood bank testing on patient care?
  - The value of professional development and continuing education?

How do we learn in this domain?

- Exposure, mentorship
- Observation of modeling
- Discussion/reflection

Extremely important for:

- MLS students
- SBB students

Importance of Assessment

- ***Guides*** learning
  - "There will be a quiz…"
- ***Enhances*** learning
- ***Provides formative feedback*** to learner
- ***Provides evidence of success*** of educational activity

https://quizizz.com/admin/quiz/60b43c4400b6ed001b1d0239/pretest-posttest-design

Assessment Methods

How to measure if learners have achieved the objectives

Psychomotor	Cognitive	Affective
• Direct observation • Student samples • Formative feedback	• Pretest/Posttest • Multiple choice questions • Case studies	• Self-reporting of attitudes • Reflective essay

Learner-Centered Assessment

Assessment is…

- Opportunity for formative feedback
- Encouragement of learner/ trainee to seek feedback
- Opportunity for learner/ trainee to participate in their learning

(My opinion)
Assessment for trainees should be "open-book"

Assessment is not…

- Punitive
- Trying to catch learner/ trainee doing something wrong
- Something that should make learner/ trainee feel bad

Alignment: Objectives, Instruction, Assessment

Course Objective	Instructional Strategies	Learner Assessment Methods
Cognitive Domain		
Upon completion of the rotation, the learner will correctly interpret test results to identify alloantibodies and autoantibodies in blood samples and in case studies when laboratory results are provided.	▪ Informal lecture/ Discussion ▪ Case Studies ▪ Discussion/Review	▪ Pretest/Posttest (MCQ format) ▪ Case Studies
Psychomotor Domain		
Upon completion of the rotation, the learner will perform routine blood bank tests on authentic blood samples, including type and screen and antibody identification, to the degree that valid results are obtained.	▪ Demonstration ▪ Written description ▪ Practice	▪ Direct Observation ▪ Formative Feedback
Affective Domain		
Upon completion of the rotation, the learner will describe the impact of blood banking on patient care.	▪ Exposure ▪ Modeling ▪ Discussion/Reflection	▪ Pretest/Posttest (self-reporting of attitudes) ▪ Reflective Essay

Overview

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  - Why talk about education & training in the blood bank?
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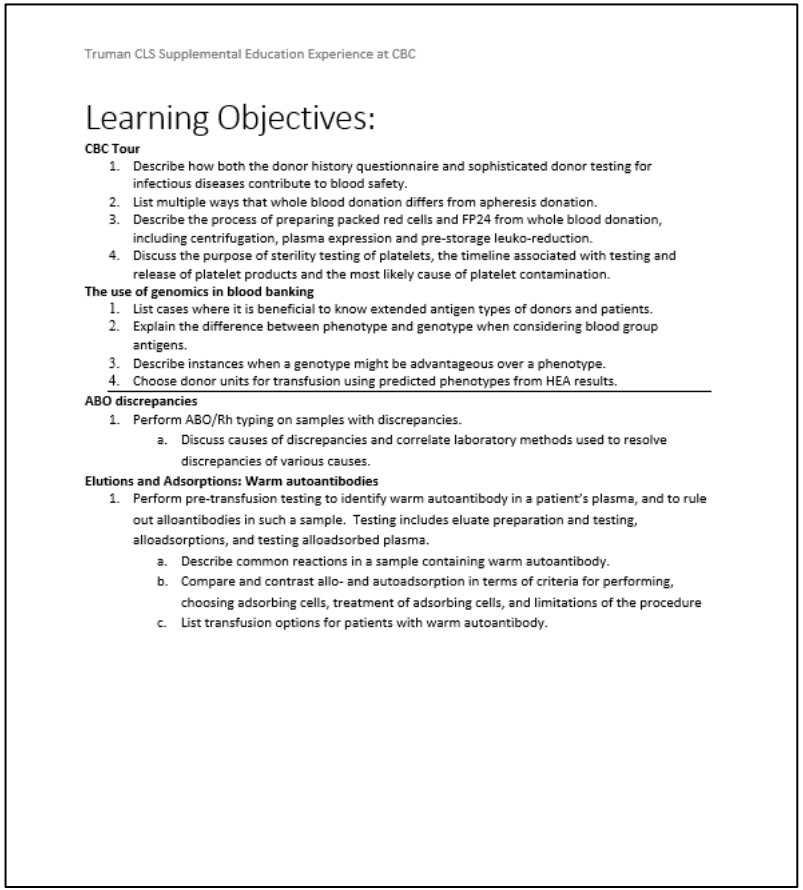
Practical Tip #1: Make Materials!

- Is each group of students receiving the same experience?
- Do staff members assigned to educational projects understand their responsibility?



Truman CLS Supplemental Education Experience at CBC

Learning Objectives:

CBC Tour

1. Describe how both the donor history questionnaire and sophisticated donor testing for infectious diseases contribute to blood safety.
2. List multiple ways that whole blood donation differs from apheresis donation.
3. Describe the process of preparing packed red cells and FP24 from whole blood donation, including centrifugation, plasma expression and pre-storage leuko-reduction.
4. Discuss the purpose of sterility testing of platelets, the timeline associated with testing and release of platelet products and the most likely cause of platelet contamination.

The use of genomics in blood banking

1. List cases where it is beneficial to know extended antigen types of donors and patients.
2. Explain the difference between phenotype and genotype when considering blood group antigens.
3. Describe instances when a genotype might be advantageous over a phenotype.
4. Choose donor units for transfusion using predicted phenotypes from HEA results.

ABO discrepancies

1. Perform ABO/Rh typing on samples with discrepancies.
    a. Discuss causes of discrepancies and correlate laboratory methods used to resolve discrepancies of various causes.

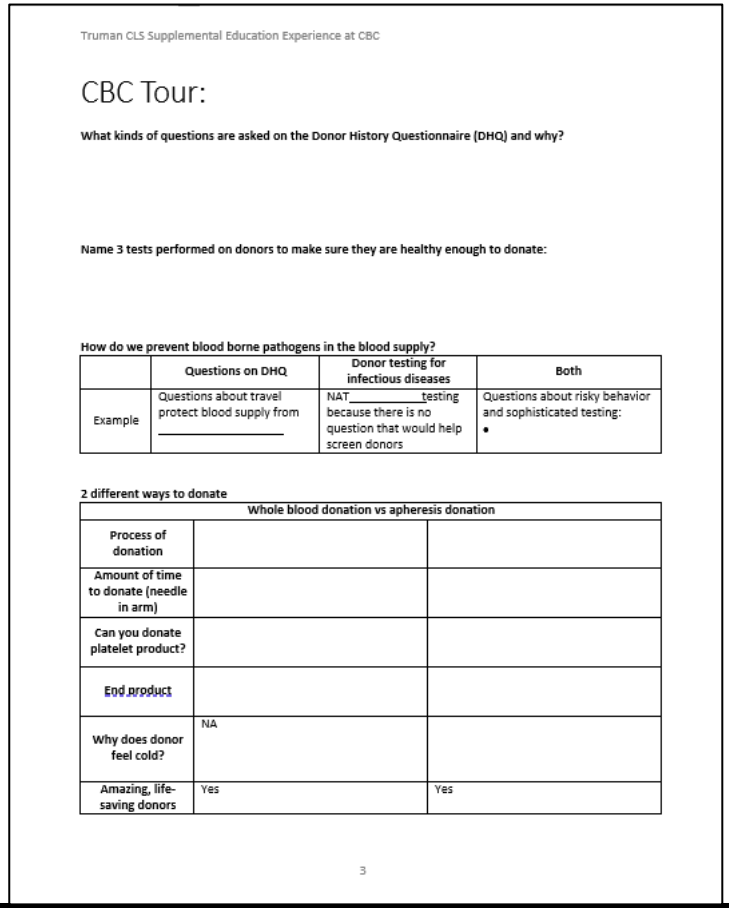
Elutions and Adsorptions: Warm autoantibodies

1. Perform pre-transfusion testing to identify warm autoantibody in a patient's plasma, and to rule out alloantibodies in such a sample. Testing includes eluate preparation and testing, alloadsorptions, and testing alloadsorbed plasma.
    a. Describe common reactions in a sample containing warm autoantibody.
    b. Compare and contrast allo- and autoadsorption in terms of criteria for performing, choosing adsorbing cells, treatment of adsorbing cells, and limitations of the procedure
    c. List transfusion options for patients with warm autoantibody.

Make Materials!

Keep it Learner-Centered

- Students provided “handbook” with spaces to fill in



Truman CLS Supplemental Education Experience at CBC

CBC Tour:

What kinds of questions are asked on the Donor History Questionnaire (DHQ) and why?

Name 3 tests performed on donors to make sure they are healthy enough to donate:

How do we prevent blood borne pathogens in the blood supply?

	Questions on DHQ	Donor testing for infectious diseases	Both
Example	Questions about travel protect blood supply from _____	NAT_____testing because there is no question that would help screen donors	Questions about risky behavior and sophisticated testing: •

2 different ways to donate

Whole blood donation vs apheresis donation		
Process of donation		
Amount of time to donate (needle in arm)		
Can you donate platelet product?		
End product		
Why does donor feel cold?	NA	
Amazing, life-saving donors	Yes	Yes

3

Make Materials!

New Hire Training:

- Have new hires categorize important information by reading SOPs
- Learner-centered: student/trainee investigation required

Handout 1.0: Comparison of IAT Methods

Instructions: This handout is meant to help you differentiate the different IAT methods used in the IRL.

1. Fill in all highlighted spaces.

Handout 1.0 Comparison of IAT Methods

	IAT method	Refer to SOP:	Incubation time at 37C	When is this method used?	Additional Information
Less sensitive	Saline IAT				• HTLA antibodies react best at saline IAT • Saline IAT used for testing prenatal titers
	LISS IAT				• LISS IAT is the default method for warm autoantibodies
	PEG IAT				• No reading at 37C; observe for hemolysis & go straight to washing after incubation • Hand wash when testing with PEG • MUST use anti-IgG when testing with PEG
	FICIN IAT				• M,N,S,s; Fy^a,Fy^b; Xg^a antigens destroyed (among others) • Rh/Kidd antibodies enhanced in ficin • Autoantibodies react strongly in ficin, usually (cold and warm); therefore, test a ficin-treated autocontrol when you are testing ficin-treated cells • Immediate spin reading is optional; reading IAT tests microscopically is not required
More sensitive	Gel testing				• 0.8% cell suspension utilized; only 25ul of plasma used per test • SOPs allow gel testing for patient workups based on hospital methodology or in cases of limited sample volume

Practical Tip #2: Build a Library

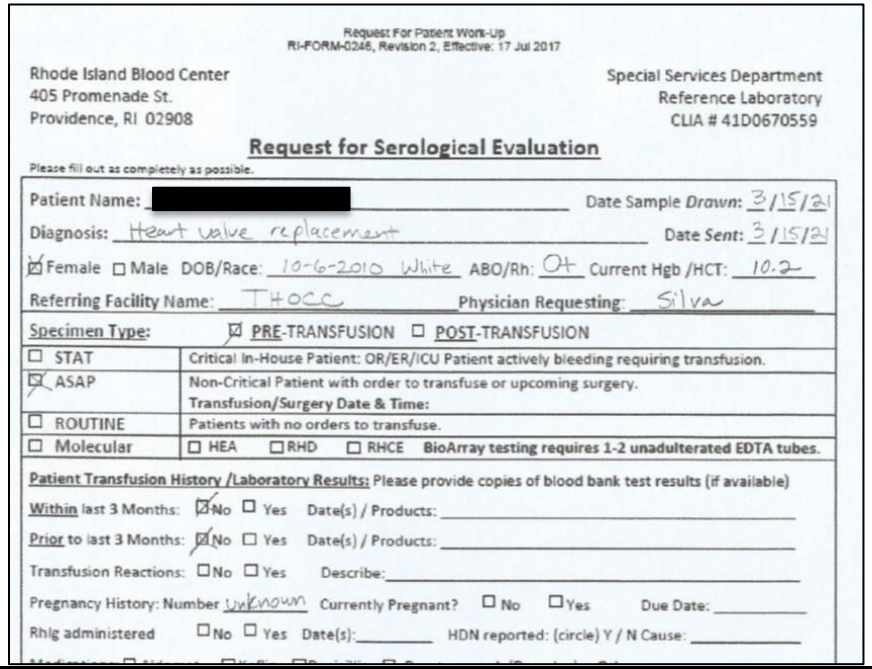
Save Samples

- Don’t let lack of samples slow down training/education
- Store frozen plasma with antibodies
  - Categorize
  - Notes on reactivity
- Limitation: long term storage of RBCs

https://www.123rf.com/photo_47198911_lab-technician-holding-blood-tube-test-in-blood-bank-background-blood-samples-other-patients.html

https://www.aabb.org/aabb-store/product/blood-banker-favorites-a-collection-of-the-best-recipes-for-blood-sample-preparation---digital-15028515

Build a Library



Request For Patient Work-Up
RI-FORM-0246, Revision 2, Effective: 17 Jul 2017

Rhode Island Blood Center
405 Promenade St.
Providence, RI 02908

Special Services Department
Reference Laboratory
CLIA # 41D0670559

Request for Serological Evaluation

Please fill out as completely as possible.

Patient Name: [redacted] Date Sample *Drawn*: 3/15/21

Diagnosis: Heart valve replacement Date *Sent*: 3/15/21

☒ Female ☐ Male DOB/Race: 10-6-2010 White ABO/Rh: O+ Current Hgb /HCT: 10.2

Referring Facility Name: THOCC Physician Requesting: Silva

Specimen Type: ☒ PRE-TRANSFUSION ☐ POST-TRANSFUSION

☐ STAT	Critical In-House Patient: OR/ER/ICU Patient actively bleeding requiring transfusion.
☒ ASAP	Non-Critical Patient with order to transfuse or upcoming surgery. Transfusion/Surgery Date & Time:
☐ ROUTINE	Patients with no orders to transfuse.
☐ Molecular	☐ HEA ☐ RHD ☐ RHCE **BioArray testing requires 1-2 unadulterated EDTA tubes.**

Patient Transfusion History /Laboratory Results: Please provide copies of blood bank test results (if available)

Within last 3 Months: ☒ No ☐ Yes Date(s) / Products: _____

Prior to last 3 Months: ☒ No ☐ Yes Date(s) / Products: _____

Transfusion Reactions: ☐ No ☐ Yes Describe: _____

Pregnancy History: Number Unknown Currently Pregnant? ☐ No ☐ Yes Due Date: _____

Rhig administered ☐ No ☐ Yes Date(s): _____ HDN reported: (circle) Y / N Cause: _____

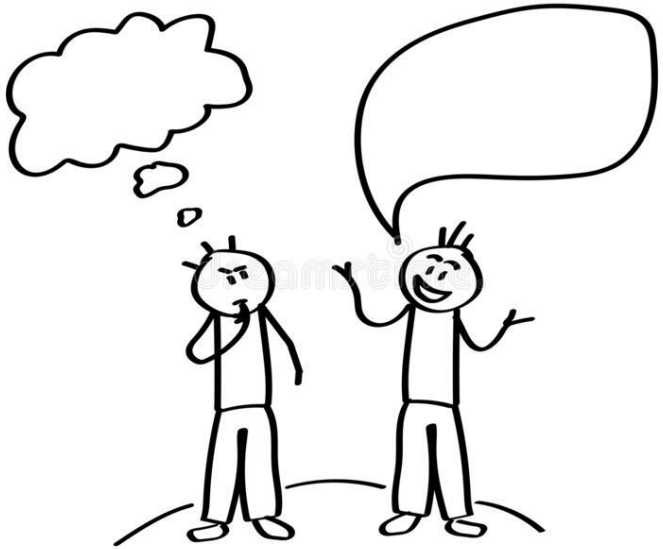
Save Example Cases

- Save paperwork (or electronic copy) of the most interesting cases
- Redact patient information, if necessary
- Reuse cases for multiple learners

Practical Tip #3: Create Ways to Practice

If you want your learner/trainee to master something, help them practice

Create Ways to Practice



“These new techs just don’t catch errors in their self-review… They make so many mistakes…”

“Are they trained in how to do self-review?

“The SOP says to do it…”

https://www.dreamstime.com/illustration/outline-two-people-talking.html

Create Ways to Practice

1. **Define expectations**

RIBC Training
Handout 1.1 Practice Reviewing Workups

As an Immunohematology tech, you will be expected to perform both self-review and peer-review of workups, preliminary reports & final reports. Here are some of the things that you are looking for when reviewing:

- ABO
  - ABO/D interpretation correct? Weak D test performed if D-negative?
  - ABO Discrepancy investigated and resolved?
- DAT
  - DAT performed? Saline control negative? Monospecific DAT performed if applicable?
  - Check cells on negative results
- Antibody ID
  - New antibodies identified by 2+2 rule? Antigen typing of corresponding antigen?
  - Clinically significant antibodies to common RBC antigens ruled out appropriately?
  - All check cells documented?
  - Conclusion/interpretation recorded and supported by data?
  - Testing complete/ includes all required methods per SOP?
- Clerical
  - All documentation complete, accurate and legible? Tech performing testing identified?
  - Errors corrected appropriately?
- Reporting
  - Patient name, birth date and submitting institution matches request form?
  - Phenotype correctly reported

Create Ways to Practice

2. Give opportunity to practice

Practice:
For each patient workup, identify the errors. These may be clerical errors, incomplete rule outs/rule ins, or missing results, etc. Good luck!

Patient 1: Last name **Oliveira**: Identify 3 errors
- _____
- _____
- _____

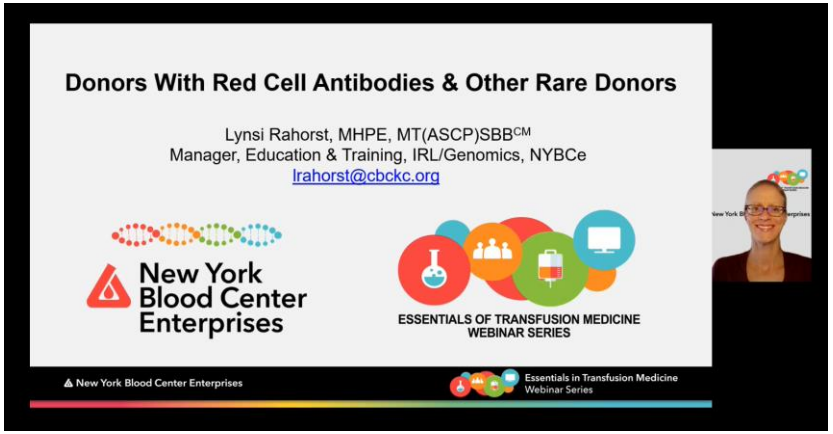
Patient 2: Last name **Costa**: Identify 3 errors
- _____
- _____
- _____

Patient 3: Last name **Doherty**: Identify 3 errors
- _____
- _____
- _____

Patient 4: Last name **Fields**: Identify 3 errors.
- _____
- _____
- _____

Practical Tip #4: Record a Presentation

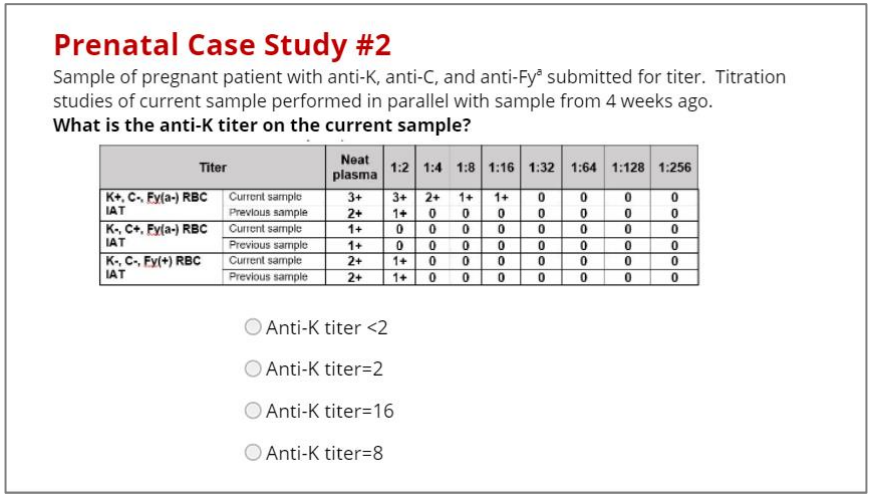
- Easy way to make materials/build a library
- Resources to use:
  - PowerPoint
  - Zoom
  - Microsoft Teams
- Provide contact information for questions
- Enhance learning with supplementary information



Practical Tip #5: Keep Presentations Learner-Centered

PowerPoint Presentation

- Survey questions
- Quizzes
- Cases to work through
- Handouts
  - Fill-in-the-blank



Prenatal Case Study #2

Sample of pregnant patient with anti-K, anti-C, and anti-Fy^a submitted for titer. Titration studies of current sample performed in parallel with sample from 4 weeks ago.

What is the anti-K titer on the current sample?

Titer		Neat plasma	1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256
K+, C-, Fy(a-) RBC IAT	Current sample	3+	3+	2+	1+	1+	0	0	0	0
	Previous sample	2+	1+	0	0	0	0	0	0	0
K-, C+, Fy(a-) RBC IAT	Current sample	1+	0	0	0	0	0	0	0	0
	Previous sample	1+	0	0	0	0	0	0	0	0
K-, C-, Fy(+) RBC IAT	Current sample	2+	1+	0	0	0	0	0	0	0
	Previous sample	2+	1+	0	0	0	0	0	0	0

- Anti-K titer <2
- Anti-K titer=2
- Anti-K titer=16
- Anti-K titer=8

Practical Tip #6: Assessment Considerations

Can't be assessed with:

- ❑ MCQs
- ❑ Written test

Psychomotor domain

- Samples to work up:
  - Did student/trainee get the right answer?
- Direct observation:
  - Did student/trainee perform tasks correctly?

Direct Observation Card

Learner name _____ **Date** _____

Procedure performed Prepare and test eluate **Instructor** _____

Needs Work (0)	Average (1)	Excellent (2)
Grades reactions appropriately		
		✓
Grades reactions inconsistently. Shakes tubes too hard. Often grades incorrectly.	Makes effort to shake tubes gently. Reaction grades are appropriate or close to correct.	Shakes tubes gently. Consistently grades reactions correctly.
Follows procedures exactly		
✓		
Rushes through procedures, sometimes skipping steps. Mistakes lead to incorrect results or invalid tests.	Makes effort to follow procedures. Catches own mistakes. Usually obtains correct results.	Consistently follows directions diligently. Obtains correct results the first time.
Records results promptly and correctly		
	✓	
Does not record results after reading each tube. Written records are illegible and incomplete.	Results are recorded promptly after reading each tube. Written mistakes are corrected appropriately.	Records each result appropriately after reading each tube. Results are neat and organized.
Interprets results correctly		
	✓	
Interprets results incorrectly. Does not demonstrate understanding of what results mean.	Arrives at the appropriate conclusion with prompting. Demonstrates understanding of test interpretation with assistance.	Arrives at the appropriate conclusion independently. Demonstrates understanding of test interpretation.

Comments: Last wash was not saved and tested.

Total Score: 4/8

Assessment

Cognitive domain

- Consider what your student/trainee needs to know BESIDES how to perform tasks & follow SOPs
- Dry case studies, MCQs, pretest/posttest

Community Blood Center
Save a Life. Right Here, Right Now.

Immunohematology Reference Lab
Training Comprehension

Module 3 Quiz		
Name		
Date		
Score		☐ Pass ☐ Reviewed Missed Questions ☐ No follow-up required ☐ <80% Fail ☐ Quiz to be retaken

	Question	Answer
1	A patient has a history of a warm autoantibody. Currently the patient has a positive DAT and their plasma is reactive with all cells tested by LISS/IAT. The patient was transfused with 2 random RBCs about 2 months ago. The most valuable procedure in this situation would be	a. Test an eluate from the patient's cells for alloantibody detection/ID. b. Autoadsorb the patient's plasma and use the adsorbed plasma for alloantibody detection/ID. c. Test the patient's neat plasma by PEG/IAT for alloantibody detection/ID. d. Alloadsorb the patient's plasma and use the adsorbed plasma for alloantibody detection/ID.
2	A patient has a 3+ DAT with both poly-specific and IgG-specific antiglobulin reagents. An eluate from the patient's cells is nonreactive with all cells tested. What would be the best way to proceed?	a. Tests the eluate with a different panel. b. Request a medication list on the patient. c. Test the eluate by a different method. d. No additional action is necessary; report the cause of the DAT as unknown.
3	The most likely explanation for the results below ~~are~~ PEG IAT: 0 0 0 0 0 0 0 0 0 0 0 37°-RT: 3+ 0 3+ 0 0 3+ 3+ 0 3+ 0 0 4C: 4+ 4+ 4+ 4+ 4+ 4+ 4+ 4+ 4+ 4+ 4+ (1 2 3 4 5 6 7 8 9 10 Auto)	a. Cold **auto**antibody + cold **allo**antibody b. Cold **auto**antibody more reactive at 4C c. Cold **allo**antibody more reactive at 4C d. Multiple cold **allo**antibodies
4	A sample on a patient with a history of a warm reactive autoantibody is reactive with all cells tested. The patient's phenotype is C+,E-,c+,e+; K-; Fy(a+b-), Jk(a-b+), S-s+. Which of the following papain-treated adsorbing cells would be appropriate for this patient?	a. R_1R_1, K-, Fy(a+b+), Jk(a+b+), S-,s+ b. R_2R_2, K-, Fy(a+b-), Jk(a-b+), S-,s+ c. R_1R_1, K-, Fy(a-b+), Jk(a-b+), S+,s+ d. r^r K-, Fy(a+b-), Jk(a+b-), S+,s-

“Stimulated Recall”

Discussion of a case in addition to bench workup

Goal: assess both psychomotor and cognitive domain through problem solving, completion of bench work, and discussion of process & results

Psychomotor + **Cognitive**

“Stimulated Recall”

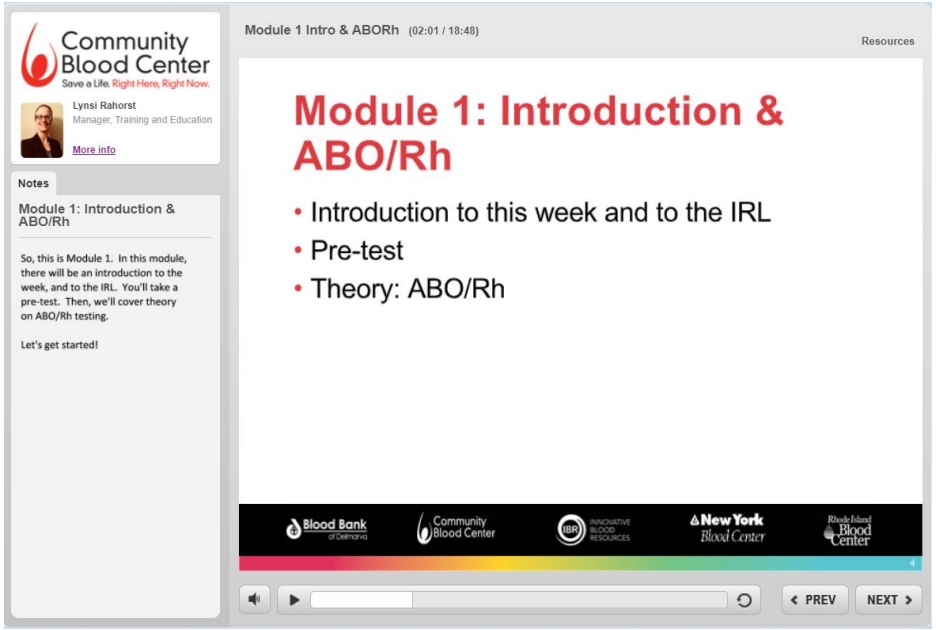
Example questions:

1. Please outline your approach to working up this sample.
2. What specific results led you to approach the problem in this way?
3. How does each assay performed contribute to your conclusion?
4. What more could you have done to support your conclusion?
5. How would you report these results to another health care professional? What information must be communicated prior to transfusing this patient?

“Stimulated Recall”

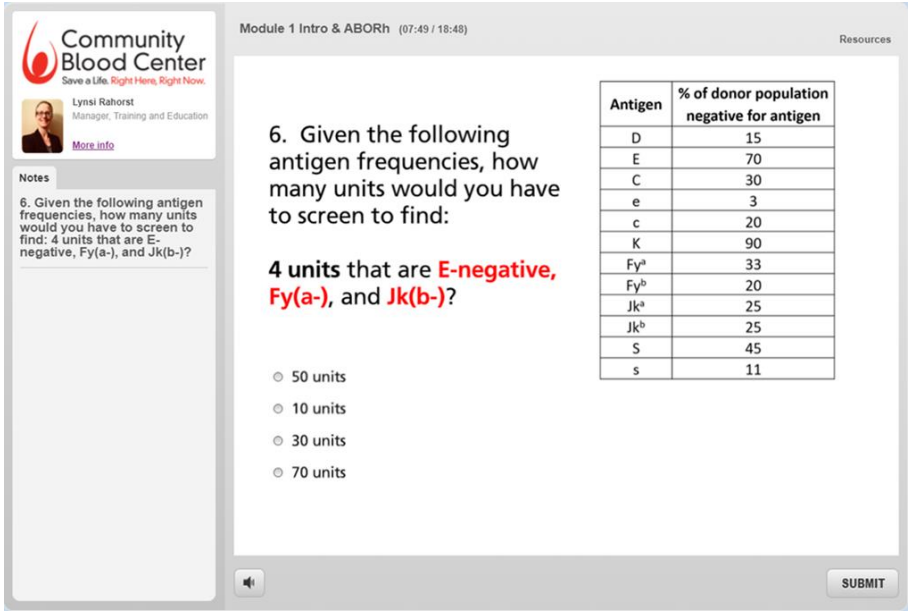
Case Specific Evaluation	Not discussed	Needs Improvement	Satisfactory	Outstanding	NA
Learner is able to outline the order of testing, and describe the appropriateness of each test.					
Learner demonstrates understanding of the assays used in the workup, and interprets each correctly.					
Learner uses important clues in initial testing (DAT result, autocontrol result, transfusion history, etc) to determine appropriate subsequent steps.					
Learner arrives at the correct conclusion.					
Learner can justify the necessity of all testing and avoids unnecessary testing.					
Learner is able to report results to another health care professional, explaining the clinical significance of the findings and recommending appropriate blood for transfusion.					
Overall Assessment					
Overall assessment of knowledge and reasoning skills					
Overall Comments					

Practical Tip #7: Go Virtual!



- Original goal: minimize in-person time
- Made with Articulate 360
- Learners review theory, observe videos of methods, take quizzes prior to arrival in IRL for benchwork (flipped classroom)

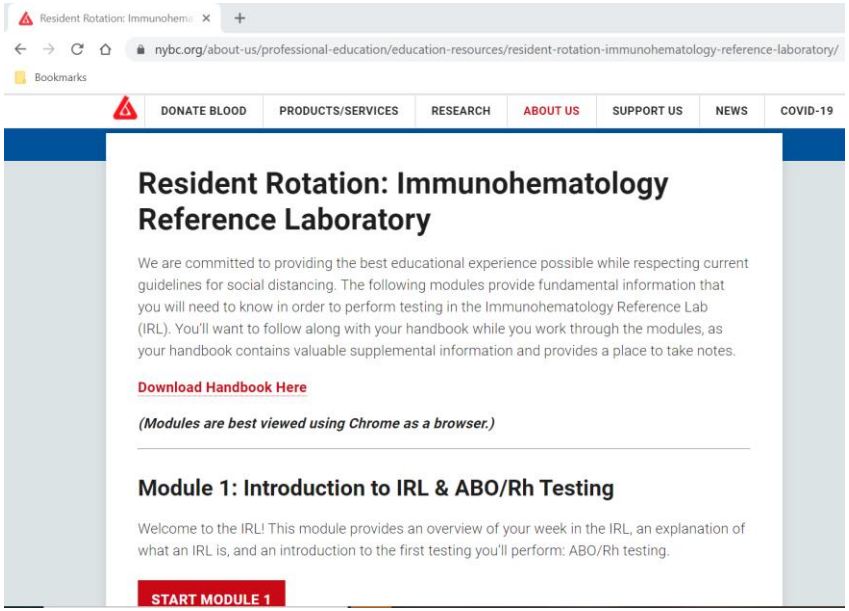
What do the Modules Include?



Antigen	% of donor population negative for antigen
D	15
E	70
C	30
e	3
c	20
K	90
Fy^a	33
Fy^b	20
Jk^a	25
Jk^b	25
S	45
s	11

- 15-56 minutes
- Theory/explanation
- Interactivity/learner participation
- Videos of bench work

Access to Online Modules



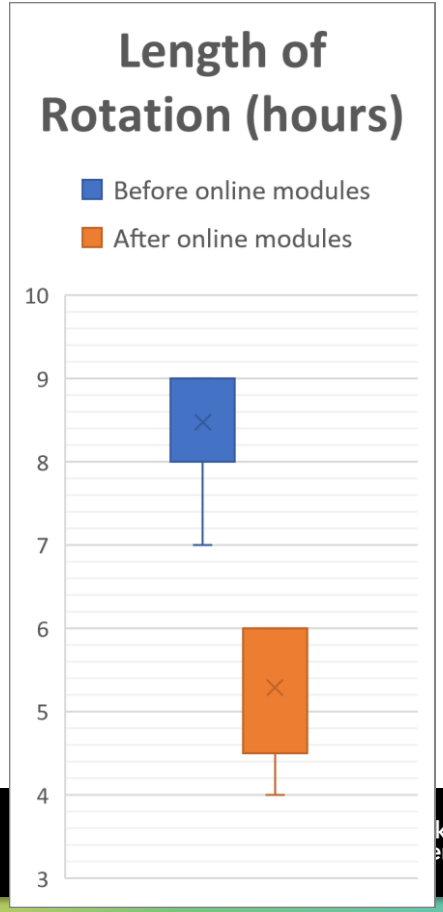
- Publicly accessible from organization's website: www.nybc.org/educationresources
- Learner can download handouts

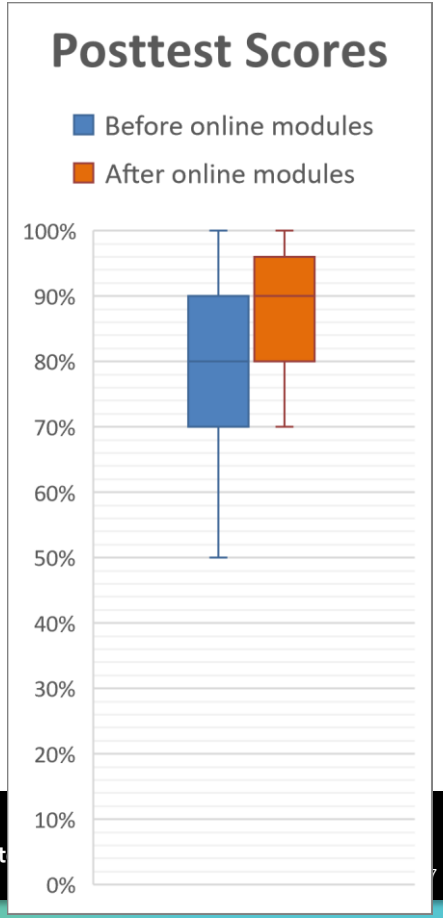
Results

- Time in the lab reduced
  - Example: Resident rotation went from 40 hours to 10 hours in-person
- Learners reported satisfaction with this new approach
- During times when COVID-19 policies prohibited visitors entirely, online modules still available
- ***Modules currently used for other purposes across organization***

Results: MLS Programs

	Pre-online modules	Post-online modules
Study period	09/2017-10/2020	11/2020-01/2022
MLS students	61	19
Ave. in-person rotation	8.48 hours	5.28 hours
Ave. posttest score	81%	87%
Ave. student feedback (scale of 5)	4.70	4.76





Practical Tip #8: Take Advantage of Available Material

Examples:

- www.bbguy.org
- www.indianinitiative.org
- www.nybc.org/educationresources
- youtube videos
- Biorad, Immucor, Grifols webinars

Caution: Information Overload

- Best approach may be to refer students/trainees to specific information/resources

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- Thank you to my colleagues in the immunohematology reference labs & genomics labs of the NYBCe who participate in education & training.
- Thank you to Michelle Lodermeier, MBA, MLS(ASCP)^{CM}SBB^{CM} for her help reviewing this presentation.

Further Reading

- Bimbaumer D. Teaching procedures: improving “see one, do one, teach one.” *Canadian Journal of Emergency Medicine.* 2011;13(6):390-394.
- Harmening D. “Education and training: practical tips for educators and trainers.” *Laboratory management: principles and processes.* D.H. Publishing. St. Petersburg, FL, 2021.
- Held S and McKimm. Improve your lecturing. *British Journal of Hospital Medicine. 2009;70*(8):466-469.
- Mann KV. Thinking about learning: implications for principle-based professional education. *Journal of Continuing Education in the Health Professions.* 2002;22:69-76.

Objectives:

At the end of this presentation, the learner will be able to…

1. Discuss learner-centered principles, including examples of how to employ learner-centered principles in education and training in the blood bank.
2. Describe the importance of the alignment of learning objectives, instructional approaches, and assessment methods.
3. List strategies that can be employed to improve education and training in the blood bank at your facility.

Thank you!

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