Colchester Research Facility
Laboratory for Clinical Biochemistry Research (LCBR)
University of Vermont
Department of Pathology and Laboratory Medicine

Lab Director: Russell P. Tracy, Ph.D.
Coordinator: Elaine Cornell
MESA 7 Project Manager: Jessica Rooney, MPH
MESA Repository Manager: Rebekah Boyle, MS

LCBR

- Russell P. Tracy, Ph.D has directed the LCBR since its inception in 1986; ABCC Board-certified Clinical Chemist
- Current Personnel includes 8 faculty members, 25 technical and administrative staff, plus students, post-doctoral fellows, and visiting scientists
- Focus on epidemiological & clinical trials research in the areas of coagulation, fibrinolysis, fibrosis, and innate and adaptive immunity
- Frequently serve as a central analysis laboratory and sample repository

Role of the LCBR in MESA 7

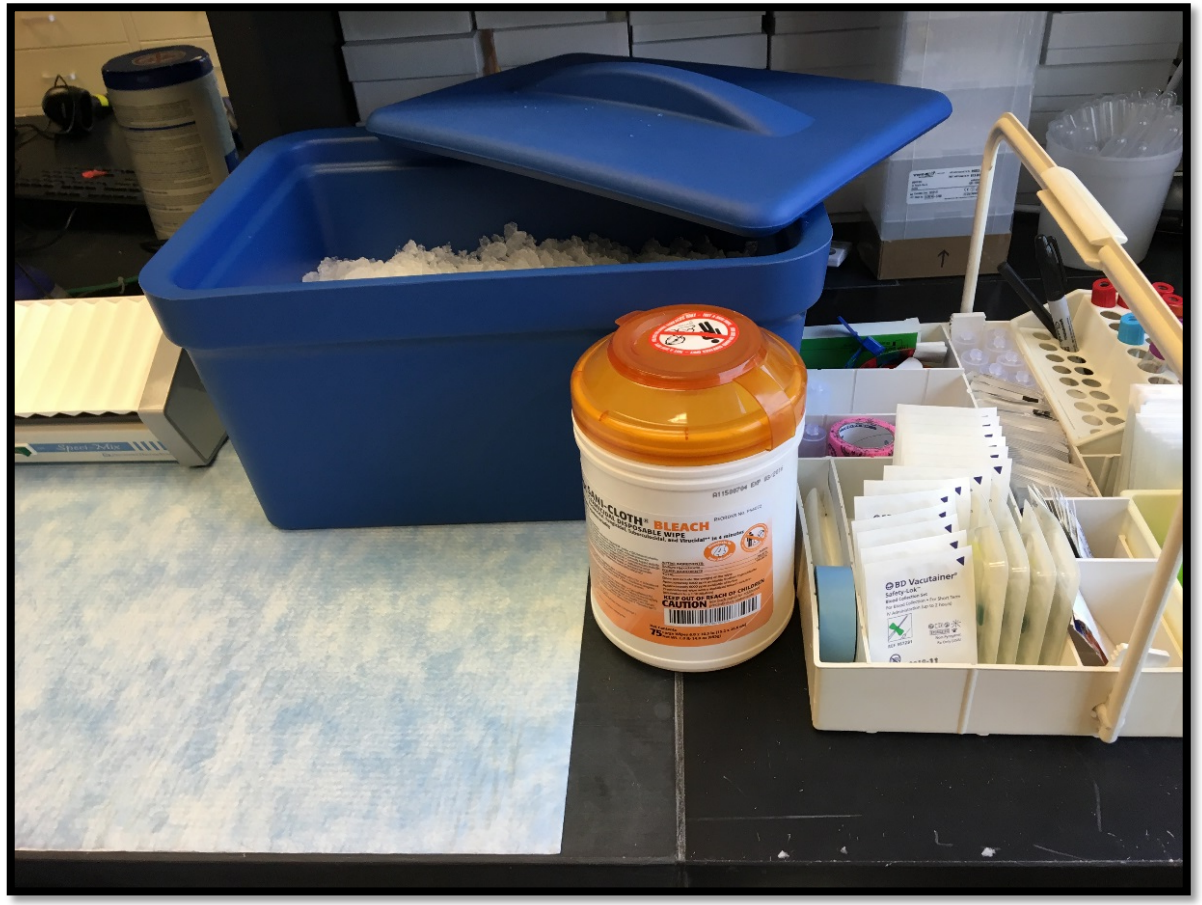
We are the MESA 7 Central Blood Analysis Lab (CBAL) and Repository

What we do:

- Assist with planning and development of MOPs for blood collection, handling, storage, sample utilization, etc.
- Receive shipments of participant samples from study sites
- Provide quality assurance feedback
- Perform some biomarker testing along with the University of Minnesota
- Inventory and provide repository storage for study samples

Blood Collection

Set Up – Venipuncture Supplies



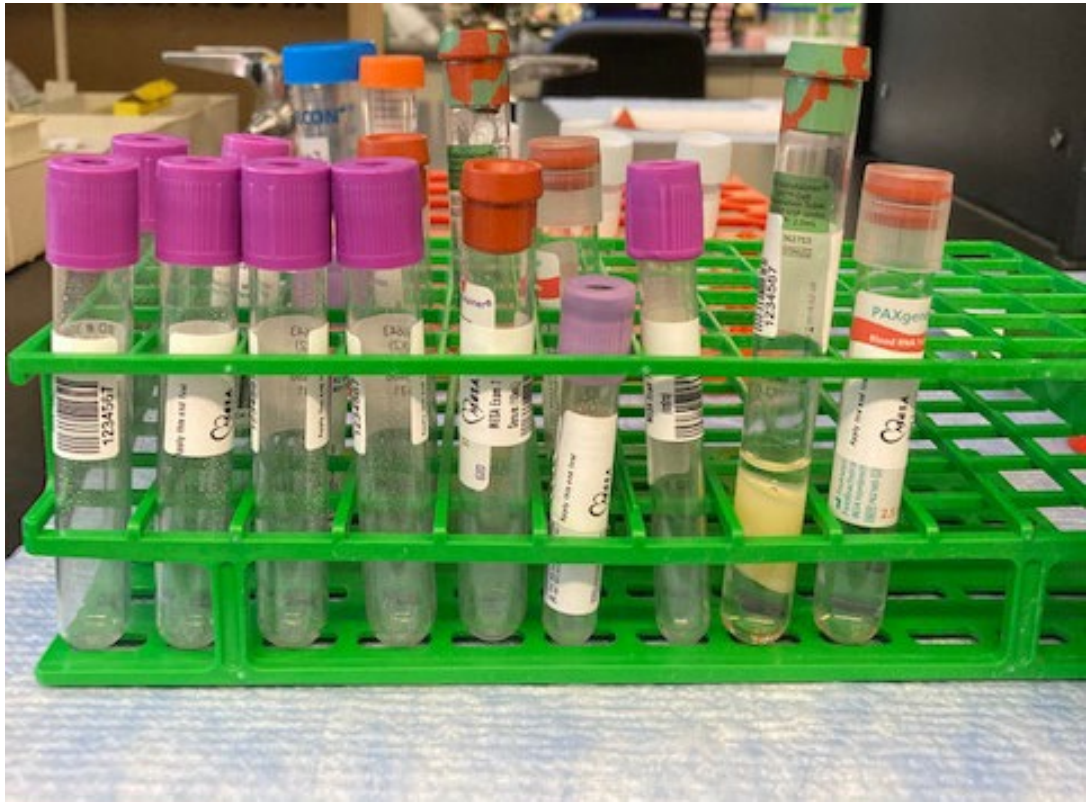
Draw Tubes

MESA 7 Draw			
(All Study Sites Except Northwestern)			
Quantity	Type	Volume	Total Volume
4	EDTA	10 mL	40 mL
1	Serum	10 mL	10 mL
1	Serum	5 mL	5 mL
1	EDTA	2 mL	2 mL
1	EDTA	10 mL	10 mL
1	PaxGene RNA	2.5 mL	2.5 mL
	Total Draw		69.5 mL

MESA 7 Draw

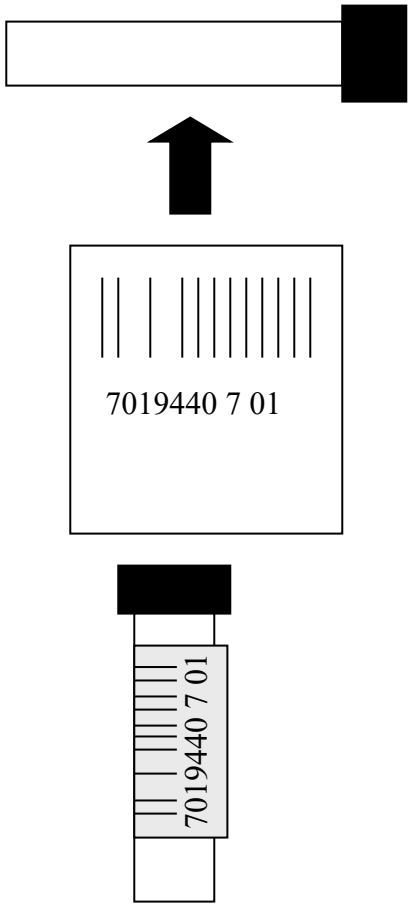
Draw Tubes Continued

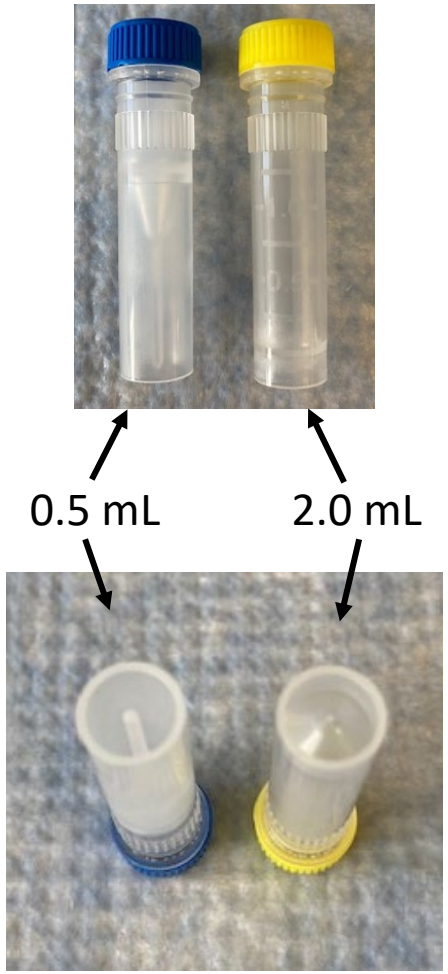
MESA 7 + Epi Draw (Northwestern)			
Quantity	Type	Volume	Total Volume
4	EDTA	10 mL	40 mL
1	Serum	10 mL	10 mL
1	EDTA	2 mL	2 mL
1	EDTA	6 mL	6 mL
1	CPT	8 mL	8 mL
1	PaxGene RNA	2.5 mL	2.5 mL
	Total Draw		68.5 mL

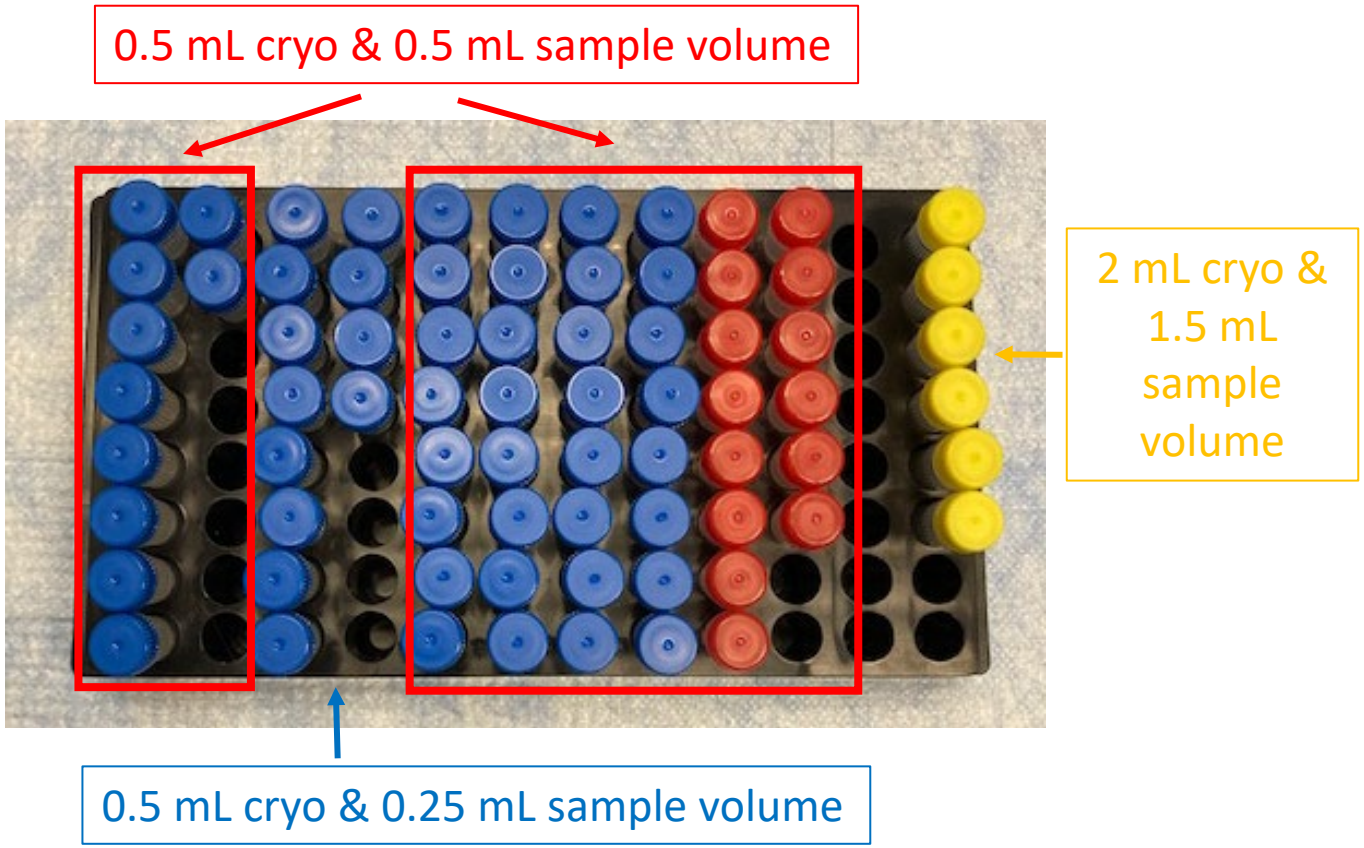


Aliquot Tube Preparation

Label Orientation







Safety Issues and Precautions for Handling Blood Specimens

In accordance with the OSHA regulations on bloodborne pathogens, the LCBR recommends the following lab safety protocol for the field center laboratories:

- ✓ Use of non-permeable lab coats, latex gloves, and face shields when handling any blood in any situation where splashes, spray, spatter, or droplets of blood may be generated and eye, nose, or mouth contamination can be reasonably anticipated.
- ✓ Use of aerosol containers in all centrifuges.
- ✓ Follow 'Standard Precautions' when handling any blood products.
- ✓ Contaminated needles and sharps shall be immediately placed in a puncture-resistant, leak-proof container. Never recap or break needles.
- ✓ Hepatitis B vaccine should be offered to all unvaccinated technicians handling blood, and documentation of vaccination, or technician's declining to be vaccinated, should be kept on file at the Clinical Center.
- ✓ Limit distractions - Noise, radios, phones, etc for your safety and the safety of those around you

Sources of safety information:

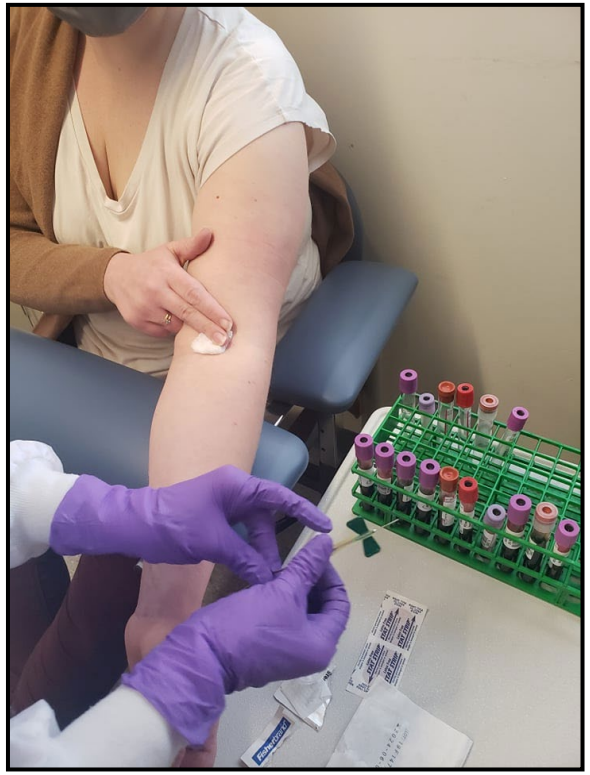
http://www.cdc.gov/niosh/topics/bbp/
http://www.osha.gov/SLTC/bloodbornepathogens/index.html
http://www.cdc.gov/elcosh/docs/d0300/d000378/d000378.pdf

Preparation of Venipuncture Site

Venipuncture procedure

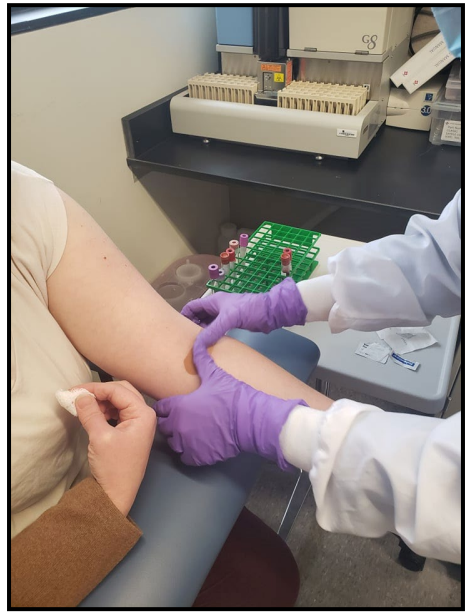
Venipuncture procedure continued

Venipuncture continued

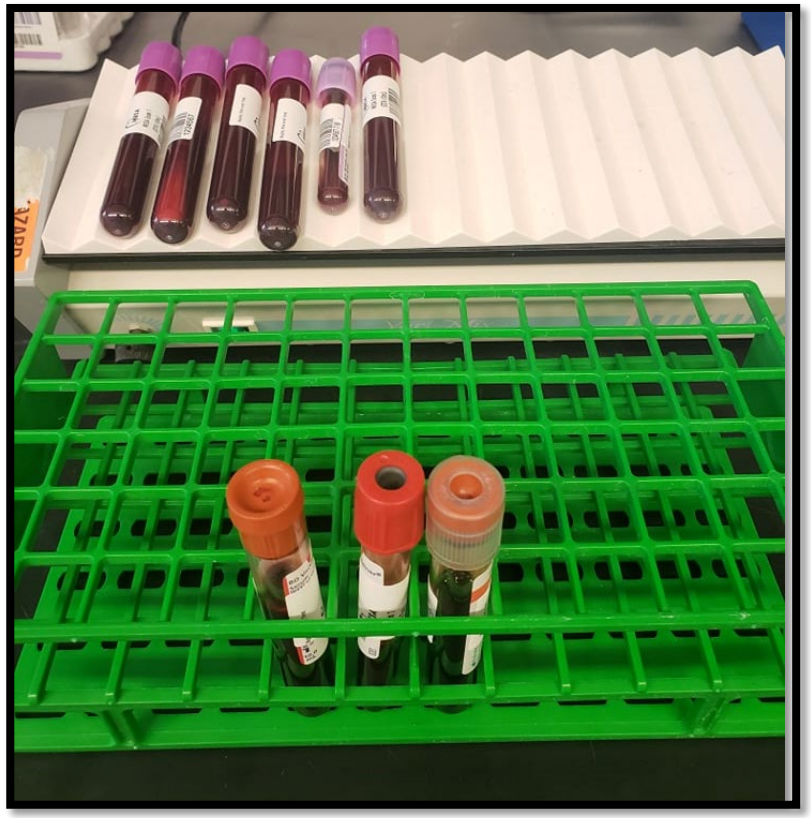


← Remove needle and apply pressure w/ gauze pad

Apply bandage →

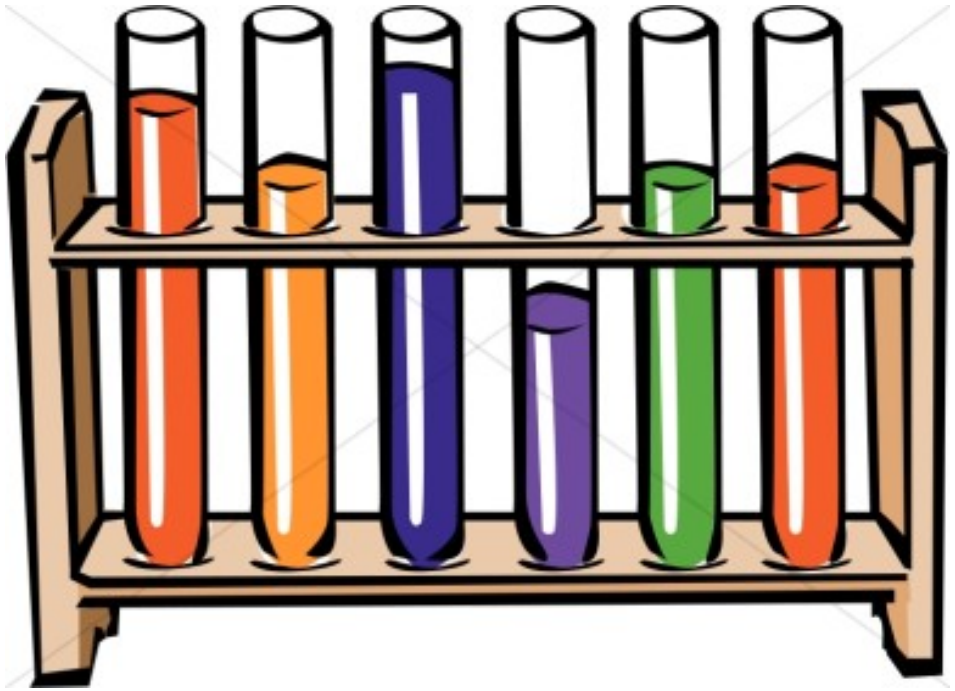


MESA 7 Classic Samples after Draw



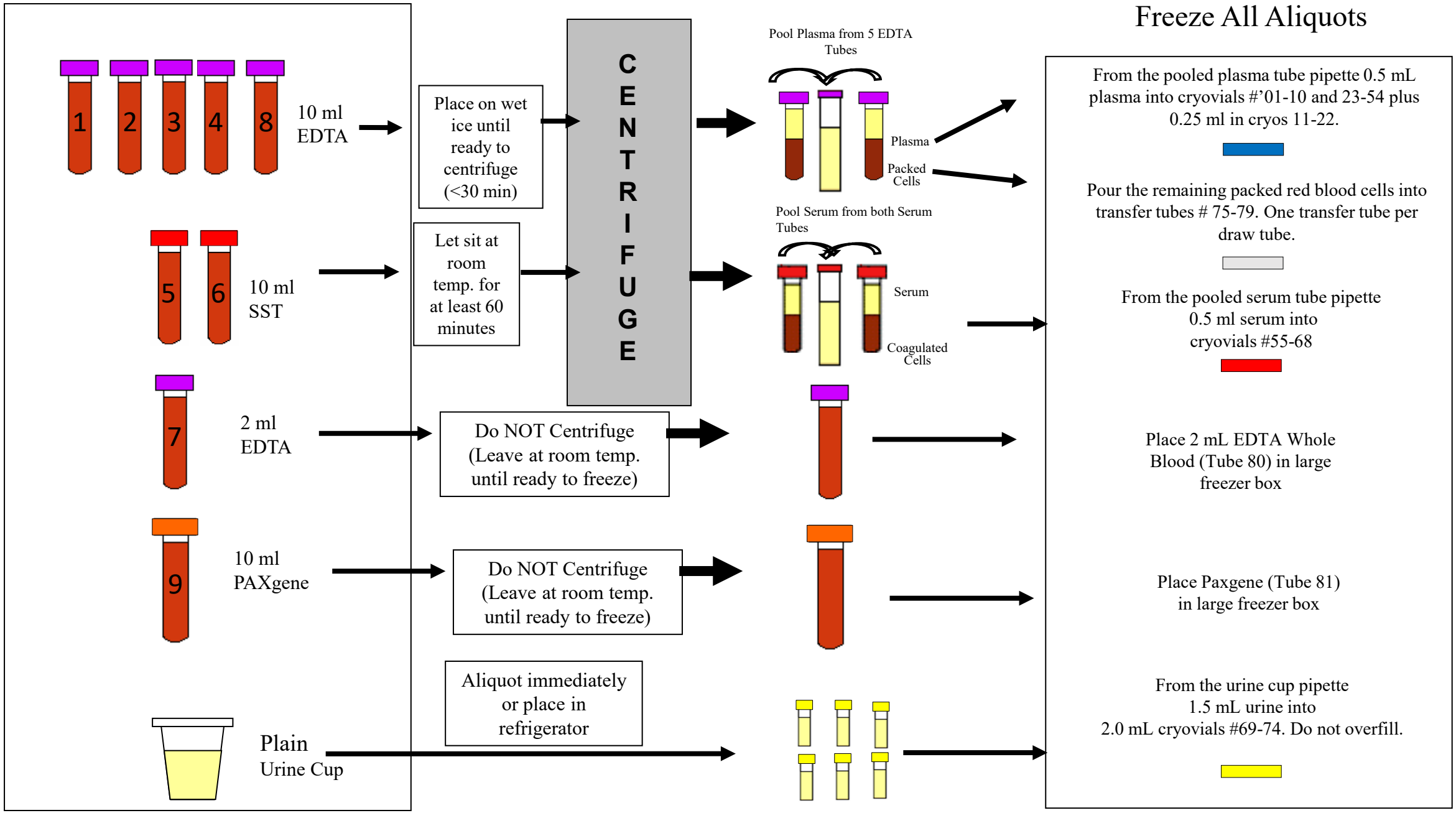
- EDTA - After filling, these tubes are mixed for ~30 seconds on the tube rocker then placed on wet ice. EDTA tubes for plasma preparation are centrifuged within 30 minutes of the draw. EDTA for whole blood can remain on ice until it can be stored in -80 C freezer.
- Serum - After filling, gently invert tube 5 times to ensure proper mixing of the activator with the blood. Tubes remain upright at room temperature for a minimum of 60 minutes, but not longer than 90 minutes, to allow the blood to clot.
- Paxgene - After filling, gently invert tube 8-10 times to mix blood with RNA stabilization additive. The tube can remain at room temperature until it is placed in a -80 C freezer for storage.

Blood Processing



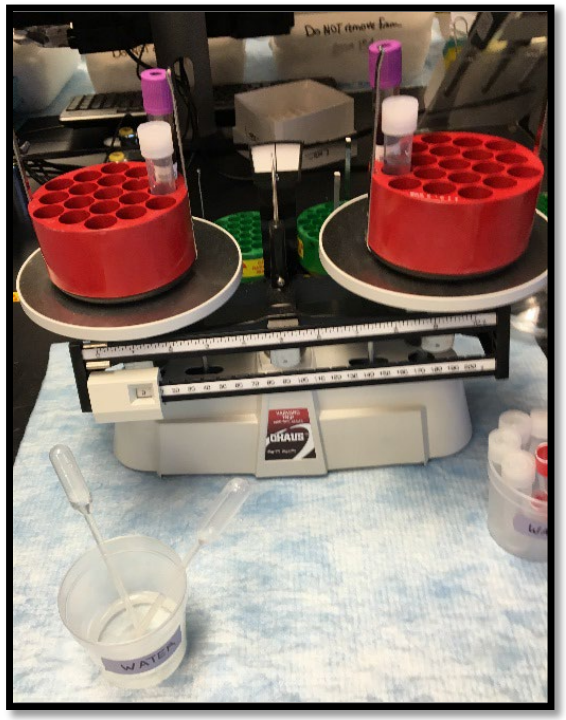
MESA Exam 7 Processing Guide

After the visit, you should have:



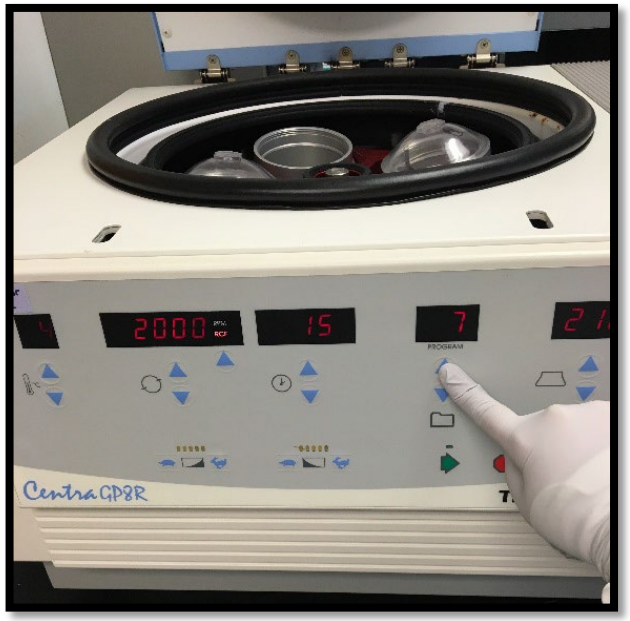
Prepare for Centrifugation

Balance tubes to be centrifuged



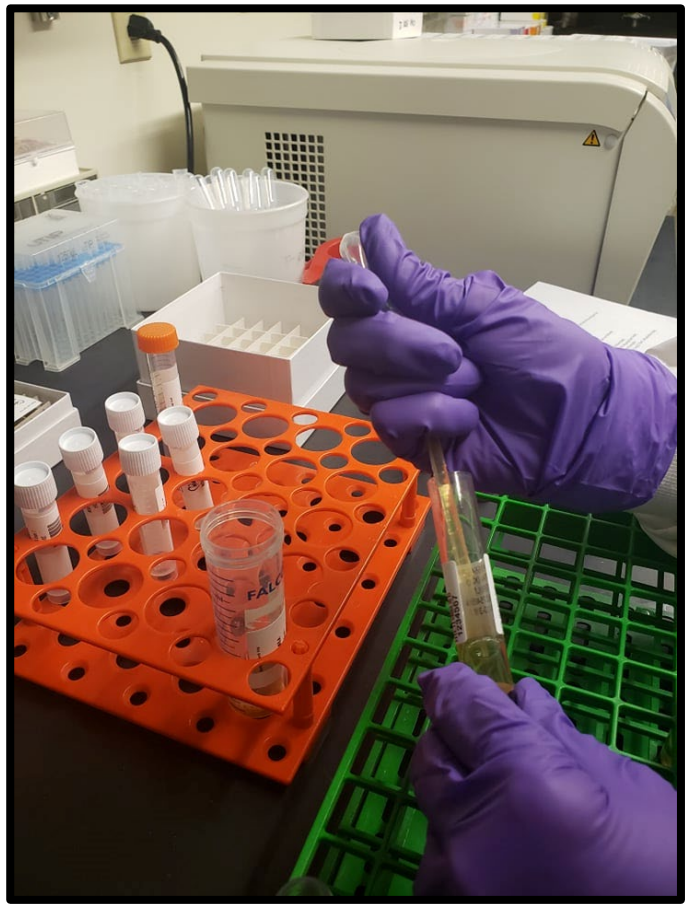
Use sealed cups to minimize aerosol hazard

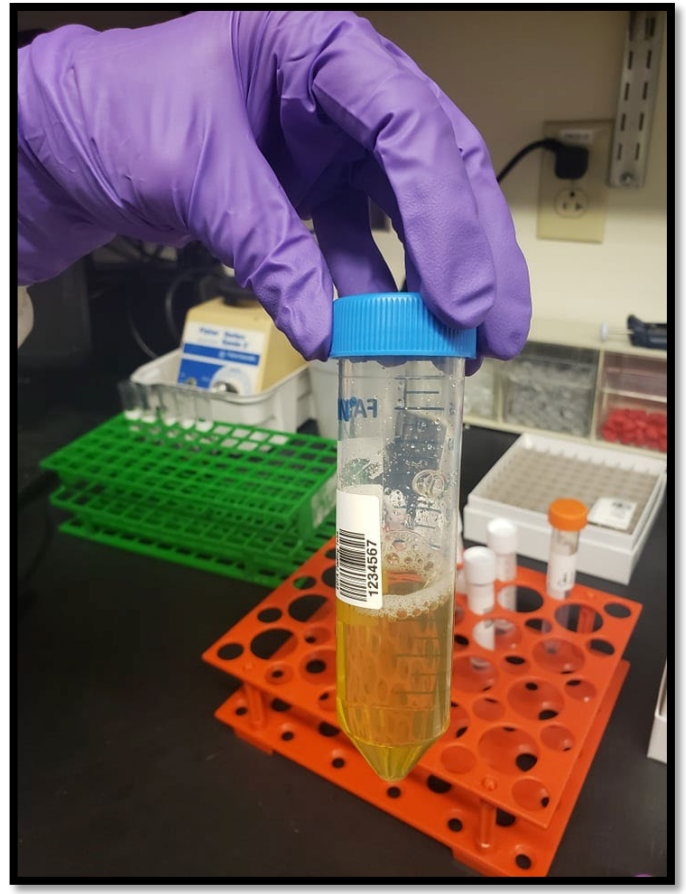
Run at 4°C for 30,000 G/min



Pool and Gently Mix

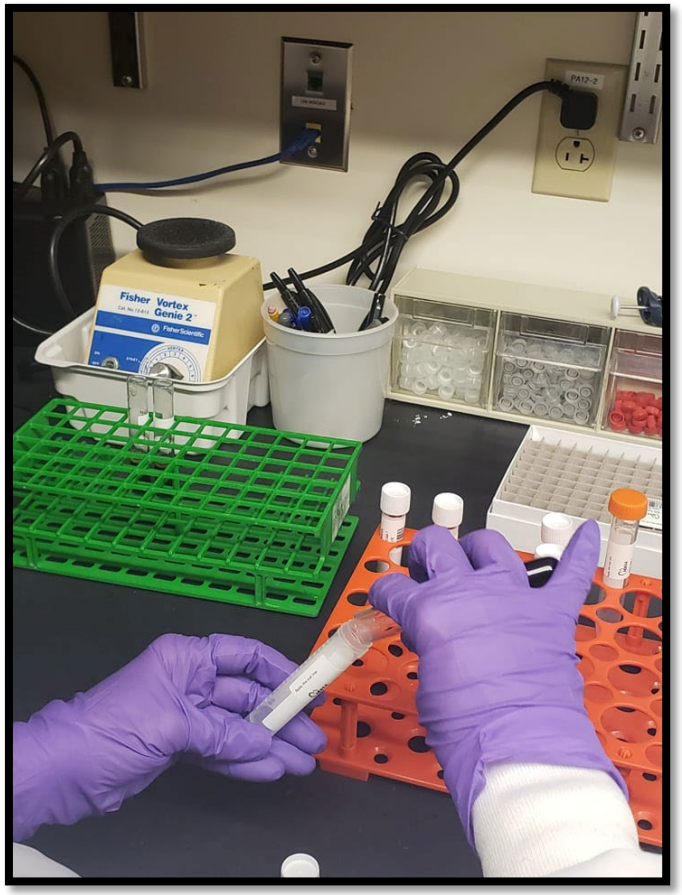
- Have labeled 15 mL (serum) 50 mL (plasma) pooling tubes ready
- Draw plasma or serum off using a pipette
- Use care to avoid disturbing the cell layer at the bottom of the tube
- Cap and gently rock tube to mix



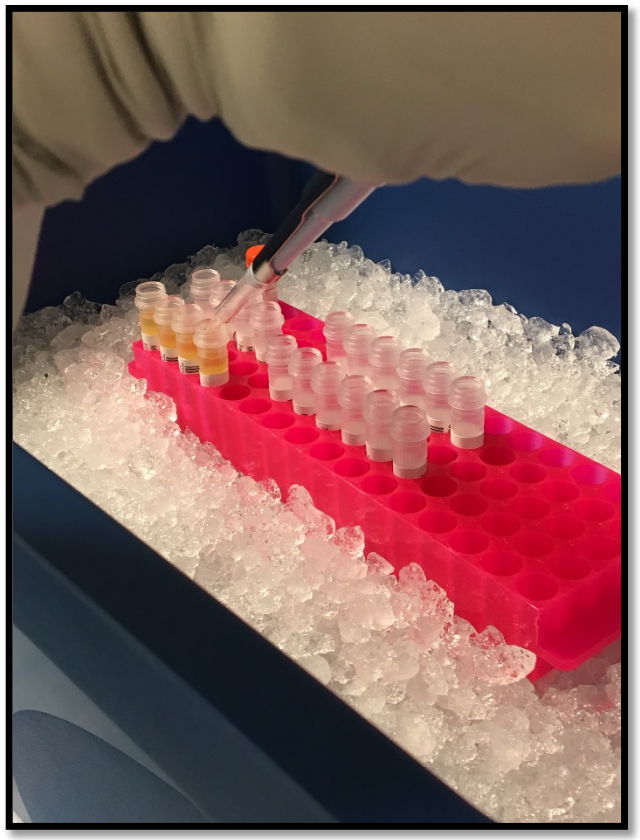


Pour Over Packed Red Blood Cells

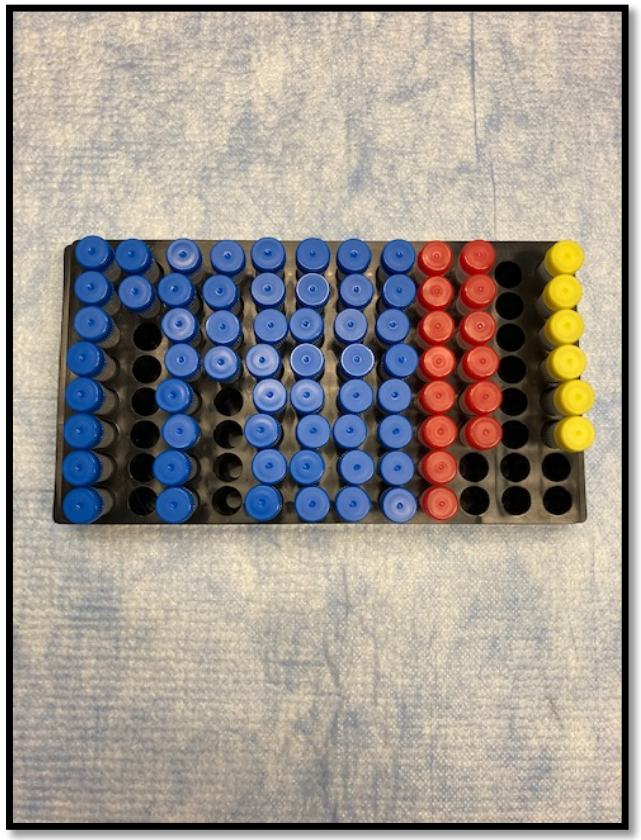
- Have labeled transfer tubes ready for 5 EDTA draw tubes
- Carefully pour any remaining plasma and all packed cells into transfer tube
- Use one transfer tube per draw tube
- Cap and freeze upright in labeled 5x5x3 inch box



Aliquot and Cap



Example rack from Exam 6

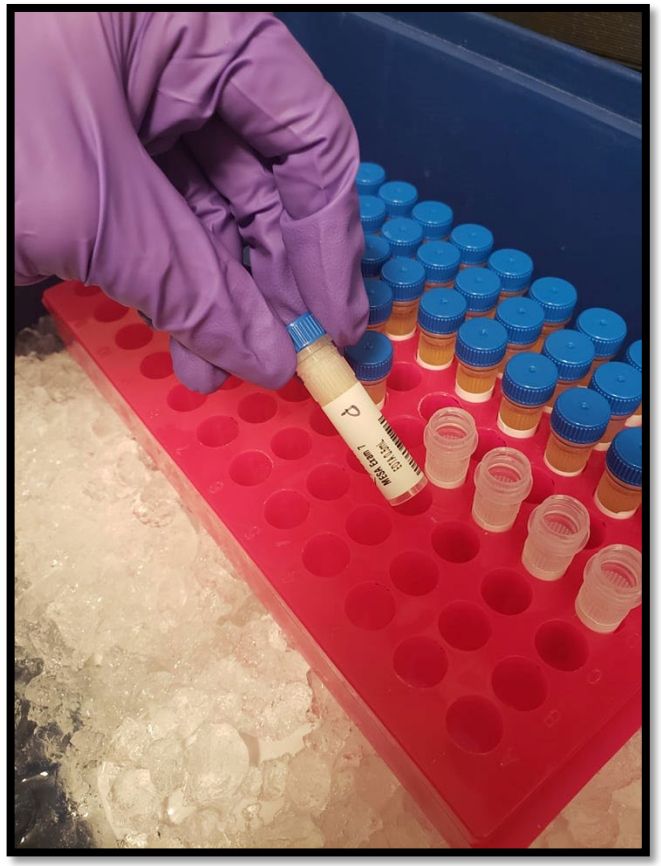


Completed blood and urine set

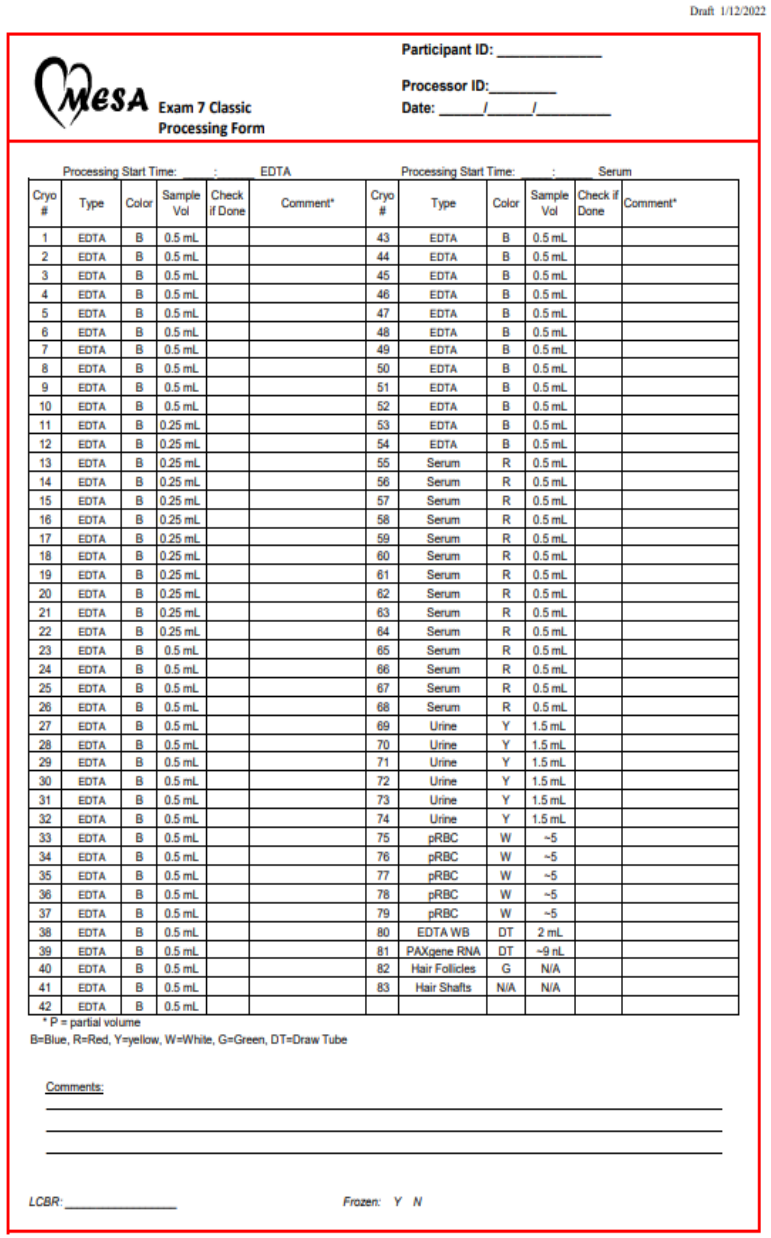
- Place rack with pre-labeled cryovials on ice or cold pack
- Aliquot 0.5 mL plasma into first 10 cryos (‘01-’10)
- Aliquot 0.25 mL plasma into next 12 cryos(‘11-’22)
- Aliquot 0.5 mL plasma into remaining 32 cryos(‘23-’54)
- Aliquot 0.5 mL serum into first 14 cryos (‘55-’68)
- Cap full cryos with colored cap (EDTA-blue, serum-red, urine-yellow)
- Change pipette tips between sample types and participants

Processing Notes

- Serum sample processing follows the same steps as EDTA plasma
- Serum must sit for a minimum of 60 minutes before centrifugation to allow for blood to clot
- Fill tubes in **numerical** order
- Do not attempt to make all aliquots if only a partial volume was collected, fill cryos in order with specified volume leaving the last with partial volume
- Mark partial volume samples on the label with a “P” and record on the processing form
- Record all aliquots made and any deviations from protocol on processing form



Processing Form



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MESA Exam 7 Classic Processing Form

Participant ID: _____

Processor ID:_____

Date: _____/_____/_____

Processing Start Time: ___:___ EDTA

Processing Start Time: ___:___ Serum

Cryo #	Type	Color	Sample Vol	Check if Done	Comment*	Cryo #	Type	Color	Sample Vol	Check if Done	Comment*
1	EDTA	B	0.5 mL			43	EDTA	B	0.5 mL		
2	EDTA	B	0.5 mL			44	EDTA	B	0.5 mL		
3	EDTA	B	0.5 mL			45	EDTA	B	0.5 mL		
4	EDTA	B	0.5 mL			46	EDTA	B	0.5 mL		
5	EDTA	B	0.5 mL			47	EDTA	B	0.5 mL		
6	EDTA	B	0.5 mL			48	EDTA	B	0.5 mL		
7	EDTA	B	0.5 mL			49	EDTA	B	0.5 mL		
8	EDTA	B	0.5 mL			50	EDTA	B	0.5 mL		
9	EDTA	B	0.5 mL			51	EDTA	B	0.5 mL		
10	EDTA	B	0.5 mL			52	EDTA	B	0.5 mL		
11	EDTA	B	0.25 mL			53	EDTA	B	0.5 mL		
12	EDTA	B	0.25 mL			54	EDTA	B	0.5 mL		
13	EDTA	B	0.25 mL			55	Serum	R	0.5 mL		
14	EDTA	B	0.25 mL			56	Serum	R	0.5 mL		
15	EDTA	B	0.25 mL			57	Serum	R	0.5 mL		
16	EDTA	B	0.25 mL			58	Serum	R	0.5 mL		
17	EDTA	B	0.25 mL			59	Serum	R	0.5 mL		
18	EDTA	B	0.25 mL			60	Serum	R	0.5 mL		
19	EDTA	B	0.25 mL			61	Serum	R	0.5 mL		
20	EDTA	B	0.25 mL			62	Serum	R	0.5 mL		
21	EDTA	B	0.25 mL			63	Serum	R	0.5 mL		
22	EDTA	B	0.25 mL			64	Serum	R	0.5 mL		
23	EDTA	B	0.5 mL			65	Serum	R	0.5 mL		
24	EDTA	B	0.5 mL			66	Serum	R	0.5 mL		
25	EDTA	B	0.5 mL			67	Serum	R	0.5 mL		
26	EDTA	B	0.5 mL			68	Serum	R	0.5 mL		
27	EDTA	B	0.5 mL			69	Urine	Y	1.5 mL		
28	EDTA	B	0.5 mL			70	Urine	Y	1.5 mL		
29	EDTA	B	0.5 mL			71	Urine	Y	1.5 mL		
30	EDTA	B	0.5 mL			72	Urine	Y	1.5 mL		
31	EDTA	B	0.5 mL			73	Urine	Y	1.5 mL		
32	EDTA	B	0.5 mL			74	Urine	Y	1.5 mL		
33	EDTA	B	0.5 mL			75	pRBC	W	~5		
34	EDTA	B	0.5 mL			76	pRBC	W	~5		
35	EDTA	B	0.5 mL			77	pRBC	W	~5		
36	EDTA	B	0.5 mL			78	pRBC	W	~5		
37	EDTA	B	0.5 mL			79	pRBC	W	~5		
38	EDTA	B	0.5 mL			80	EDTA WB	DT	2 mL		
39	EDTA	B	0.5 mL			81	PAXgene RNA	DT	~9 mL		
40	EDTA	B	0.5 mL			82	Hair Follicles	G	N/A		
41	EDTA	B	0.5 mL			83	Hair Shafts	N/A	N/A		
42	EDTA	B	0.5 mL								

* P = partial volume

B=Blue, R=Red, Y=yellow, W=White, G=Green, DT=Draw Tube

Comments:

_____

_____

_____

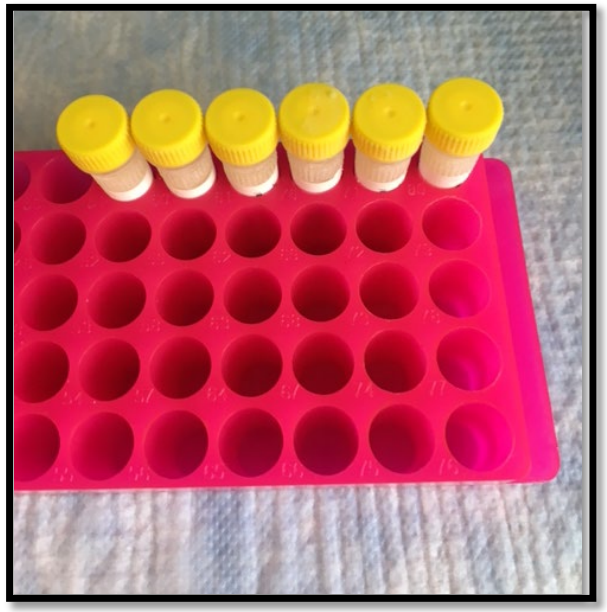
LCBR: _____ *Frozen: Y N*

Mesa7ClassicProcessingForm_011222

Urine Collection and Processing

'spot' urine collection
~11 mLs required for processing

1.5 mL x 6 cryos

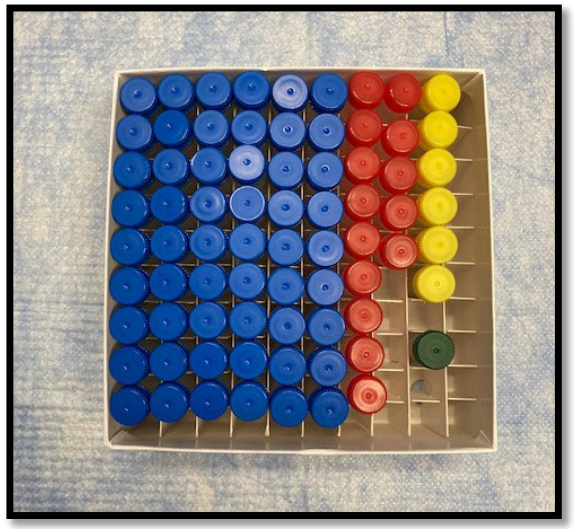


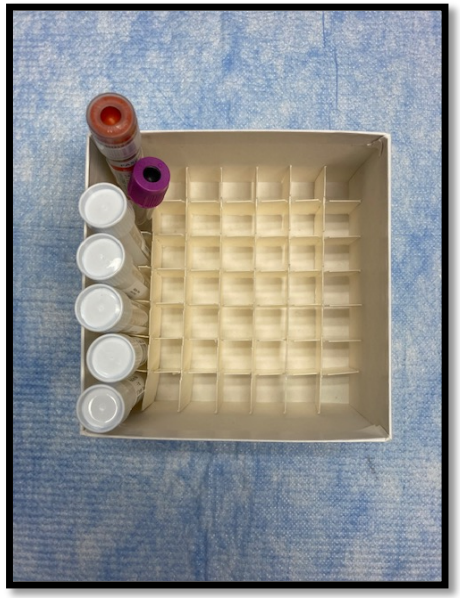
Labeled urine aliquots

- Cryovials 69-74, 2 mL size vial
- 1.5 mL urine added to each tube
- Place all tubes on ice until the can be frozen @ -80 C

(preferably within 10 mins)

Prepare for Freezer

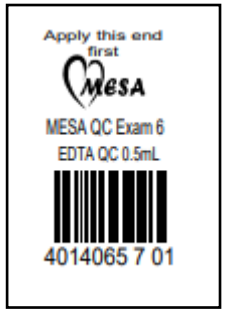


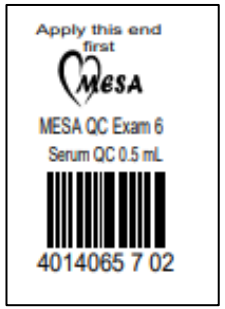


- Place all cryovials in 5x5x2 inch fiberboard box with 100 cell grid
- Label box with “Freezer Box” label
- Place Paxgene RNA draw tube, EDTA 2 mL whole blood draw tube, and 5 pRBC transfer tubes in 5 x 5 x 3 inch fiberboard box with 49 cell grid
- All samples should be frozen upright in a -80^{o}C freezer until ready to ship

Blind Duplicates for QC

- A blind duplicate sample for quality control will be reserved from ~10% of participants (5% each for EDTA and serum.).
- Participants selected for EDTA QC activity will automatically be selected for urine QC.
- Participants will be selected for QC purposes based on the last two digits of their ID numbers.
- EDTA & urine QC activity last 2 digits of their 7 digit MESA ID are 06, 16, 26, 36, and 46.
- Serum QC activity last 2 digits of their 7 digit MESA ID are 56, 66, 76, 86, and 96.





MESA EXAM 6: - BLIND DUPLICATE SHIPPING FORM

Date of shipment: _____
Center: _____ Prepared by: _____

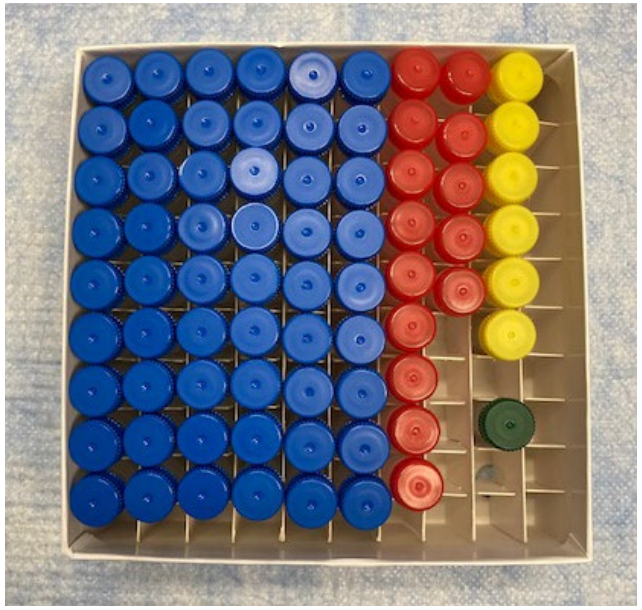
FedEx Air Bill#: _____

(Include in shipment AND e-mail:)

Blind Dupe /QC ID#	Sample Type	Color code (red, purple, yellow)

Packing and Shipping

Participant Blood Cryovial Sample Shipment



Cryovial Box 1 Participant

Tall Tubes Box 1 Participant
(4 participant sets fit per box)

MESA

MESA EXAM 7 - SHIPPING FORM

Date of shipment: _____

Center: _____ Prepared by: _____

FedEx Air Bill#: _____

(Include in shipment AND e-mail: Jessica.lanzer@med.uvm.edu, Elaine.Cornell@uvm.edu, and Rebekah.Boyle@uvm.edu)

MESA ID#	VISIT DATE	BOX #

MESA_Exam7_ ShippingForm

Packing Frozen Blood Samples

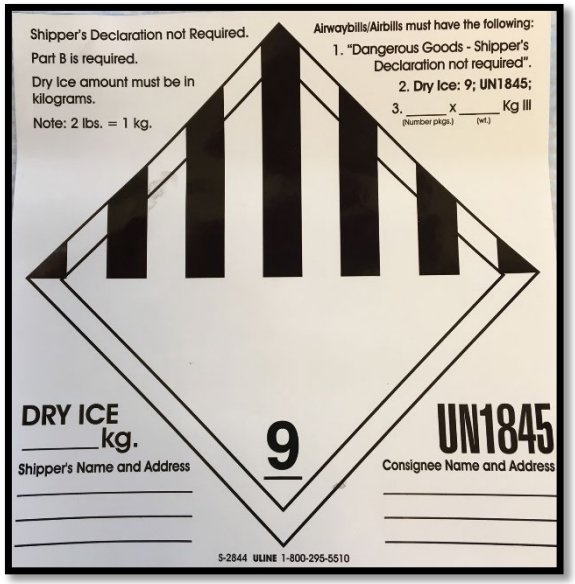
The following shipping instructions comply with the International Air Transport Association's Goods Regulation-Packaging Instructions 650 and 954

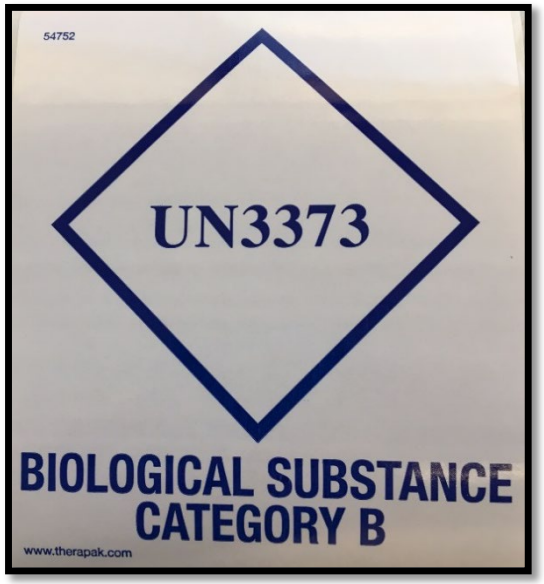
- Line Styrofoam mailer with cushioning/absorbent material (lab mat)
- Place 5-10 lbs of dry ice in bottom of mailer
- Place another layer of absorbent material on top of dry ice to act as a barrier between the dry ice and freezer boxes
- Ensure cryovials are packed in 5x5x2 inch cardboard freezer boxes with either 81 or 100 cell grids
- Secure cryovial boxes with rubber bands and place in a zip top bag with absorbent material sufficient for the volume of sample being sent
- Ensure tall tubes are packaged according to instructions and placed in zip top bag with absorbent material sufficient for the volume of sample being sent
- Place bagged samples into Styrofoam mailer
- Place another layer of absorbent material over freezer boxes
- Place remaining dry ice (~5-10 lbs) on top of absorbent material and put the top of the Styrofoam in place
- Insert the shipping form and participant processing forms on top of the Styrofoam mailer before sealing the outer cardboard flaps

Shipping Schedule

- Frozen samples should be shipped Monday or Tuesday of every other week
- We would like to develop a shipping schedule so every site ships the same week, but are divided between the two days
- Please let us know if you have any limitation at your site that are related to schedule (Dry Ice availability, etc)

Shipping Frozen Blood Samples





- Use Fed-Ex Priority Overnight Delivery
- Shipment information should be e-mailed to Jessica Rooney, Elaine Cornell, and Rebekah Boyle (Jessica.lanzer@med.uvm.edu elaine.cornell@med.uvm.edu & Rebekah.boyle@med.uvm.edu)
- All packages must be marked with
  - A UN3373 Biological Substance Category B label
  - A dangerous goods Category 9 UN1845 Dry Ice label (with dry ice weight)
  - A completed Fed-Ex air bill
  - The shipper and recipient's name, address, and phone number
- All packages should be shipped to:

  Rebekah Boyle
  University of Vermont
  Laboratory for Clinical Biochemistry Research
  360 South Park Drive
  Colchester, VT 05446
  p:(802)656-8938

Certification

Certification Process

Obtaining Certification

- Read and understand the appropriate chapters in the MESA 7 Manual of Operations.
- Attend Central Training Zoom session
- Successfully complete the written exam
- Successfully complete blood draw/processing while be observed

Maintaining Certification

- Perform phlebotomy/processing on a minimum of one person every month for the first three month and every other month after that

Certifying Other Technicians

- Ensure new technician has read MESA's Laboratory MOP and section of the Exam 7 MOP.
- Perform phlebotomy/processing with new technician observing
- Supervise as new technician drawing/processing blood samples from one volunteer as described in the protocol and in accordance with the certification checklist
- Administer written examination prepared by LCBR.
- Send exams and checklists to LCBR and CC


Questions