Clinical Research Consortium for the Study of Cerebellar Ataxia (CRC-SCA) Study Manual of Procedures

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Section	Change
Document Footer	Updated to "Version (April 2025)"
Throughout Document	Minor changes made to phrasing and wording. No alterations to procedures were made.

National Institute of Neurological Disorders and Stroke Biorepository:

BioSpecimen **E**xchange for **N**eurological **D**isorders, **BioSEND**

Biospecimen Collection, Processing, and Shipment Manual for Clinical Research Consortium for the Study of Cerebellar Ataxia (CRC-SCA) Study

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1.0 PURPOSE

The purpose of this manual is to provide collection site staff (PIs, study coordinators, and the sample collection and processing teams) at various study sites with instructions for collection and submission of biological samples. It includes instructions for biospecimen submission to the BioSpecimen Exchange for Neurological Disorders (BioSEND) located at Indiana University.

This manual includes instructions for the collection, processing, aliquoting and shipping of the following samples:

- Plasma
- Buffy Coat
- Serum
- Whole Blood
- CSF

These procedures are relevant to all study personnel responsible for processing blood specimens to be submitted to BioSEND.

2.0 ABBREVIATIONS

BioSEND	BioSpecimen Exchange for Neurological Disorders
EDTA	Ethylene Diamine Tetra-acetic Acid
IATA	International Air Transport Association
RBC	Red Blood Cells
RCF	Relative Centrifugal Force
RPM	Revolutions Per Minute
SCA	Spinocerebellar Ataxia
CSF	Cerebrospinal Fluid

3.0 BioSEND Information

3.1 BioSEND Contacts

Tatiana Foroud, PhD, Principal Investigator

Carolyn Dunifon, Clinical Research Coordinator

Phone: 317-274-5751
Email: cdunifon@iu.edu

General BioSEND Contact Information

Phone: 317-278-6158
Email: biosend@iu.edu
Website: https://biosend.org/
CRC-SCA Study Resources: https://biosend.org/coordinate-studies/active-studies/crc-sca

Sample Shipment Mailing Address
BioSEND
Indiana University School of Medicine
351 W. 10th Street, TK-217
Indianapolis, IN 46202-4118

3.2 Hours of Operation

Indiana University business hours are from 8 AM to 5 PM Eastern Time, Monday through Friday.

Frozen samples must be shipped Monday- Wednesday only.

For packaging and shipment details, please refer to Appendix K (Frozen Shipping Instructions)

Check the weather reports and the shipping courier website to make sure impending weather events (blizzards, hurricanes, etc.) will not impact the shipping or delivery of the samples. Couriers often reports anticipated weather delays on their website.

3.3 Holiday Schedules

- Please note that courier services may observe a different set of holidays. Please be sure to verify shipping dates with your courier prior to any holiday.
- **Weekend/holiday deliveries will not be accepted.**

3.4 Holiday Observations

Date	Holiday
January 1	New Year's Day
3rd Monday in January	Martin Luther King, Jr Day
4th Monday in May	Memorial Day
June 19th	Juneteenth (observed)
July 4	Independence Day (observed)
1st Monday in September	Labor Day
4th Thursday in November	Thanksgiving
4th Friday in November	Friday after Thanksgiving
December 25	Christmas Day

Please note that BioSEND has extended closures surrounding the week of Thanksgiving and the last two weeks of the year. Please contact biosend@iu.edu for details of closures.

Please see https://biosend.org/holiday-closures for additional information.

4.0 BioSEND Sample Requirements

NINDS approves each study for a specific biospecimen collection protocol. Studies and study sites should make every effort to meet their approved biospecimen collection requirements. The expected number of samples from each site that should be returned to BioSEND are listed in section 4.1.

If a sample is not obtained at a particular visit, this should be recorded in the notes section of the **Sample Record and Shipment Notification Form (see Appendix I).** This form is submitted with your sample shipment to BioSEND.

4.1 Protocol Schedule for Biospecimen Submission to BioSEND – CRC-SCA

All Visits	Quantity
Serum aliquots, 1ml	6
Plasma aliquots, 1ml	6
Buffy Coat aliquots	2
Whole Blood, 3ml	2
CSF aliquots, 1 ml	10

5.0 SPECIMEN COLLECTION KITS, SHIPPING KITS AND SUPPLIES

BioSEND will provide a sufficient number of labels and supplies only for those specimens that are to be shipped back to the BioSEND repository (See the Protocol Schedule for Biospecimen Submission to BioSEND for your site in Section 4.1); any tubes that will remain at the collection site or shipped to other repositories should be labeled accordingly. Ensure that all tubes are properly labeled during processing and at the time of shipment according to Section 6.2.

5.1 Kit Supply to Study Sites

Each individual site will be responsible for ordering study kits. We advise sites to proactively confirm kits are on hand ahead of study visits.

Within the kit request module, there is a drop down menu to request kits based on the Principal Investigator at that site. Kits and individual items can be ordered as required through the kit request module.

The link to the kit request module is shown below:

- CRC-SCA: http://kits.iu.edu/biosend/crc-sca

Please allow **TWO weeks** for kit orders to be processed and delivered.

5.2 Specimen Collection Kit Contents

Collection kits contain the following (for each subject) as designated per your protocol and/or NINDS resource development agreement. Kits provide the necessary supplies to collect samples from a given subject. Do not replace or supplement any of the tubes or kit components provided with your own supplies unless you have received approval from the NINDS/BioSEND Study team to do so. *Please store all kits at room temperature until use.*

Quantity	Lumbar Puncture Tray Components
1	Sprotte® needle, 24G x 90mm **OR** Sprotte® needle, 22G x 90mm
1	Introducer needle, 1 mm x 30 mm
1	Hypodermic needle, 22G x 1.5”
1	Plastic syringe, (3 ml, luer lock) with 25G x 5/8” needle attached
4	Polypropylene syringe (6 ml, luer lock)
1	Needle stick pad
1	Adhesive bandage
1	Drape, fenestrated, 2 tabs, paper, 18” x 26”
2	Towel, 13.5” x 18”
6	Gauze pad, 2” x 2”
3	Sponge stick applicator
1	Lidocaine 1%, 5 ml
1	Povidone-Iodine Topical Solution, 0.75 oz

Quantity	Blood Collection Kit
2	Serum red-top tube, 10ml (glass)
2	EDTA lavender-top tube, 10ml (glass)
2	EDTA lavender-top tube, 3ml (plastic)
15	Siliconized cryovial, 2ml
2	Disposable Pipette, 3ml
2	Biohazard bag w/ absorbent sheet
1	Cryobox, 25-slot
1	Dry ice shipper
1	Case & specimen label set
1	Airway bill envelope
1	Shipping labels (includes dry ice label)

Quantity	CSF Collection Kit
1	LP tray, 24g or 22g (see contents above)
2	Conical tube, 15ml
2	Conical tube, 50ml
1	Medication filter straw
11	Siliconized cryovial, 2ml

Extra Supplies
Serum red-top tube, 10ml (glass)
EDTA lavender-top tube, 10ml (glass)
EDTA lavender-top tube, 3ml (plastic)
Siliconized cryovial, 2ml
Disposable Pipette, 3ml
Biohazard bag w/ absorbent sheet
Cryobox, 25-slot
Conical tube, 15ml
Conical tube, 50ml
Airway bill envelope
Shipping labels (includes dry ice label)

5.3 Site Required Equipment

The following materials and equipment are necessary for the processing of specimens at the collection site and are to be **supplied by the local site**:

- Personal Protective Equipment: lab coat, nitrile/latex gloves, safety glasses
- Tourniquets
- Alcohol Prep Pads
- Gauze Pads
- Bandages
- Butterfly needles and hubs
- Microcentrifuge tube rack
- Test tube rack
- Sharps bin and lid

In order to process samples, project sites must have access to the following equipment:

- Centrifuge capable of ≥ 1500 rcf (1500 x g) with refrigeration to 4°C
- -80°C Freezer

In order to ship specimens, you must provide:

- Dry ice (minimum 10 pounds per shipment)

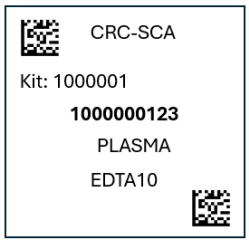
6.0 SPECIMEN LABELS

Labels must be affixed on all collection and aliquot tubes to prevent sample mix-ups and ensure chain-of-custody tracking. BioSEND provides labels for all samples being collected and returned to BioSEND. The site is responsible for providing labels for biospecimens that will be retained at the site. If labels are provided but the sample is not collected, please discard the unused labels.

6.1 Types of Labels

Each kit contains all labels required for the return of biospecimens to BioSEND.

The **Kit Labels** do not indicate a specimen type, but are affixed on BioSEND forms and on specific packing materials. See Appendix K for further instructions.



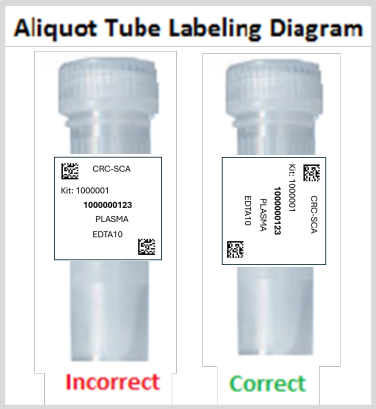
The **Specimen Labels** are placed on all blood collection and aliquot tubes. Each Specimen Label has a unique barcode that is tied to the Kit. The labels indicate the specimen type, as well as the collection tube for that specimen. For example, the label to the right would be placed on a plasma aliquot generated from a 10ml EDTA tube.

6.2 Affixing Labels

In order to ensure the label adheres properly and remains on the tube, follow these instructions:

- Place blood collection and aliquot labels on **ALL** collection and aliquot tubes **BEFORE** sample collection, sample processing, or freezing. This will help to ensure the label properly adheres to the tube before exposure to moisture or different temperatures.

- Place label **horizontally** on the tube (wrapped around sideways if the tube is upright) and **just below the ridges** of the aliquot tubes (see attached labeling diagram).



- Take a moment to ensure the label is **completely affixed** to each tube. It may be helpful to roll the tube between your fingers after applying the label.

7.0 SPECIMEN COLLECTION AND PROCESSING PROCEDURES

Consistency in sample collection and processing is essential for biomarker studies. All samples are drawn in the same order and then processed in a uniform fashion. **Please read the instructions before collecting any specimens. Have all your supplies and equipment out and prepared prior to drawing blood.**

7.1 Order of Specimen Collection

Blood collection should be performed in the following order:

1. Serum (red top) blood collection for serum, two 10ml tubes
2. EDTA (lavender top) blood collection for plasma and buffy coat, two 10ml tubes
3. EDTA (lavender top) blood collection for Whole Blood, two 3ml tubes

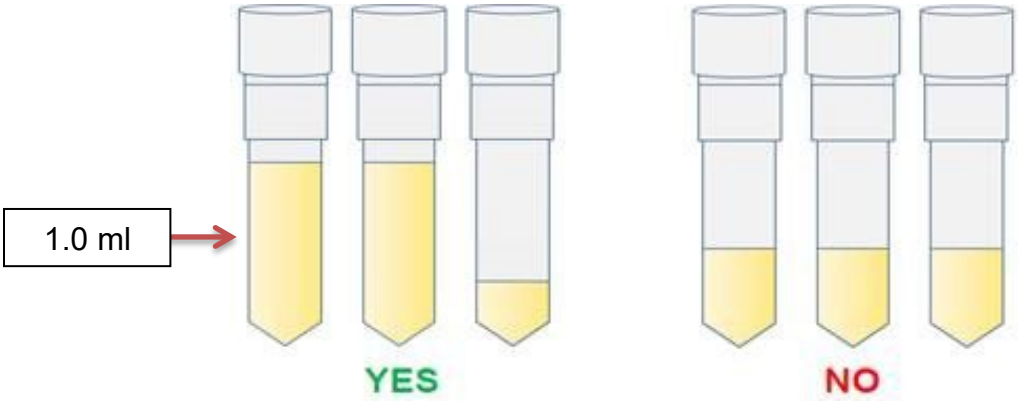
7.2 Blood Collection Protocols

1. Serum (red top) blood collection for serum, twp 10ml tubes **(Appendix F)**
2. EDTA (lavender top) blood collection for plasma and buffy coat, two 10ml tubes **(Appendix B)**
3. EDTA (lavender top) blood collection for Whole Blood, two 3ml tubes **(Appendix D)**

7.4 Filling Aliquot Tubes

In order to ensure that BioSEND receives a sufficient amount of sample for processing and storage, and to avoid cracking of the tubes prior to shipment, each aliquot tube should be filled to the assigned volume (refer to detailed processing instructions for average yield per sample). Over-filled tubes may burst once placed in the freezer, resulting in a loss of that sample.

Please generate as many standard-sized aliquots as possible, with any remaining volume used to create a single residual aliquot.



8.0 Packaging and Shipping Instructions

ALL study personnel responsible for shipping should be certified in biospecimen shipping. If not available at your University, training and certification is available through the CITI training site (Course titled "Shipping and Transport of Regulated Biological Materials" at https://www.citiprogram.org/).

8.1 Sample Record and Shipment Notification Form

The Specimen Collection and Processing Form should be completed for all samples submitted to BioSEND. Please see Appendix I for further instructions.

8.2 Shipping Instructions

All samples for CRC-SCA are shipped frozen. Reference Appendix K for frozen shipping instructions.

8.3 Shipping Address

All samples are shipped to the BioSEND laboratory:

BioSEND
Indiana University School of Medicine
351 W. 10th Street, TK-217
Indianapolis, IN 46202-4118

9.0 Data Queries and Reconciliation

Samples Record and Shipment Form (Appendix I) must be completed the day that samples are collected to capture information related to sample collection and processing. This form includes information that will be used to reconcile sample collection and receipt, as well as information essential to future analyses.

The Health Informatics Institute data collection team will be collaborating with BioSEND to reconcile information captured in the database compared to samples received and logged at BioSEND. Information that appears incorrect in the USF database will be queried through the standard system. Additional discrepancies that may be unrelated to data entry will be resolved with the Principal Investigator in a separate follow up communication. If applicable, a non-conformance report will be provided to sites.

Data discrepancies may result from:

- Incorrect samples collected and shipped
- Damaged or incorrectly prepared samples
- Unlabeled or mislabeled samples
- Discrepant information documented on the BioSEND Sample Forms to information entered into the Health Informatics Institute database.
- Samples frozen and stored longer than three months at the site

10.0 APPENDICES

Appendix B: Whole Blood Collection for Isolation of Plasma and Buffy Coat

Appendix D: Whole Blood Collection for Banking

Appendix F: Whole Blood Collection for Isolation of Serum

Appendix G: Cerebrospinal Fluid Collection

Appendix I: Sample Record and Shipment Notification Form

Appendix K: Frozen Shipping Instructions

Appendix Q: UPS ShipExec™ Thin Client Instructions

Appendix B – Whole Blood Collection for Plasma and Buffy Coat

Whole Blood Collection for Plasma and Buffy Coat using 10 ml EDTA (glass) tubes

1. Store empty EDTA (plastic) tubes at room temperature 64°F – 77°F (18°C to 25°C) prior to use.

2. Place "PLASMA" specimen labels on six clear-capped 2 ml cryovial tubes. Place "BUFFY COAT" specimen labels on an additional two clear-capped 2ml cryovial tubes.

3. Pre-chill the labeled cryovials on wet ice for at least 5 minutes.

4. Set centrifuge to 4°C to pre-chill before use. Time needed to pre-chill the centrifuge to 4°C will depend on your centrifuge model.

5. Using a blood collection set and a holder, collect blood into the lavender top 10 ml EDTA (glass) tubes using your institution's recommended procedure for standard venipuncture technique.

   The following techniques shall be used to prevent possible backflow:
   a. Place donor's arm in a downward position.
   b. Hold tube in a vertical position, below the donor's arm during blood collection.
   c. Release tourniquet as soon as blood starts to flow into the tube.
   d. Make sure tube additives do not touch stopper or end of the needle during venipuncture.

6. Allow at least 10 seconds for a complete blood draw to take place in each tube. Ensure that the blood has stopped flowing into the tube before removing the tube from the holder. The tube vacuum is designed to draw 10 ml of blood into the tube.

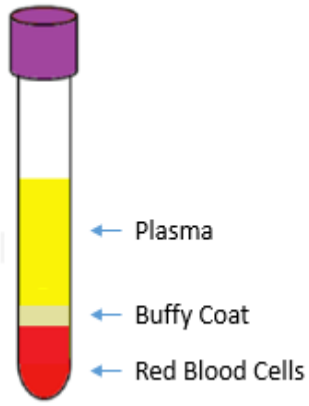
7. Immediately after blood collection, gently invert/mix (180 degree turns) the EDTA tubes 8 – 10 times. **Do not shake the tubes!**

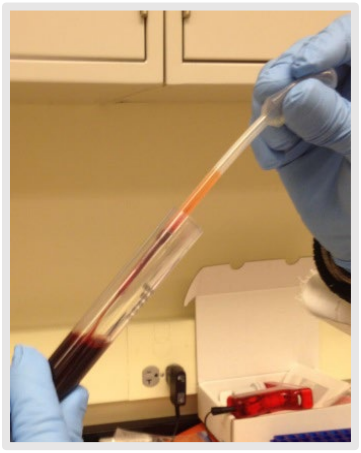
8. Within 30 minutes of blood collection, centrifuge balanced tubes for 15 minutes at 1500 RCF (x g) at 4°C. It is critical that the tubes be centrifuged at the appropriate speed and temperature to ensure proper plasma separation.

9. Remove the plasma by tilting the tube and placing the pipette tip along the lower side of the wall. **Use caution not to touch the buffy coat or packed red blood cells at the bottom of the tube so that the plasma is not contaminated** (see below). Using a disposable tipped micropipette, transfer plasma into the clear-capped cryovials. Aliquot 1 ml per cryovial. If you cannot obtain 6 plasma aliquots, please note "low volume draw" on the Sample Record

and Shipment Notification form (Appendix I) under “Notification of Problems”. Each 10 ml EDTA tube should yield approximately 4-5 ml of plasma.

10. After plasma has been removed from the EDTA tubes, aliquot buffy coat layer (see figure below) into clear-capped cryovial using a disposable graduated micropipette. All of the buffy coat from a single 10 ml EDTA tube will be placed into one cryovial, resulting in two buffy coat spceimens. The buffy coat aliquot is expected to have a reddish color from the red blood cells.





11. After plasma and buffy coat has been aliquoted into cryovials, **discard** the 10ml EDTA collection tubes. Do not send these tubes to BioSEND.

12. Complete the Sample Collection and Processing Form (Appendix I).

13. Place the labeled cryovials in the 25 slot cryobox. Place the cryobox UPRIGHT on dry ice. Transfer to **-80°C freezer as soon as possible, within 2 hours of blood draw**. Store all samples at -80°C until shipped to BioSEND on dry ice.

14. Ship the frozen plasma and buffy coat aliquots to BioSEND according to Appendix K – Frozen Shipping Instructions.

Plasma and Buffy Coat Collection and Preparation – 10 ml K3 EDTA (glass) Tube

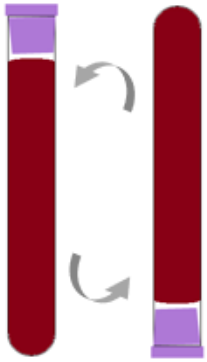
Step One

- Label tubes and cryovials with specimen labels prior to blood draw.
- Pre-chill cryotubes on wet ice for at least 5 minutes.

Step Two

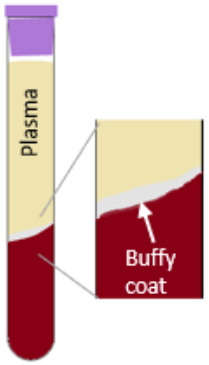
- Collect blood in EDTA tubes, allowing blood to flow for 10 seconds and ensuring blood flow has stopped.

Step Three



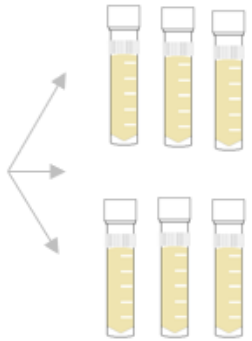
- Immediately after blood draw, **gently** invert tubes 8-10 times to mix samples.

Step Four



- Within 30 minutes of blood draw, centrifuge sample at 4°C at 1500 x g for 15 minutes.

Step Five



- Using a clean transfer pipet, aliquot 1 ml plasma into each cryotube.
- Store plasma aliquots upright at -80°C until shipment.

Step Six

- Using a clean transfer pipet, collect the buffy coats (will include residual plasma and some red blood cells).
- Transfer the buffy coat from each collection tube into a cryovial, resulting in two buffy coat aliquots.
- Store plasma and buffy coat aliquots upright at -80°C until shipment.

Appendix D – Whole Blood Collection (No Processing)

Two 3ml lavender-Top EDTA Tube are provided by BioSEND for Whole Blood collection (to be shipped to BioSEND FROZEN; no processing required).

1. Store empty Whole Blood EDTA tubes at room temperature, 64°F - 77°F (18°C to 25°C) before use.

2. Place pre-printed specimen label (WBLD) on the **two 3ml lavender top EDTA tube** prior to blood draw.

3. Using a blood collection set and a holder, collect whole blood into the tubes using your institution's recommended procedure for standard venipuncture technique.

   The following techniques shall be used to prevent possible backflow:

   a. Place donor's arm in a downward position.
   b. Hold tube in a vertical position, below the donor's arm during blood collection.
   c. Release tourniquet as soon as blood starts to flow into tube.
   d. Make sure tube additives do not touch stopper or end of the needle during venipuncture.

4. **Immediately after blood collection, gently invert/mix (180 degree turns) the EDTA tubes 8-10 times. Do not shake the tube!**

5. Complete the Sample Record and Shipment Notification form (Appendix I).

6. Place the lavender-Top EDTAs in a **WIRE** or **PLASTIC** rack. Do **NOT** use a Styrofoam rack. This will cause the lavender-Top EDTA tube to crack when frozen. Place the lavender-Top EDTA tubes immediately to a **-80°C Freezer.**

7. Ship the whole blood tube to BioSEND according to **Appendix K - Frozen Shipping Instructions.**

WBLD Preparation – 2 x 3 ml K2 EDTA (Purple Top) Tube

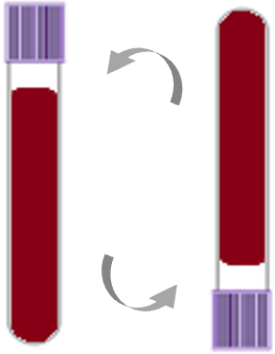
Step One

- Store tubes at room temperature.
- Label tubes with preprinted WBLD label prior to blood draw.

Step Two

- Collect blood into both 3ml EDTA tubes, allowing blood to flow for 10 seconds and ensuring blood flow has stopped.

Step Three



- Immediately after blood draw, invert tubes 8-10 times to mix samples.

Step Four

- Transfer to -80◦C. Store upright and keep frozen until shipment to BioSEND.

Appendix F – Whole Blood Collection for Isolation of Serum

Whole Blood Collection for Isolation of Serum: 10 ml red-top serum (glass) tubes and cryovials are provided by BioSEND for the collection of serum.

1. **CRITICAL STEP: Store empty serum determination (red-top) tubes at room temperature 64°F – 77°F (18°C to 25°C) prior to use.**

2. Place pre-printed specimen labels noted as "**SERUM**" on the serum determination red-top tubes and on six of the 2 ml cryovials prior to blood draw. Six cryovials will be shipped to BioSEND; any remaining cryovials may be retained by the site and labeled accordingly.

3. Pre-chill labeled cryovials on wet ice for at least 5 minutes or longer.

4. Set centrifuge to 4°C to pre-chill before use. Time needed to pre-chill the centrifuge to 4°C will depend on your centrifuge model.

5. Using a blood collection set and a holder, collect blood into the **10 ml red-top serum (glass) tubes** using your institution's recommended procedure for standard venipuncture technique.

   The following techniques shall be used to prevent possible backflow:
   a. Place donor's arm in a downward position
   b. Hold tube in a vertical position, below the donor's arm during blood collection
   c. Release tourniquet as soon as blood starts to flow into tube.
   d. Make sure tube additives do not touch stopper or end of the needle during venipuncture.

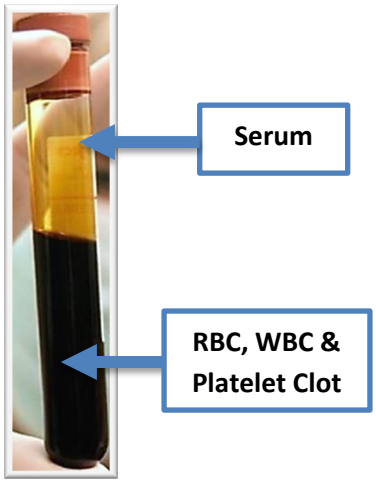
6. Allow at least 10 seconds for a complete blood draw to take place in each tube. **Ensure that the blood has stopped flowing into the tube before removing the tube from the holder.** The tube with its vacuum is designed to draw 10 ml of blood into the tube.

7. **CRITICAL STEP: Immediately after blood collection, gently invert/mix (180 degree turns) the serum determination tube 8-10 times. Do not shake the tubes!**

8. **CRITICAL STEP: Allow blood to clot at room temperature for at least 30 minutes.**

   ❖ Within 30 to 60 minutes from blood collection, centrifuge balanced tubes for 15 minutes at 1500 RCF (x g) at 4°C. **It is critical that the tubes be centrifuged at the appropriate speed and temperature to ensure proper serum separation.**

9. Remove the serum by tilting the tube and placing the pipette tip along the lower side of the tube wall. **Use caution to pipet only the serum layer and not the red blood cell layer.** Using a disposable tipped micropipette, transfer serum into the pre-labeled cryovials. Aliquot 1.0 ml per cryovial. Send six 1.0 ml aliquots to BioSEND. Each 10 ml Serum tube should yield, on average, 4.5 ml of serum.



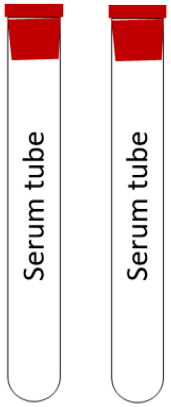
10. Complete the **Sample Record and Shipment Notification form (Appendix I).**

11. Place the labeled cryovials in the 25 slot cryovial box. Place the cryobox UPRIGHT on dry ice. Transfer to **-80°C Freezer as soon as possible**. Store all samples UPRIGHT at **-80°C until shipped** to BioSEND on dry ice.

12. Ship the frozen serum aliquots to BioSEND according to **Appendix K – Frozen Shipping Instructions.**

Serum Preparation –10 ml Serum (Red Top) Tube

Step One

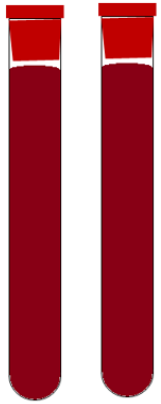


- Store tubes at room temperature.
- Label tubes with preprinted serum labels prior to blood draw.

Step Two

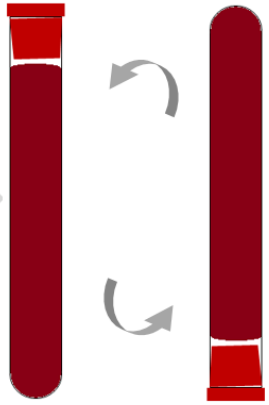
- Label 6 cryotubes with serum aliquot labels.
- Pre-chill cryotubes on wet ice for at least 5 minutes

Step Three



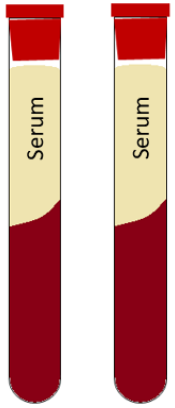
- Collect blood in serum tubes, allowing blood to flow for 10 seconds and ensuring blood flow has stopped.

Step Four



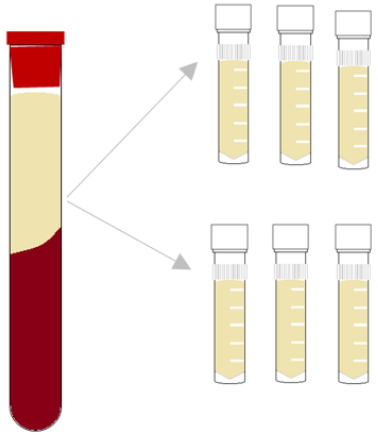
- Immediately after blood draw, invert tubes 8-10 times to mix samples.

Step Five



- Allow blood to clot for 30 minutes
- Within 60 minutes of blood draw, centrifuge sample at 4°C at 1500 x g for 15 minutes.

Step Six



- Using a clean transfer pipet, aliquot 1.0 ml serum into each cryotube.
- Store serum aliquots upright at -80°C until shipment.

Appendix G — Cerebrospinal Fluid Collection

Important Note

CSF should be collected in the morning between 8am – 10am, preferably fasted.

1. Lumbar Puncture Supplies

The lumbar puncture tray contains the following items, which will be used to perform the lumbar puncture. Check the dates of expiration: these reflect the expiration date of the lidocaine and sterile seal. Supplies for shipment of CSF are sent with the blood collection kit.

Quantity	Lumbar Puncture Tray Kit Components
1	Sprotte® needle, 24G x 90mm*
1	Introducer needle, 1 mm x 30 mm
1	Hypodermic needle, 22G x 1.5”
1	Plastic syringe, (3 ml, luer lock) with 25G x 5/8” needle attached
4	Polypropylene syringe (6 ml, luer lock)
1	Needle stick pad
1	Adhesive bandage
1	Drape, fenestrated, 2 tabs, paper, 18” x 26”
2	Towel, 13.5” x 18”
6	Gauze pad, 2” x 2”
3	Sponge stick applicator
1	Lidocaine 1%, 5 ml
1	Povidone-Iodine Topical Solution, 0.75 oz

*Trays with 22G x 90mm Sprotte® needle and introducer available upon request.

Sterile, individually packaged 50 ml conical tubes are provided for sites who are completing the Lumbar Puncture through the use of the gravitational method. Please ensure that all supplies necessary for a participant draw are available at your site at least two weeks prior to the appointment.

2. Setting Up the LP

a. On an overbed table, remove the contents of the LP kit from the outer plastic packaging, leaving the contents wrapped in their sterile drape. Leave everything wrapped until the person performing the LP is seated and begins examining the subject.

b. Feel the outside of the LP kit (still wrapped) to determine which end contains the spongy swabs. Turn this end toward the person performing the LP and begin unwrapping the kit.

c. Touch only the outside of the paper wrapper. When you grab an edge to unfold it, touch only the folded under portions of the outside of the wrapper. Also, don't let the outside of the wrapper touch any part of the inside. If you touch any part of the paper wrapper, or if any non-sterile object outside of the wrapper touches any part of the inside of the wrapper, discard the kit and start over. If you are in doubt as to whether something touched the inside of the paper wrapper, throw the kit away and start over.

3. Maintaining the sterile field

a. Keep in mind that there are usually many staff in the room during an LP, and a big part of assisting with the LP is keeping the field sterile—keeping people away from it, and reminding them to be careful around it. If anyone touches the inside of the paper wrapper or any part of the contents of the kit, throw the kit away and start over. If you are in doubt as to whether someone touched the kit, throw it away and start over. Also, you are the monitor for whether the person performing the LP has broken sterility usually by touching something not sterile with a sterile gloved hand. Feel free to speak up and inform people if need be. Be assertive.

4. Tips for Clinicians Performing Lumbar Puncture: Optimizing patient comfort and minimizing the risk of adverse events.

a. Talk the patient through the procedure so that there are no surprises.

b. Use of a Sprotte® 24g or 22g atraumatic spinal needle and careful technique are optimal for reducing post-LP headache risk. This Sprotte® 24g or 22g atraumatic spinal needle is included in the BioSEND LP Tray; additional needles may be ordered upon request. A pencil point spinal needle such as Whitacre® 24g, Spinocan® 22g, or other 24g may also be used.

c. Use adequate local anesthesia. Use the 25g 1/2" needle and inject lidocaine to raise a skin wheal. Then, inject lidocaine using the pattern of a square— first the center,

and then to all 4 corners. If the subject is thin, do not insert the deep infiltration needle OR the spinal introducer all the way. Use only about 2/3 of their length (to prevent entering the subarachnoid space with anything other than the 24g pencil point spinal needle).

d. Encourage fluid intake immediately after LP is helpful.

e. Be sure to give post-LP care instructions verbally to the subject (see below).

5. Post-LP Care Instructions

- Advise the subject to refrain from exertion (e.g., exercise, housework, gardening, lifting, sexual activity, or any other strenuous activities) for 24 hours after the LP.

- Advise the subject to continue with increased fluid intake.

a. Mild to Moderate headache after a lumbar puncture

- Mild to Moderate headache following lumbar puncture usually resolves within 3-4 days.

- Treatment of Mild to Moderate headache:
  - Limit physical activity as much as possible.
  - Oral fluids and caffeine are helpful. Drinking a soft drink (for example) is preferable to coffee, which has some diuretic activity.
  - Acetaminophen should be used for symptomatic relief. If a subject cannot tolerate acetaminophen, ibuprofen should be used. Avoid aspirin. If these do not relieve the headache, acetaminophen with codeine or an equivalent could be considered.

b. Severe headache after a lumbar puncture

If the headache becomes severe, posturally sensitive (relieved by supine posture), or is accompanied by nausea, vomiting, tinnitus, and/or visual disturbances, the subject should contact the site study staff for further instruction per standard clinical care.

6. Detailed Lumbar Puncture Procedure

a. Place the preprinted Collection and Aliquot "**CSF**" labels on the collection and ten 2 ml aliquot tubes. These 10 tubes will be shipped to BioSEND. Any remaining tubes will be retained by the site.

b. **Unlike the plasma and serum aliquot tubes, the CSF tubes should remain at room temperature; do not pre-chill these tubes.**

c. Perform lumbar puncture using the atraumatic technique.

d. Collect CSF into syringes or sterile conical tube (if a noticeably bloody tap, discard the first 1-2 mls). After the LP has begun and fluid is being collected, aliquot the first 1–2 mls of CSF from the first syringe**. If your site performs clinical testing on CSF, this is the CSF that should be sent to your local lab. If your site does not perform clinical testing on CSF, discard this first 1-2mls.**

e. Collect additional CSF per your site's protocol and transfer to 50 ml conical polypropylene tube at room temperature. Firmly cap and mix gently by inverting 3-4 times.

f. Within 15 minutes of collection, transfer the CSF from the 50 ml conical tube to two 15 ml conical tubes ensuring that there is equal volume in each. Spin the CSF samples down at 2000 x g for 10 minutes at **room temperature**, 64°F – 77°F (18°C to 25°C).

g. After centrifugation, pipette the supernatant from both 15 ml conical tubes and transfer to a new 50 ml conical tube. Ensure that debris at the bottom of the 15 ml conical tubes are not disturbed. Firmly cap the 50 ml conical tube and mix gently by inverting 3-4 times.

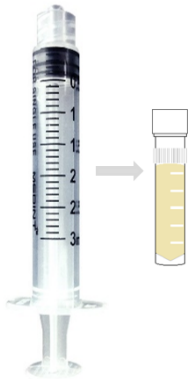
h. Pipette (micropipette preferred) 1.0 ml of supernatant directly into each of the pre-labeled aliquot tubes to be sent to BioSEND.
   - Remaining CSF should be aliquoted according to your site's protocols. If there is no local repository, BioSEND will accept all aliquots.

i. Place the labeled cryovials in the 25-slot cryobox and place UPRIGHT on dry ice. Transfer to **-80°C Freezer.** Store all samples at **-80°C until shipped** to BioSEND on dry ice.

j. Ship the CSF aliquots to BioSEND according to **Appendix K – Frozen Shipping Instructions** along with **Appendix I – Sample Shipment Notification Form**

CSF Collection and Preparation

Step One

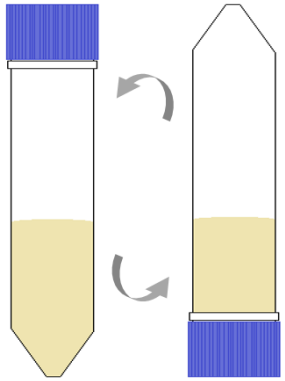


- Collect CSF into the 3ml luer lock syringe or by gravitational pull.
- Dispense 1-2 ml into cryovial.
- Send to local lab for testing, if applicable.

Step Two

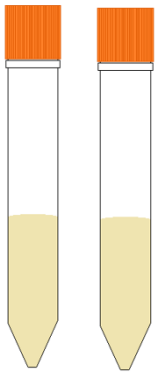
- Collect CSF into the 5ml luer lock syringe or by gravitational pull
- Transfer sample into 50 ml conical tube.

Step Three



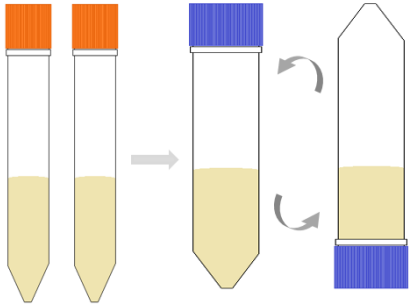
- Immediately after collection, gently invert the 50 ml conical tube 3-4 times to mix the sample.

Step Four



- Transfer CSF into <u>two</u> 15 ml conical tubes.
- Within 15 minutes of collection, centrifuge samples at room temperature at 2000 x g for 10 minutes.

Step Five



- Using a clean transfer pipette, transfer CSF from both 15 ml conical tubes into a 50 ml conical tube, leaving the debris in the bottom.
- Gently invert the 50 ml conical tube 3-4 times to mix the sample.
- Aliquot 1.0 ml into the cryovials.
- Store CSF aliquots <u>upright</u> at -80^{o}C until shipment to BioSEND.

Appendix I – Sample Record and Shipment Notification Form

A Sample Form must be completed for each subject-visit submitted to BioSEND. A copy of this form should also be included in the shipper. A copy of the form will be emailed to you upon completion. BioSEND will receive an automated notification of your shipment when you click the "Submit" button; no additional notification is required. If you are unable to submit the form in REDCap, please notify BioSEND at biosend@iu.edu instead.

The form can be completed via REDCap by following the below link:

- **Link to Sample Collection and Processing Form:** https://redcap.uits.iu.edu/surveys/?s=TEDDWFYCYJ3L8HEE

Appendix K – Frozen Shipping Instructions

IMPORTANT!

Frozen samples must be shipped Monday – Wednesday only, using Next Day Air delivery

Please be aware of holidays and inclement weather and plan your shipments accordingly. Reach out to biosend@iu.edu if you have any questions

Specimens being shipped to BioSEND are Category B UN3373 specimens and as such must be triple packaged and compliant with IATA Packing Instructions. *See the latest eEdition of the IATA regulations for complete documentation.*

Triple packaging consists of a primary receptacle(s), a secondary packaging, and a rigid outer packaging. The primary receptacles must be packed in secondary packaging in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents into the secondary packaging. Secondary packaging must be secured in outer packaging with suitable cushioning material. Any leakage of the contents must not compromise the integrity of the cushioning material or of the outer packaging.

IATA Packing and Labeling Guidelines

- The primary receptacle (cryovials or blood collection tubes) must be leak proof and must not contain more than 1 L total.
- The secondary packaging (plastic canister or biohazard bag) must be leak proof and if multiple blood tubes are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent direct contact with adjacent blood tubes.
- Absorbent material must be placed between the primary receptacle (cryovials or blood collection tubes) and the secondary packaging. The absorbent material must be of sufficient quantity to absorb the entire contents of the specimens being shipped. Examples of absorbent material are paper towels, absorbent pads, cotton balls, or cellulose wadding.
- A shipping manifest listing the specimens being shipped must be included between the secondary and outer packaging.
- The outer shipping container must display the following labels:
  - ✓ Sender's name and address
  - ✓ Recipient's name and address
  - ✓ Responsible persons (shipper and recipient)
  - ✓ The words "Biological Substance, Category B"
  - ✓ UN3373
  - ✓ Class 9 label including UN 1845, and net weight of dry ice contained

BioSEND Packaging and Shipment Instructions – Frozen Shipments

1. Generate airway bill and schedule courier pick-up, as needed.

   - For instructions on generating airway bills and scheduling using the UPS ShipExec™ Thin Client system, see Appendix Q.

2. Record the tracking number onto the Sample Record and Shipment Notification form (Appendix I).

3. Make a copy of the Sample Record and Shipment Notification form.

4. Place all frozen labeled cryotubes in the cryobox. Only include specimens from one subject in each cryobox.

5. Place the cryobox in a clear plastic biohazard bag (do NOT remove the absorbent material found in the bag), and seal the biohazard bag according to the instructions on the bag. Affix a Case Label to the outside of the biohazard bag.

6. Place approximately 2-3 inches of dry ice in the bottom of the Styrofoam® shipping container.

7. Place whole blood tubes in bubble sleeves and seal.

8. Place the tubes in a clear plastic biohazard bag (do NOT remove the absorbent material found in the bag), and seal the biohazard bag according to the instructions on the bag. Affix a Kit Label to the outside of the biohazard bag and place in shipping container.

9. Place the biohazard bag containing the cryobox into the provided Styrofoam® shipping container on top of the dry ice. Please ensure that the cryobox is placed so that the cryovials are upright in the shipping container (as pictured).

10. Fully cover the cryobox with approximately 2 inches of dry ice. Do not include more than 2 subjects' worth of samples in a single shipper.

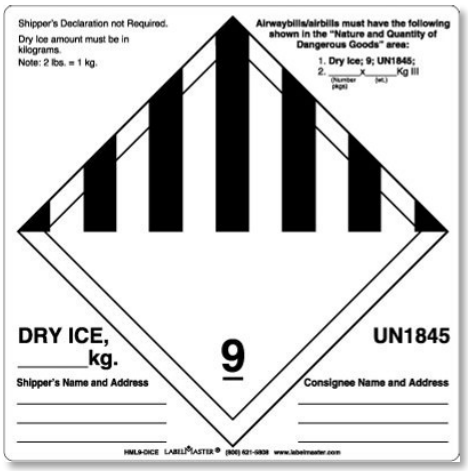
11. If including additional biohazard bags in package, include a layer of dry ice (approximately 2 inches) between each biohazard bag.

12. The inner Styrofoam® shipping container must contain at least 10 lbs (or 4.5 kg) of dry ice. The dry ice should entirely fill the inner box to ensure the frozen state of the specimens.

13. Replace the lid on the Styrofoam® container. Place the completed Sample Record and Shipment Notification form in the package on top of the Styrofoam® lid for each patient specimen, and close and seal the outer cardboard shipping carton with packing tape.

14. Print a copy of your UPS® airway bill generated through the UPS ShipExec™ Thin Client system (see Appendix Q). Place airway bill into the provided airway bill envelope and affix envelope to package.

15. Complete the Class 9 UN 1845 Dry Ice Label with the following information:
    - Your name and return address
    - Net weight of dry ice in kg (this amount must match the amount recorded on the airway bill)
    - Consignee name and address:



BioSEND
IU School of Medicine
351 W. 10th Street
TK-217
Indianapolis, IN 46202

- Do not cover any part of this label with other stickers, including pre-printed address labels.

IMPORTANT!
Complete the required fields on your airway bill and Class 9 Dry Ice labels, or courier may reject or return your package.

16. Apply all provided warning labels (UN3373, Dry Ice Label and Fragile Label), taking care not to overlap labels with each other or with airway bill.

17. Hold packaged samples in -80°C freezer until time of courier pick-up/drop-off.

18. Specimens should be sent to the address below. Frozen shipments should be sent Monday through Wednesday only to avoid shipping delays on Thursday or Friday.

BioSEND
IU School of Medicine
351 W. 10th Street
TK-217
Indianapolis, IN 46202

19. **Notify BioSEND by completing the Sample Record and Notification Form via REDCap (see Appendix I for details). Do not ship until you've completed this form, as submission of this form serves as your shipment notification.**

20. Use courier tracking system to ensure the delivery occurs as scheduled and is received by BioSEND.

In addition to tracking and reconciliation of samples, the condition and amount of samples received are tracked by BioSEND for each sample type. Investigators and clinical coordinators for each project are responsible for ensuring that the requested amounts of each fluid are collected to the best of their ability and that samples are packed with sufficient amounts of dry ice to avoid thawing in the shipment process.

Appendix Q - UPS ShipExec™ Thin Client Instructions

***** The shipment label in ShipExec should not be created until the day of shipment *****

1) Log in to the UPS ShipExec™ Thin Client website: https://kits.iu.edu/UPS or https://kits.iu.edu/ups.
    a. To request an account, complete the following survey: https://redcap.uits.iu.edu/surveys/?s=88TTWY3KAF
2) Find the "Shipping" dropdown menu in the top left corner of the screen and click on "Shipping and Rating".
3) Once the Indiana University page loads, look for the "Study Group" dropdown menu under "Shipment Information" on the right side of the screen. Choose your study from the dropdown menu.
4) After selecting your study, click on the magnifying glass icon on the left side of the screen under "Ship From".
5) An address book and filters will populate the screen. On the right side of the screen, a list of all the site addresses within the study you selected should populate.
    a. Filter the list down more by looking to the left side of the screen and searching for their address by filling in the "Company", "Contact", or "Address 1" fields. Click on the Search button when ready.
    b. Once you have found your site address, click on the "Select" button to the left of the address.
6) Make sure your address populated in the fields under "Ship From" on the main page.
    a. If you accidentally selected the wrong address, click on the "Reset" button on the bottom right of the screen. After the page reloads and clears the information, select your study again from the "Study Group" menu and click on the magnifying glass icon again to search for your correct address.
    b. To change the address for your site and study group, please complete the following survey: https://redcap.uits.iu.edu/surveys/?s=88TTWY3KAF
7) Enter the total weight of your package in the "Weight" field on the right side of screen under the name of your study.
    a. Leave the "Dry Ice Weight" field empty or enter "0" if shipping an ambient sample.
8) Enter the weight of the dry ice for frozen shipments in the "Dry Ice Weight" field.
    a. The "Dry Ice Weight" field can *never* be higher than the "Weight" field.
    b. **(Steps 9-10 can be skipped if you do not need to schedule a pickup)**
9) After entering the weights, click on the blue "Pickup Request" button.
10) When the Create Pickup Request box pops up, enter information into all the fields provided.
    a. Enter the "Earliest Time Ready" and "Latest Time Ready" in 24-hour format.
        i. Scheulde pickup at a minimum 1 hour *before* the "Earliest Time Ready"
    b. Choose a name and phone number that is the best contact if the UPS driver has question related to picking up your package
    c. Entering the "Room Number" and "Floor" will help the UPS driver locate your package
        i. The "Floor" field only allows numerical characters while the "Room Number" field is free text.
    d. Click "Save" when done.
11) Once you are certain that all the correct information has been entered, click the "Ship" button in the bottom right corner of the screen.
12) If no red error messages pop up at the top of your screen after clicking on "Ship", then you should have 2 downloaded PDF files: Shipment Receipt & UPS Package Label

   a. Shipment Receipt will list a “Pickup No.” that references your specific package if there is ever an issue with UPS picking up your package

13) Print out the UPS airway bill to any printer at your location.
   a. Fold the UPS airway bill and slide it inside the plastic UPS sleeve.
   b. Peel the back off the plastic UPS sleeve and stick the sleeve to your package, making sure it is laying as flat as possible along the surface of the package.
14) Place your package in the spot designated in your pickup request, or wherever your daily UPS pickups occur.
15) If you need to reprint your airway bill or void your shipment, click on “History” at the top of the main screen.
   a. If your shipment does not automatically pop up, enter the date of shipment and then click “Search”.
   b. To reprint your airway bill, click on the printer icon to the far left under “Action”
   c. To void your shipment, click on the “X” icon to the far left under “Action”
      i. If you created an airway bill that you no longer need, you must void the shipment to ensure your study will not be charged for the shipment.