

National Institute of Neurological Disorders and Stroke
Biorepository:

BioSpecimen Exchange for Neurological Disorders, BioSEND

**Biospecimen Collection, Processing, and Shipment Manual for
EpiBioS4Rx Study**

Table of Contents

1.0	<u>Purpose</u>	4
2.0	<u>Abbreviations</u>	4
3.0	<u>BioSEND Information</u>	5
3.1	<u>BioSEND Contacts</u>	
3.2	<u>Hours of Operation</u>	
3.3	<u>Holiday Schedules</u>	
3.4	<u>Holiday Observations</u>	
4.0	<u>BioSEND Sample Requirements</u>	7
4.1	<u>Protocol Schedule for Biospecimen Submission – EpiBioS4Rx</u>	
5.0	<u>Specimen Collection Kits, Shipping and Supplies</u>	9
5.1	<u>Kit Supply to Study Sites</u>	
5.2	<u>Specimen Collection Kit General Contents</u>	
5.3	<u>Specimen Collection Kit Contents</u>	
5.4	<u>Site Required Equipment</u>	
6.0	<u>Specimen Labels</u>	13
6.1	<u>Types of Labels</u>	
6.2	<u>Affixing Labels</u>	
7.0	<u>Specimen Collection and Processing Procedures</u>	15
7.1	<u>Order of Specimen Collection</u>	
7.2	<u>Blood Collection Protocols</u>	
7.3	<u>Filling Aliquot Tubes (Plasma, Buffy Coat)</u>	
8.0	<u>Packaging and Shipping Instructions</u>	17
8.1	<u>Sample Record and Shipment Notification Form</u>	
8.2	<u>Shipping Instructions</u>	
8.3	<u>Shipping Address</u>	
9.0	<u>Appendices</u>	19
	Appendix A: Whole Blood Collection for Isolation of RNA	

- Appendix B: Whole Blood Collection for Isolation of Plasma
- Appendix C: Whole Blood Collection for Isolation of Buffy Coat
- Appendix K: Frozen Shipping Instructions
- Appendix P: Bulk Shipping Instructions

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:

- PAXgene® (for RNA extraction)
- Plasma
- Buffy Coat (for DNA extraction)

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
RCF	Relative Centrifugal Force
RPM	Revolutions Per Minute

3.0 BioSEND INFORMATION

3.1 BioSEND Contacts

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General BioSEND Contact Information

Fax: 317-278-1100

Email: biosend@iu.edu

Website: www.BioSEND.org

Sample Shipment Mailing Address

BioSEND

Indiana University School of Medicine 351

W. 10th Street. TK-217

Indianapolis, IN 46202-5188

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 FedEx.com website to make sure impending weather events (blizzards, hurricanes, etc.) will not impact the shipping or delivery of the samples. FedEx® 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
3 rd Monday in January	Martin Luther King, Jr Day
4 th Monday in May	Memorial Day
July 4	Independence Day (observed)
1 st Monday in September	Labor Day
4 th Thursday in November	Thanksgiving
4 th Friday in November	Friday after Thanksgiving
December 25	Christmas Day

Please note that between December 24th and January 2nd (or the first business day after New Year's Day) Indiana University will be open Monday through Friday for essential operations **ONLY** and will re-open for normal operations on January 2nd. If at all possible, biological specimens for submission to Indiana University should **NOT** be collected and shipped to Indiana University between December 24th and January 2nd. Should it be necessary to ship blood samples for DNA extraction to Indiana University during this period, please contact the Indiana University staff before December 24th by e-mailing biosend@iu.edu, so that arrangements can be made to have staff available to process incoming samples. Frozen specimens collected during this period should be held at your site to ship after the first business day in January.

Please see https://www.biosend.org/holiday_closures.html 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 [sections 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 - EpiBioS4Rx

Visit (month)	D1	D3	D5	D15	D30	D90	D180
Whole blood for RNA (PAXGene® tube, 2.5ml)	-	-	2	2	-	-	-
Plasma aliquots, 250ul	6	6	6	6	6	6	6
Buffy Coat	1	1	1	1	1	1	1

5.0 SPECIMEN COLLECTION KITS, SHIPPING KITS AND SUPPLIES

Research specimen collection kits as well as clinical lab supplies (except dry ice and equipment listed in Section 5.4) will be provided by BioSEND. These materials include blood tubes, boxes for plasma and buffy coat aliquots, as well as partially completed shipping labels to send materials to BioSEND. Barcoded kit labels, collection tube labels, and aliquot tube labels will all be provided by BioSEND. Collection tube labels and aliquot tube labels will be pre-printed with study information specific to the type of sample being drawn. BioSEND will provide a sufficient number of labels 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 [Sections 4.1](#)); any tubes that will remain at the collection site 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

Kits for a subject are all inclusive. They contain all supplies necessary to collect from a subject for the duration of the visit protocol.

Each individual site will be responsible for ordering the kit from BioSEND. 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 and site number of 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:

- EpiBioS4Rx: <http://kits.iu.edu/epibios4rx>

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

5.2 Specimen Collection Kit General 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.* Note that “supplemental” kits will be provided should you require additional supplies from those contained in the visit specific kits.

BioSEND Supplies

Available upon request from the online kit request module ([Section 5.1](#))

General Items
Ambient shipping kits
25 cell cryobox
Cryovial tube (0.5 ml) with clear cap
FedEx® return airbill
Shipping container for dry ice shipment (shipping and Styrofoam® box)
Plastic biohazard bag
Warning label packet
Blood Collection Items
PAXgene® tube (2.5 ml)
Lavender-top EDTA blood collection tube (10 ml)

We realize there may be instances where additional supplies are needed; therefore, one supplemental kit will be provided with the initial kit shipment for new studies. Replacement supplemental kits can be requested on the kit request website. In addition, individual supplies can be requested as well.

5.3 Specimen Collection Kit Contents – EpiBioS4Rx

Specimen Collection Supplies	PAXgene® (2.5ml)	EDTA (10mL)	Cryovial (0.5ml)	Cryovial (2.0ml)	Disposable pipet (1mL)	Frozen Shipping Kit
All kits	4	7	50	10	7	1

5.4 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 consistently across all projects and ensure the highest quality samples possible, project sites must have access to the following equipment:

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

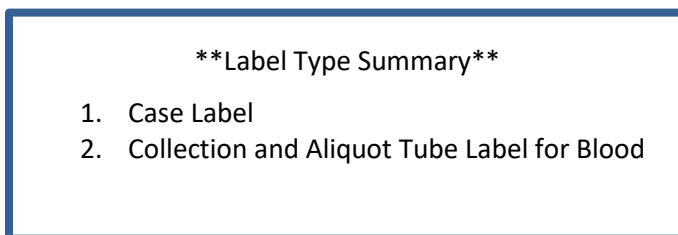
In order to ship specimens, you must provide:

- Dry ice (approximately 30-40 pounds per shipment)

6.0 SPECIMEN LABELS

Labels must be affixed on all collection and aliquot tubes to ensure unique specimen identity. 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 return the unused labels to BioSEND when the specimens are shipped to BioSEND for permanent storage.**

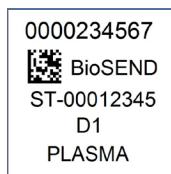
6.1 Types of Labels



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



The **Case Labels** do not indicate a specimen type, but are affixed on BioSEND forms and on specific packing materials.

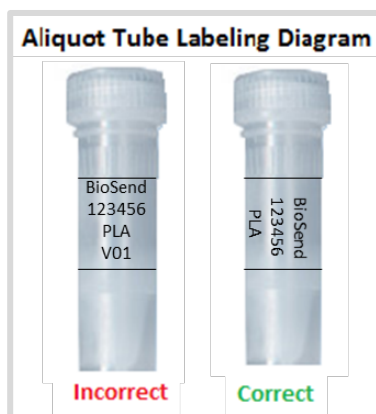


The **Collection and Aliquot Tube Labels for Blood** are placed on all blood collection and aliquot tubes.

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.
- The blood collection and aliquot tube labels contain a 2D barcode on the left hand side of the label. When turned horizontally, the barcode should be closer to the top (cap end) of the tube.
- 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:

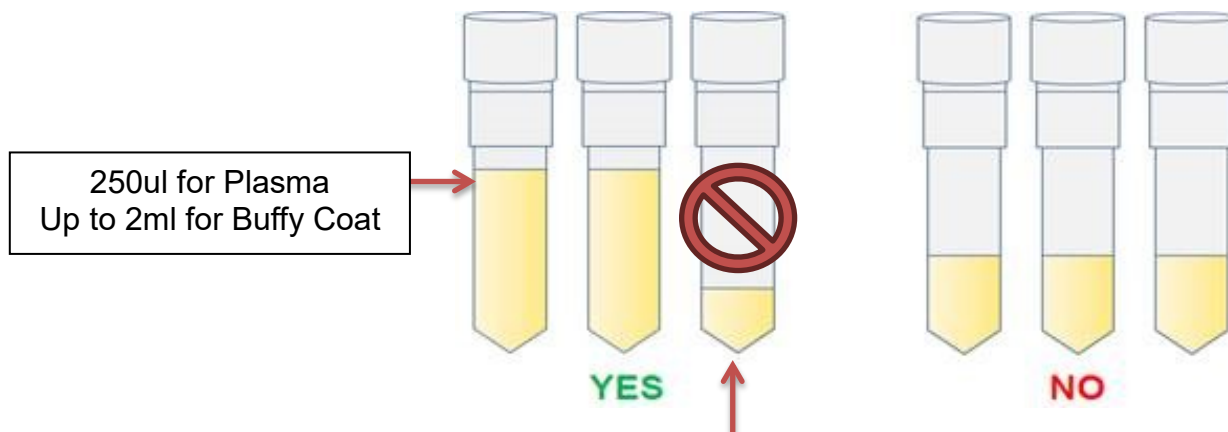
1. PAXgene® tube for RNA
2. EDTA (lavender top) blood collection for plasma and buffy coat

7.2 Blood Collection Protocols

1. PAXgene® tube for RNA (**Appendix A**)
2. EDTA (lavender top) blood collection for plasma (**Appendix B**)
3. EDTA (lavender top) blood collection for Buffy Coat (**Appendix C**)

7.3 Filling Aliquot Tubes (Plasma, Buffy Coat)

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. Each site is supplied with sufficient collection tubes to provide the specimen volume described in the Protocol Schedules for Biospecimen Submission ([see Section 4](#)). Specimens collected in addition to those described in Section 4 are collected at the site's discretion and are not returned to BioSEND.



Please note: It is critical for the integrity of future studies using these samples that study staff **not submit** residual aliquot tubes (anything under instructed volume) to BioSEND.

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 Biosample shipping form

All sample shipments to BioSEND must include the Biosample shipping form, which can be found in Redcap.

- Emailed to BioSEND@iu.edu at the time the samples are being shipped
- And the original document should be Included in the shipment with the samples

8.2 Shipping Instructions

Frozen Shipments: Reference Appendix K for frozen shipping instructions.

- Frozen PAXgene® Tubes
- Frozen aliquots of plasma
- Frozen Buffy Coat

*****Important Note*****

Include samples for only one subject per shipping container.

For frozen shipments, include no more than two packing envelopes per shipping container in order to have room for a sufficient amount of dry ice to keep samples frozen up to 24 hours.

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 46202-5188

9.0 APPENDICES

- Appendix A: Whole Blood Collection for Isolation of RNA
- Appendix B: Whole Blood Collection for Isolation of Plasma
- Appendix C: Whole Blood Collection for Isolation of Buffy Coat
- Appendix K: Frozen Shipping Instructions
- Appendix P: Bulk Shipping Instructions

Appendix A – Whole Blood Collection for Isolation of RNA

Whole Blood Collection for Isolation of RNA: 2.5 ml PAXgene® tubes are provided by BioSEND for the collection of blood for RNA isolation.



See training video for blood collection for RNA: (<http://www.preanalytix.com/videos/rna-tubecollection-video/>)

1. **CRITICAL STEP:** Store PAXgene® tubes at room temperature 64°F - 77°F (18°C to 25°C) before use.
2. Place pre-printed Collection and Aliquot “RNA” label on the PAXgene™ tubes prior to blood draw. Please refer to the tables in Section 4 to determine how many of the PAXgene® tubes are to be shipped to BioSEND from your site.
3. Using a blood collection set and a holder, collect blood into the PAXgene® tubes using your institution's recommended procedure for standard venipuncture technique.



The following techniques shall be used to prevent possible backflow:

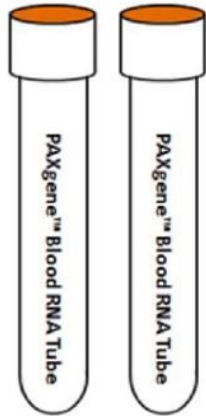
- a. Place donor's arm in a downward position.
 - b. Hold tube in a vertical position, below the donor's arm during blood collection.
 - c. Release tourniquet as soon as blood starts to flow into tube.
 - d. Make sure tube additives do not touch stopper or end of the needle during venipuncture.
4. Allow 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 PAXgene® tube with its vacuum is designed to draw 2.5 ml of blood into the tube.
 5. **Immediately after blood collection, gently invert/mix (180 degree turns) the PAXgene® tubes 8 – 10 times. Do not shake the tube!**
 6. Place the PAXgene® tubes upright in a **WIRE** or **PLASTIC** rack. Do **NOT** use a Styrofoam® rack. This will cause the PAXgene® tubes to crack when frozen. **Allow the filled PAXgene® tubes to incubate upright at room temperature for 2 hours.**
 7. Complete the **BioSample Shipping Record**

8. After samples have incubated at room temperature for 2 hours, transfer the WIRE or PLASTIC rack with the PAXgene® tubes to **-80°C freezer**. Store all samples at **-80°C until shipped** to BioSEND on dry ice.
9. Ship the PAXgene® tubes to BioSEND according to **Appendix K - Frozen Shipping Instructions**.

PAXgene™ Preparation (2.5ml Tube)

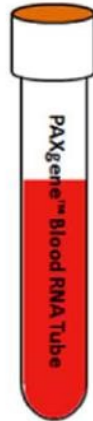


Step One



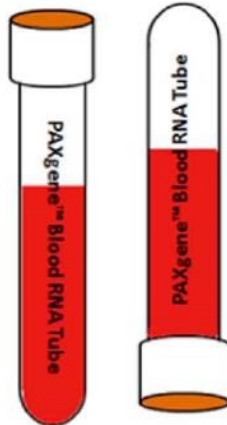
- Store tubes at room temperature.
- Label tubes with pre-printed subject labels prior to blood draw.

Step Two



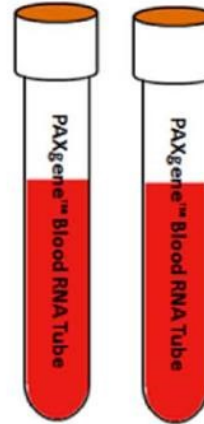
- Collect blood into *one* PAXgene Tube allowing blood to flow for 10 seconds and ensuring blood flow has stopped.

Step Three



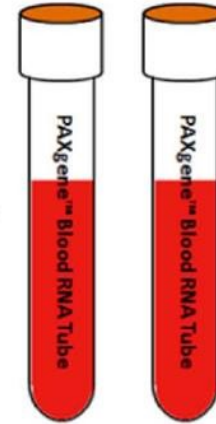
- Immediately after blood draw, invert tubes 8-10 times to mix samples.
- Repeat steps two and three for second tube.

Step Four



- Incubate tubes upright at room temperature for 2 hours before freezing the samples.

Step Five



- After 2 hour incubation at room temperature, store tubes upright in a -80°C in a wire rack until shipment.

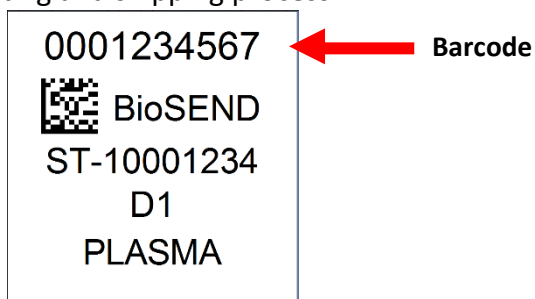


Appendix B – Whole Blood Collection for Isolation of Plasma

Whole Blood Collection for Isolation of Plasma: 10 ml Lavender-Top EDTA tube(s) and cryovials are provided by BioSEND for the collection of plasma.



1. **CRITICAL STEP:** Store empty Lavender-Top EDTA tubes at room temperature 64°F – 77°F (18°C to 25°C) prior to use.
2. Place pre-printed Collection and Aliquot “**PLASMA**” label on 10 ml lavender-top EDTA tube(s) and on six of the 2 ml cryovial tubes. The six labeled cryovials will be shipped to BioSEND. The remaining plasma can be retained by the site and labeled per site standards. Labels for samples kept by the site are not provided by BioSEND.
3. Please ensure that aliquots for BioSEND are kept in numerical order (by barcode) throughout the aliquoting and shipping process.

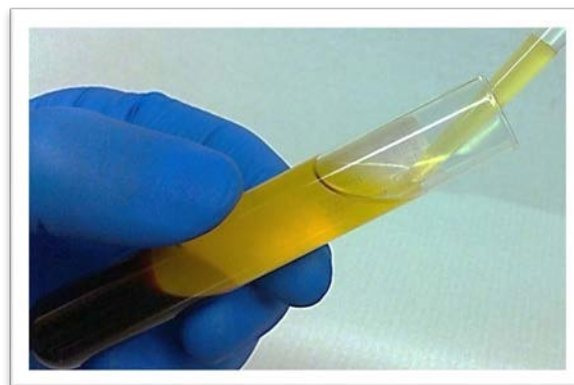
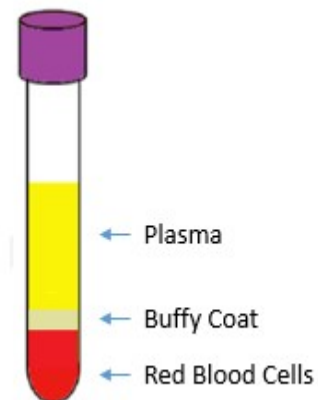


4. Pre-chill the labeled cryovials on wet ice for at least 5 minutes.
5. Set centrifuge to 4°C to pre-chill before use. Time needed to pre-chill the centrifuge to 4°C will depend on your centrifuge model.

6. Using a blood collection set and a holder, collect blood into the **lavender top 10 ml EDTA tube(s)** 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.
7. 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.
8. **CRITICAL STEP:** Immediately after blood collection, gently invert/mix (180 degree turns) the Lavender-Top EDTA tube(s) 8 – 10 times. Do not shake the tubes!
9. 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 (see worksheet in Appendix H to calculate RPM in your particular rotor).**
 - Equivalent rpm for spin at 1500 x g=
10. 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 pre-labeled cryovials. Aliquot 250 ul per cryovial. Send 6 250 ul aliquots to BioSEND. If you cannot obtain the requested number of 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, on average, 5 ml of plasma.



11. Complete the **Biosample Shipping Record**.
12. 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**. Store all samples at **-80°C until shipped** to BioSEND on dry ice.
13. Ship the frozen plasma aliquots to BioSEND according to **Appendix K – Frozen Shipping Instructions**.

Preparation of Plasma (10mL Lavender Top Tube)

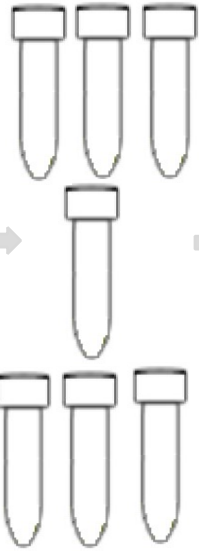


Step One



- Store tube at room temperature.
- Label tube with pre-printed subject labels prior to blood draw.

Step Two



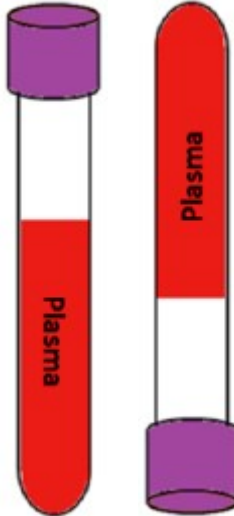
- Label 6 0.5mL cryovials for plasma and 1 2.0mL cryovial for buffy coat with pre-printed subject labels prior to blood draw.
- Pre-chill cryovials on wet ice for 5 minutes or longer.

Step Three



- Collect blood in Plasma Tube allowing blood to flow for 10 seconds and ensuring blood flow has stopped.

Step Four



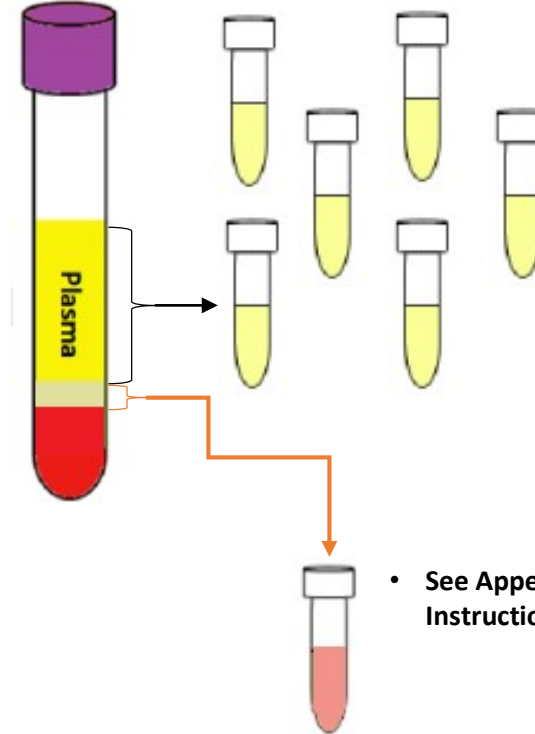
- Immediately after blood draw, invert tubes 8-10 times to mix samples.

Step Five



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

Step Six and Seven



- Aliquot 250 uL of plasma into each 0.5mL cryovial tube.
- Store plasma aliquots at -80°C until shipment.
- Return 6 X 250 uL aliquots to BioSend

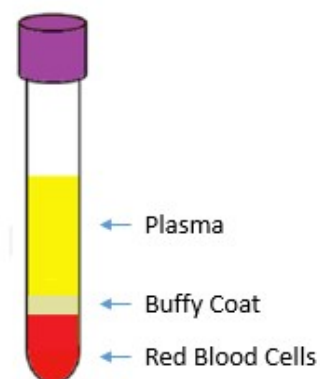
- See Appendix C for Buffy Coat Preparation Instructions.

Appendix C –Whole Blood Collection for Isolation of Buffy Coat

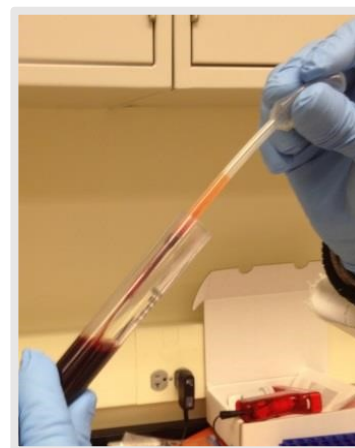
Whole Blood Collection for Isolation of Buffy Coat: 10 ml Lavender-Top EDTA tube(s) and cryovials are provided by BioSEND for the collection of the buffy coat.



1. **CRITICAL STEP:** Store Lavender-Top EDTA tubes at room temperature 64°F - 77°F (18°C to 25°C) before use.
2. Place pre-printed Collection and Aliquot “**Buffy Coat**” label onto cryovials with clear cap.
3. After plasma has been removed from the EDTA lavender-top tube (see Appendix B), aliquot buffy coat layer (see figure below) into labeled cryovial with clear cap using a disposable graduated micropipette. All of the buffy coat from a single 10 ml lavender-top EDTA tube will be placed into one cryovial. The buffy coat aliquot is expected to have a reddish color from



the red blood cells.



4. Complete the **Biosample shipping record**.
5. Place the labeled cryovial in the 25-slot cryovial box with the plasma cryovials and place on dry ice. Transfer to a **-80°C Freezer when possible**. Store all samples UPRIGHT at **-80°C until shipped** to BioSEND on dry ice.
6. Ship the frozen buffy coat aliquot to BioSEND according to **Appendix K – Frozen Shipping Instructions**.

Buffy Coat Preparation (10ml Lavender Top Tube)

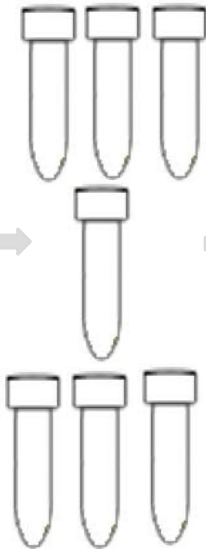


Step One



- Store tube at room temperature.
- Label tube with pre-printed subject labels prior to blood draw.

Step Two



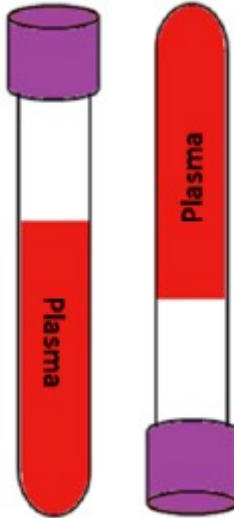
- Label 6 0.5mL cryovials for plasma and 1 2.0mL cryovial for buffy coat with pre-printed subject labels prior to blood draw.
- Pre-chill cryovials on wet ice for 5 minutes or longer.

Step Three



- Collect blood in Plasma Tube allowing blood to flow for 10 seconds and ensuring blood flow has stopped.

Step Four



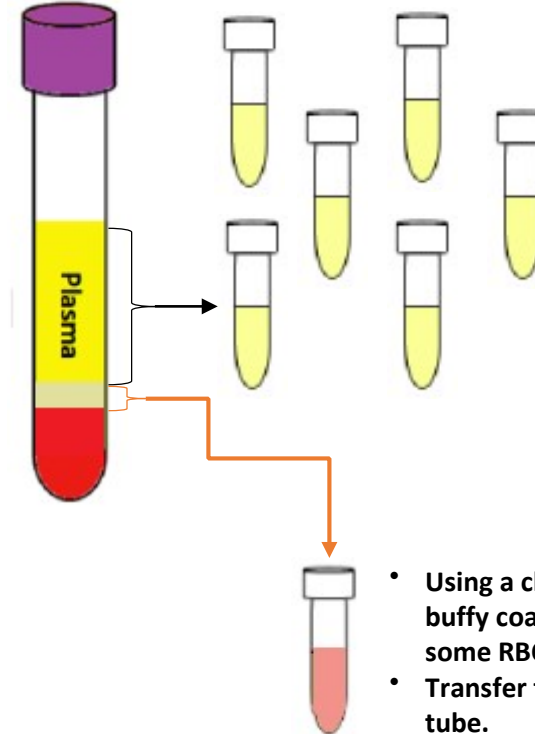
- Immediately after blood draw, invert tubes 8-10 times to mix samples.

Step Five



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

Step Six and Seven



- Using a clean transfer pipette, collect the buffy coat (may have residual plasma and some RBCs included).
- Transfer the buffy coat into a 2.0mL cryovial tube.
- Store buffy coat aliquot at -80°C until shipment.
- Return 1 X 2.0 mL aliquot to BioSend.

- See Appendix B for Plasma Preparation Instructions

Appendix K – Frozen Shipping Instructions

IMPORTANT!

**FROZEN SAMPLES MUST BE SHIPPED MONDAY THROUGH WEDNESDAY ONLY
USING PRIORITY OVERNIGHT DELIVERY**

Please be aware of holidays and inclement weather, and plan your shipments accordingly.

All samples are shipped frozen EXCEPT whole blood for DNA.

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.*

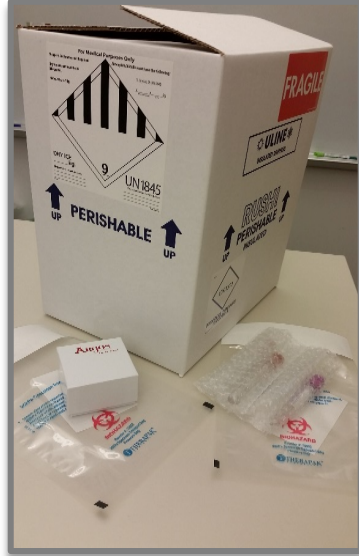
Triple packaging consists of a primary receptacle(s), a secondary packaging, and a rigid outer packaging. The primary receptacles must be packed in secondary packaging in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents into the secondary 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. Contact FedEx® to confirm service is available and schedule package to be picked up.
2. Record the FedEx® tracking number (found at the top of the FedEx® airbill) 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 1 ml aliquots of plasma, serum, and CSF in the cryobox.

- Each cryobox holds 25 aliquots. Only include specimens from one subject in each cryobox.
- If a CSF draw was also completed at the visit, include the CSF aliquoted specimens (10 cryovials). These should be included in the same cryobox as the plasma and serum aliquots.
- Cryoboxes should contain specimens from only one subject.



5. Place the cryobox in the 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. Insert PAXgene™ tubes and/or 6ml EDTA whole blood tube into the bubble wrap tube shuttle, and place the tube shuttle in the 2nd clear plastic biohazard bag. Seal the biohazard bag according to the instructions on the bag. Affix a Case Label to the outside of the biohazard bag.

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



8. 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).
9. Fully cover the cryobox with approximately 2 inches of dry ice.
10. Place the biohazard bag containing the PAXgene™ tubes and/or 6ml EDTA whole blood tube on top of the 2nd layer of dry ice and cover with another 2-3 inches of dry ice.

11. The inner Styrofoam® shipping container must contain approximately 10 lbs (or 4.5 kg) of dry ice. The dry ice should entirely fill the inner box and be placed on top of the canisters to ensure the frozen state of the specimens.



12. 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.

13. Complete the FedEx return airbill with the following information:

- Section 1, "From": fill in your name, address, phone number.
- Section 6, "Special Handling and Delivery Signature Options": under "Does this shipment contain dangerous goods?" check the boxes for "Yes, Shipper's Declaration not required" and "Dry Ice". Enter the number of packages (1) x the net weight of dry ice in kg.

14. Complete the Class 9 UN 1845 Dry Ice Label (black and white diamond) 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 airbill)
- Consignee name and address:

Shipper's Declaration not Required. Dry ice amount must be in kilograms. Note: 2 lbs. = 1 kg.		Airwaybills/airbills must have the following shown in the "Nature and Quantity of Dangerous Goods" area: 1. Dry Ice; 9; UN1845; 2. _____ x _____ Kg III	
DRY ICE, kg. Shipper's Name and Address _____ _____		UN1845 Consignee Name and Address _____ _____	
<small>IML-DI-ICE LABELMASTER® (800) 821-0808 www.labelmaster.com</small>			

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

IMPORTANT!

Complete the required fields on the FedEx® return airbill and Class 9 Dry Ice labels, or FedEx® may reject or return your package.

15. Apply all provided warning labels (UN3373, Dry Ice Label and Fragile Label) as well as the completed FedEx® return airbill to the outside of package, taking care not to overlap labels.
16. Hold packaged samples in -80°C freezer until time of FedEx pick-up/drop-off.
17. Specimens should be sent to the address below via **FedEx® Priority Overnight**. Frozen shipments should be sent Monday through Wednesday only to avoid shipping delays on Thursday or Friday. FedEx does not replenish dry ice if shipments are delayed or held over during the weekend.

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18. **Notify BioSEND by email (biosend@iu.edu) that a shipment has been sent and attach the Sample Record and Shipment Notification form to your email. If email is unavailable please call BioSEND. Do not ship until you've contacted and notified BioSEND staff about the shipment in advance.**
19. Use FedEx® tracking 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 P– Bulk Frozen Shipping Instructions

Use these instructions when shipping samples from multiple subjects and potentially multiple draw dates, together in one shipment container. Please discuss the option of bulk shipping with BioSEND before using this method.

IMPORTANT!

**FROZEN SAMPLES MUST BE SHIPPED MONDAY THROUGH WEDNESDAY ONLY
USING PRIORITY OVERNIGHT DELIVERY**

Please be aware of holidays and inclement weather, and plan your shipments accordingly.

All samples are shipped frozen EXCEPT whole blood for DNA.

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 – Bulk Frozen Shipments

1. Contact FedEx to confirm service is available and schedule package to be picked up.
2. **Record the FedEx tracking number (found at the top of the FedEx airbill) 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 1 ml aliquots of plasma, serum, and CSF in the cryobox.



- Each cryobox holds 25 aliquots. Only include specimens from one subject in each cryobox.
- If a CSF draw was also completed at the visit, include the CSF aliquoted specimens (10 cryovials). These should be included in the same cryobox as the plasma and serum aliquots.

5. Place the cryobox in the 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. Insert PAXgene™ tubes and/or 6ml EDTA whole blood tube into the bubble wrap tube shuttle, and place the tube shuttle in the 2nd clear plastic biohazard bag. Seal the biohazard bag according to the instructions on the bag. Affix a Case Label to the outside of the biohazard bag.



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

8. Place the biohazard bag containing the cryobox into the provided Styrofoam shipping container (Large) on top of the dry ice. Please ensure that the cryobox is placed so that the cryovials are upright in the shipping container.
Please include only 5-10 cryoboxes.
9. Fully cover the cryobox with approximately 2 inches of dry ice.
10. Place the biohazard bag containing the PAXgene™ tubes and/or 6ml EDTA whole blood tube on top of the 2nd layer of dry ice and cover with another 2-3 inches of dry ice.
Please include only 5-10 biohazard tube bags.



11. The inner Styrofoam shipping container must contain approximately 45 lbs (or 20 kg) of dry ice. The dry ice should entirely fill the inner box and be placed on top of the bags to ensure the frozen state of the specimens.



12. 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.
13. Complete the FedEx return airbill with the following information:
 - a. Section 1, "From": fill in your name, address, phone number.
 - b. Section 6, "Special Handling and Delivery Signature Options": under "Does this shipment contain dangerous goods?" check the boxes for "Yes, Shipper's Declaration not required" and "Dry Ice". Enter the number of packages (1) x the net weight of dry ice in kg.

14. Complete the Class 9 UN 1845 Dry Ice Label (black and white diamond) with the following information:
 - a. Your name and return address
 - b. Net weight of dry ice in kg (this amount must match the amount recorded on the airbill)
 - c. Consignee name and address:

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Shipper's Declaration not Required. Dry ice amount must be in kilograms. Note: 2 lbs. = 1 kg.	Airwaybills/airbills must have the following shown in the "Nature and Quantity of Dangerous Goods" area: 1. Dry Ice; 9; UN1845; 2. _____ (kg) _____ (kg)
DRY ICE, kg. Shipper's Name and Address _____ _____	UN1845 Consignee Name and Address _____ _____
HAZ-DRY ICE LABELMASTER® (800) 621-0008 www.labelmaster.com	

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

IMPORTANT!

Complete the required fields on the FedEx return airbill and Class 9 Dry Ice labels, or FedEx may reject or return your package.

15. Apply all provided warning labels (UN3373, Dry Ice Label and Fragile Label) as well as the completed FedEx return airbill to the outside of package, taking care not to overlap labels.
16. Hold packaged samples in -80°C freezer until time of FedEx pick-up/drop-off.
17. Specimens should be sent to the address below via **FedEx Priority Overnight**. Frozen shipments should be sent Monday through Wednesday only to avoid shipping delays on Thursday or Friday. FedEx does not replenish dry ice if shipments are delayed or held over during the weekend.

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18. Notify BioSEND by email (biosend@iu.edu) that a shipment has been sent and attach the Sample Record and Shipment Notification form to your email. If email is unavailable please call BioSEND. Do not ship until you've contacted and notified BioSEND staff about the shipment in advance.
19. Use FedEx tracking 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.

IMPORTANT!

Bulk frozen shipments, should include no more than ten cryovial boxes (separated by patient within biohazard bags) and ten biohazard tube bags per shipping container in order to have room for a sufficient amount of dry ice to keep samples frozen up to 24 hours.