



Biospecimen Exchange for Neurological Disorders

## The Late Effects of TBI (LETBI)

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BIOSPECIMEN COLLECTION & PROCESSING

# Overview

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1. Specimen uniformity and quality
2. Site Equipment
3. Procedures
  - Kit Contents and Ordering
  - Sample Labelling
  - Sample Collection and Processing
  - Shipping Samples
  - Non-Conformance
4. Contact Information

# Specimen Uniformity and Quality

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GENERAL REMINDERS

# Specimen Standardization and Quality

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Most biomarkers are sensitive to *time* and *temperature*

- Standardization of processing across sites is key
- Specimens must be processed within 2 hours of collection
- Reference the *BioSEND Biomarker Specimen Collection, Processing, and Shipment Manual* as needed
- Do not replace or supplement any kit components without first receiving approval from BioSEND/NINDS

Questions? Email [biosend@iu.edu](mailto:biosend@iu.edu)

# Site Consumables and Equipment

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*Sites will need to supply the following items:*

- Gloves
- Alcohol wipes
- Butterfly needles
- Tourniquet
- Gauze pads
- Bandages
- Microcentrifuge tube rack
- Sharps bin and lid
- Crushed ice
- Pipettes and pipette tips
- Centrifuge capable of maintaining 4°C
- -80°C Freezer
- Dry ice

# Procedures

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MAINTAINING SPECIMEN UNIFORMITY AND QUALITY



# Biospecimen Collection Protocol

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	V0	V1	V2	V3	V4
Plasma (6 x 1.5ml)	X	X	X	X	X
Buffy Coat (2 aliquots)	X	X	X	X	X



# Kit Contents and Ordering

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- All sites will be sent a Supplemental Kit with their first kit shipment
  - Contains extra blood collection tubes and processing supplies
  - May be used to replace items in study visit kits
- Study Visit Kits should be ordered as soon as visits are planned
  - Contains collection, processing, and shipping supplies specific to each visit
  - Includes barcoded labels
  - The supplies/labels in each study visit kit are intended for that visit only

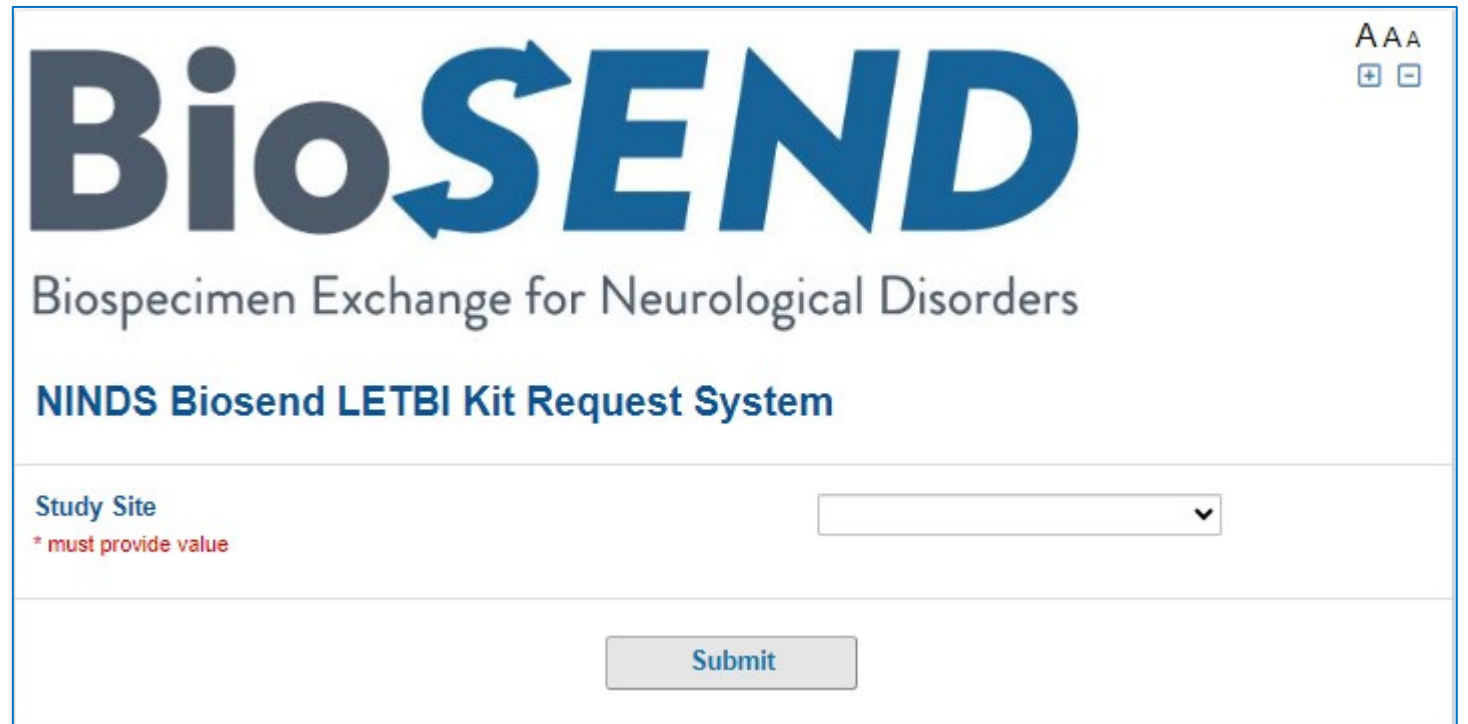
# Kit Contents and Ordering – REDCap Survey

<http://kits.iu.edu/biosend/letbi>  
<https://redcap.link/LETBI-IPV>

Order kits online through the Kit Request Module for:

- Blood kits
- Supplemental Kit
- Extra Supplies

Please provide as much notice as possible when ordering kits and/or supplies.



The screenshot shows the BioSEND logo in large blue letters, with the 'S' containing a circular arrow. Below the logo is the text 'Biospecimen Exchange for Neurological Disorders' and 'NINDS Biosend LETBI Kit Request System'. In the top right corner, there are accessibility icons for text size (AAA) and a plus/minus sign. Below the header is a form with a 'Study Site' label, a red asterisk indicating a required field, and a dropdown menu. A 'Submit' button is located at the bottom of the form.

# Kit Contents and Ordering: Confirm Site Info

LETBI Kit Request Module

<b>Study Site</b> <small>* must provide value</small>	Indiana Univers	Select your site from the drop-down list
<b>Indiana University School of Medicine</b> Carolyn Dunifon Dept. of Medical & Molecular Genetics 351 West 10th Street, TK-318 Indianapolis, IN 46202-3002 (317) 274-5751 cdunifon@iu.edu		Verify contact information and update if needed
<b>Is the contact name above correct?</b> <small>* must provide value</small>	<input type="radio"/> Yes <input checked="" type="radio"/> No	reset
<b>New Contact Name</b> <small>* must provide value</small>	Claire Wegel	
<b>Is the shipping address above correct?</b> <small>* must provide value</small>	<input type="radio"/> Yes <input type="radio"/> No	reset
<b>Is the e-mail address above correct?</b> <small>* must provide value</small>	<input type="radio"/> Yes <input type="radio"/> No	reset
<b>Is the phone number above correct?</b> <small>* must provide value</small>	<input type="radio"/> Yes <input type="radio"/> No	reset

# Kit Contents and Ordering: Kit Types

## LETBI Kit Request Module

- Kits are not specific to a subject or time point. After collection, sites will indicate the subject and time point to which BioSEND should link the samples.

<b>Kit Type</b> <b>**Please allow two weeks for shipment**</b> <i>* must provide value</i>	<input checked="" type="checkbox"/> <b>Blood Collection Kit</b>
	<input type="checkbox"/> <b>Supplemental Kit</b>
	<input type="checkbox"/> <b>Extra Supplies</b>
	Please specify in comments if you need kits before the standard two week shipment time.
<b>Blood Collection Kit Quantity</b> <i>* must provide value</i>	<input type="text"/>
<b>Comments</b>	<input type="text"/>
	<a href="#">Expand</a>

# Kit Contents and Ordering: Kit Breakdown

LETBI Kit Request Module

Comments	
<b>Each Blood Collection Kit contains:</b>	<b>Kit contents of selected kit will appear at the bottom of the page</b>
2 - 10mL EDTA tubes, plastic 6 - Purple cryovial, micronic (2 ml) 2 - Grey cryovial, micronic (2 ml) 2 - Disposable transfer pipettes (3ml) 1 - 48-slot micronic cryovial tray 1 - Biohazard bag with absorbent sheet 1 - Shipping label packet (Dry Ice, Fragile, UN3373) 1 - Air waybill envelope 1 - Dry Ice Shipper 1 - Specimen/Case label set--ST labels	

Expand

# Kit Contents and Ordering: Blood Kit



# Kit and Supply Ordering

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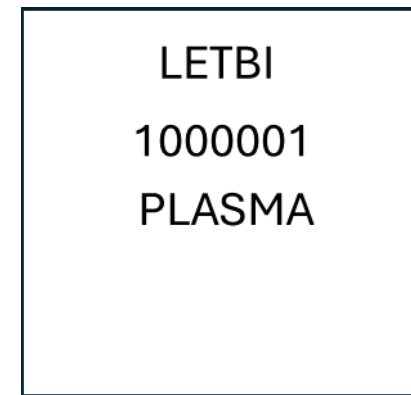
- Click “Submit” to send order to BioSEND; staff will confirm receipt of your order
- Please allow two week turn-around time for kit shipments
- If urgent request needed, please note date needed by in comments and email BioSEND. We cannot guarantee urgent orders, but we will do our best to accommodate.
- BioSEND will send confirmation of shipment and tracking number when supplies ship

# Sample Labelling: Example Labels

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## Labels are provided by Indiana University

- Please check that all samples are properly labelled to ensure correct identification by IU
- If do not have enough labels to complete a visit, please contact IU *immediately*
- Labelling the tubes during processing prevents sample mix-ups



# Sample Labelling – Cryotube Labels

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LETBI  
1000001  
PLASMA



**Biorepository/Study**



**Sample Type**



**Kit Number**

# Sample Labelling – Cryotube Labels

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Note: cryotube barcodes are printed on tube, not on the label. Barcodes are tied to the specific kit they arrive in (ie, a specific subject and visit). **Please do not mix the labels from one kit with the cryotubes from another.**

Barcode is in human readable format on side of tube, 2D format on bottom of tube



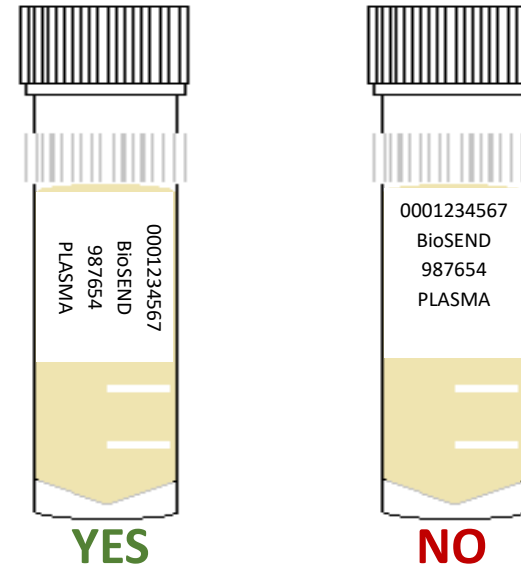
LETBI  
1000001  
PLASMA

# Sample Labelling: Label Placement

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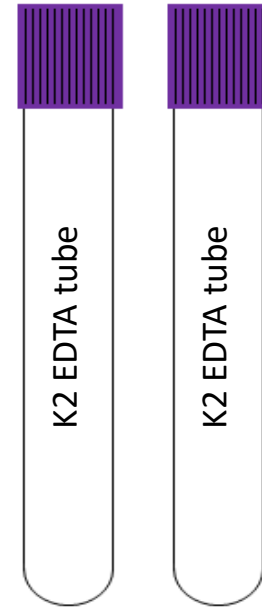
Please...

- Label all collection and aliquot tubes before cooling, collecting, processing, or freezing samples
- Label only 1 subject's tubes at a time to avoid mix-ups
- Wrap the label around the tube horizontally - label position is important for all tube types
- Make sure the label is completely adhered by rolling between your fingers



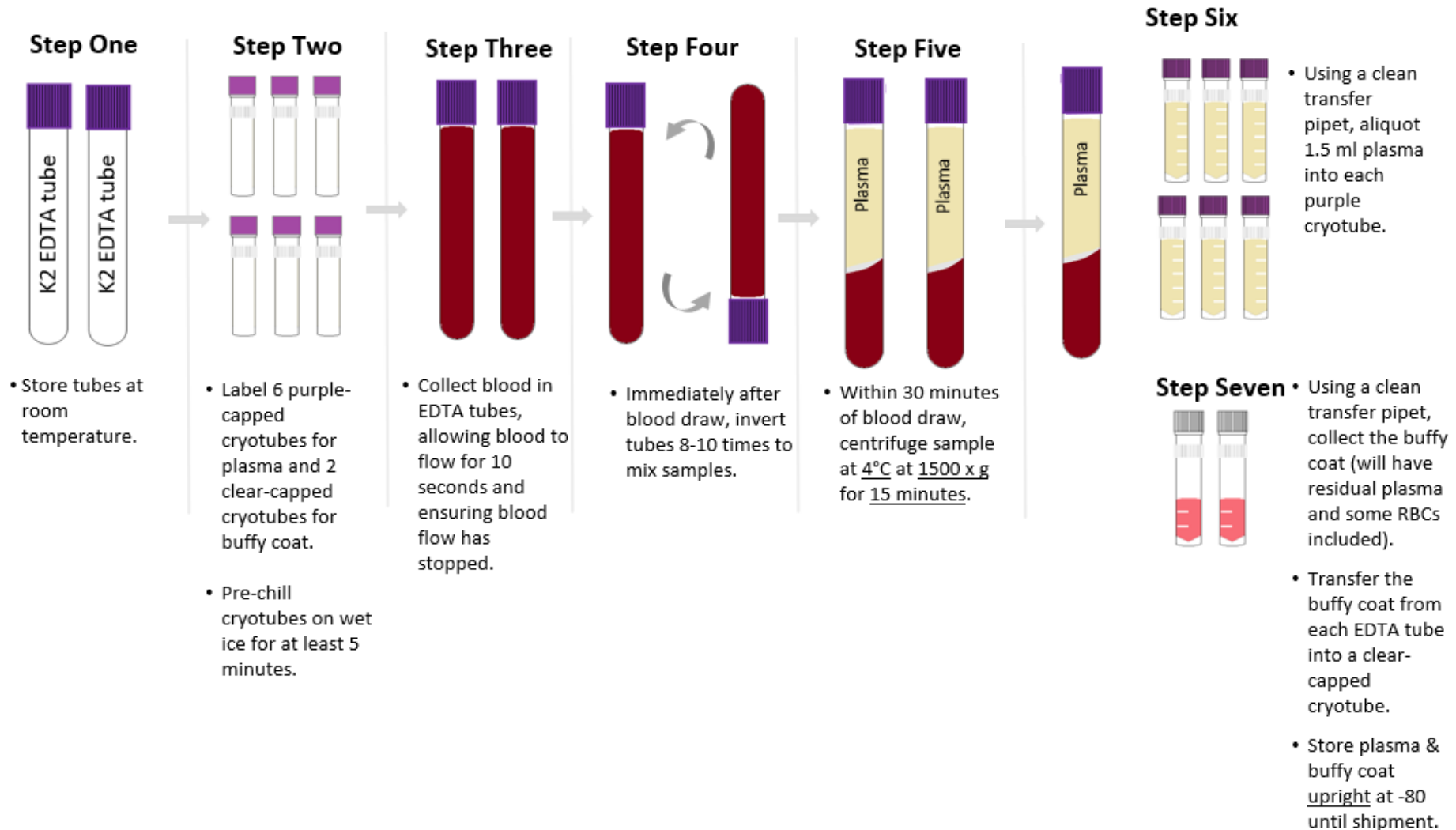
# Sample Collection and Processing

*Supplies provided for the collection of  
plasma and buffy coat*



2 x 10ml EDTA  
(plastic) collection  
tubes

# Sample Collection and Processing: Plasma & Buffy Coat

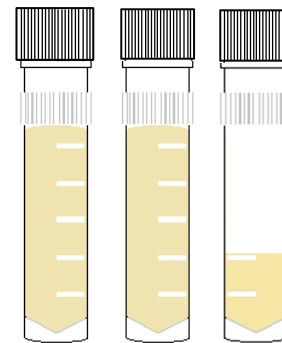


# Sample Collection and Processing: Aliquots

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Filling biomarker plasma aliquots:

- Fill as many cryovials as possible to 1.5 ml (plasma)
- Over-filled vials may burst in freezer!
- Ship ALL material to IU, even if final vial is less than standard volume



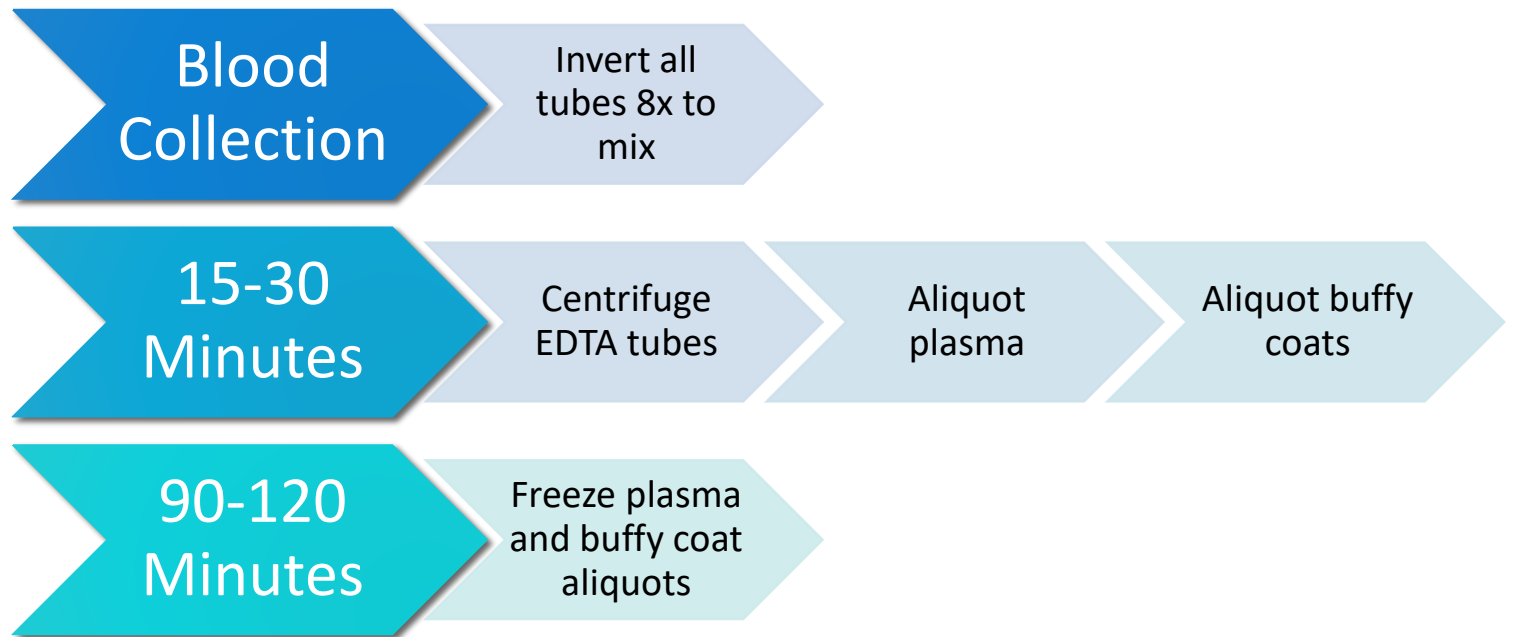
YES



NO

# Sample Collection and Processing: Timeline

Timeline for blood processing





# Sample Collection and Processing: Issue #1

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## Troubleshooting Blood Collection

### Issue #1: Tube with little/no vacuum

- Always check expiration date on the tube before beginning blood draw and discard expired tubes
- Store tubes at “room temperature” – extreme temperature can affect vacuum
- Keep extra vacutainer tubes from supplemental kit nearby during blood draw to replace “bad” tubes
- If this is a frequent occurrence, report tube type and lot number to IU.

# Sample Collection and Processing: Issue #2

## Troubleshooting Blood Collection

### Issue #2: Hemolyzed serum and/or plasma caused by incorrect collection

Cause: Blood Collection Methods	Corrective Action
Improper venipuncture site	Draw from median cubital, basilic, and cephalic veins from antecubital region of arm
Prolonged tourniquet use	Tourniquet should be released after no more than 1 min, excessive fist clenching should be avoided
Not allowing alcohol to dry on skin before venipuncture	Without touching, allow the venipuncture site to air dry
Use of too large/small bore needle resulting in excess force applied to blood	Avoid using too small/large needle. Needle size dependent on the subject's physical characteristics & amount of blood to be drawn. Most commonly used sizes are 19 – 23.
Pulling/pushing plunger too fast while drawing/transferring blood	Avoid drawing the syringe plunger too forcefully when collecting blood
Ensure all blood collection assemblies are fitted securely, to avoid frothing	

For more information, visit: [http://www.bd.com/vacutainer/pdfs/techtalk/TechTalk\\_Jan2004\\_VS7167.pdf](http://www.bd.com/vacutainer/pdfs/techtalk/TechTalk_Jan2004_VS7167.pdf)



# Sample Collection and Processing: Issue #2 continued

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## Troubleshooting Blood Collection

### Issue #2: Hemolyzed serum and/or plasma caused by incorrect processing

Cause: Sample Processing Methods	Corrective Actions
Vigorous mixing/shaking	Gently invert blood collection tube when mixing additive with specimen, follow guidelines in Biologics Manual regarding number of times to invert each type of tube
Not allowing serum to clot for recommended time	Serum tubes without clot activator should be allowed to clot for 60 min in a vertical position
Exposure to excessive heat or cold	Keep samples at ambient temperature until processing
Prolonged contact of serum/plasma with cells	Do not store uncentrifuged samples beyond recommended time

For more information, visit: [http://www.bd.com/vacutainer/pdfs/techtalk/TechTalk\\_Jan2004\\_VS7167.pdf](http://www.bd.com/vacutainer/pdfs/techtalk/TechTalk_Jan2004_VS7167.pdf)

# Sample Collection and Processing Form

Direct link:

<https://redcap.link/LETBISampleForm>

First page captures basic subject and visit information

# BioSEND

Biospecimen Exchange for Neurological Disorders

Protocol: Late Effects of TBI (LETBI)

Please complete the Specimen Collection and Processing Form, below.

[Returning?](#)

AAA



Page 1 of 2

Study Site

Email address of staff member completing this form

*Note: A copy of the completed sample form and the shipping manifest will be sent to this address.*

GUID/ Study ID:

Sex (used for DNA quality control)

Visit

Kit Number

Funding Source

Next Page >>

Save & Return Later

# Sample Collection and Processing Form

Direct link:

<https://redcap.link/LETBISampleForm>

Second page captures processing information

## Blood Collection and Processing

Date of venipuncture blood collection   Today M-D-Y

Time of venipuncture blood collection   Now H:M  
Use 24 Hour clock

Date participant last ate   Today M-D-Y

Time participant last ate   Now H:M

### 2. PLASMA and BUFFY COAT (Purple-top EDTA tubes, 10 mL)

Was blood collected and processed for PLASMA EDTA?

Yes

No

reset

Time of PLASMA EDTA tube centrifugation   Now H:M  
Use 24 Hour clock

Duration of PLASMA EDTA tube centrifugation   
minutes

Rate of PLASMA EDTA tube centrifugation   
x g

Temperature of PLASMA EDTA tube centrifugation   
degrees Celsius

Number of PLASMA EDTA aliquots created for BioSEND   
Each aliquot should be 1.0 mL

Number of BUFFY COAT aliquots created for BioSEND

Time PLASMA EDTA and BUFFY COAT were placed in freezer   Now H:M  
Use 24 Hour clock.

# Sample Collection and Processing Form

Direct link:

<https://redcap.link/LETBISampleForm>

PDF form of responses will be emailed to you. **Print a copy of the Frozen Shipping Manifest and include with shipment.**

## LETBI Frozen Shipping Manifest

Please verify/update the information below. When you click the "Submit" button below, a PDF copy of the Frozen Shipping Manifest will be emailed to you for Subject [subj\_id].

Please print a copy of that document and include it in the Kit #[kit\_num] shipping container.

Study Site:

- Mount Sinai Beth Israel Medical Center  
 University of Washington  
 Massachusetts General Hospital

GUID:

\_\_\_\_\_

Visit:

- V0  
 V1  
 V2  
 V3  
 V4

IU Kit Number:

\_\_\_\_\_

Date of blood collection:

\_\_\_\_\_

### PLASMA EDTA

Number of PLASMA EDTA aliquots shipped:

\_\_\_\_\_

Number of BUFFY COAT aliquots shipped:

\_\_\_\_\_

### Shipping Information - Please complete.

Frozen shipments should be sent Monday-Wednesday only. Please check for holiday closures prior to shipping. Contact us at biosend@iu.edu if you are unsure whether or not it is safe to ship.

Date of shipment:

\_\_\_\_\_

Did/will you use the IU UPS interface to generate the shipping label?

- Yes  
 No

# Sample Collection and Processing Form

Submission of the Shipping Manifest portion of the form serves as shipment notification to BioSEND

- Must be completed prior to shipment
- If samples are shipped and not received, BioSEND will follow-up with courier. It is recommended that sites also track shipment to ensure safe delivery

# Shipping Frozen Samples: Tips

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## Packing and Shipping Frozen Samples

- Plasma and buffy coats all ship frozen
- Ship frozen samples on dry ice
- Frozen samples should be shipped **only** Monday through Wednesday
- Always fill carton to **top** with dry ice
- Do not pack shipment until the day of pickup



Class 9 Dry Ice Label should not be covered with other stickers and must be completed, or UPS will reject/return your package!

# Shipping Samples

Packing and Shipping Frozen Samples

Shipper's Declaration not Required.

Dry Ice amount must be in kilograms.

Note: 2 lbs. = 1 kg.

Airwaybills / airbills must have the following:  
1. Dry Ice; 9; UN 1845  
2.  $\frac{\text{Number}}{\text{(Number pkgs)}} \times \frac{\text{wt}}{\text{(wt)}} \text{ Kg}$

Net weight of dry ice in kg

Dry Ice  kg.

Your name & address

Shipper's Name and Address

UN 1845

Consignee Name and Address

IU information and address

9

06426 1/01 RRD

The image shows a Class 9 Dry Ice Label template. It features a central diamond shape with a dashed border and a solid border. Inside the diamond, there are several vertical bars of varying heights. The label contains text for shipper's declaration, dry ice amount, and airwaybill requirements. There are three main input areas: a box for 'Dry Ice' weight in kg, a box for 'Shipper's Name and Address', and a box for 'Consignee Name and Address'. Red arrows point to these areas with labels: 'Net weight of dry ice in kg' points to the 'Dry Ice' box, 'Your name & address' points to the 'Shipper's Name and Address' box, and 'IU information and address' points to the 'Consignee Name and Address' box. The number '9' is printed in the center of the diamond, and 'UN 1845' is printed to the right of the diamond. The text '06426 1/01 RRD' is at the bottom left.

# Shipping Samples: Frozen

Do not ship more than 4 biohazard bags in a single shipper (equivalent to four subject-visits).

- Allows room for dry ice to keep samples frozen in transit
- Minimizes loss in the rare but unfortunate event of courier issues



# Shipping Samples – UPS: <https://kits.iu.edu/UPS>

The screenshot shows the shipping interface for Indiana University School of Medicine. The header includes the IU logo and the text "INDIANA UNIVERSITY SCHOOL OF MEDICINE". Below the header, the text "and Affiliated Biorepositories" is displayed. The interface is divided into two main sections: "Ship From" and "Shipment Information".

**Ship From Section:**

- Search for address: A search bar with a magnifying glass icon and a "Clear" button.
- Code: Input field.
- Company: Icahn School of Medicine - Mt. Sinai
- Contact: Kenny Persaud
- Address 1: 1425 Madison (Icahn Building)
- Address 2: Icahn L4 39
- Address 3: Input field.
- City: New York
- State/Province: NY
- Postal Code: 10029
- Country/Territory: United States

**Shipment Information Section:**

- Study Group: SSBC (dropdown menu)
- Weight: 20 (input field) LB (dropdown menu)
- Dry Ice Weight: 10 (input field) LB (dropdown menu)
- Description of Return: Biologic Specimens
- Pickup Request: A blue button.

**Annotations:**

- "Search for address": A dashed box around the search bar with a blue arrow pointing to it.
- "Choose Study": A dashed box around the "Study Group" dropdown with a blue arrow pointing to it.
- "Enter weight": A dashed box around the "Weight" and "Dry Ice Weight" input fields with a blue arrow pointing to them.
- "Schedule Pickup": A dashed box around the "Pickup Request" button with a blue arrow pointing to it.
- "Click 'Ship'": A dashed box around the "Ship" button at the bottom right with a blue arrow pointing to it.

**Buttons:**

- Clear (blue button)
- Pickup Request (blue button)
- Reset (blue button)
- Ship (blue button)

# Shipping Samples via UPS

IU UPS ShipExec Shipping Portal

- Print out UPS air waybill
- Ensure all elements (barcode, return address, etc.) printed clearly
- Fold and insert UPS air waybill into clear plastic sleeve on package

JOHN SMITH  
INDIANA UNIVERSITY  
410 WEST 10TH STREET  
INDIANAPOLIS IN 46202

2 LBS

1 OF 1

RS

SHIP TO:

SCHOOL OF MEDICINE  
317-278-2694  
INDIANA UNIVERSITY  
TK 217  
351 W 10TH ST  
INDIANAPOLIS IN 46202



IN 461 9-01



UPS NEXT DAY AIR

1

TRACKING #: 1Z 976 R8W 84 3985 8595



BILLING: P/P  
DESC: Biological Specimens  
RETURN SERVICE

Reference No. 1: 4087277

XOL 20.03.09 NV45 83.0A 12/2019





# Shipping Samples: Closures

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

Please also consider weather when shipping. UPS will post service updates on their webpage. Reach out to BioSEND if you are unsure if it is safe to ship.

# Non-Conformance

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Non-conformance to standard procedures may reduce the utility of the biospecimens:

- Not processing plasma within 2 hours of collection allows for breakdown of certain proteins and small molecules
- Over/under centrifuging changes plasma composition



# Non-Conformance Reporting con't

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Most common non-conformance issues:

- Shipment notification not sent
- Samples shipped for weekend/holiday delivery
- Sample form incomplete/inaccurate
- Low volume
- Unlabeled or mislabeled tube(s)
- Sample hemolysis



# Non-Conformance and Inventory Reporting

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Most common non-conformance issues:

- BioSEND will notify sites directly of any issues upon receipt
- BioSEND will email sites a monthly inventory report of all samples received from that site to date
- ***If you are experiencing issues, please reach out to us for help! It is much easier to prevent an issue before sample collection & shipment than trying to fix it after the fact***

# BioSEND.org

On the website, you can:

- Access your study's kit request module and sample submission form
- Download the most recent version of the Manual of Procedures
- View a recording of this training
- Find information about holiday closures
- Access shipping resources

## Study Resources

### KIT REQUEST MODULE

Please follow the below link to access the Kit Request Module. This link will direct you to a REDCap database where study coordinators and staff may request kits, individual supplies, and/or labels. Please allow a total of two weeks for kit requests to be fulfilled.

[Kit Request System](#) →

### SPECIMEN COLLECTION AND PROCESSING FORM

Please use the below link to access the collection and processing form for this protocol. This form must be completed prior to shipment. We also ask that all shipments include a physical copy of the shipping manifest portion of the form.

[Specimen Collection and Processing Form](#) →

### MANUAL OF PROCEDURES

The below downloadable manual was created specifically for the DxCTEII study. Please feel free to explore the manual through the hyperlinked 'Table of Contents'. Questions concerning any part of the manual may be directed to [biosend@iu.edu](mailto:biosend@iu.edu) for further clarification.

[Manual of Procedures](#) ↓

### TRAINING SLIDES

These slides correspond to the BioSEND DxCTEII protocol training. Training is available upon request by contacting [biosend@iu.edu](mailto:biosend@iu.edu).

[Training Slides](#) ↓

### SAMPLE SHIPPING

BioSEND can receive samples Monday-Friday, excluding holidays. Frozen samples should be shipped M-W. Ambient samples may be shipped on Th.

[Generate UPS airbill or schedule pickup](#) →

[Check holiday closures](#) →

[What do I do for Friday blood draws](#) →

# Contacts

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## Indiana University

General Questions/Shipment Notifications:

[biosend@iu.edu](mailto:biosend@iu.edu)

317-278-6158

Request kits:

<http://kits.iu.edu/biosend/letbi>