

## ADCFB Protocol Update: V03.2024

Section	Change
	Updated logos and colors throughout.
3.1	Corrected Room Number to TK-217 in NCRAD’s shipping address. Added alternate phone number to reach NCRAD team.
5.1	Specified that dry ice for sample shipment should be pelleted. Clarified dry ice weight required for small and large batch sample shipments.
6.1	Removed 4x5” plastic bags from all blood collection kit and supplemental supply kit types. Added site specific blood kits: Blood Kit 10 and Vanderbilt Blood Kit 20. Added CSF Kit: 1.5 ml CSF Collection kit. Specified limit of 1 supplemental supply kit per site per year. Removed Biohazard and Fragile labels from frozen shipping kits. Specified outer dimensions of frozen shippers.
7.2	Added picture showing correct label placement of labels on PBMC tubes to ensure buffy coat is visible during processing. Specified to release tourniquet when filling last collection tube.
7.3	<b>Updated processing window to 2 hours.</b> Specified to release tourniquet when filling last collection tube.
8.3	<b>Updated processing window to 2 hours.</b>
9.2.1	Noted maximum capacity of frozen shippers. Maximum 3 kits per small shipper. Maximum 8 kits per large shipper.

# Alzheimer's Disease Center

## Fluid Biomarkers

in collaboration with the

# National Centralized Repository for Alzheimer's Disease and Related Dementias



**Biospecimen Collection, Processing, and Shipment Manual of  
Procedures**

**Version 04.2024**

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## 1.0 Abbreviations

AD	Alzheimer’s Disease
ADCFB	Alzheimer’s Disease Center Fluid Biomarkers
CSF	Cerebrospinal Fluid
DNA	Deoxyribonucleic Acid
EDTA	Ethylene Diamine Tetra-acetic Acid
GUID	Globally Unique Identifier
IATA	International Air Transport Association
NACC	National Alzheimer's Coordinating Center
NCRAD	National Centralized Repository for Alzheimer’s Disease and Related Dementias
PHI	Protected Health Information
RBC	Red Blood Cells
RCF	Relative Centrifugal Force
RPM	Revolutions Per Minute

## 2.0 Purpose

The collection of biofluids is an important part of the Alzheimer's Disease Center Fluid Biomarkers (ADCFB) Study. The purpose of this manual is to provide study staff (PIs, study coordinators, phlebotomists) at the various study sites with instructions for collection and submission of biological samples for ADCFB study visits. It includes instructions for biofluid submission to NCRAD located in Indianapolis at Indiana University.

*Centers may collect and send the following samples to NCRAD:*

- PBMC
- Plasma
- Buffy Coat (DNA Extraction)
- Cerebrospinal Fluid (CSF)

This manual includes instructions for collection of blood and CSF, fractionation of blood from collection tubes, aliquoting, labeling, storage prior to shipping, and shipping to NCRAD.

These procedures are relevant to all study personnel responsible for processing specimens provided to NCRAD for the ADCFB protocol.

## 3.0 NCRAD Information

### 3.1 NCRAD Contacts

**Tatiana Foroud, PhD, Core Leader**

Phone: 317-274-2218

**Kelley Faber, MS, CCRC, Senior Project Manager**

Phone: 317-274-7360

Email: [kelfaber@iu.edu](mailto:kelfaber@iu.edu)

**Stephanie Steidel, MS, Clinical Research Coordinator**

Phone: 317-274-1685

Email: [ssteidel@iu.edu](mailto:ssteidel@iu.edu)

**General NCRAD Contact Information**

Phone: 1-800-526-2839 or 317-278-8413

Email: [alzstudy@iu.edu](mailto:alzstudy@iu.edu)

Website: [www.ncrad.org](http://www.ncrad.org)

**Sample Shipment Mailing Address**

ADCFB at NCRAD

Indiana University School of Medicine

351 W. 10th St. TK-217

Indianapolis, IN 46202

Phone: 1-800-526-2839

Alternate phone: 1-317-278-8413

### 3.2 NCRAD 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 packing and shipment details of samples, please refer to [Section 9.0](#) of this protocol.

Check the weather report to make sure impending weather events (blizzards, hurricanes, etc.) will not impact the shipping or delivery of the samples.

### 3.3 NCRAD Holiday Observations

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
July 4	Independence Day
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 Day

Please note that between December 24<sup>th</sup> and January 2<sup>nd</sup>, Indiana University will be open Monday through Friday for essential operations **ONLY** and will re-open for normal operations on January 2<sup>nd</sup>. If possible, biological specimens for submission to Indiana University should **NOT** be collected and shipped to Indiana University after the second week in December. 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 20<sup>th</sup> by e-mailing [alzstudy@iu.edu](mailto:alzstudy@iu.edu), so that they can arrange to have staff available to process incoming samples. Please see: [https://ncrad.org/holiday\\_closures.html](https://ncrad.org/holiday_closures.html) for additional information.

- 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 delivery must be arranged in advance with NCRAD staff.**



## 4.0 Globally Unique Identifier (GUID)

The GUID is a participant ID that allows researchers to share data specific to a study participant, without exposing personally identifiable information. A GUID is made up of random alpha-numeric characters and does not include any PHI in the identifier. By using GUIDs in your research data, the system can associate a single research participant's genetic, imaging, and clinical assessment data even if the data was collected at different locations or throughout different studies. No PHI will be sent to NCRAD, only the GUID.

To create a GUID follow these steps:

1. Create an account: <https://bricsguid.nia.nih.gov/portal/jsp/login.jsp>
2. Once you have an account, go to the GUID Tool – Create GUID
3. To open the 'Launch GUID Tool' you will need to have Java installed on your device
4. In order to generate a GUID, the following PHI is required ([Appendix A](#)):
  - Complete legal given (first) name of participant at birth
  - If the participant has a middle name
  - Complete legal family (last) name of participant at birth
  - Day of birth
  - Month of birth
  - Year of birth
  - Name of city/municipality in which participant was born
  - Country of birth

## 5.0 ADCFB Laboratory Collection

### 5.1 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
- Tourniquet
- Alcohol Prep Pad
- Gauze Pad
- Bandage
- Butterfly needles and hub
- Microcentrifuge tube rack
- Sharps bin and lid
- Wet Ice Bucket
- Wet ice
- Pelleted dry ice

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  $\geq 2000 \times g$  with refrigeration to 4°C
- -80°C Freezer

In order to ship specimens, you must provide:

- Pelleted dry ice (approximately 15 pounds for small batches and 45 pounds for large batches)

## 5.2 Biospecimens Sent to NCRAD

Samples are to be submitted according to the shipping methods outlined in [Section 9.0](#). Guidelines for the processing, storage location, and timing of sample collection are listed in the tables below.

### 5.2.1 Biofluid Collection Schedule

Depending on the approved blood volume, centers will collect and send the following blood-based biospecimens to NCRAD:

**Blood-based Biospecimen Collection Table**

Biospecimen	Total Blood Volume Collected			
	20 ml	30 ml	40 ml	50 ml
Plasma	X	X	X	X
Buffy Coat (DNA)	X	X	X	X
PBMC			X	X

Whole blood is collected in up to three purple-top EDTA tubes and up to two green-top sodium heparin (NaHep) tubes for shipment to NCRAD. If collected, the sodium heparin tubes are shipped to NCRAD on the day of the participant visit (Monday through Thursday only). The 10 ml EDTA tubes are processed locally into plasma and buffy coat fractions; they are then aliquoted, frozen at the study site, and shipped to NCRAD.

If desired, sites may also collect and send CSF samples at each annual visit:

**CSF Biospecimen Collection Table**

Biospecimen	Annual visits
CSF	X

Consent forms must specify that any biological samples and de-identified clinical data may be shared with academic and/or industry collaborators through NCRAD. Recommended consent language can be found on the NCRAD website

at: [https://ncrad.org/recommended\\_consent\\_language.html](https://ncrad.org/recommended_consent_language.html). A copy of the consent form for each participant should be kept on file by the site investigator.

### 5.2.2 Biofluid Collection Charts

#### Blood Collection Table

Draw Order*	Collection Tube	Drawn At	Specimen Type	Aliquot Volume	Total Number of Aliquots	Shipping Temperature
1**	2 Sodium Heparin (Green-Top) Blood Collection Tubes (10 ml)	Visit 1	Whole Blood	N/A	N/A	Ambient
2	2 or 3 EDTA (Purple-Top) Blood Collection Tubes (10 ml)	Each visit	Plasma	1.5 ml plasma aliquots	Up to 10	Frozen
		Each visit	Buffy Coat	~1.0 ml buffy coat aliquots	Up to 3	Frozen

\*Chart shows full 50ml blood collection. Combination of tubes being drawn may vary but always need to follow this order for the tubes that are drawn.

\*\*If drawing blood for PBMCs, Sodium Heparin tubes **must** be the first tubes into which blood is collected. If not, the EDTA tubes will be first.

#### CSF Collection Table

Collection Tube	Drawn At	Specimen Type	Aliquot Volume	Total Number of Aliquots	Shipping Temperature
Sterile Container	Each visit	CSF	1.5 ml CSF aliquots	Up to 14	Frozen

## 6.0 Specimen Collection Kits, Shipping Kits, and Supplies

NCRAD will provide: 1) Blood sample collection kits for research specimens to be stored at NCRAD, the Blood Supplemental Supply Kit, the Frozen Shipment Kit; 2) CSF collection kits including Lumbar Puncture (LP) trays, the CSF Supplemental Supply Kit; and 3) clinical lab supplies (with the exception of pelleted dry ice and equipment supplies listed in [Section 5.1](#)). The provided materials include blood tubes, pipettes, LP trays (when applicable), boxes for plasma, buffy coat, and CSF aliquots, as well shipping materials to send biospecimens to NCRAD. Kit number labels, site and PTID labels, and collection tube and aliquot labels will all be provided by NCRAD. Details regarding the blood kits are found in this Manual of Procedures. Collection tube and aliquot labels will be preprinted with study information specific to the type of sample being drawn. Ensure that all tubes are properly labeled during processing and at the time of shipment according to [Section 7.1](#).

Depending on the allowed blood volume, Centers may order one of four types of kits:

**ADCFB Kits**

	Total Blood Volume Collected			
	20 ml	30 ml	40 ml	50 ml
Kit Type	20	30	40	50

**6.1 NCRAD Specimen Collection Kit Contents**

Collection kits contain the following (for each participant) and provide the necessary supplies to collect samples from a given participant. Do not replace or supplement any of the tubes or kit components provided with your own supplies unless you have received approval from the NCRAD Study team to do so. Please store all kits at room temperature until use.

**Blood Collection Kits**

**ADCFB Blood Kit 20**

Quantity	ADCFB Blood Kit 20 Components
1	Large Plastic Bag
2	EDTA (purple-top) blood collection tube (10 ml)
1	15 ml conical polypropylene tube (orange cap)
6	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
2	Cryovial (2.0 ml) with clear cap
11	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
3	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
4	Disposable graduated transfer pipettes (3 ml)

**ADCFB Blood Kit 30**

<b>Quantity</b>	<b>ADCFB Blood Kit 30 Components</b>
1	Large Plastic Bag
3	EDTA (purple-top) blood collection tube (10 ml)
1	50 ml conical polypropylene tube (blue cap)
9	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
3	Cryovial (2.0 ml) with clear cap
16	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
4	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
4	Disposable graduated transfer pipettes (3 ml)

**ADCFB Blood Kit 40**

<b>Quantity</b>	<b>ADCFB Blood Kit 40 Components</b>
1	Large Plastic Bag
2	Sodium Heparin (green-top) blood collection tube (10 ml)
2	EDTA (purple-top) blood collection tube (10 ml)
1	15 ml conical polypropylene tube (orange cap)
6	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
2	Cryovial (2.0 ml) with clear cap
13	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
5	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
4	Disposable graduated transfer pipettes (3 ml)

**ADCFB Blood Kit 50**

Quantity	ADCFB Blood Kit 50 Components
1	Large Plastic Bag
2	Sodium Heparin (green-top) blood collection tube (10 ml)
3	EDTA (purple-top) blood collection tube (10 ml)
1	50 ml conical polypropylene tube (blue cap)
9	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
3	Cryovial (2.0 ml) with clear cap
18	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
6	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
4	Disposable graduated transfer pipettes (3 ml)

**Site Specific Blood Collection Kits**

**ADCFB Blood Kit 10**

**\*Sites with restricted blood collection volumes ONLY**

Quantity	ADCFB Blood Kit 10 Components
1	Large Plastic Bag
1	EDTA (purple-top) blood collection tube (10 ml)
3	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
1	Cryovial (2.0 ml) with clear cap
6	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
2	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
2	Disposable graduated transfer pipettes (3 ml)

**ADCFB Blood Kit 30 – UAB\***

**\*University of Alabama Birmingham ONLY**

<b>Quantity</b>	<b>ADCFB Blood Kit 30 - UAB Components</b>
1	Large Plastic Bag
2	EDTA (purple-top) blood collection tube (10 ml)
1	Sodium Heparin (green-top) blood collection tube (10 ml)
1	50 ml conical polypropylene tube (blue cap)
6	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
2	Cryovial (2.0 ml) with clear cap
12	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
4	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
4	Disposable graduated transfer pipettes (3 ml)

**ADCFB Vanderbilt Blood Kit 20**

**\*Vanderbilt ONLY**

<b>Quantity</b>	<b>ADCFB Vanderbilt Blood Kit 20 Components</b>
1	Large Plastic Bag
1	EDTA (purple-top) blood collection tube (10 ml)
1	Sodium Heparin (green-top) blood collection tube (10 ml)
3	Cryovial (2.0 ml) with purple cap
1	Cryovial (2.0 ml) with blue cap
1	Cryovial (2.0 ml) with clear cap
7	Preprinted Collection Tube and Aliquot Labels
3	Preprinted Kit Number Label
3	Label for handwritten Site and PTID
1	Cryovial box (holds up to 25 cryovials)
2	Disposable graduated transfer pipettes (3 ml)

## CSF Collection Kits

### ADCFB LP Kits\*

*\*Sites must specify 22- or 24-gauge kit when ordering from NCRAD.*

Quantity	LP Kit Components
1	Sprotte needle, 22 or 24 gauge X 3.5" (90mm)
1	Introducer needle, 1 mm x 30 mm
1	Hypodermic needle, 22 gauge x 1.5"
1	Plastic syringe, (3 ml, luer lock) with 25G x 5/8" needle attached
4	Polypropylene syringe (5 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
2	Lidocaine 1%, 5 ml
1	Povidone-Iodine Topical Solution, 0.75 oz

### ADCFB CSF Kits

Quantity	CSF Kit Components
13	Cryovial tube (2.0 ml) with orange cap
1	Cryovial tube (2.0 ml) with yellow cap
1	Cryovial tube (2.0 ml) with blue cap
3	15 ml conical polypropylene tube-individually wrapped
1	50 ml conical polypropylene tube-individually wrapped
14	Pre-printed Collection Tube and Aliquot Label
3	Pre-printed Kit Number label
3	Label for handwritten Patient ID
1	Cryovial box (holds up to 25 cryovials)

### ADCFB 1.5 ml CSF Kits

Quantity	CSF Kit Components
1	Cryovial tube (2.0 ml) with orange cap
1	Pre-printed Collection Tube and Aliquot Label
3	Pre-printed Kit Number label



### ADCFB Supplemental Supply Kits

Limit 1 Supplemental supply kit per site per year.

#### ADCFB Blood Supplemental Supply Kit 20

Quantity	ADCFB Blood Supplemental Supply Kit 20 Components
1	Large Plastic Bag
10	EDTA (purple-top) blood collection tube (10 ml)
5	15 ml conical polypropylene tube (orange cap)
30	Cryovial (2.0 ml) with purple cap
5	Cryovial (2.0 ml) with blue cap
10	Cryovial (2.0 ml) with clear cap
15	Label for handwritten Site and PTID
5	Cryovial box (holds up to 25 cryovials)
10	Disposable graduated transfer pipettes (3 ml)

#### ADCFB Blood Supplemental Supply Kit 30

Quantity	ADCFB Blood Supplemental Supply Kit 20 Components
1	Large Plastic Bag
15	EDTA (purple-top) blood collection tube (10 ml)
5	50 ml conical polypropylene tube (blue cap)
45	Cryovial (2.0 ml) with purple cap
5	Cryovial (2.0 ml) with blue cap
15	Cryovial (2.0 ml) with clear cap
15	Label for handwritten Site and PTID
5	Cryovial box (holds up to 25 cryovials)
10	Disposable graduated transfer pipettes (3 ml)

#### ADCFB Blood Supplemental Supply Kit 40

Quantity	ADCFB Blood Supplemental Supply Kit 20 Components
1	Large Plastic Bag
10	EDTA (purple-top) blood collection tube (10 ml)
10	Sodium Heparin (green-top) blood collection tube (10 ml)
5	15 ml conical polypropylene tube (orange cap)
30	Cryovial (2.0 ml) with purple cap
5	Cryovial (2.0 ml) with blue cap
10	Cryovial (2.0 ml) with clear cap
15	Label for handwritten Site and PTID
5	Cryovial box (holds up to 25 cryovials)
10	Disposable graduated transfer pipettes (3 ml)

**ADCFB Blood Supplemental Supply Kit 50**

Quantity	ADCFB Blood Supplemental Supply Kit 20 Components
1	Large Plastic Bag
10	EDTA (purple-top) blood collection tube (10 ml)
15	Sodium Heparin (green-top) blood collection tube (10 ml)
5	50 ml conical polypropylene tube (blue cap)
45	Cryovial (2.0 ml) with purple cap
5	Cryovial (2.0 ml) with blue cap
15	Cryovial (2.0 ml) with clear cap
15	Label for handwritten Site and PTID
5	Cryovial box (holds up to 25 cryovials)
10	Disposable graduated transfer pipettes (3 ml)

**CSF Supplemental Supply Kit**

Quantity	CSF Supplemental Supply Kit Components
10	50 ml conical polypropylene tube-individually wrapped (blue cap)
20	15 ml conical polypropylene tube-individually wrapped (blue cap)
20	Cryovial tube (2.0 ml) with orange cap
5	Cryovial tube (2.0 ml) with blue cap
5	Cryovial tube (2.0 ml) with yellow cap
3	Dry Ice Shipping Label and UN3373 Label
10	Small biohazard bags with absorbent sheet
5	3 ½" × 22 Sprotte needle with Introducer (90mm)
10	Adhesive Spot Bandage

**ADCFB Shipping Kits**

**NCRAD Ambient Shipping Kit**

Quantity	NCRAD Ambient Shipping Kit Components
1	Plastic biohazard bag with absorbent sheet
1	Small IATA shipping box with insulated cooler
1	Small refrigerant pack
1	UN3373 Biological Substance Category B label
1	List of contents card
1	UPS Airbill Sleeve
1	UPS Laboratory Pak

**NCRAD Frozen Shipping Supply Kit (Small Shippers)**

Quantity	Frozen Shipping Kit Components for Blood-Based Biomarkers
1	Large Plastic Bag
3	Plastic Biohazard bag with absorbent sheet (small)
1	UPS Airbill Sleeve
1	Shipping box/Styrofoam container (Small– Outer dimensions: 10x12x16")
1	UN3373 label
1	UPS Dry ice shipping label

**NCRAD Frozen Shipping Supply Kit (Large Shippers)**

Quantity	Frozen Shipping Kit Components for Blood-Based Biomarkers
1	Large Plastic Bag
8	Plastic Biohazard bag with absorbent sheet (small)
1	UPS Airbill Sleeve
1	Shipping box/Styrofoam container (Large – Outer dimensions: 17x17x17")
1	UN3373 label
1	UPS Dry ice shipping label

**Individual Supplies**

Quantities	Items Available upon request within the NCRAD kit module
By Request	Cryovial box (holds up to 25 cryovials)
By Request	Cryovial (2.0 ml) with purple cap
By Request	Cryovial (2.0 ml) with blue cap
By Request	Cryovial (2.0 ml) with clear cap
By Request	Cryovial (2.0 ml) with orange cap
By Request	15 ml conical polypropylene tube (orange cap)
By Request	50 ml conical polypropylene tube (blue cap)
By Request	15 ml conical polypropylene tube-individually wrapped (blue cap)
By Request	50 ml conical polypropylene tube-individually wrapped (blue cap)
By Request	Shipping container for dry ice shipment (Styrofoam container – must specify Small or Large in Comments)
By Request	Styrofoam shipping containers for ambient shipments (11”x 9”x 8”, 1 1/2” wall)
By Request	Plastic biohazard bag with absorbent sheet (small)
By Request	Disposable graduated transfer pipette (3 ml)
By Request	Sodium Heparin (green-top) blood collection tube (10 ml)
By Request	EDTA (Purple-Top) Blood Collection Tube (10 ml)
By Request	Warning label packet (UN3373 label and Dry ice shipping label)
By Request	UN3373 label
By Request	Dry ice shipping label
By Request	UPS Airbill Sleeve
By Request	Fine Point Permanent Markers
By Request	Site and PTID Labels

**6.2 Kit Supply to Study Sites**

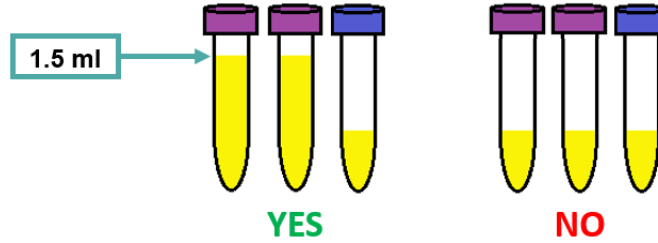
Each site will be responsible for ordering and maintaining a steady supply of kits from NCRAD. We advise sites to keep a supply of each kit type available. Be sure to check your supplies and order additional materials before you run out or supplies expire so you are prepared for study visits. Please go to: <http://kits.iu.edu/adcfb> to request additional kits and follow the prompts to request the desired supplies.

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

**6.3 Filling Cryovials (Plasma and CSF)**

In order to ensure that NCRAD 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 after processing is completed (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 sample.

Aliquot the remaining biologic material as the residual volume and ship to NCRAD. Ship *all* material to NCRAD. Fill as many aliquot tubes as possible. For example, if 2.7 ml of a plasma sample is obtained, fill 1 cryovial with 1.5 ml, and one additional cryovial with the remaining 1.2 ml.



**Please note:** It is critical for the integrity of future studies using these samples that study staff note if an aliquot tube contains a residual volume (anything under 1.5 ml). Please highlight that the aliquot contains a small volume by utilizing the blue cryovial cap provided in each kit. Please record the last four digits of the residual aliquot on the Biological Sample and Notification Form. If there are any unused cryovials, please do not send the empty cryovials to NCRAD. These unused cryovials (ensure labels are removed) can be saved as part of a supplemental supply at your site or the cryovials can be disposed of per your site’s requirements.

To assist in the preparation and aliquoting of samples, colored caps are used for the aliquot tubes. The chart below summarizes the association between cap color and type of aliquot.

Cap Color	Sample Type
Purple	Plasma
Clear	Buffy Coat
Orange	CSF
Blue	Residual sample (Plasma and/or CSF)

## 7.0 Blood Collection and Processing Procedures

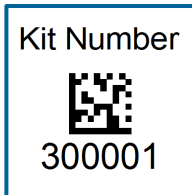
### 7.1 Labeling Samples

#### \*\*\*Important Note\*\*\*

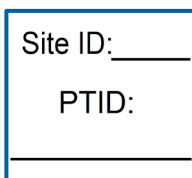
In order to ensure the highest quality samples are collected, it is essential to follow the specific collection and shipment procedures detailed in the following pages. Please read the following instructions first before collecting any specimens. Have all your supplies and equipment out and prepared prior to drawing blood.

## Label Type Summary

1. Kit Number Label
2. Site and PTID Label
3. Collection Tube and Aliquot Labels



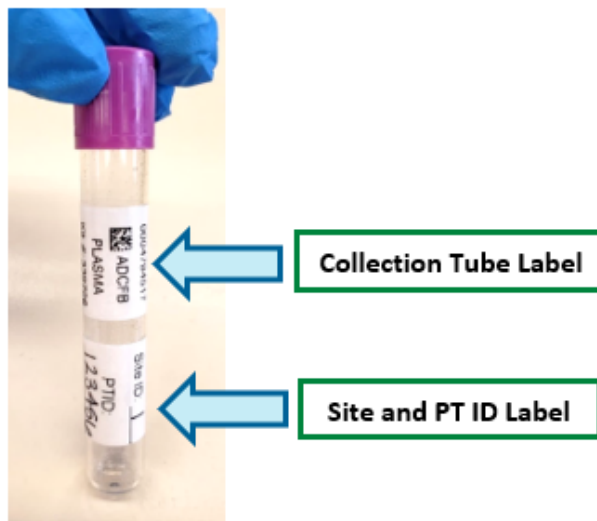
**Kit Number Labels** tie together all specimens collected from one participant at one visit. They should be placed on each cryobox, and in the designated location on the Blood Sample and Shipment Notification Forms.



**Site and PTID Labels** are used to document the individual's unique Site and PTID. Place one label on each blood collection tube.



Place one **Collection Tube and Aliquot Label** on each blood collection tube and cryovial.



**Labeled EDTA (Purple-Top) Blood Collection Tube**

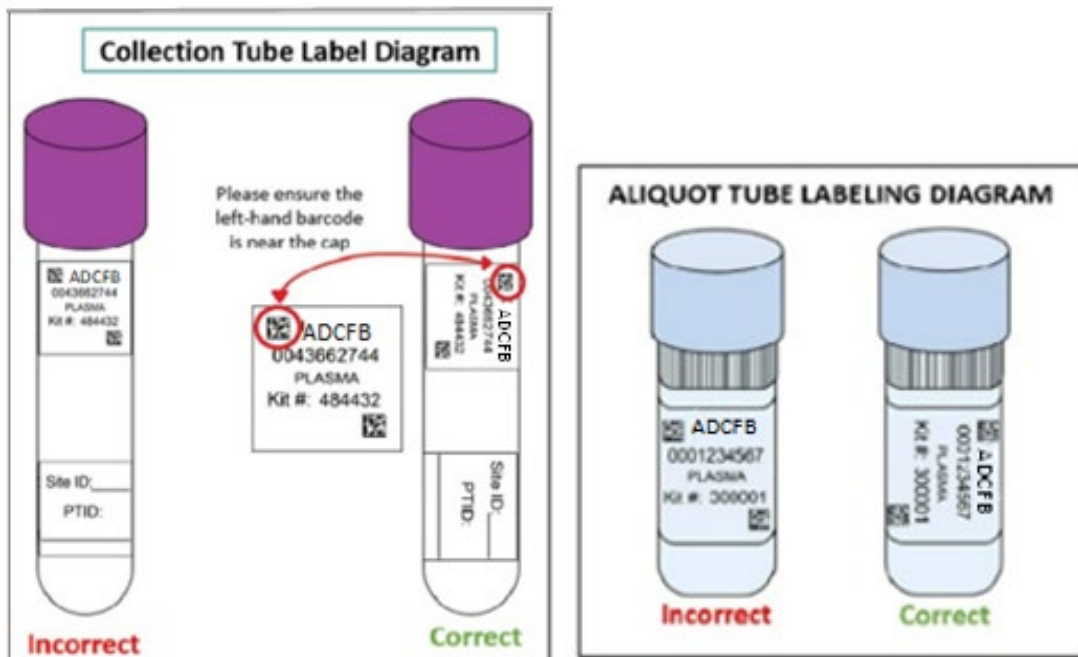
**\*\*Important Note\*\***

**Each collection tube will have two labels:** the collection tube label and the Site and PTID Label. Be sure to place labels in the same configuration consistently among tubes, with the barcoded label near the top of the tube and the handwritten Site and PTID label near the bottom of the tube.

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

- Place Collection Tube and Aliquot Labels on **ALL** collection tubes and cryovials **BEFORE** sample collection. This should help to ensure the label properly adheres to the tube before exposure to moisture or different temperatures.
- Using a fine point permanent marker, fill-in and place the Site and PTID Labels on the EDTA (purple-top) tubes **BEFORE** sample collection. These labels are placed on collection tubes in addition to the Collection Tube Label.
- The Collection Tube Labels contain a 2D barcode on the top left-hand side and bottom right-hand side of the label. Place the top left barcode toward the tube cap.
- Place label **horizontally** on the tube (wrapped around sideways if the tube is upright).

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



## 7.2 Whole Blood Collection with 10 ml Sodium Heparin (Green-Top) Tube for PBMC

### \*\*\*Important Note\*\*\*

Once drawn, sodium heparin tubes **MUST** be shipped to NCRAD the day of collection via UPS Next Day Air service. This is to ensure the specimens have the most viable cells available at extraction.

These samples should only be collected Monday-Thursday. **DO NOT** collect these samples on **Fridays**.

1. Store empty sodium heparin tubes at room temperature, 64°F - 77°F (18 °C – 25 °C) before use.
2. Place completed site and PTID label and preprinted **PBMC** collection tube label on each of the sodium heparin (green-top) blood collection tubes. Place labels such that a clear window remains visible down the length of the tube as shown below to ensure buffy coat can be seen by NCRAD lab staff during processing.



3. Using a blood collection set and a holder, collect blood into the 10 ml sodium heparin tubes using your institution's recommended procedure for standard venipuncture technique.

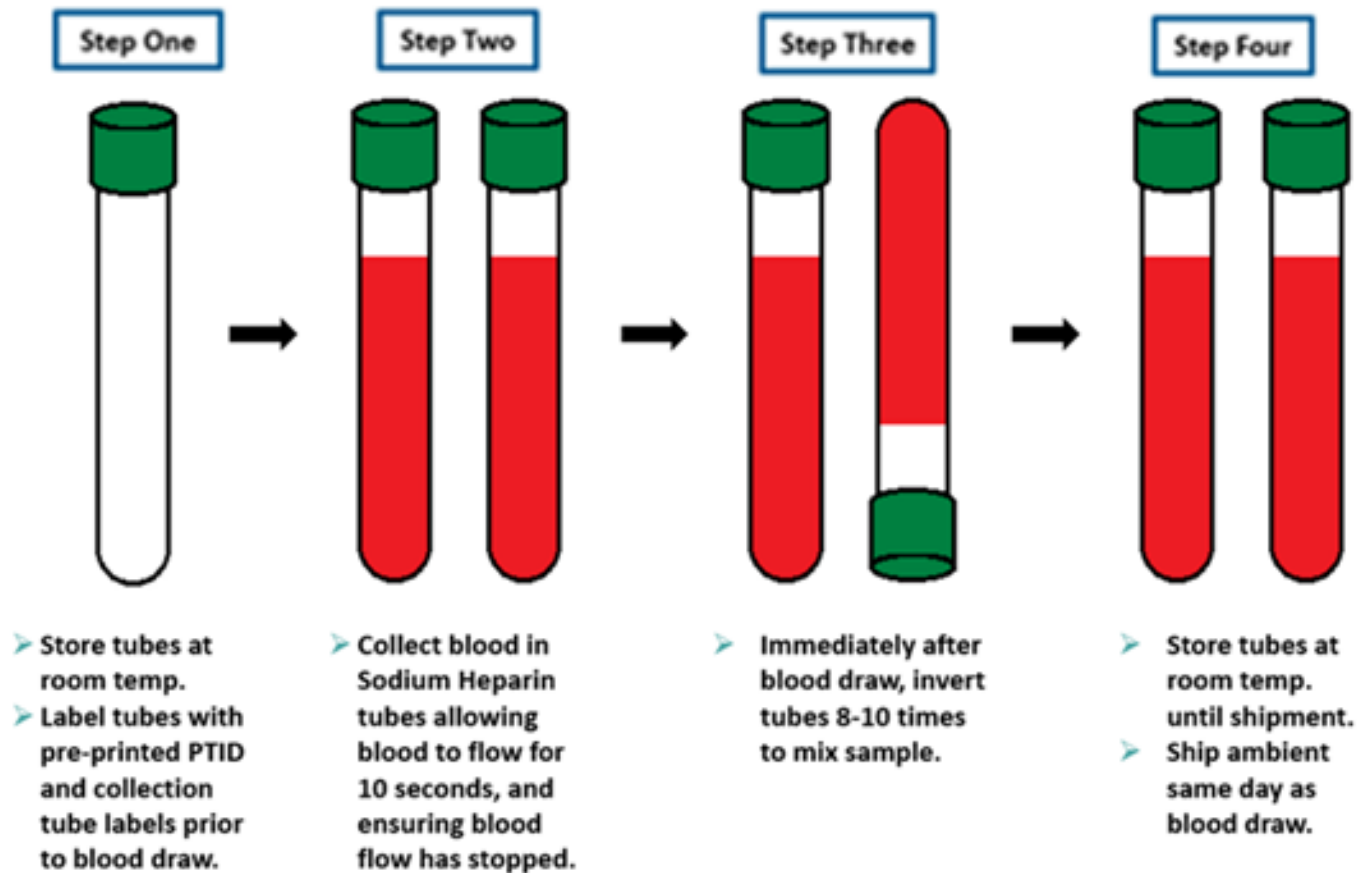
#### **The following techniques shall be used to prevent possible backflow:**

- 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 last collection tube.
  - d. Make sure tube additives do not touch the stopper or the end of the needle during venipuncture.
4. Allow at least 10 seconds for a complete blood draw to take place in the tube. **Ensure that the blood has stopped flowing into each tube before removing the tube from the holder.** The tube with its vacuum is designed to draw 10 ml of blood into the tube.
5. Immediately after blood collection, gently invert/mix (180-degree turns) each tube 8-10 times.
6. Ship the unprocessed sodium heparin (green-top) blood collection tubes **ambient** to NCRAD the day of the participant visit. Please see [Section 9.1](#) for detailed ambient shipping instructions.
7. Complete Blood Sample and Shipment Notification Form ([Appendix C](#)).

## PBMC Preparation (10 ml Sodium Heparin Tube)



**Check expiration dates of tubes before collection to make sure tubes are not expired!**

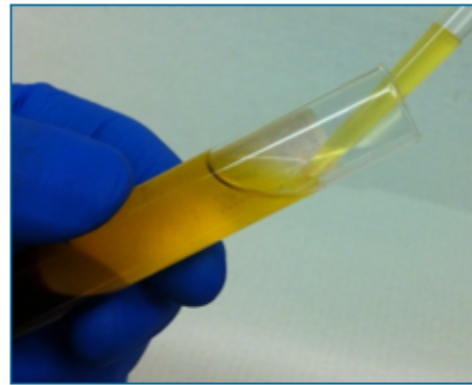
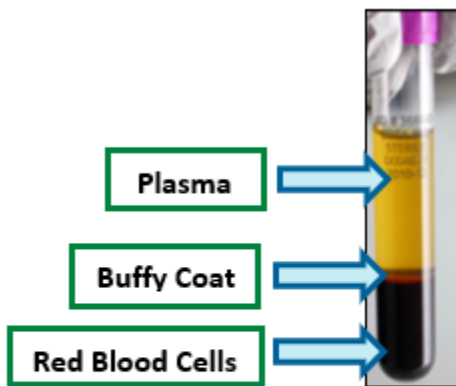
### 7.3 Whole Blood Collection with 10 ml EDTA (Purple-Top) Tube for Plasma and Buffy Coat

1. Store empty EDTA tubes at room temperature, 64°F - 77°F (18 °C – 25 °C) before use.
2. Set centrifuge to 4°C to pre-chill before use.
3. Place completed site and PTID Label and preprinted **PLASMA** Collection Tube Label on the purple-top EDTA tubes. Place preprinted **PLASMA** Aliquot Labels on the 2 ml cryovials with purple caps and 2 ml cryovial with blue cap (if necessary, for residual). Place preprinted **BUFFY COAT** Aliquot Label on the 2 ml cryovials with clear caps.
4. Using a blood collection set and a holder, collect blood into the **EDTA (Purple-Top) Blood Collection Tube (10 ml)** using your institution's recommended procedure for standard venipuncture technique.

**The following techniques shall be used to prevent possible backflow:**

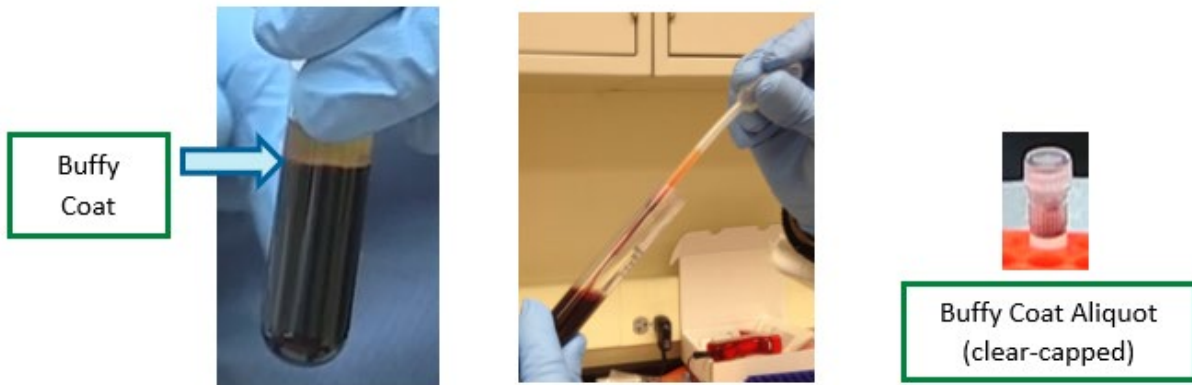
- a. Place participant's arm in a downward position.
  - b. Hold tube in a vertical position, below the participant's arm during blood collection.
  - c. Release tourniquet as soon as blood starts to flow into last collection tube.
  - d. Make sure tube additives do not touch stopper or end of the needle during venipuncture.
5. 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.
    - a. If complications arise during the blood draw, please note the difficulties on the 'Biological Sample and Shipment Notification Form'. Do not attempt to draw an additional EDTA tube at this time. Process blood obtained in existing EDTA tube.
  6. Immediately after blood collection, gently invert/mix (180 degree turns) the EDTA tube 8-10 times.
  7. Immediately after inverting the EDTA tube, place it on wet ice until centrifugation begins.

8. Centrifuge balanced tubes for 10 minutes at 2000 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 B](#) to calculate equivalent RPM for spin at 2000 x g).**
  - a. While centrifuging, remember to record all times, temperatures and spin rates on the Biological Sample and Shipment Notification Form.
  - b. Record original volume drawn for each tube in spaces provided on the Biological Sample Shipment and Notification Form.
  - c. Plasma samples need to be spun, aliquoted, and placed in the freezer within 2 hours from the time of collection.
  - d. Record time aliquoted on the Biological Sample Shipment and Notification Form.
  
9. Remove the plasma by tilting the tube and placing the pipette tip along the lower side of the wall being careful not to agitate the packed red blood cells at the bottom of the collection tube.
  
10. Each EDTA tube should yield, on average, 4-5 ml of plasma. Transfer plasma from all EDTA tubes into the 15 ml conical tube (for 20 ml collections) or the 50 ml conical tube (for 30 ml collections) and gently invert 3 times. Aliquot 1.5 ml plasma per cryovial. Be sure to only place **plasma** in cryovials with purple caps and labeled with **PLASMA** labels. Place residual plasma (<1.5 ml) in the blue-capped cryovial. **If a residual aliquot (<1.5 ml) is created, document the specimen number and volume on the Biological Sample and Shipment Notification Form.**



**NOTE: When pipetting plasma from the EDTA tube into the 15 ml or 50 ml conical tube, be very careful to pipette the plasma top layer only, leaving the buffy coat and the red blood cell layers untouched.**

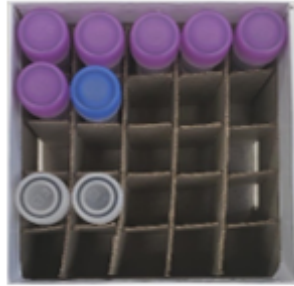
11. Place the labeled cryovials in the 25 cell cryobox and place on pelleted dry ice. **Transfer to -80°C Freezer when possible.** Store all samples at **-80°C until shipped** to NCRAD on pelleted dry ice. Record time aliquots frozen and storage temperature of freezer on Biological Sample Shipment and Notification Form ([Appendix C](#)).
12. After plasma has been removed from the EDTA (Purple-Top) Blood Collection Tubes (10 ml), aliquot the buffy coat layer (in the top layer of cells, the buffy coat is mixed with RBCs-see figure) from one EDTA tube into a labeled, clear-capped cryovial using a micropipette. The buffy coat aliquot is expected to have a reddish color from the RBCs. Be sure to only place the buffy coat from one EDTA tube into each cryovial. Repeat this step for the second and third EDTA tubes (if collecting 30ml total), placing these buffy coats into the second and third clear-capped cryovials.



13. Dispose of collection tube with red blood cell pellet according to your site's guidelines for disposing of biomedical waste.
14. Record the specimen number and volumes of the EDTA tubes and corresponding buffy coat samples on the Biological Sample Shipment and Notification Form.

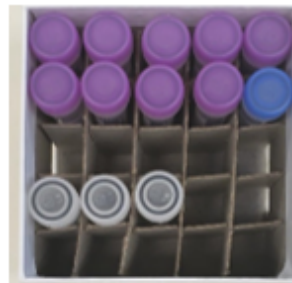
15. Place the labeled cryovials in the 25 cell cryobox and place on pelleted dry ice. **Transfer to -80°C Freezer when possible.** Store all samples at -80°C until shipped to NCRAD on pelleted dry ice. Record time aliquots frozen and storage temperature of freezer on Biological Sample and Shipment Notification Form.

**20 or 40 ml Collections**



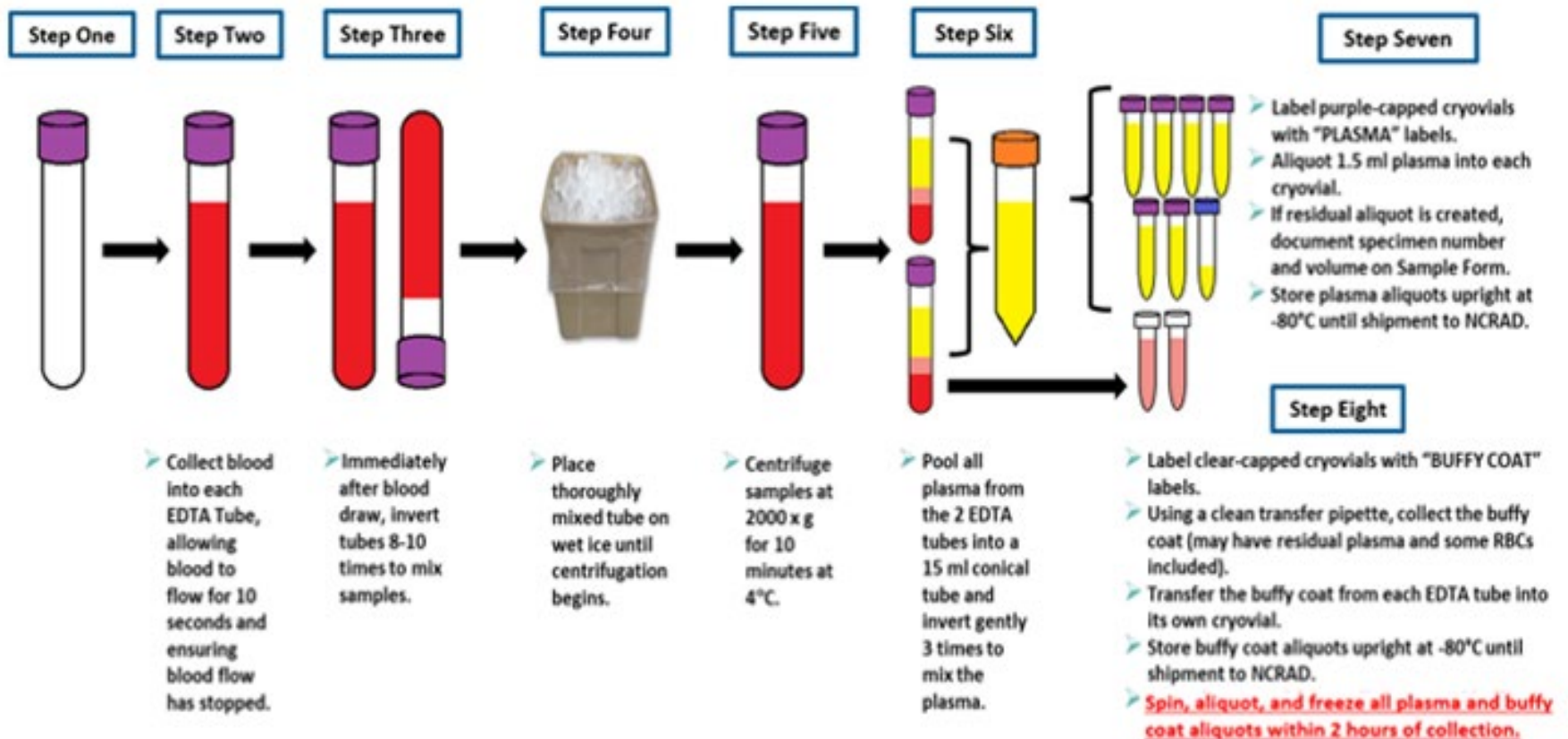
**Plasma Aliquots (up to 7 possible) and  
Buffy Coats (2)**

**30 or 50 ml Collections**



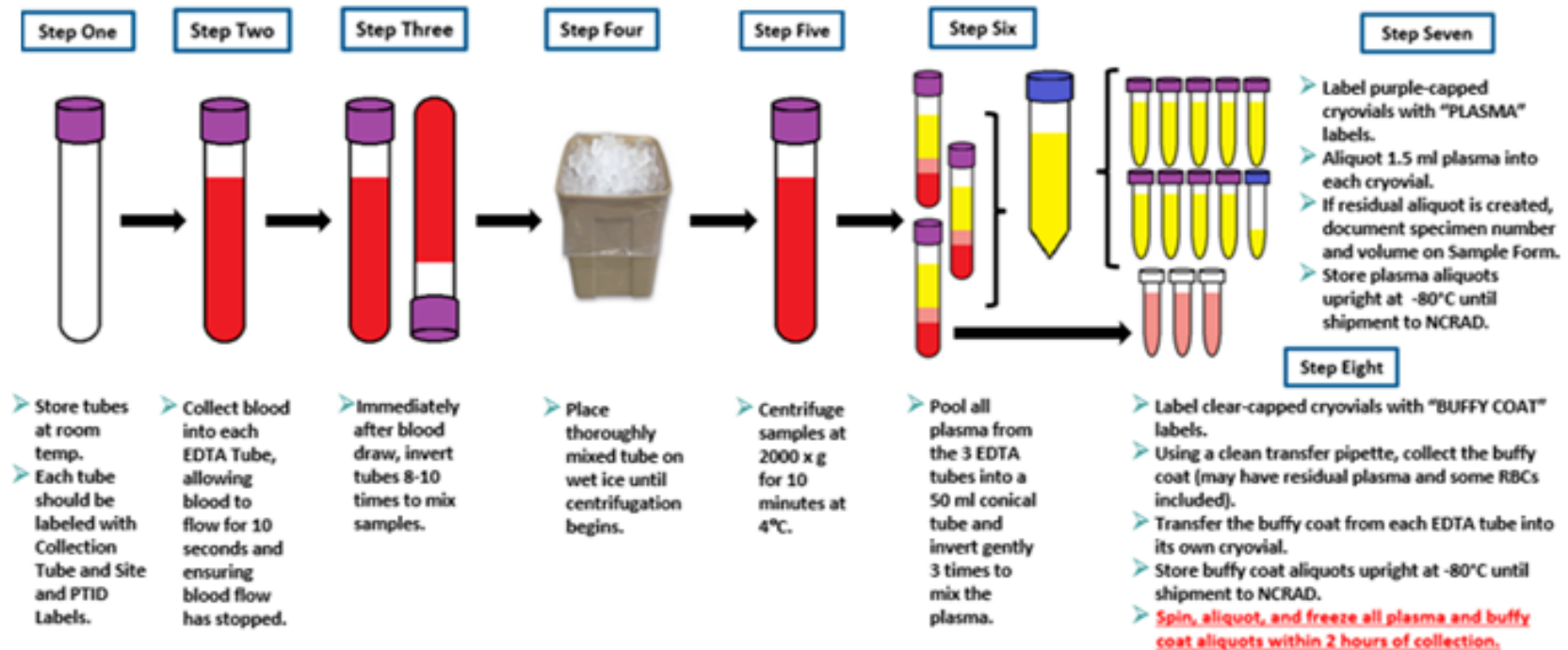
**Plasma Aliquots (up to 10 possible) and  
Buffy Coats (3)**

## Plasma and Buffy Coat Preparation EDTA Purple-Top Tube (2 x 10 ml)



**Check expiration dates of tubes before collection to make sure tubes are not expired!**

## Plasma and Buffy Coat Preparation EDTA Purple-Top Tube (3 x 10 ml)



Check expiration dates of tubes before collection to make sure tubes are not expired!



## 8.0 Cerebrospinal Fluid Collection and Processing

### \*\*\*Important Note\*\*\*

**CSF samples should be collected in the morning before breakfast and after an overnight fast. There should be a minimum 6-hour fast before collection of biomarker fluids and CSF. Only water is permitted until blood draws and the lumbar puncture are completed.**

There are general guidelines to follow regarding CSF Collection.

- Begin by confirming participant consented to lumbar puncture (LP) before scheduling the procedure and again prior to performing procedure.
- If LP and PET scan are done on the same day, LP should be completed prior to the PET scan; otherwise, there should be at least 12 hours between LP and PET scan.
- LP should occur after, or a minimum of 72 hours prior, to an MRI scan.
- Do NOT use any extension tubing due to the tendency of manufactured plastic tubing to bind beta amyloid peptides and other important AD biomarkers.
- If LP was attempted but unsuccessful in obtaining CSF, a second attempt under fluoroscopy (if deemed appropriate by site clinician) is allowed.
- LP under fluoroscopy is permitted, if needed. Site personnel should advise the participant that use of fluoroscopy (x-rays) involves exposure to radiation.
- Participants taking an anti-platelet agent (e.g. aspirin) may, at the discretion of the site clinician, be discontinued from that agent for a period of time prior to lumbar puncture and/or continue off agent for a period of time post LP. Participants who are taking anticoagulants (e.g. warfarin (Coumadin) and/or dabigatran (Pradaxa)) may not undergo an LP and are not suitable to participate in this study.
- Each study participant or a person designated to speak for them will be contacted by phone one day after the LP to confirm participant well-being and to query about any adverse events.
- Identify a physician (e.g., anesthesiologist) able to perform a blood patch for any participant who experiences a post lumbar puncture headache. Find out ahead of time who to call to schedule and perform a blood patch at your center, should the need arise. Ensure billing procedures are in place ahead of time.
- Ensure you have at least two “Lumbar Puncture Tray Kits” and sufficient “CSF Supplemental Supply Kit” provisions on hand prior to scheduling an LP visit. Also ensure adequate site-provided supplies (see above), including pelleted dry ice, are available. Check expiration dates on all supplies, especially lidocaine.

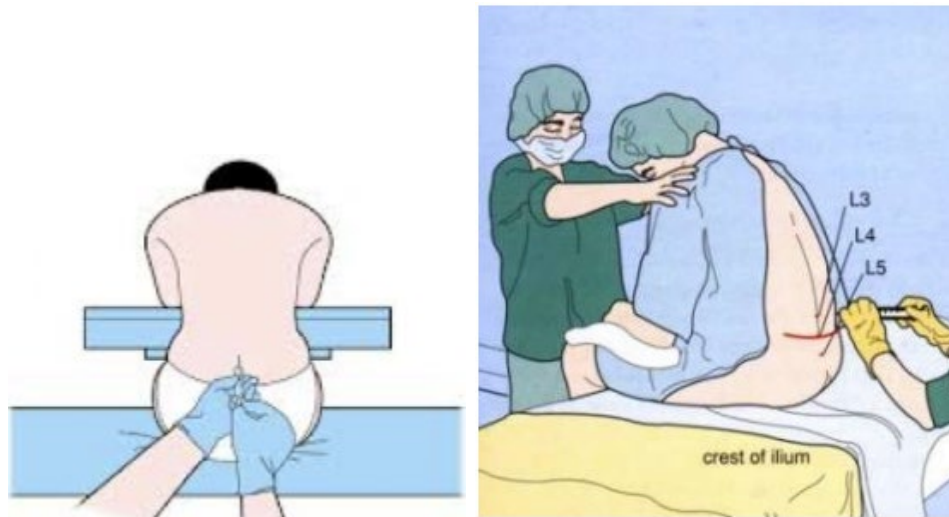
### 8.1 Scheduling the LP

All LPs should be performed in the morning if possible. Availability of staff and facilities for next day blood patch should be considered when scheduling LPs. CSF amyloid levels can vary depending upon the time of day the sample is collected. It is important for the time of day of collection to remain consistent across study visits.

The LP should be rescheduled if the participant does not feel well or is febrile.

### 8.2 Performing the LP

The recommended position is sitting with curved back and head down. For comfort, a stool may be used to prop up the feet and legs. The same position should be used at follow-up LPs. It is critical to try to optimize positioning, and usually requires an assistant. Other positions and needles are allowed (e.g., when using fluoroscopy) but this should be recorded on the CSF Sample and Shipment Notification Form. A pillow may be placed under the head for comfort.

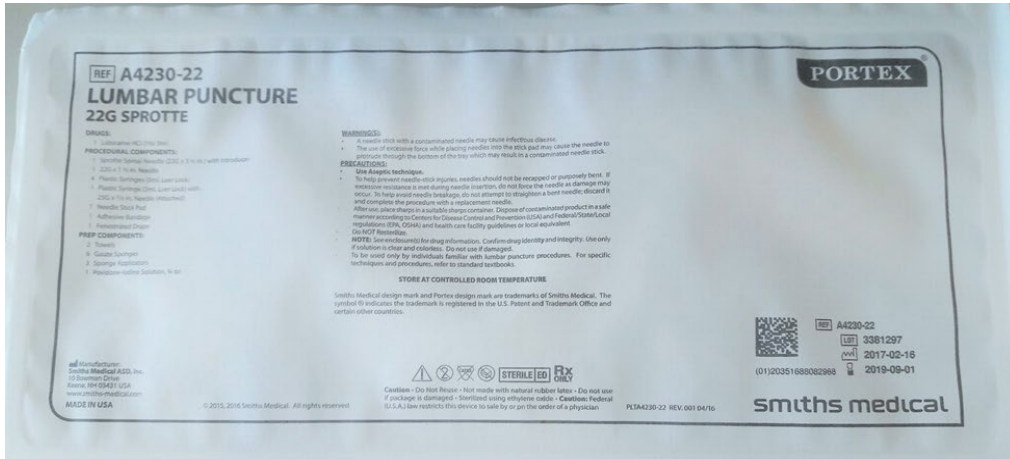


On the bedside table nearest where the person performing the lumbar puncture will sit, place a pair of sterile gloves (in their packaging) and a blue pad. Remove the contents of the lumbar puncture tray from the outer plastic packaging, leaving the contents wrapped in their sterile drape. Leave everything wrapped until the person performing the lumbar puncture is seated.

Feel the outside of the lumbar puncture kit (still wrapped up) to determine which end contains the spongy swabs. Turn this end toward the person performing the lumbar puncture and begin un-wrapping the kit.

## Biospecimen Collection, Processing, and Shipment Manual

### Lumbar Puncture Tray Kit Images



Exterior of LP Tray provided by NCRAD containing the 22 gauge Sprotte Needle with Introducer.



Close up of Sprotte Spinal Needle (22 gauge x 3 ½ in.) with Introducer (24 gauge is equivalent but with lavender top needle)

Interior of LP Tray Provided by NCRAD

**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, throw the kit away and start over.
- If you are in any doubt as to whether the inside of the wrapper has been touched, throw the kit away and start over.

#### **Cleaning the Lumbar Puncture Site**

The lumbar puncture site is cleaned with Povidone-Iodine Topical Solution according to best standard medical practices.

Once the kit is successfully unwrapped, open the bottle of Povidone-Iodine Topical Solution somewhere away from the kit. Use an alcohol swab to remove any loose chunks of dried material off of the bottle top. You don't want anything to fall onto the open and sterile lumbar puncture kit. Pour enough Povidone-Iodine Topical Solution into the prep well to cover the bottom, about ¼ inch deep.

#### **Maintaining the Sterile Field**

An important aspect of assisting with a successful lumbar puncture is keeping the field sterile. If there are a number of staff members in the room, please be sure they do not accidentally contaminate the sterile field. Once the person performing the lumbar puncture has donned sterile gloves, additional help may be needed to obtain or un-wrap any new tubes, needles, or supplies.

#### **Unwrapping the Sterile 15 and 50 ml Conical Tubes**

Note that the 15 ml and 50 ml tubes into which CSF is collected and transferred come individually wrapped and are sterile inside and out. These wrappers should be peeled open by an assistant (not touching the tube) and the tube carefully dropped onto the LP tray or elsewhere in the sterile field in a manner that avoids contamination. Any additional needles or other individually-wrapped sterile items can be handled the same way.

- Do not drop any packaging onto the tray or sterile field.
- Do not let the item touch the outside of the packaging on its way to the tray.

#### **Lidocaine, Syringe with Needle, Gauze Pads**

Anesthesia is usually achieved within 2 minutes after injecting the lidocaine. Occasionally, the person performing the lumbar puncture will need to use more lidocaine to numb up a particular spot, or they may need to move to another spot entirely.

Hold the lidocaine bottle upside down and at a slight angle toward the person performing the lumbar puncture so that they can plunge the needle into the bottle and extract some lidocaine without touching you or the bottle. Use two hands to stabilize the bottle. If the person performing the LP requires additional sterile gauze, open the gauze pad the same way as the syringe and needle, by holding open the package so the person performing the lumbar puncture can grab the gauze without touching you or the package.

#### **General CSF Collection Methods**

LPs for CSF collection should be performed using a small caliber atraumatic needle. CSF should be obtained via gravity flow using the 22 gauge Sprotte needle, although aspiration through this or smaller needles is allowable. Prior approval from the Clinical Core is required before the aspiration method can be utilized. Sites must designate the method of CSF collection for data tracking purposes. It is recommended that CSF be obtained from participants in a sitting position. Alternate needles, positions or methods (e.g., use of fluoroscopy) should be noted on the CSF Sample and Shipment Notification Form.

#### **Collection of CSF by Gravity**

After the spinal needle enters the L3-4 or adjacent intrathecal space and the stylet is withdrawn, CSF should flow freely. **Discard first 1-2 ml of CSF if blood tinged. If not blood tinged, collect first 1-2 ml of CSF into a 15 ml conical tube and pipette into the yellow cap cryovial for local lab. Collect 20-30 ml CSF total into the remaining two 15 ml conical tubes.**

**Reminder:** If the CSF is blood-tinged, the first 1-2 ml of CSF should be discarded (or more if needed) to clear the blood before collecting the 20-30 ml for CSF analysis. **15 ml is the required MINIMUM for CSF biomarker analysis.** If 15 ml is not obtained and provided to the NCRAD, document the reason for under-collection on the comments section of the CSF Sample and Shipment Notification Form.

Up to 30 ml of CSF can be collected for the ADCFB protocol. Any additional CSF collected will require a separate informed consent document that is connected to a specific protocol. NCRAD recommends that the additional non-ADCFB CSF collected does not exceed 10 ml for a total of 40 ml.

**Washcloths, Band-Aids, and Clean Up**

After the person performing the lumbar puncture collects the last of the CSF, remove the needle and introducer and wash the Povidone-Iodine Topical Solution off the participant. A warm, wet washcloth can be used. A Band-Aid should be applied to the puncture site. The participant should lie flat for 30-60 minutes. Next, discard the LP kit following local guidelines, and dispose of sharp components in an appropriate sharps container.

**Suggested management of post-lumbar puncture headache**

Classic post-lumbar puncture (low pressure) headache typically begins 24-48 hours after dural puncture, and the headache is worse when the participant is upright (sits or stands) and improves when the participant is recumbent with the head **no higher** than the spinal cord.

Safety and comfort of the LP is maximized by the use of atraumatic needles. The protocol requires use of a 22 gauge Sprotte needle. Lumbar puncture is a standard procedure for collection of CSF but may be associated with pain during the performance of the procedure, comparable to the level of pain experienced during a blood draw. This is usually temporary and confined to the lower back. A persistent low-pressure headache may develop after lumbar puncture, probably due to leakage of CSF. If a post-LP headache persists it may need additional treatment, e.g. with fluids and analgesics. Uncommonly, a blood patch (injection of some of the participant's blood to patch the CSF leak) may be needed.

**Prevention:** Use of a small gauge and atraumatic needle with careful technique are helpful in preventing post-lumbar puncture headache. Having the participant refrain from exercise or strenuous activities (especially heavy lifting) and staying well-hydrated for 24 hours after the LP may minimize the chance of a lumbar puncture headache.

**Treatment of headache after a lumbar puncture:**

- Limit physical activity as much as possible for at least 24 hours post-procedure.
- Increase oral fluid intake. Caffeine may be helpful.
- Routine analgesics such as acetaminophen may be used.

Post-lumbar puncture headache often resolves with the above treatment. If the headache persists after 24 hours of this management, it will likely require a blood patch. A blood patch *typically* relieves the headache instantly.

### 8.3 Step by Step Summary of CSF Collection Procedure

1. Ensure all samples collected are appropriately labeled.
2. Print CSF Sample and Shipment Notification Form.
3. Confirm all supplies are available.
4. Label the thirteen orange-capped cryovials and one blue-capped cryovial with provided CSF Aliquot Labels. Do **NOT** open and label the 15 ml and 50 ml tubes that will be kept sterile to collect the CSF.
5. Pre-cool the centrifuge and pre-cool all fourteen labeled cryovials on wet ice. Do **NOT** pre-cool the 15 ml and 50 ml tubes that will be kept sterile to collect the CSF.
6. Measure vitals (participant lying down).
7. Record the time of LP and associated information on the CSF Sample and Shipment Notification Form.
8. Collect 20-30 ml CSF at the L3/L4 position (or adjacent position) using a 22 gauge Sprotte spinal needle via gravity flow with participant in upright position (or document alternate method on CSF Sample and Shipment Notification Form) following these steps:
  - a. Collect initial 1-2 ml (if bloody, collect CSF until cleared of blood) using the 15 ml conical tube. If not bloody, transfer first 1-2 ml into yellow-capped cryovial for local lab.
  - b. Collect an additional 20-30 ml CSF into the unlabeled and sterile 15 ml polypropylene tubes from the "CSF Supply Kit". 15 ml is the required minimum.
  - c. If using aspiration, use **ONLY** the polypropylene syringes included in the "Lumbar Puncture Collection Kit" and transfer directly into the unlabeled and sterile 15 ml polypropylene tube from the "CSF Supply Kit". There are four 6 ml Luer lock polypropylene syringes in the "Lumbar Puncture Collection Kit." Note this on the CSF Sample and Shipment Notification Form.
9. As one person takes the immediate post procedure vital signs, a second person should process the CSF as follows:
  - a. Place samples upright on wet ice and ensure samples are kept on wet ice for the entire time prior to processing. Preferably within 15 minutes of collection, centrifuge briefly at low speed (2000 x g, 10 min, 4°C) to pellet any cellular debris.

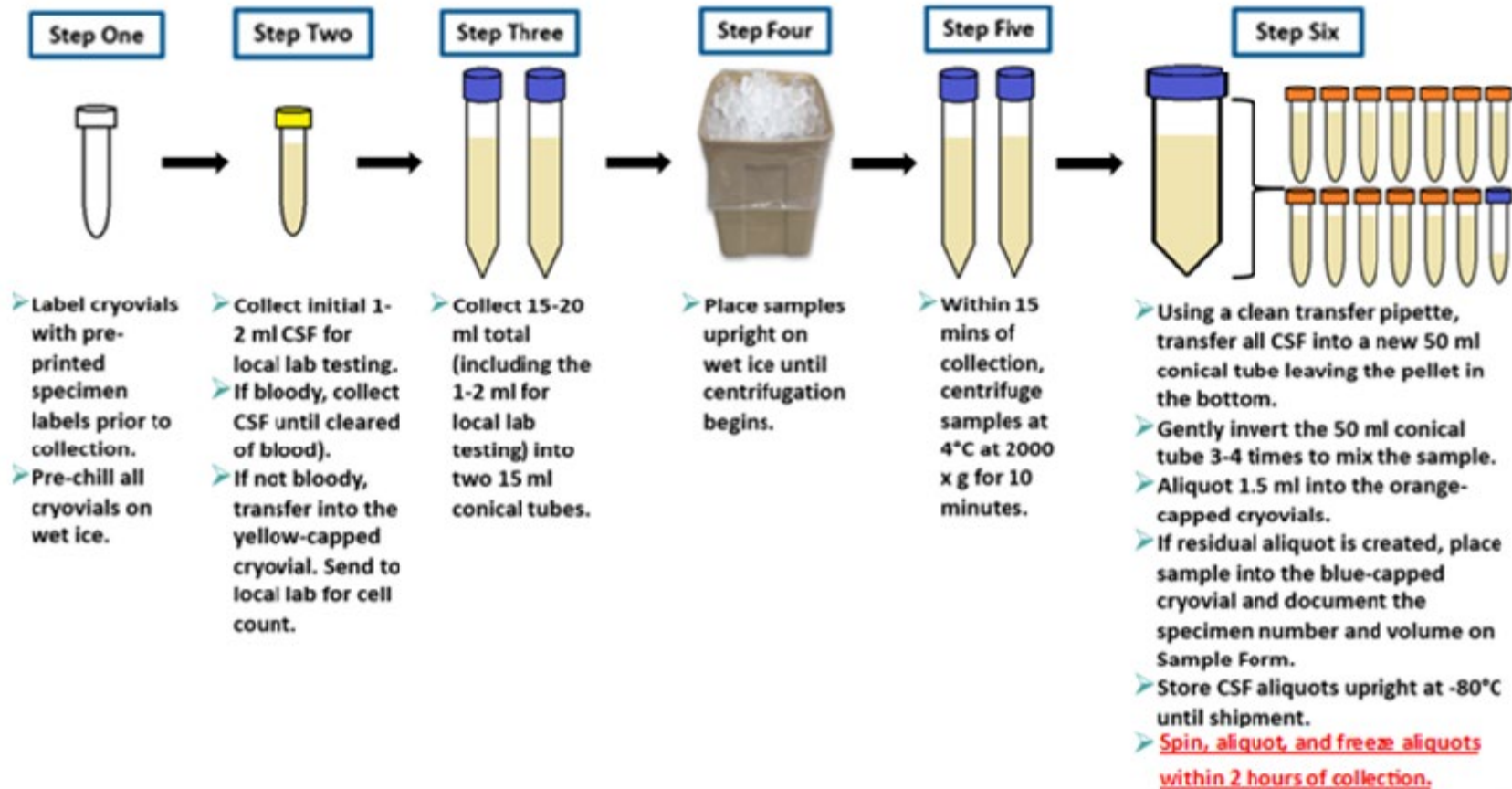
- b. Using a clean transfer pipette, transfer CSF from both 15 ml conical tubes into a 50 ml conical tube, leaving the debris at the bottom of each 15 ml centrifuged tube. Gently invert the 50 ml conical tube 3-4 times to mix the sample.
  - c. Aliquot 1.5 ml volumes into the orange-capped cryovials. If a residual aliquot is created, aliquot into blue-capped cryovial. Document specimen number and volume on CSF Sample Notification Form.
  - d. Within 2 hours of CSF collection, samples need to be spun, aliquoted and in the freezer. Store CSF aliquots at -80°C until shipment. Record time of freezing on CSF Sample and Shipment Notification Form.
10. Provide food and drink to participant (participant may lay flat to minimize the chance of a post-LP headache).
  11. Place the labeled cryovials in the 25 cell cryobox and place on pelleted dry ice. Transfer to -80°C Freezer when possible. Store all samples at -80°C until shipped to NCRAD on pelleted dry ice. Record time aliquots placed in freezer and storage temperature of freezer on Biological Sample and Shipment Notification Form ([Appendix D](#)).



**CSF Aliquots (up to 14 possible)**



# CSF Preparation (15-20 ml total)



**Check expiration dates of supplies before collection to make sure they are not expired!**

## 9.0 Packaging & Shipping Instructions

**ALL** study personnel responsible for shipping should be certified in biospecimen shipping. If you have difficulty finding biospecimen shipping training, please notify a NCRAD coordinator.

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

### 9.1 Ambient Packaging Instructions

**\*\*\*Important Note\*\*\***

**AMBIENT SAMPLES MUST BE SHIPPED MONDAY-THURSDAY ONLY!**

**Ambient PBMC samples must be shipped the day of blood draw, so do not draw on Fridays.**

Ambient sodium heparin (green-top) sample shipments should be considered as Category B UN3373 and as such must be tripled packaged and compliant with the IATA Packing Instructions 650. *See the Latest Edition of the IATA Regulations for complete documentation.*

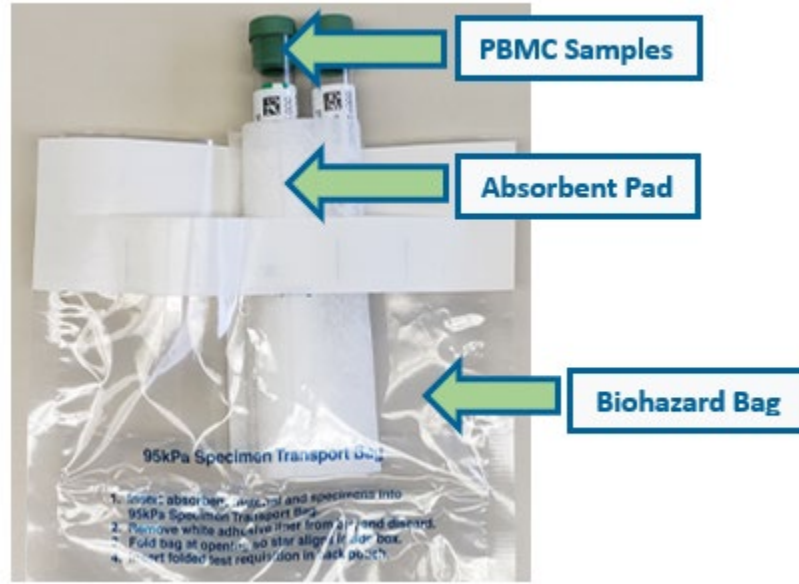
Triple packaging consists of a primary receptacle(s), a secondary packaging, and a rigid outer packaging. The primary receptacles must be packed in secondary packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. 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.

**\*\*\* Ambient Shipping Packing and Labeling Guidelines \*\*\***

- The primary receptacle (sodium heparin tube) must be leak proof and must not contain more than 10 ml total.
- The secondary packaging (small biohazard bag) must be leak proof.
- Absorbent material must be placed between the primary receptacle and the secondary packaging (small biohazard bag). The absorbent material should be of sufficient quantity in order 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 of 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 Person
  - ✓ The words "Biological Substance, Category B"
  - ✓ UN3373

*9.1.1 NCRAD Packaging Instructions—Ambient Shipments*

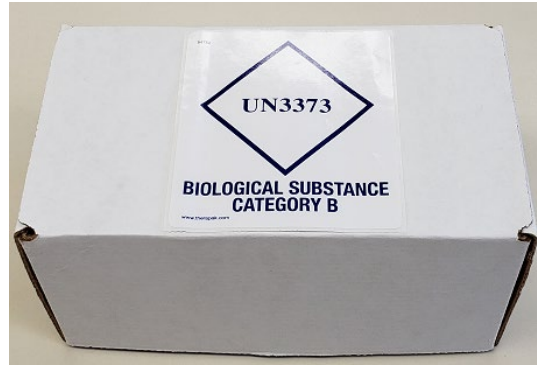
1. Place refrigerant pack in the freezer 24 hours prior to shipment.
2. Notify NCRAD of shipment by emailing NCRAD coordinators at: [alzstudy@iu.edu](mailto:alzstudy@iu.edu)
  - a. Complete and attach the Blood Sample and Shipment Notification Form to the email. (See [Appendix C](#))
3. Place filled and labeled sodium heparin (green-top) tubes into the plastic biohazard bag with absorbent sheet. If absorbent tube sleeve is included, place tubes in sleeve slots then place sleeve with tubes in the biohazard bag.



4. Remove as much air as possible from the plastic biohazard bag and seal the bag according to the directions printed on the bag.
5. Place the refrigerant pack into the cooler on top of the filled biohazard bag.



6. Place the lid onto the cooler.
7. Place an extra copy of the Blood Sample and Shipment Notification Form on top of the cooler lid along with a completed list of contents card.
8. Close the shipping box. Label the outside of the cardboard box with the enclosed UN3373 (Biological Substance Category B) label.



9. Place the closed, labeled shipping box within a UPS Laboratory Pak. **Seal the UPS Laboratory Pak.**



10. Place UPS return airbill on the sealed UPS Laboratory Pak.
11. Use UPS tracking to ensure the delivery occurs as scheduled and is received by NCRAD.

## 9.2 Frozen Packaging Instructions

The most important issue for shipping is to maintain the temperature of the samples. The frozen samples must never thaw; not even the outside of the tubes should be allowed to defrost. This is best accomplished by making sure the Styrofoam container is filled completely with pelleted dry ice.

### \*\*\*Important Note\*\*\*

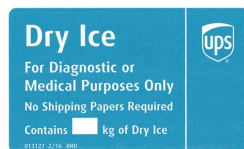
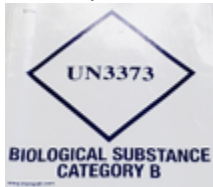
#### **FROZEN SAMPLES MUST BE SHIPPED MONDAY-WEDNESDAY ONLY!**

Specimens being shipped to NCRAD should be considered as Category B UN3373 specimens and as such must be triple packaged and compliant with IATA Packing Instructions 650. *See the Latest Edition 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.

### \*\*\* Packing and Labeling Guidelines \*\*\*

- The primary receptacle (cryovial) must be leak proof and must not contain more than 1L total.
- The secondary packaging (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 and the secondary packaging. The absorbent material should be of sufficient quantity in order 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 of 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 Person
  - ✓ The words "Biological Substance, Category B"
  - ✓ UN3373
  - ✓ UPS Dry Ice label and net weight of dry ice contained.



*9.2.1 NCRAD Packaging Instructions – Frozen Shipments*

1. **Notify NCRAD of shipment by emailing NCRAD coordinators at [alzstudy@iu.edu](mailto:alzstudy@iu.edu).**  
Attach the following to the email:
  - a. Completed Sample Form ([Appendix C](#)) to the email notification (email NCRAD coordinator prior to shipment to receive sample form).
  - b. If email is unavailable, please call NCRAD at 1-800-526-2839 or 317-278-8413 and do not ship until you've contacted and notified NCRAD coordinators about the shipment in advance.
  
2. Place the cryovial boxes containing frozen samples into a biohazard bag.
  
3. As the cryovial box is placed in the plastic biohazard bag, do NOT remove the absorbent material found in the bag. Seal according to the instructions on the bag.
  
4. Place approximately 2-3 inches of pelleted dry ice in the bottom of the Styrofoam shipping container.
  
5. Place the biohazard bags into the provided Styrofoam-lined shipping container on top of the pelleted dry ice. Please ensure that cryovial boxes are placed so the cryovials are upright in the shipping container.
  - a. Do NOT overpack frozen shippers. Small shippers have capacity for a MAXIMUM of 3 kits. Large shippers have capacity for a MAXIMUM of 8 kits
  
6. Fully cover the biohazard bags containing the cryovial boxes tubes with approximately 2 inches of pelleted dry ice.
  
7. After the samples have been placed into the shipping container, completely fill the inner Styrofoam with dry ice pellets to ensure the frozen state of the specimens during transit.
  
8. Replace the lid on the Styrofoam carton. Place the completed Blood Sample 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.
  
9. Complete the UPS Dry Ice Label with the following information:
  - a. Net weight of dry ice in kg (must match amount on the airbill)
  - b. Do not cover any part of this label with other stickers, including preprinted address labels.
  
10. Apply all provided warning labels and UPS return airbill to the outside of package, taking care not to overlap labels.

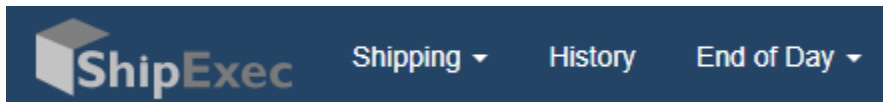
**\*\*\*Important Note\*\*\***

**Complete the required fields on the UPS Dry Ice label or UPS may reject or return your package.**

11. If possible, hold packaged samples in -80°C freezer until time of UPS pick-up/drop-off. If storage in a -80°C freezer until UPS pick-up is not possible, package samples no more than 4 hours before the expected pick-up time.
12. Use UPS tracking to ensure the delivery occurs as scheduled and is received by NCRAD. Please notify NCRAD by email ([alzstudy@iu.edu](mailto:alzstudy@iu.edu)) that a shipment has been sent and include the UPS tracking number in your email.

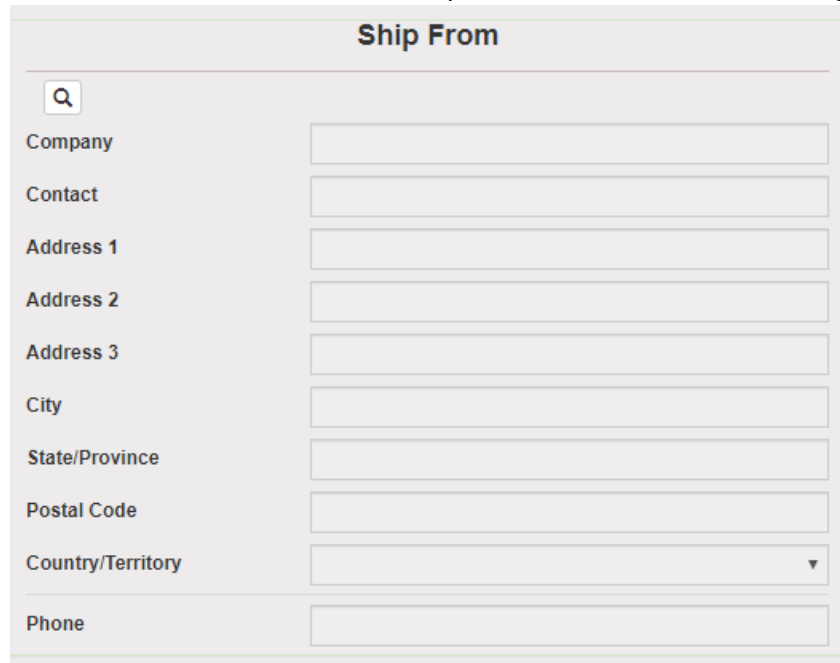
### 9.3 Ambient and Frozen Shipping Instructions

1. Log into the ShipExec Thin Client at [kits.iu.edu/UPS](http://kits.iu.edu/UPS).
  - a. If a new user or contact needs access, please reach out to your study contact for access.
2. Click “Shipping” at the top of the page and select “Shipping and Rating”.



3. Select your study from the “Study Group” drop down on the right side of the main screen. Choosing your study will automatically filter the address book to only addresses within this study.
4. Click on the magnifying glass icon in the “Ship From” section to search for your shipping address.





- a. Search by Company (site), Contact (name), or Address 1 (first line of your site’s street address). Click Search.
  - b. Click Select to the left of the correct contact information.
  
5. Verify that both the shipping information AND study reference are correct for this shipment.
  - a. If wrong study contact or study reference, click Reset in the bottom right of the screen to research for the correct information.
  
6. Enter Package Information
  - a. Ambient shipments
    - i. Enter the total weight of your package in the “Weight” field and leave the “Dry Ice Weight” field empty.
  - b. Frozen shipments
    - i. Enter the total weight of your package in the “Weight” field.
    - ii. Enter the dry ice weight in the “Dry Ice Weight” field.
    - iii. If the “Dry Ice Weight” field is higher than the “Weight” field, you will receive an error message after clicking Ship and need to reenter these values.
  - c. Click Ship in the bottom right of the page when complete.
  
7. If your site does not already have a daily UPS pickup, you can schedule one here.
  - a. Click the blue Pickup Request button. Enter the earliest pickup time and latest pickup time in 24-hr format.
  - b. Give a name & phone number of someone who the UPS driver can call if having issues finding the package.
  - c. Give the Floor and Room Number (if needed) to be as descriptive as possible where this package needs to be picked up from. Click Save.

8. Print the airbill that is automatically downloaded.
  - a. To reprint airbill, click History at the top left of the page.
    - i. Shipments created from the user that day will automatically populate. If shipments from a previous day need to be located, search by ship date.
    - ii. Locate the correct shipment, and click on the printer icon to the left of the tracking number under “Action” to reprint the airbill
    - iii. Click print icon on right side of the tracking number line.
  
9. Fold airbill, and place inside plastic UPS sleeve.
  
10. Peel the back off of the UPS sleeve and stick the sleeve to the package top. Ensure that sleeve does not cover any warning labels (e.g. dry ice label) or overlap taped seams.

## 10.0 Data Queries and Reconciliation

Sample and Shipment Notification forms must be completed on the day that samples are collected because they include information that will be used to reconcile sample collection and receipt, as well as information essential to future analyses.

NCRAD will collaborate with the data team at NACC to reconcile information captured in the NACC database compared to samples received and logged at NCRAD. Additional discrepancies may be sent directly to the center staff to reconcile.

Data queries or discrepancies with samples shipped and received at NCRAD may result from:

- Incorrect samples collected and shipped
- Damaged or incorrectly prepared samples
- Unlabeled samples, samples labeled with incomplete information, or mislabeled samples
- Discrepant information documented on the Blood Sample and Shipment Notification Form and logged at NCRAD compared to information entered into the NACC database.

## 11.0 Appendices

[Appendix A: GUID Demographics Form](#)

[Appendix B: Rate of Centrifuge Worksheet](#)

[Appendix C: Blood Sample and Shipment Notification Form](#)

[Appendix D: CSF Sample and Shipment Notification Form](#)

Please be certain to collect the following demographic information to generate a Global Unique Identifier. **Do NOT** return this information to NCRAD. Only send the GUID to NCRAD.

1. Complete legal given (first) name of participant at birth: \_\_\_\_\_
2. Complete additional (middle) name or names at birth: \_\_\_\_\_
3. Complete legal family (last) name of participant at birth: \_\_\_\_\_
4. Suffix: \_\_\_\_\_
5. Date of Birth: \_\_\_\_\_
6. Name of city/municipality in which participant was born: \_\_\_\_\_
7. Country of birth: \_\_\_\_\_

Please complete and return this form by email to the NCRAD Project Manager if you have any questions regarding sample processing. The correct RPM will be sent back to you.

**Submitter Information**

**Name:**

**Site:**

**Submitter e-mail:**

**Centrifuge Information**

Please answer the following questions about your centrifuge.

**Centrifuge Type**

Fixed Angle Rotor:       Swing Bucket Rotor:

**Radius of Rotation (mm):**

Determine the centrifuge’s radius of rotation (in mm) by measuring distance from the center of the centrifuge spindle to the bottom of the device when inserted into the rotor (if measuring a swing bucket rotor, measure to the middle of the bucket).

**Calculating RPM from G-Force:**

$$RCF = \left( \frac{RPM}{1,000} \right)^2 \times r \times 1.118 \quad \Rightarrow \quad RPM = \sqrt{\frac{RCF}{r \times 1.118}} \times 1,000$$

RCF = Relative Centrifugal Force (G-Force)

RPM = Rotational Speed (revolutions per minute)

R= Centrifugal radius in mm = distance from the center of the turning axis to the bottom of centrifuge

Comments:

**Please send this form to NCRAD Study Coordinator at [alzstudy@iu.edu](mailto:alzstudy@iu.edu)**

Biospecimen Collection, Processing, and Shipment Manual

## Appendix C: Blood Sample and Shipment Notification Form

*Please email the form on or prior to the date of shipment.*

To: Kelley Faber    Email: [alzstudy@iu.edu](mailto:alzstudy@iu.edu)    Phone: 1-800-526-2839

**From:** \_\_\_\_\_ **UPS tracking #:** **1Z976R8W84**  
**Phone:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**Study:** ADCFB    **Sex:**  M  F    **Year of Birth:** \_\_\_\_\_

**Site ID:** \_\_\_\_\_ **PT ID:** \_\_\_\_\_

**GUID:** \_\_\_\_\_

**NACC Visit:** \_\_\_\_\_

KIT BARCODE

**Blood Collection:**

Date of Draw: _____ [MMDDYY]	Time of Draw: _____ [HHMM]
Date subject last ate: _____ [MMDDYY]	Time subject last ate: _____ [HHMM]

**PBMC (NaHep Tubes)**  N/A

#1	Specimen Number <b>(Last four digits):</b> _____	Original volume drawn: _____ ml
#2	Specimen Number <b>(Last four digits):</b> _____	Original volume drawn: _____ ml

**Blood Processing:**

**Plasma & Buffy Coat (EDTA Tube)**

EDTA #1 specimen number <b>(Last four digits):</b> _____	_____	Original blood volume of EDTA #1: _____ mL	_____ mL
EDTA #2 specimen number <b>(Last four digits):</b> _____	_____ <input type="checkbox"/> N/A	Original blood volume of EDTA #2: _____	<input type="checkbox"/> N/A
EDTA #3 specimen number <b>(Last four digits):</b> _____	_____ mL <input type="checkbox"/> N/A	Original blood volume of EDTA #3: _____	<input type="checkbox"/> N/A
Time spin started: _____	_____ [HHMM]	Duration of centrifuge: _____	_____ mins
Temp of centrifuge: _____	_____ °C	Rate of centrifuge: _____	_____ x g
Time aliquoted: _____	_____ [HHMM]	Number of 1.5 mL plasma aliquots created (purple cap): _____	_____
Volume of residual plasma aliquot (less than 1.5 mL in blue cap): _____	_____ mL <input type="checkbox"/> N/A	Specimen number of residual plasma aliquot <b>(Last four digits):</b> _____	<input type="checkbox"/> N/A
Buffy coat #1 specimen number <b>(Last four digits):</b> _____	_____	Buffy coat #1 volume: _____	_____ mL
Buffy coat #2 specimen number <b>(Last four digits):</b> _____	_____ <input type="checkbox"/> N/A	Buffy coat #2 volume: _____	<input type="checkbox"/> N/A
Buffy coat #3 specimen number <b>(Last four digits):</b> _____	_____ <input type="checkbox"/> N/A	Buffy coat #3 volume: _____	<input type="checkbox"/> N/A
Time aliquots frozen: _____	_____ [HHMM]	Storage temperature of freezer: _____	_____ °C

**Notes:** \_\_\_\_\_

**Appendix D: CSF Sample and Shipment Notification Form**

Please email the form on or prior to the date of shipment.

To: Kelley Faber Email: [alzstudy@iu.edu](mailto:alzstudy@iu.edu) Phone: 1-800-526-2839

From: \_\_\_\_\_ UPS tracking #: **1Z976R8W84**

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Study: ADCFB Sex:  M  F Year of Birth: \_\_\_\_\_

Site ID: \_\_\_\_\_ PT ID: \_\_\_\_\_

GUID: \_\_\_\_\_

NACC Visit: \_\_\_\_\_

KIT BARCODE

**CSF Collection:**

Date of Draw: _____ [MMDDYY]	Time of Draw: _____ [HHMM]
Date subject last ate: _____ [MMDDYY]	Time subject last ate: _____ [HHMM]
Collection process: <input type="checkbox"/> Gravitational <b>OR</b> <input type="checkbox"/> Pull	Needle used to collect CSF: <input type="checkbox"/> 20g Quincke <input type="checkbox"/> 22g Sprotte <input type="checkbox"/> 22g Quincke <input type="checkbox"/> 24g Sprotte <input type="checkbox"/> 25g Quincke <input type="checkbox"/> Other (please specify): _____

**CSF Processing:**

Time spin started:	_____ [HHMM]
Duration of centrifuge:	_____ mins
Temp of centrifuge:	_____ °C
Rate of centrifuge:	_____ x g
Total amount of CSF collected (mL):	_____ mL
Time aliquoted:	_____ [HHMM]
# of 1.5 mL CSF aliquots created: <b>(Orange-capped cryovial)</b>	_____
If applicable, volume of CSF residual aliquot (less than 1.5 mL): <b>(Blue-capped cryovial)</b>	_____ mL
If applicable, specimen number of residual aliquot: <b>(Last four digits)</b>	_____
Time aliquots frozen:	_____ [HHMM]
Storage temperature of freezer:	_____ °C

Notes: \_\_\_\_\_