



# Biomarker Collection, Processing and Shipment

Sarah Walter, MSc  
ADNI Coordinating Center, ADCS

# Biomarkers in Biofluids

## Rationale:

The development of valid and reliable biomarkers for AD is needed to:

- Aid in the recognition of the illness at its earliest clinically recognizable stages
- Detect the disease before dementia or other symptoms appear
- Distinguish AD from other causes of dementia especially valuable, together with imaging tests, in the evaluation of disease-modifying therapies

# AD Biomarkers

Promising biomarkers that will be measured in ADNI fluids:

- Tau in CSF
  - Amyloid beta in CSF
  - Isoprostanes in CSF, Plasma
  - Homocysteine in plasma, CSF
  - Abeta 40 and Abeta 42 in Plasma
- 
- ADNI will soon launch a Rules Based Medicine (RBM) interrogation of baseline and 1 year plasma and CSF samples with a 151 analyte panel at RBM.

# Sampling Schedule

EMCI	CSF	Plasma	Serum
Screen			
Baseline	✓	✓	✓
Month 3 MRI			
Month 6		✓	✓
Month 12		✓	✓
Month 18 Tel Check			

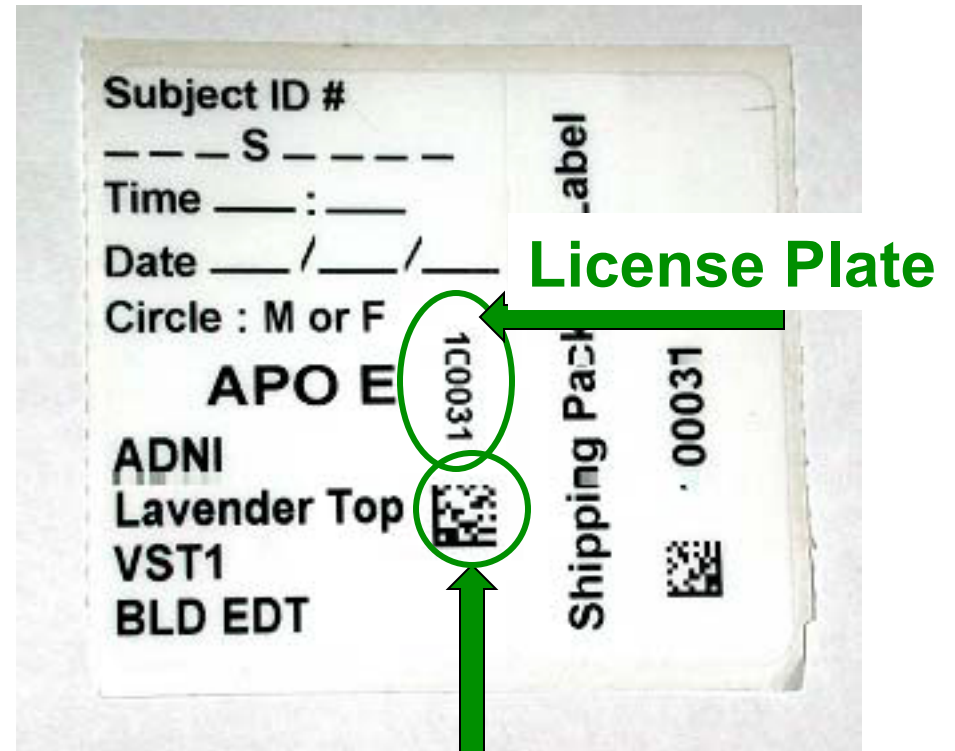
LMCI and CN Follow up Subjects	CSF	Plasma	Serum
Baseline	✓	✓	✓
Month 6 Tel Check			
Month 12		✓	✓
Month 18 Tel Check			

# Collection

- After overnight fast
- Standard time of day (8 am)
- Order of collection
  - 2 plain red top tubes (for serum)
  - 2 EDTA purple top (for plasma)
  - CSF by Lumbar Puncture

# ADNI Biomarker Labels

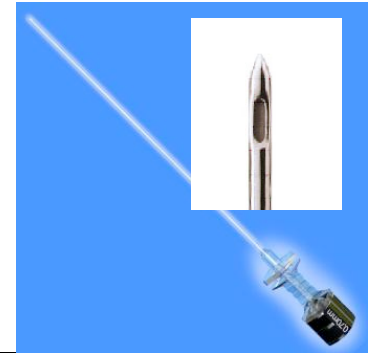
- Specific to sample type and visit
- Barcodes identify sample
- License plate same within the visit for all samples
- Record License Plate on worksheet and eCRF



# Biomarker Supplies

- Screening Lab kits provided by Covance
- All Biomarker and Genetic sample collection and shipping materials will be provided by ADNI Coordinating Center, ADCS
  - \*Covance is no longer providing Biomarker kits
- Initial Supplies will be sent upon ADNI GO Approval
- Resupply Order forms
  - Email: [adcs-clinops@ucsd.edu](mailto:adcs-clinops@ucsd.edu)
  - Fax: ( 858) 452-0573

# LP Supplies



Coordinating Center will  
Provide:

- LP Trays
- 22G Sprotte Needle with  
Introducer
- Polypropylene collection  
tubes
- 2 x 13 mL transfer tubes  
with clear caps

\*5 mL syringes and extra  
lidocaine needles can be  
requested

## PROCEDURAL COMPONENTS:

- 2 Sprotte Spinal Needles (24G x 90mm)
- 2 Introducer Needles (1mm x 30mm)
- 1 22G x 1 1/2 in. Needle
- 1 Plastic Syringe (3ml, Luer Slip) with  
25G x 5/8 in. Needle (Attached)
- 1 Needle Stick Pad
- 2 Medication Labels
- 1 Adhesive Bandage
- 1 Fenestrated Drape with 2 Tabs

## PREP COMPONENTS:

- 2 Towels
- 3 Gauze Sponges
- 3 Sponge Applicators



# Have on hand:

## Lumbar Punctures

- Extra lidocaine
- Dry Ice
- Sterile Gloves
- Blue pad
- Extra gauze pads, bandaids
- Clean washcloths/towels
- Sharps container
- LP Fact Sheet and post-LP instructions

## Blood Collection

- Centrifuge
- Dry Ice
- Band-aids/Plasters
- Sharps container
- Sterile Gloves
- Gauze pads

# Worksheet

Alzheimer's Disease Cooperative Study  
ADCS

## Biomarker Samples

Page 1 of 3

PARTICIPANT NUMBER: [ ][ ][ ][ ] S [ ][ ][ ][ ]

EXAMINER INITIALS: [ ][ ][ ]

EXAMINATION DATE: [ ][ ] [ ][ ] [ ][ ][ ][ ]  
MONTH DAY YEAR

**Instructions:**

- Begin by printing out a PDF of the online Biomarker Samples Form and completing the Sample Identification Labels. The bar code label must be placed on the transfer tube prior to freezing. Fluids should be collected in the following order:
  - \* Biomarker plain red-top tubes (2 blood collection tubes)
  - \* Biomarker lavender-top (2 blood collection tubes)
  - \* Urine collection container
  - \* CSF Collection (if applicable)
- Complete the Biomarker Samples Form online before shipping samples. Print a PDF of the completed form and include a copy with the shipment. FedEx all biomarker samples the SAME DAY on DRY ICE.
- Please refer to the Procedures Manual for more detailed instructions.
- This form must be completed ASAP once the FedEx information is available so that the UPENN lab can be notified of the shipment.

Which of the following was collected at this visit?

☐ Blood  
☐ CSF  
☐ None

If CSF collected, please answer the following:

Needle Used:

☐ Spottle  
☐ Sharp

Method of Collection:

☐ gravity  
☐ syringe suction

Overnight fast from midnight?

☐ Yes  
☐ No

The exact date and time entered below must be noted on the specimen labels.

Date of Collection: [ ][ ] [ ][ ] [ ][ ][ ][ ]  
Month Day Year

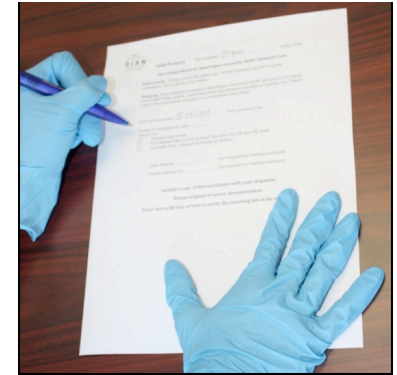
Time of Collection: [ ][ ] : [ ][ ] HH : MM

Phlebotomist Initials: [ ][ ][ ]

CSF Collector Initials: [ ][ ][ ]

- Complete as you collect and process samples
  - Date, Time, Amount of Collection
  - Aliquot Amount, Time
  - Time Frozen
  - Shipping Details
- Include copy in shipment
- Enter into eCRF day of collection

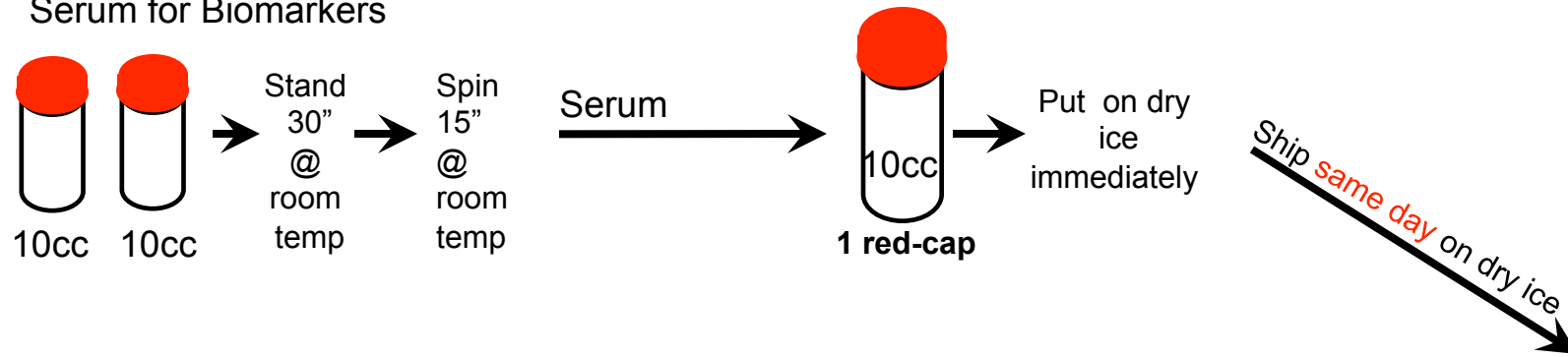
# Lab Notification



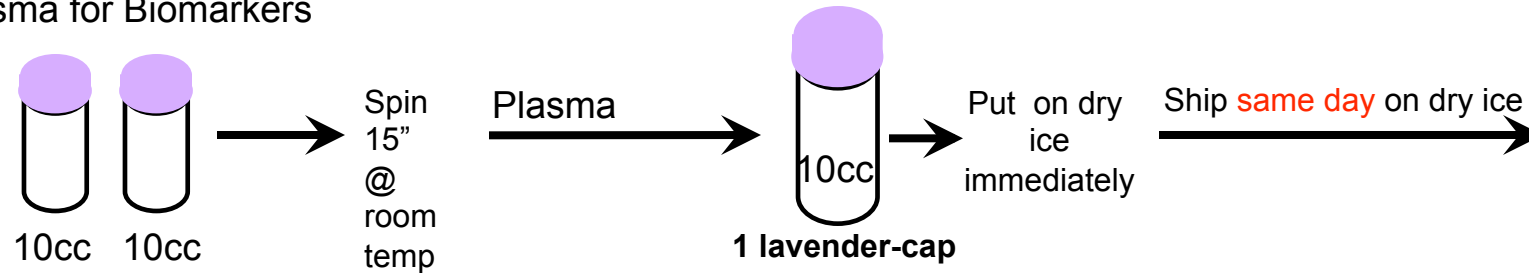
- Notify the Upenn laboratory of your shipment by entering the Biomarker collection eCRF day of collection/shipment

## Fasted Biomarker Samples

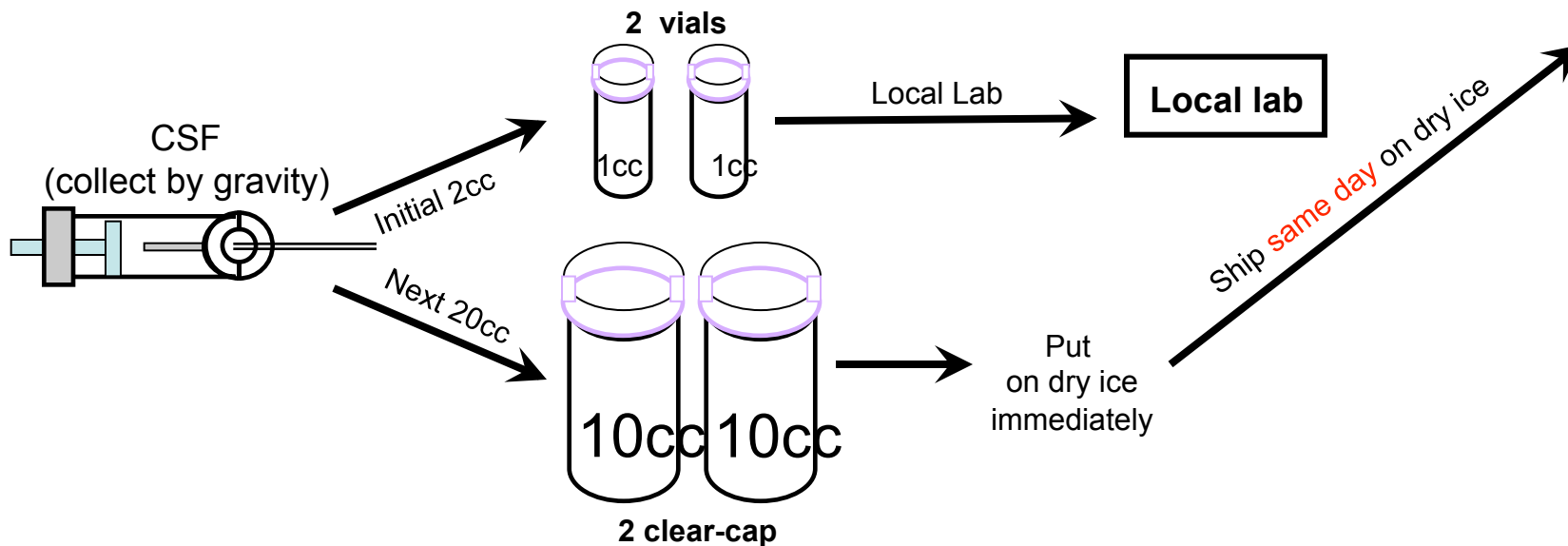
### Serum for Biomarkers



### Plasma for Biomarkers



**ADNI  
Biomarker  
core**



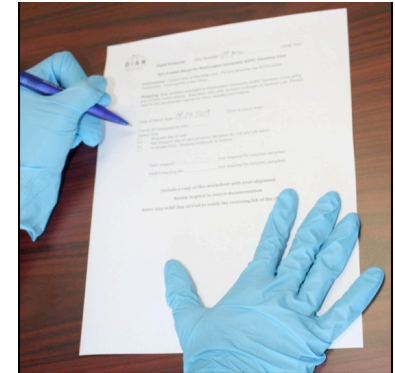
# Plasma Samples



Use 2 x 10 mL **lavender-top** EDTA tubes

1. Write the Subject Identification Number on the side of the tubes prior to drawing blood.
2. Collect blood until each tube is full; gently mix by inversion, 10-12 times.
3. Estimate blood volume and record on worksheet
4. Centrifuge the tube at room temperature within one (1) hour of collection. Spin for 15 minutes using the Sorvall T 6000D Centrifuge (rotor H-1000B swinging bucket rotor) at 3000 rpm (1500 rcf) with the brake on, or in another centrifuge and rotor at a comparable rcf.
5. Complete ADNI Biomarker Label for BLD EDT, place on 13 mL Polypropylene Transfer Tube. Stand in tube rack
6. Using a clean transfer pipette, carefully transfer plasma from blood tubes into the transfer tube, and firmly cap with the **lavender screw cap**.
7. Place upright in dry ice and allow it to completely freeze

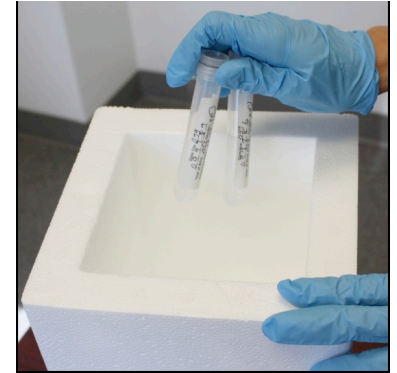
# Serum Samples



Use 2 x 10 mL plain **red-top tubes**

1. Write the ADNI subject ID on tubes prior to drawing blood.
2. Collect blood until each tube is full.
3. Estimate blood volume and record on worksheet.
4. Allow to clot for 30 minutes (room temperature) in a vertical position.
5. Centrifuge the tube at room temperature within one (1) hour of collection. Spin for 15 minutes using the Sorvall T 6000D Centrifuge (rotor H-1000B swinging bucket rotor) at 3000 rpm (1500 rcf) with the brake on, or in another centrifuge at a comparable rcf.
6. Complete ADNI Biomarker Label for BLD SER, place on 13 mL Polypropylene Transfer Tube. Stand in tube
7. Using a clean transfer pipette carefully transfer serum from each of the two red-top tubes into the 13 mL plastic transfer tube, then firmly cap with the **red screw cap**.
8. Place upright in dry ice and allow to completely freeze.

# CSF Samples



1. Complete ADNI CSF label and place each of these on two 13 mL plastic transfer tubes.
2. Follow the LP Procedure for collection of CSF by gravity using 22G Sprotte needle.
3. Collect the first 2 mL of CSF for cell counts, glucose and total protein, send to local lab
4. Transfer the remainder of the CSF (20 mL) into two 13 mL plastic transfer tubes, firmly cap with clear screw caps.
4. Place the tubes upright in dry ice and allow to completely freeze.

# Ship it!



**Freeze samples completely on dry ice before packaging.**

1. Place small pieces of dry ice in a bubble-wrap bag.
2. Quickly transfer sample tube from dry ice to the bubble wrap bag
3. Seal the bag with the self-adhesive flap.
4. Quickly place bubble bag with contents into the ziplock bag
5. Place directly on dry ice in Styrofoam shipping box.
6. Fill the box with dry ice and cover. Place container into cardboard box;
7. Affix Federal Express shipping label and call for pick up.

**DO NOT ALLOW SAMPLES TO THAW AT ANY POINT AFTER THEY  
HAVE BEEN FROZEN**

**NEVER** place liquid samples in a freezer.

**NEVER** ship a sample that was not first frozen upright in dry ice.



# Shipping Reminders



- All individuals packaging and shipping biological materials must be certified following local institutional requirements. File any relevant certifications in your site Regulatory Binder for monitoring.
- All shipments for this study are priority overnight.
- Ship fasted serum and plasma with CSF

# More Shipping Reminders

FedEx all biomarker samples the SAME DAY on DRY ICE priority overnight shipping (Monday-Thursday).

When Friday visit is necessary:

- check Saturday Delivery on the FedEx airbill
- apply orange “Saturday Delivery” labels prominently to the package.

FEDEX Airbills will be provided by Coordinating Center

ADNI Biomarker Core Laboratory

7 Maloney South

University of Pennsylvania Medical Center

3400 Spruce Street

Philadelphia, PA 19104



# Would you like some help?

- Email UPenn Laboratory at:  
[ADNI@uphs.upenn.edu](mailto:ADNI@uphs.upenn.edu)
- Supply and protocol questions can be sent to [adcs-clinops@ucsd.edu](mailto:adcs-clinops@ucsd.edu)