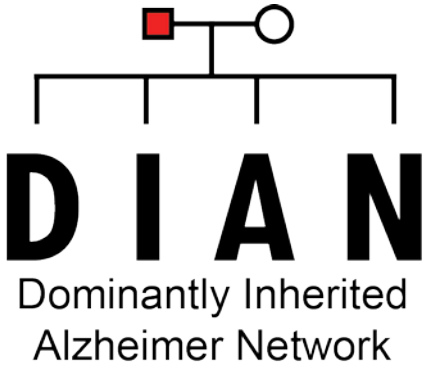


Dominantly Inherited Alzheimer Network Longitudinal Study (DIAN-L)

PET Technical Procedures Manual v2.8

October 01, 2014

Notice

Responsibilities and Approvals

Function	*Name and Title*	*Signature/Date*
NIL ICL Director Approval	Tammie Benzinger, Executive Management NIL ICL	
NIL ICL Project Manager Approval	Russ Hornbeck, Management NIL ICL	

Revision History

Version	*Issue Date*	*Description of Revision*
1.0	February 01, 2008	Initial version of document
2.0	February 11,2010	Version 2.0 (Amendment 2.0)
A3	March 23, 2011	Version A3 (Amendment 3.0)
2.0	March 12, 2013	Added Batch Record #, Redacted Tracer Information
2.1	March 19, 2013	Corrected Pregnancy Test timeline to match protocol
2.2	April 09, 2013	Added language to ensure PET scans are not uploaded to local clinical Picture Archiving and Communication Systems (PACS) for Medical Review
2.3	June 26, 2013	Added question to Metadata forms to directly address whether female participants are of childbearing potential
2.4	July 08, 2013	Added 3D Filtered Back-projection (3DFBP) reconstruction option to PiB forms to accommodate ongoing scans.
2.5	July 30, 2013	Revised Uploader Section to reflect CNDA upgrade to XNAT 1.6
2.6	November 08, 2013	Added new PET Scanner Type information
2.7	August 29, 2014	Changed subset specifications for GE Discovery 690, 710. Changed FOV for 600, 690, 710 models to 25.6 cm. Added PICO scanner, HRRT 4mm smoothing for PiB, Biograph (1093/1094) and MCT scanners zoom changed to 2.0. Removed Radiotracer log requirement and forms.
2.8	October 01, 2014	Reinserted AV45(florbetapir F 18) Protocol. Added alternative pagination for metadata forms.

Table of Contents

Imaging Overview:

We hypothesize that Alzheimer disease (AD) has a preclinical stage in which elevated levels of brain amyloid protein and accumulation of beta-amyloid deposits foreshadow the gradual onset of neuronal dysfunction, cell loss and dementia. While the exact role of amyloid in the initiation of brain damage is still unclear, we suggest that clarifying the temporal relationships between amyloid deposition, neural dysfunction and loss, and the onset of dementia would be extremely helpful in understanding the biological origins of AD and in designing appropriate interventions. Brain imaging provides a window into many of the hypothesized biochemical, functional and anatomic changes in AD. With positron emission tomography (PET) using [^{11}C]PiB and florbetapir F 18 it is possible to estimate the density of beta-amyloid (Aβ) plaques by imaging the PiB binding sites. With [^{18}F]FDG PET it is possible to estimate neuronal function from measures of metabolic activity. Finally, with magnetic resonance imaging (MRI) loss of brain tissue over time can be quantified in regional and global brain volume measures. It is our premise that by examining the temporal and spatial interrelationships between these three measures important insights will be gained into the pathophysiology of AD. The value of the imaging measures is further amplified when combined with the complimentary data of CSF biomarkers and clinical and psychometric evaluations.

PET

Sites collecting PET scans must use a PET scanner that has been qualified to scan DIAN-L subjects. After images are uploaded into the Central Neuroimaging Database Archive (CNDA), quality control will be done by the Imaging Core team at the University of Michigan (headed by Dr. Robert Koeppe) and processing will be done by the Imaging Core team at Washington University (headed by Dr. Tammie Benzinger).

To ensure standardization across sites all tracer activity shall be converted and recorded in millicuries (mCi).

PET PiB

Scan Acquisition: Participant preparation consists of intravenous catheterization followed by the bolus injection (over 10-60 sec) of **PiB 8-18 mCi**. There are two acceptable procedures for obtaining the PiB PET scans. In one approach, the subject will rest quietly for approximately 30 minutes after injection and then be positioned in the scanner for scanning which will start 40 minutes after injection, acquiring 6 x 5 minute frames for a total acquisition time of 30 additional minutes. In the second approach the subject will be positioned in the scanner at the time of injection and a full 70 minute scan will be obtained starting at the time of injection. The first approach consists of the minimum dataset needed for analysis, while the second approach will allow more complex data analysis and modeling of the kinetic properties of the tracer. The site PI will have complete flexibility as to which approach to use for each PET PiB scanning session.

Specifically, in the first approach the PET scan will be acquired in dynamic, 3D imaging mode for 30 min (consisting of 6 x 5 min frames) beginning 40 min (+/- 30 seconds) after injection of PiB. In the second approach PET scan will be acquired in dynamic, 3D imaging mode for 70 min (consisting of 4 x 15 sec frames, 8 x 30 sec frames, 9 x 60 sec frames, 2 x 180 sec frames, 10 x 300 sec frames) beginning at the time of injection. No blood sampling will be performed for the PiB PET study. A standard brain transmission scan (or CT transmission scan for PET/CT scanners) will be obtained for attenuation correction after the emission data acquisition, or prior to acquisition if obtaining a CT transmission. Subjects will be removed from the scanner following the completion of the transmission scan (See PET Protocol below).

PET FDG

Scan Acquisition: Subjects to receive a PET FDG scan in the morning are asked to omit all food and fluids (except water) from midnight the night before the FDG scan (or FDG and PiB if done on the same day) until after the imaging is completed. Subjects scanned later in the day are asked to omit food and fluids (except water) for at least 4 hours prior to FDG injection. Upon arrival to the imaging center, compliance to the dietary requirements should be confirmed and blood glucose level should be checked. Blood glucose level should be < 140 mg/dL (7.8 mmol/L). If BGL ≥140 mg/dL, rescheduling the subject should be considered. If this is not an option, the scan should continue and a note should be made on the metadata form in the appropriate comment box following the blood glucose record.

Typically, the PiB scans will be followed closely by the FDG scans on the same day; however, this arrangement is for convenience to the subject and coordinators but is not a requirement (see Appendix A for schema). After completion of PiB scanning, subjects will be moved to a dimly lighted, quiet room and **FDG 5 mCi** will be injected as a bolus. About 20 min later, subjects will be repositioned in the PET scanner, and FDG PET scans will be acquired in dynamic, 3D mode beginning 30 min (+/- 30 seconds) after injection of FDG for 30 min (consisting of 6 x 5 min frames). A standard brain transmission scan (or CT transmission scan for PET/CT scanners) will be obtained for attenuation correction after the emission data acquisition, or prior to acquisition if obtaining a CT transmission. (The transmission scan for the PiB scan cannot be used for the PET FDG scan.) Subjects will be removed from the scanner following the completion of the transmission scan.

Note: The injection of the FDG should be timed so that a minimum of 120 minutes (about 6 half-lives of C-11) will elapse from the time of injection of PiB to the start of the FDG scan. This means that a minimum of 90 minutes should elapse between the time of injection of PiB and the time of injection of FDG to provide for the nearly complete decay of C-11. Subjects may drink water (in moderation) between the PiB and FDG scans, but no food intake will be permitted (in compliance with the recommended 4 hour fast prior to the FDG scan).

PET Florbetapir F 18 (Avid Compound: ^{18}F-AV-45)

NOTE: Site participation in florbetapir F 18 PET imaging is limited. Sites must be enrolled in the DIAN-TU (Trials Unit) or ADNI (Alzheimer's Disease Neuroimaging Initiative) studies to use this tracer.

Scan Acquisition: Participant preparation consists of intravenous catheterization followed by the bolus injection of **10 mCi** of **florbetapir F 18**. There are two acceptable procedures for obtaining the florbetapir F 18 PET scans. In one approach, the subject will rest quietly for approximately **40 minutes** after injection and then positioned in the scanner for scanning which will start **50 minutes** after injection (note the temporal difference from PiB). The scanner will acquire 4 x 5 minute frames for a total acquisition time of 20 additional minutes. In the second approach the subject will be positioned in the scanner at the time of injection and a full 70 minute scan will be obtained starting at the time of injection. The first approach consists of the minimum dataset needed for analysis. The second approach allows more complex data analysis and modeling of the kinetic properties of the tracer. The site PI will have flexibility as to which approach to use for each florbetapir F 18 scanning session.

Specifically, in the first approach the PET scan will be acquired in dynamic, 3D imaging mode for 20 min (consisting of 4 x 5 min frames) beginning 50 min (+/- 30 seconds) after injection of florbetapir F 18. In the second approach, the PET scan will be acquired in dynamic, 3D imaging mode for 70 min (consisting of 4 x 15 sec frames, 8 x 30 sec frames, 9 x 60 sec frames, 2 x 180 sec frames, 10 x 300 sec frames) beginning at the time of injection. No blood sampling will be performed for the florbetapir F 18 PET study. A standard brain transmission scan (or CT transmission scan for PET/CT scanners) will be obtained for attenuation correction after the emission data acquisition, or prior to acquisition if obtaining a CT transmission. Subjects will be removed from the scanner following the completion of the transmission scan (See PET Imaging Protocol section).

Note: The injection of florbetapir F 18 must performed at least 2 hrs. after injection of PiB and 12 hrs. after injection of FDG, or florbetapir F 18 must be injected 12 hours or more before either PiB or FDG (6 half-lives in all cases).

General Information

The purpose of this manual is to explain the PET imaging component of the DIAN-L protocol. Standard procedures are needed to ensure consistency of data collection in this longitudinal study.

This manual contains information for study-site staff involved with the care of the study participants during the imaging procedures and those involved with scanning the study participants

Contact Information

If you have any questions or concerns regarding PiB, florbetapir F 18, or FDG PET imaging study please contact:

DIAN-PET@DIAN-info.org

If you have question regarding the scan uploading to the CNDACNDA please contact:

CNDA-help@DIAN-info.org

Site Qualification

Your institution must obtain human research approval that specifically includes the use of radioactive tracers prior to enrolling participants for the PiB protocol. Separate IRB approval may be required for PET centers not under the governance of the main imaging site.

Scanner qualification:
All PET performance sites will be required to obtain scanner qualification by the University of Michigan team and Robert Koeppe, PhD (koeppe@umich.edu) before conducting scans. This procedure will require the scanning of a radioactive (<1 mCi 18F activity) Hoffman 3-D brain phantom on two separate days using the specified DIAN-L PET protocol. If needed, this phantom may be provided, on a temporary basis, to the performance site by the DIAN-L Imaging Core. The PET protocol will be provided to the performance site and will be specific to the PET scanner make and model. Subsequently, the acquisition and reconstruction parameters for the human subjects must be the same as used in the phantom scanning (with specific scans for both the human PiB and FDG PET acquisitions). Reconstructed resolution will be using the equivalent of a ramp filter (i.e., near the intrinsic resolution of the scanner) as this allows maximum flexibility during processing and analysis. Scanner specific qualifications will come from Dr. Robert Koeppe.

After acquisition and reconstruction, phantom image data will be uploaded to the DIAN-L Central Archive (CNDA), retrieved by the University of Michigan team, and reviewed. If problems are identified with the phantom scans, the site will be contacted directly by Dr. Koeppe's team, the relevant issues will be discussed, and specific changes suggested. Qualification scans and review will be repeated (and iterated) until the site is qualified. Once the site is qualified the Hoffman 3-D brain phantom is then returned as directed by the University of Michigan team.

PiB [^{11}C]2-(4'-methylamino-phenyl)-6-hydroxy-benzothiazole qualification) Prior to conducting PET PiB studies, each site will be qualified for PiB production by Scott Mason, PhD., (masonns@upmc.edu) at the University of Pittsburgh. If the site is not yet producing PiB for human use, Dr. Mason will provide preclinical toxicology, evidence for lack of human pharmacologic actions, and a sample PiB Drug Master File (DMF). It is expected that each site will need to adapt the DMF to their local environment. Dr. Mason will be available for consultation during this phase.

Once your institution has received human research approvals that specifically include the use of radioactive tracer approval, AND your site has passed the phantom QC imaging, your site is ready to scan DIAN-L subjects. If your site is doing PiB, production approval must also be obtained before scanning DIAN-L subjects, see above.

Continued Quality Monitoring During Execution Phase

All MRI, PET PiB, PET FDG, and PET florbetapir F 18 image data sets uploaded from any site will be quarantined in the Central Neuroimaging Data Archive (CNDA) until the data is passed by the appropriate image QC team. As described above all review of images should occur within two working days and the performance site will be contacted if a study does not meet criteria.

PET Pre-Scan Procedures / General Information

Participant Pre-screening

All participants should have been screened by the study coordinator for the following contraindications:

- Inability to cooperate/claustrophobia (sedation is not offered for this protocol)
- Inability to lie on the scanner bed for two 30-70 minute scan sessions of PET imaging.
- Inability to achieve venous access sufficient for tracer administration

Subject Preparation

Subjects to be imaged in the morning are asked to omit all food and fluids (except water) from midnight the night before the FDG scan (or FDG and PiB if done on the same day) until after the imaging is completed. Subjects scanned later in the day are asked to omit food and fluids (except water) for at least 4 hours prior to FDG injection.

Image Subject/Session Identification

Research subject IDs will be generated by the Alzheimer's Disease Cooperative Study (ADCS) and assigned by the Clinical Study Coordinator at the clinical site prior to the PET visit. These IDs will be **seven digit numbers (e.g. 9000001)** . Session identifiers, which distinguish between a subject's visits, will be provided by the CNDA. These IDs will be a composite of the subject ID, the visit number (e.g. v00, v01, v02) and the acquisition type (e.g. 9000001_v00_FDG, 9000001_v00_PiB). Each PET scan session will have a separate ID independent of whether they are obtained on the same day or not. For phantom scans, a subject representing the phantom may have to be created in the database if the phantom has not been scanned previously. Please see Appendix B for instructions on creating a phantom subject. The ID for the phantom subject will look like DIAN_{Site ID}_P (e.g. DIAN_007_P) and the session ID for phantom acquisitions will look like DIAN_{Site ID}_P_{Date of Scan} (e.g. DIAN_007_P_090101).

Entering Subject Information

If using a DICOM or ECAT scanner, please enter the subject's information into the scanner following your standard local practice. This will assure the scan is formatted for your local archival system. When data are uploaded to the CNDA, the scan header will be de-identified and rendered HIPAA compliant. Data will be identified in the CNDA by subject code only.
When you upload the data to the CNDA, you will be required to select the appropriate subject from a list of DIAN-L subjects already entered in the database.

You may be required to manually edit the visit identifier during upload to reflect what is noted on your metadata forms, as the system may not always populate with the accurate visit ID. Please check with the study coordinator regarding the correct visit identifier.

NOTE: PET Sessions must not be uploaded or shared as a local medical record (i.e. for local medical review) or sent to a site's PACS (Picture and Archive communications) system.

Documentation

Be sure to complete the metadata sheet ***as the study is being acquired.*** The PET scan information form must be provided by the study coordinator prior to the scan.

IMPORTANT: There are different metadata sheets for PiB PET imaging, FDG PET, and Florbetapir F18 imaging. Regardless of whether both PiB and FDG or PiB and Florbetapir F18 imaging are being conducted in the same imaging session, forms need to be completed for all studies.

NOTE: Site participation in florbetapir F 18 PET imaging is limited. Sites must be enrolled in the DIAN-TU (Trials Unit) or ADNI (Alzheimer's Disease Neuroimaging Initiative) studies to use this tracer.

Imaging Metadata Forms - PiB

DIAN-L

PiB Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial* ☐ *Follow-up___*

Site Code:

Study Coordinator Name:

DIAN-L Participant Initials:

PET Technologist Initials:

NOTE: Every visit should have ORIGINAL scan data entered before any rescan data is entered

Is the participant a woman of childbearing potential? ☐ Yes ☐ No

If the participant is a woman of childbearing potential, please report the following:

Has the participant had a negative urine pregnancy test within ***7 days prior*** to this procedure? ☐ Yes ☐ No
If there is a chance the participant could be pregnant, she should not continue with the study procedures.

If the participant is a lactating mother, is she aware of the guidelines regarding lactation and PiB? ☐ Yes ☐ No
If the participant is lactating, please refer her to the research coordinator for lactation guidelines.

Was the scan conducted?

- ☐ Yes
- ☐ No

Reason why the scan was not conducted:

- ☐ Illness
- ☐ Participant unavailable
- ☐ Participant unwilling
- ☐ Administrative problems
- ☐ Withdrawn consent
- ☐ Other (specify)

Comments:

Please note that in the event the scan is not completed but transmission or CT was acquired, please contact CNDA-help@DIAN-info.org for further assistance.

Subject Number | Subject Initials

DIAN-L

PiB Scan Information

Participant:

Participant ID | Visit# | Date of Scan (/ /)

Visit: ☐ *Initial;* ☐ *Follow-up___*

Scan Date

Month Day Year

BATCH / LOT ID

If you are not using the scanner you were qualified for, please contact Dr. Koeppe, koeppe@umich.edu, for prior approval and explain below.

Time of today's Scanner QC

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Time of PiB dose assay

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

PiB dose assay

to nearest 0.1 mCi

mCi

Time of residual PiB assay

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Residual left in syringe

if >0.1 mCi

mCi

Net injected dose of PiB

Corrected for residual activity to nearest 0.1 mCi

Target Range: 8.0-18.0 mCi

mCi

PiB volume

ml

DIAN-L

PiB Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Time of PiB injection

Enter '00' for seconds portion of time if seconds are unavailable.

HH:MM:SS

Time scan started (emission)

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Provide an explanation if start time varies from protocol:

SECTION II. SCAN PROTOCOL INFORMATION

Any variations from protocol during PiB uptake?

☐ Yes
☐ No

If Yes, describe

Subject motion problems:

☐ Yes
☐ No

If Yes, describe

DIAN-L

PiB Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Scanner malfunction:

- ☐ Yes
- ☐ No

If Yes, describe

Other protocol variations:

- ☐ Yes
- ☐ No

If Yes, describe

SECTION III. SCAN RECONSTRUCTION

Check which of the following reconstructions was used:

- ☐ FORE/2D-OSEM (Siemens)
- ☐ 3D-OSEM (Siemens)
- ☐ 3D-Iterative (GE)
- ☐ FORE-Iterative (GE)
- ☐ 3D Back-projection (GE)
- ☐ 3D-RAMLA (Philips)
- ☐ LOR-RAMLA (Philips)

If OSEM:

subsets:

- ☐ 14
- ☐ 16
- ☐ 20
- ☐ 21
- ☐ 24
- ☐ 32
- ☐ N/A
- ☐ Other

If Other, specify:

Subject Number | Subject Initials

DIAN-L

PiB Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Iterations:

- ☐ 4
- ☐ 6
- ☐ Other

If Other, specify:

If using 3D-RAMLA reconstruction (Older Allegro, Gemini, Gemini GLX scanners), Lambda (λ) = **0.008**?

☐ Check here to confirm

If using LOR-RAMLA reconstruction (Newer Gemini TF scanner), Filter set to "**Sharp**"?

☐ Check here to confirm

If FORE/2D-OSEM (Siemens) reconstruction:

HR+ Scanner (Siemens), Brain Mode "**ON**"

☐ Check here to confirm

BioGraph Model 1080 Scanner (Siemens),

Trim "**ON**"

☐ Check here to confirm

- Or -

"336 Matrix Used"

☐ Check here to confirm

BioGraph Model 1093/1094 Scanner (Siemens),

"**336 Matrix Used"**

☐ Check here to confirm

BioGraph Model mCT Scanner (Siemens),

"**400 Matrix Used"**

☐ Check here to confirm

If 3D-OSEM (Siemens) reconstruction:

BioGraph Model mMR (PETMR) Scanner (Siemens),

"344 Matrix Used"

☐ Check here to confirm

High Resolution Research Tomograph (HRRT) Scanner (Siemens),

"256 Matrix Used"

☐ Check here to confirm

BioGraph Model 1023/1024 (PICO) Scanner (Siemens),

Trim **"ON or set to 2.0"**

☐ Check here to confirm

128 Matrix Used

☐ Check here to confirm

No post-process smoothing:

☐ Check here to confirm

Decay Correction:

- ☐ Yes
- ☐ No

PiB Form Page 5 of 6

DIAN-L

PiB Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

If using a CT for attenuation, verify effective mAs is between 23-50 mAS ☐ **mAS**

Scatter Correction:

- ☐ Yes
- ☐ No

Attenuation Correction:

- ☐ CT
- ☐ Ge-68+Segmentation
- ☐ Cs-137+Segmentation
- ☐ PET/MR (mMR)

SECTION IV. DATA TRANSFER AND ARCHIVE:

Was data transferred to CNDA within 24 hours of scan?

Data must be transmitted to CNDA within 24 hours of the PET scan. If your site is unable to complete the transfer within 24 hours please indicate the problem in the "Comments" section below.

- ☐ Yes
- ☐ No

Transfer Date

☐☐☐☐☐☐☐☐

Month Day Year

Comments:

Data Archived Locally

If No, please explain under comments.

- ☐ Yes
- ☐ No

Archive Medium / Comments :

Imaging Metadata Forms - FDG

DIAN-L

FDG Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Site Code:

Study Coordinator Name:

DIAN-L Participant Initials:

PET Technologist Initials:

NOTE: Every visit should have ORIGINAL scan data entered before any rescan data is entered.

Is the participant a woman of childbearing potential? ☐ Yes ☐ No

If the participant is a woman of childbearing potential, please report the following:

Has the participant had a negative urine pregnancy test within ***7 days prior*** to this procedure? ☐ Yes ☐ No
If there is a chance the participant could be pregnant, she should not continue with the study procedures.

If the participant is a lactating mother, is she aware of the guidelines regarding lactation and FDG? ☐ Yes ☐ No
If the participant is lactating, please refer her to the research coordinator for lactation guidelines.

Was the scan conducted?

- ☐ Yes
- ☐ No

Reason why the scan was not conducted:

- ☐ Illness
- ☐ Participant unavailable
- ☐ Participant unwilling
- ☐ Administrative problems
- ☐ Withdrawn consent
- ☐ Other (specify)

Comments:

Please note that in the event that the scan is not completed but the transmission or CT was acquired, please contact CNDA-help@DIAN-info.org for further assistance.

Subject Number | Subject Initials

DIAN-L

FDG Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Scan Date

☐☐☐☐☐☐☐☐

Month Day Year

If you are not using the scanner you were qualified for, please contact Dr. Koeppe, koeppe@umich.edu, for prior approval and explain below.

Time of today's Scanner QC

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Time of blood glucose measurement

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Blood Glucose (pre-FDG)

Proper Range: <140 mg/dL (If the BGL ≥140 mg/dL please consider rescheduling the subject. If this is not an option, continue with the data acquisition and provide explanation below.)

mg/dL or mmol/L

Time of FDG dose assay

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

DIAN-L

FDG Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

FDG dose assay
to the nearest 0.1 mCi

mCi

Net injected dose of FDG
Corrected for residual activity to nearest 0.1 mCi
Target Dosage: 5.0 mCi

mCi

FDG Volume

ml

Time of FDG injection
Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Provide an explanation if blood glucose was measured after the FDG injection

Time of residual FDG assay
Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Residual left in syringe
if >0.1 mCi

mCi

Time scan started (emission)
Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Provide an explanation if start time varies from protocol:

DIAN-L

FDG Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

SECTION II. SCAN PROTOCOL INFORMATION

Was FDG uptake according to protocol?

☐ Yes

☐ No

If Yes, describe:

Subject motion problems:

☐ Yes

☐ No

If yes, describe:

Scanner malfunction

☐ Yes

☐ No

If yes, describe:

Other protocol variations:

☐ Yes

☐ No

If yes, describe:

DIAN-L

FDG Scan Information

Participant:

		/ /
Participant ID	Session ID	Date of Scan

Visit: ☐ *Initial;* ☐ *Follow-up___*

SECTION III. SCAN RECONSTRUCTION

Check which of the following reconstructions was used:

- ☐ FORE/2D-OSEM (Siemens)
- ☐ 3D-OSEM (Siemens)
- ☐ 3D-Iterative (GE)
- ☐ FORE-Iterative (GE)
- ☐ 3D Back-projection (GE)
- ☐ 3D-RAMLA (Philips)
- ☐ LOR-RAMLA (Philips)

If OSEM:

subsets:

- ☐ 14
- ☐ 16
- ☐ 20
- ☐ 21
- ☐ 24
- ☐ 32
- ☐ N/A
- ☐ Other

If Other, specify:

Iterations:

- ☐ 4
- ☐ 6
- ☐ Other

If Other, specify:

Subject Number | Subject Initials

DIAN-L

FDG Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

If using 3D-RAMLA reconstruction (Older Allegro, Gemini, Gemini GLX scanners), Lambda (λ) = **0.008**?

☐ Check here to confirm

If using LOR-RAMLA reconstruction (Newer Gemini TF scanner), Filter set to "**Sharp**"?

☐ Check here to confirm

If FORE/2D-OSEM (Siemens) reconstruction:

HR+ Scanner (Siemens), Brain Mode "**ON**"

☐ Check here to confirm

BioGraph Model 1080 Scanner (Siemens),

Trim "**ON**"

☐ Check here to confirm

- Or -

"336 Matrix Used"

☐ Check here to confirm

BioGraph Model 1093/1094 Scanner (Siemens),

"**336 Matrix Used"**

☐ Check here to confirm

BioGraph Model mCT Scanner (Siemens),

"**400 Matrix Used"**

☐ Check here to confirm

If 3D-OSEM (Siemens) reconstruction:

BioGraph Model mMR (PETMR) Scanner (Siemens),

"344 Matrix Used"

☐ Check here to confirm

High Resolution Research Tomograph (HRRT) Scanner (Siemens),

"256 Matrix Used"

☐ Check here to confirm

BioGraph Model 1023/1024 (PICO) Scanner (Siemens),

Trim **"ON or set to 2.0"**

☐ Check here to confirm

128 Matrix Used

☐ Check here to confirm

No post-process smoothing:

☐ Check here to confirm

Decay Correction:

☐ Yes

☐ No

DIAN-L

FDG Scan Information

Participant:

		/ /
Participant ID	Visit#	Date of Scan

Visit: ☐ *Initial;* ☐ *Follow-up___*

If using a CT for attenuation, verify effective mAs is between 23-50 mAS ☐ **mAS**

Scatter Correction:

- ☐ Yes
- ☐ No

Attenuation Correction:

- ☐ CT
- ☐ Ge-68+Segmentation
- ☐ Cs-137+Segmentation
- ☐ PET/MR

SECTION IV. DATA TRANSFER AND ARCHIVE:

Was data transferred to CNDA within 24 hours of scan?

Data must be transmitted to CNDA within 24 hours of the PET scan. If your site is unable to complete the transfer within 24 hours please indicate the problem in the "Comments" section below.

- ☐ Yes
- ☐ No

Transfer Date

☐☐☐☐☐☐☐☐

Month Day Year

Comments:

Data Archived Locally

If No, please explain under comments.

- ☐ Yes
- ☐ No

Archive Medium / Comments :

Imaging Metadata Forms - Florbetapir F 18

DIAN-L – ***Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.***

Florbetapir F 18 Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Scan Date

Month Day Year

Is the participant a woman of childbearing potential? ☐ Yes ☐ No

If the participant is a woman of childbearing potential, please report the following:

Has the participant had a negative urine pregnancy test within ***4 days prior*** to this procedure? ☐ Yes ☐ No
If there is a chance the participant could be pregnant, she should not continue with the study procedures.

If the participant is a lactating mother, is she aware of the guidelines regarding lactation and florbetapir F 18? ☐ Yes ☐ No
If the participant is lactating, please refer her to the research coordinator for lactation guidelines.

Was the scan conducted?

- ☐ Yes
- ☐ No

Reason why the scan was not conducted:

- ☐ Illness
- ☐ Participant unavailable
- ☐ Participant unwilling
- ☐ Administrative problems
- ☐ Withdrawn consent
- ☐ Other (specify)

Was the tracer administered?

- ☐ Yes
- ☐ No

Comments:

Please note that in the event the scan is not completed but transmission or CT was acquired, please contact DCA-help@wustl.edu for further assistance.

Subject Number | Subject Initials

DIAN-L – ***Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.***

Florbetapir F 18 Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Scan Date

Month Day Year

☐☐☐☐☐☐☐☐

BATCH / LOT ID

If you are not using the scanner you were qualified for, please contact Dr. Koeppe, koeppe@umich.edu, for prior approval and explain below.

Time of today's Scanner QC

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Time of florbetapir F 18 dose assay

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Florbetapir F 18 dose assay

to nearest 0.1 mCi

mCi

Time of residual florbetapir F 18 assay

Enter '00' for seconds portion of the time if seconds are unavailable.

HH:MM:SS

Residual left in syringe

if >0.1 mCi

mCi

Net injected dose of florbetapir F 18

Corrected for residual activity to nearest 0.1 mCi

Target Dosage: 10.0 mCi

mCi

Provide an explanation if start time varies from protocol:

Subject Number | Subject Initials

DIAN-L – ***Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.***

Florbetapir F 18 Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Florbetapir F 18 volume

☐ **ml**

Time of florbetapir F 18 injection

Enter '00' for seconds portion of time if seconds are unavailable.

☐ **HH:MM:SS**

Time scan started (emission)

Enter '00' for seconds portion of the time if seconds are unavailable.

☐ **HH:MM:SS**

Provide an explanation if start time varies from protocol:

SECTION II. SCAN PROTOCOL INFORMATION

Was florbetapir F 18 uptake according to protocol?

☐ Yes
☐ No

If no, describe

Was subject motion within normal range?

☐ Yes
☐ No

If no, describe

DIAN-L – ***Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.***

Florbetapir F 18 Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Did the scanner function properly?

☐ Yes
☐ No

If no, describe

Did scan acquisition follow protocol?

☐ Yes
☐ No

If no, describe

SECTION III. SCAN RECONSTRUCTION

Check which of the following reconstructions was used:

☐ FORE/2D-OSEM (Siemens)
☐ 3D-OSEM (Siemens)
☐ 3D-Iterative (GE)
☐ FORE-Iterative (GE)
☐ 3D-RAMLA (Philips)
☐ LOR-RAMLA (Philips)

If OSEM:

subsets:

☐ 14
☐ 16
☐ 20
☐ 21
☐ 24
☐ 32
☐ N/A
☐ Other

If Other, specify:

DIAN-L – ***Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.***

Florbetapir F 18 Scan Information

Participant:

Participant ID	Visit#	Date of Scan
		/ /

Visit: ☐ *Initial;* ☐ *Follow-up___*

Iterations:

☐ 4
☐ 6
☐ Other

If Other, specify:

If using 3D-RAMLA reconstruction (Older Allegro, Gemini, Gemini GLX scanners), Lambda (λ) = **0.008**?

☐ Yes
☐ No If no, explain:

If using LOR-RAMLA reconstruction (Newer Gemini TF scanner), Filter set to "**Sharp**"?

☐ Yes
☐ No If no, explain:

If FORE/2D-OSEM (Siemens) reconstruction:

HR+ Scanner (Siemens),

Brain Mode "**ON**"

☐ Check here to confirm

BioGraph Model 1080 Scanner (Siemens),

Trim "**ON**"

☐ Check here to confirm

- Or -

"336 Matrix Used"

☐ Check here to confirm

BioGraph Model 1093/1094 Scanner (Siemens),

"**336 Matrix Used"**

☐ Check here to confirm

BioGraph Model mCT Scanner (Siemens),

"**400 Matrix Used"**

☐ Check here to confirm

BioGraph Model 1023/1024 (PICO) Scanner (Siemens),

Trim **"ON or set to 2.0"**

☐ Check here to confirm

128 Matrix Used

☐ Check here to confirm

If 3D-OSEM (Siemens) reconstruction:

BioGraph Model mMR (PETMR) Scanner (Siemens),

"344 Matrix Used"

☐ Check here to confirm

High Resolution Research Tomograph (HRRT) Scanner (Siemens),

"256 Matrix Used"

☐ Check here to confirm

DIAN-L – ***Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.***

Florbetapir F 18 Scan Information

Participant:

		/ /
Participant ID	Visit#	Date of Scan

Visit: ☐ *Initial;* ☐ *Follow-up___*

Confirm post-process smoothing **NOT** used.

☐ Yes

☐ No

If no, explain:

Was decay correction used?

☐ Yes

☐ No

If no, explain:

If using a CT for attenuation, verify effective mAs is between 23-50 mAS ☐ **mAS**

(listed last online)

Was scatter correction used?

☐ Yes

☐ No

If no, explain:

Attenuation Correction:

☐ CT

☐ Ge-68+Segmentation

☐ Cs-137+Segmentation

☐ PET/MR

Protocol: DIAN-TU-001

DIAN-L – *Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.*

Florbetapir F 18 Scan Information

Participant:

		/ /
Participant ID	Visit#	Date of Scan

Visit: ☐ *Initial;* ☐ *Follow-up___*

SECTION IV. DATA UPLOAD AND ARCHIVE:

Was data uploaded to DCA within 24 hours of scan?

Data must be transmitted to DCA within 24 hours of the PET scan. If your site is unable to complete the upload within 24 hours please indicate the problem in the "Comments" section below.

☐ Yes

☐ No

Upload Date

☐☐☐☐☐☐☐☐

Month Day Year

Comments:

Data Archived Locally

If No, please explain under comments.

☐ Yes

☐ No

Archive Medium / Comments :

PET Technologist Name (Print): _____

PET Technologist Signature: _____ Date: _____

PET Imaging Protocol

Scanner Parameters and Reconstruction

Siemens HR+ scanner:

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition. The extended field of view option with Siemens scanner is preferred (FOV z axis 21cm – rather than 15)

Note: Do not rinse syringe after florbetapir F 18 injection.

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB, and FDG Human protocols)

Scan: transmission: 5 min 2-D scan post-emission scan. Process with segmentation and re-projection.

Reconstruction: FORE followed by 2D-OSEM, 4 iterations, 16 subsets, no smoothing, zoom=2.0. Reconstruct into 128x128 grid. Brain mode must be set to "ON".

Siemens BioGraph TruePoint PET/CT scanner (Models 1093/1094):

Scan: transmission: CT scan

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition. The extended field of view option with Siemens scanner is preferred (FOV z axis 21cm – rather than 15)

Note: Do not rinse syringe after florbetapir F 18 injection

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB, and FDG Human protocols)

Reconstruction: FORE followed by 2D-OSEM, 4 iterations, 16 subsets (or 14 subsets, if the option of 16 is not available, which depends on the software version), no smoothing. Reconstruct into 336x336 grid if software no longer allows "TRIM" to be used. For software still allowing "TRIM", reconstruction into a 168x168 grid is

okay.
The button saying "Match CT slices" needs to be turned OFF. With this button on, PET gets interpolated onto the CT slice spacing. Clicking this button off allows the PET data not being interpolated and results in either 81 or 109 PET slices for the standard 3-ring and extended FOV 4-ring (TrueV) systems, respectively.

Siemens BioGraph mCT PET/CT scanner:

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition. The extended field of view option with Siemens scanner is preferred (FOV z axis 21cm – rather than 15)

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB and FDG Human protocols)

Reconstruction: FORE followed by 2D-OSEM, 4 iterations, 24 subsets. Reconstruct into 400x400 grid.
The button saying "Match CT slices" needs to be turned OFF. With this button on, PET gets interpolated onto the CT slice spacing. Clicking this button off allows the PET data not being interpolated and results in either 81 or 109 PET slices for the standard 3-ring and extended FOV 4-ring (TrueV) systems, respectively. **Zoom must be set to 2.0.**

Siemens BioGraph mMR (PETMR) scanner:

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition. The extended field of view option with Siemens scanner is preferred (FOV z axis 21cm – rather than 15)

Note: Do not rinse syringe after florbetapir F 18 injection.

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB and FDG Human protocols)

Reconstruction: 3D-OSEM, 4 iterations, 21 subsets. Reconstruct into 344x344x127 grid (344 mtx).
Filter turned OFF (AllPass). Zoom should be set to 2.

Siemens High Resolution Research Tomograph (HRRT) scanner:

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition. The extended field of view option with Siemens scanner is preferred (FOV z axis 21cm – rather than 15)

Note: Do not rinse syringe after florbetapir F 18 injection.

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB and FDG Human protocols)

Reconstruction: 3D-OSEM, 6 iterations, 16 subsets. Reconstruct into 256x256x207 grid (256 mtx). Voxel size: **1.219 mm^3**. Smoothing Filter: PiB = **4mm**, FDG & florbetapir F 18 = **2mm**. All Corrections: **ON**

Siemens BioGraph 1023/1024 (PICO) scanner:

To reduce motion artifact for this scanner, ***two separate emission scans*** will be acquired as closely together as possible. The first is to be started at 40 (PiB), 30 (FDG), or 50 (AV-45) min. If your scanner software version does not allow a repeat emission acquisition unless you perform a second CT scan, please contact Robert Koeppe (Koeppe@umich.edu) prior to scanning.

Scan: emission:

PiB: The PiB protocol will be acquired with a ***40 minute uptake*** followed by two ***15 minute*** (3 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: The florbetapir protocol will be acquired using a ***50 minute uptake*** followed by a two ***10 minute*** (2 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition.

Note: Do not rinse syringe after florbetapir F 18 injection.

FDG: The FDG protocol will be acquired following a ***30 minute uptake*** followed by two **15 minute** (3 x 300 sec frames) 3-D dynamic FDG acquisition.

(The following parameters will be used for PiB and FDG Human protocols)

Reconstruction: FORE followed by 2D-OSEM, 6 iterations, 16 subsets. Grid: 128x128. TRIM: **ON**, if your software allows a setting for TRIM (rather than just ON or OFF), **TRIM should be set to 2.0**, Zoom: **2.0,** Smoothing Filter: **NONE** (or 0.0), All Corrections: **ON**

NOTE *- If your scanner software version has on option for "Match CT Slice location", this must be left 'OFF' (e.g. box is unchecked)*

Questions:
Contact: Bob Koeppe (Koeppe@umich.edu)

GE Discovery PET/CT scanners:

Scan: transmission: CT scan

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition.

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB, and FDG Human protocols)

FOV:

If GE site uses a 128x128 grid, use 25.6 cm FOV, which yields 2mm voxels.

On newer GE systems (i.e. the Discovery 600, 690, 710) use a 25.6 cm FOV with a 192x192 matrix. This yields 1.333 mm voxels and keeps the target closer to center.

Reconstruction: Iterative (OSEM) reconstruction: On older systems (Advance, Discovery LS, and some older Discovery STs, FORE iterative (called 3D FORE Iterative, though the 3D is for acquisition, not reconstruction) is to be used. For newer Discovery STs and all Discovery STE, RX, 600, and 690 models, 3D Iterative (true 3D reconstruction), must be used.

4 iterations will be used for all scanner models. The number of subsets depends on the scanner model, as the number of subsets must divide evenly into the number of crystals per ring. All smoothing should be turned off. For FORE iterative this is both the loop filter and the transaxial post-filter. For 3D-iterative (called VuePoint or VuePoint HD) this is the loop filter and both the transaxial and axial post-filters.

Advance & Discovery LS	**20 subsets**
Discovery ST	**24 subsets**
Discovery STE	**20 subsets**
Discovery RX	**21 subsets**
Discovery 600	**32 subsets**
Discovery 690	**24 subsets**
Discovery 710	**24 subsets**

Philips scanners:

Scan: transmission: CT scan for Gemini PET/CT models or Ge-68 scan for Allegro model

Scan: emission:

PiB: Sites can choose between two PET protocols to be administered for PiB; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic PiB acquisition scan starting at the time of injection and the other is a ***40 minute uptake*** followed by a ***30 minute*** (6 x 300 sec frames) 3-D dynamic PiB acquisition.

Florbetapir F 18: Sites may choose between two florbetapir F 18 protocols; one protocol is a 70 minute [(4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames] 3-D dynamic florbetapir F 18 acquisition scan starting at the time of injection and the other is a ***50 minute uptake*** followed by a ***20 minute*** (4 x 300 sec frames) 3-D dynamic florbetapir F 18 acquisition.

Note: Do not rinse syringe after florbetapir F 18 injection.

FDG: The FDG protocol will be acquired as a 30 minute uptake followed by a dynamic 3-D acquisition for 30 min, acquired as 6 x 300 sec frames. See Appendix A.

(The following parameters will be used for PiB and FDG Human protocols)

Reconstruction: LOR-Ramla if available, or 3D-Ramla on older scanner models/software versions.
For Gemini TF models, the smoothing should be set to "Sharp".
For Allegro and older Gemini models, the lambda parameter should be set to 0.008.
All other reconstruction parameters should be left at factory defaults.

Questions:
Contact: Bob Koeppe (Koeppe@umich.edu)

Methods:

IMPORTANT: For all sites with PET-only scanners, post-emission transmission scans should be collected for the DIAN-TU PiB, florbetapir F 18, ^{18}F-AV-1451 and FDG protocols.

NOTE: If your site is collecting dynamic PiB or florbetapir F 18 with 33 frames, the patient should be marked prior to the start of the scan and realigned prior to the start of the frame at 40 minutes (PiB) or 50 minutes (florbetapir F 18) post-injection. This will reduce motion problems.

PiB and FDG imaging on the same day:

6 x 300 sec Frame Dynamic PiB Acquisition / Standard 6 x 300 sec Frame Dynamic FDG Acquisition.

- Upon arrival to the imaging center, compliance to the dietary requirements should be confirmed. Have the patient use the restroom and empty their bladder.
- Allow them to lie comfortably in a bed or reclining chair in a room in which the ambient noise is minimal and the degree of lighting can be controlled and minimized. Supply them with blankets/pillows as needed to maximize their comfort.
- Obtain intravenous access using either a small butterfly needle or angiocath. At this time blood glucose level should be checked. Optimally, blood glucose level should be <140 mg/dL (7.8 mmol/L). If BGL is ≥140 mg/dL, consider rescheduling the patient if possible. If this is not an option, please provide an explanation on the metadata form in the appropriate comment box following the blood glucose record.
- Draw PiB (target range: 8-18 mCi) and assay with a dose calibrator. ***Record the assayed dose (to the nearest 0.1 mCi) and assay time to the nearest minute. In the event of difficulties with***

radiochemical yields, the scan should not be performed if <8 mCi are available for injection. In this case the scan should be rescheduled.

- Inject the PiB over 10-60 seconds. Rinse the syringe and flush the line with at least 10 cc of normal saline. ***Record the injection time to the nearest minute. Do NOT discontinue the IV line at this time as it will be used for the FDG scan as well, if FDG is being done on the same day.***
- Re-assay the dose syringe and record the residual activity and time of assay. Allow the subject to rest comfortably in the room for 30 minutes for the incorporation of PiB into the brain.
- At the end of the 30 minute incorporation period, have the patient use the restroom and empty their bladder. (*Note* Depending on subject capabilities, this process may need to start prior to 30min to ensure the scan begins in a timely manner.)
- Position and secure the subject in the scanner using appropriate head restraints.
- Acquire a ***dynamic***, 3D scan consisting of 6 x 300 sec frames beginning 40 minutes +/- 30 seconds after tracer injection. Obtain post emission attenuation, unless using a PET/CT.
- *Upon completion the subject can be removed from the scanner and encouraged to void. The patient will have a break of approximately 10 minutes before the FDG study can begin. This is to permit adequate decay of PiB from the brain (90 min, see below, from the time of PiB injection to the start time of the FDG PET injection.)
- Subjects may drink water (in moderation) between the PiB and FDG scans, but no food intake will be permitted (in compliance with the recommended 4 hour fast prior to the FDG scan).
- After completion of PiB scanning, subjects will be moved to a dimly lighted, quiet room and 5±0.5 mCi of FDG will be injected as a bolus. ***Record the assayed dose and assay time to the nearest minute.***
- Rinse the syringe and flush the line with at least 10 cc of normal saline. ***Record the injection time to the nearest minute.*** The IV line can be discontinued at this time.
- Re-assay the dose syringe. If the residual activity is 0.1 mCi or greater, record the amount and correct the amount of the injected dose for the residual activity.
- Allow the subject to rest comfortably in the room for 20 minutes for the incorporation of FDG into the brain. During the incorporation period, the patient's eyes should be open and the ears should remain un-occluded.
- At the end of the 20 minute incorporation period, have the patient use the restroom and empty their bladder. (*Note* Depending on subject capabilities, this process may need to start prior to 20min to ensure the scan begins in a timely manner.)
- Reposition the subject in the PET scanner. FDG PET scans will be acquired in dynamic, 3D mode beginning 30 min after injection of FDG for 30 min (6 x 5 min frames).
- A second transmission scan will be obtained for attenuation correction and subjects will be removed from the scanner following the completion of the second transmission scan. (*Note* If using a PET/CT scanner, the CT transmission will be done prior to the data acquisition.)
- Note: The injection of the FDG should be timed so that a minimum of 120 minutes (about 6 half-lives of C-11) will elapse from the time of injection of PiB to the start of the FDG scan. This means that a minimum of 90 minutes should elapse between the time of injection of PiB and the time of injection of FDG to provide for the nearly complete decay of C-11.

70 minute Extended Dynamic PiB Acquisition/Standard 6 x 300 sec Frame Dynamic FDG Acquisition.

- Upon arrival to the imaging center, compliance to the dietary requirements should be confirmed.
- Have the patient use the restroom and empty their bladder.
- Obtain intravenous access using either a small butterfly needle or angiocath. At this time, blood glucose level should be checked. Blood glucose level should be <140 mg/dL (7.8 mmol/L). If BGL is $\geq$ 140 mg/dL, consider rescheduling the patient if possible. If this is not an option, please provide an explanation on the metadata form in the appropriate comment box following the blood glucose record.

- Position the subject in the scanner using appropriate head restraints.
- Draw PiB (target range: 8-18 mCi) and assay with a dose calibrator. ***Record the assayed dose (to the nearest 0.1 mCi) and assay time to the nearest minute. In the event of difficulties with radiochemical yields, the scan should not be performed if <8 mCi are available for injection. In this case the scan should be rescheduled.***
- Inject the PiB over 10-60 seconds. Rinse the syringe and flush the line with at least 10 cc of normal saline. ***Record the injection time to the nearest minute. Do NOT discontinue the IV line at this time as it will be used for the FDG scan as well, if FDG is being done on the same day.***
- Re-assay the dose syringe and record the residual activity and time of assay.
- Acquire a ***dynamic***, 3D scan consisting of the following:
    - 4 x 15 sec frames
    - 8 x 30 sec frames
    - 9 x 60 sec frames
    - 2 x 180 sec frames
    - 10 x 300 sec frames
    - Obtain post emission attenuation (unless using a PET/CT)

*Please see previous scanning protocol for FDG scanning instructions.

PET Only Scanners
Acquire an attenuation correction scan using rod sources for 5-6 minutes after the acquisition of the emission scan. Segmentation and re-projection routines will be applied for attenuation correction.

PET/CT Scanners
Standard CT acquisition parameters. Verify effective mAs is between 23-50 mAs.

***Note* Siemens Biograph scanners should have the "Match CT Slice" turned off.**

Typically, the PiB scans will be followed closely by the FDG scans on the same day; however, this is for convenience to the subject and coordinators but is not a requirement (see below for schemas).

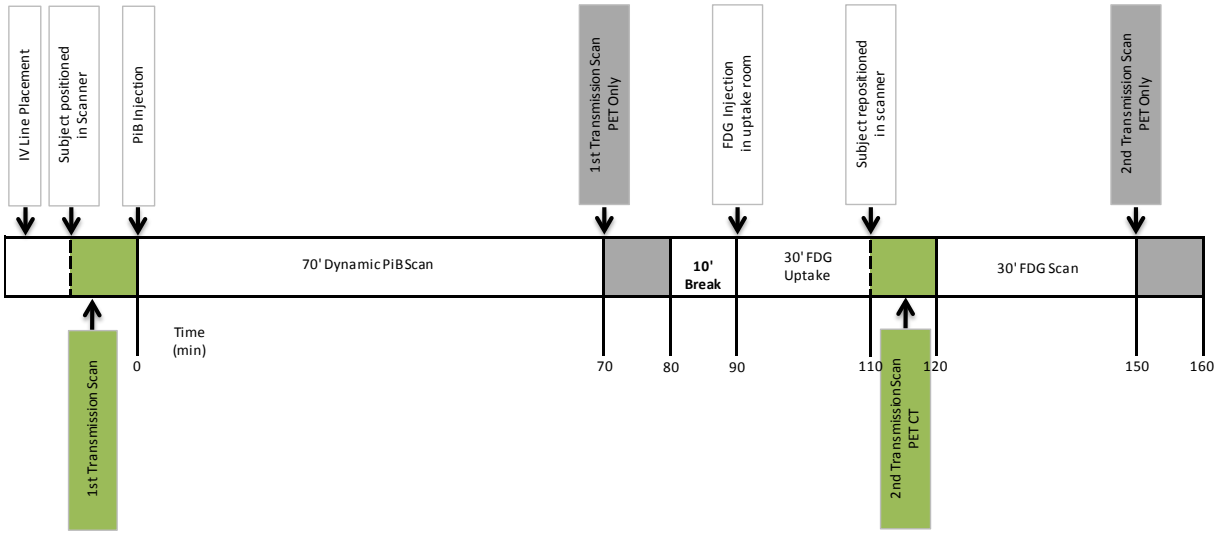
Appendix A: Examples of PiB/ Florbetapir F 18 / FDG Protocols

***Note* the following schema show transmission scan acquisition for PET/CT (green) and PET Only (grey) scanners. CT transmissions will be obtained prior to emission data acquisitions**

Example 1: 70 min Extended Dynamic PiB and Standard 6 x 300 sec Frame Dynamic FDG

Framing Sequence

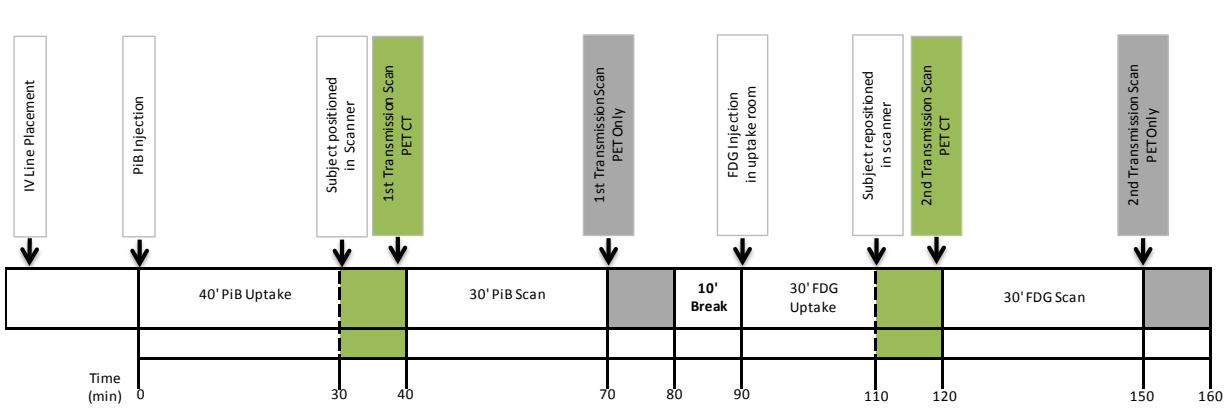
- **PiB: (4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames starting at time of PiB injection**
- **FDG: (6 x 300s) frames starting 30 min post FDG injection.**



Example 2: 6 x 300 sec Dynamic PiB and Standard 6 x 300 sec Frame Dynamic FDG

Framing Sequence

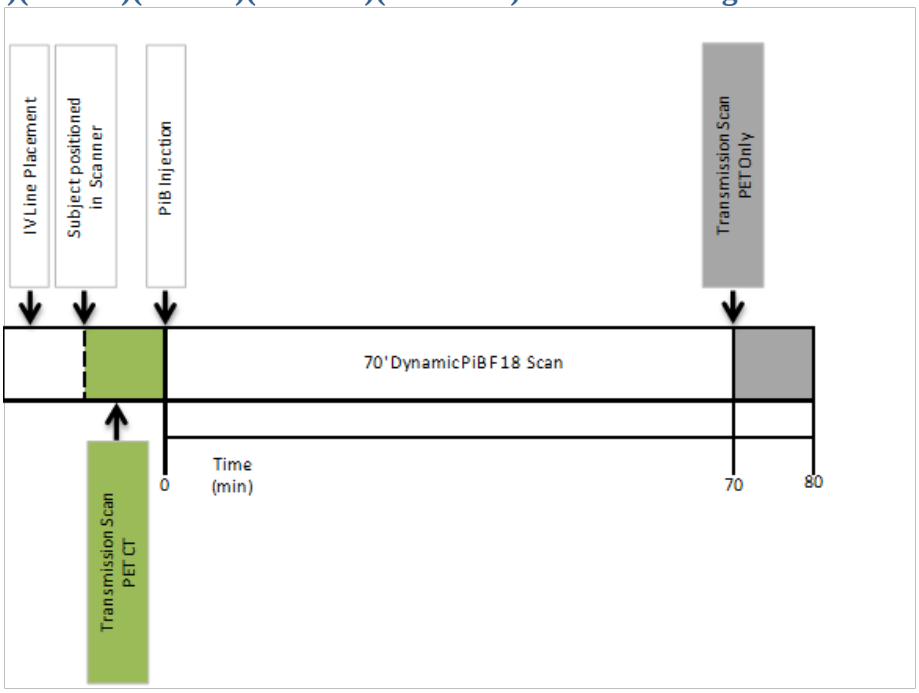
- **PiB: (6 x 300s) frames starting 40 min post PiB injection**
- **FDG: (6 x 300s) frames starting 30 min post FDG injection**



Example 3: 70 min Extended Dynamic PiB Only (Single Day

Framing Sequence

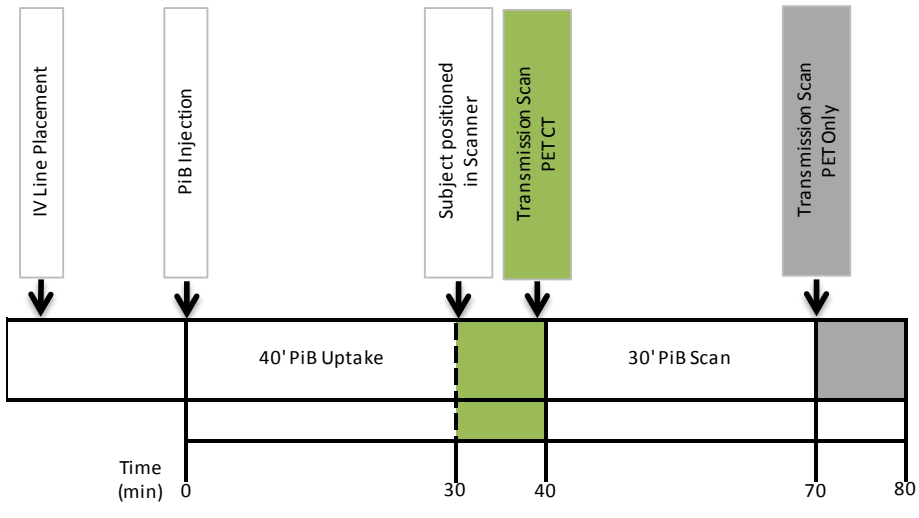
- **PiB: (4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames starting at time of PiB injection**



Example 4: Standard 6 x 300 sec Dynamic Acquisition PiB Only (Single Day)

Framing Sequence

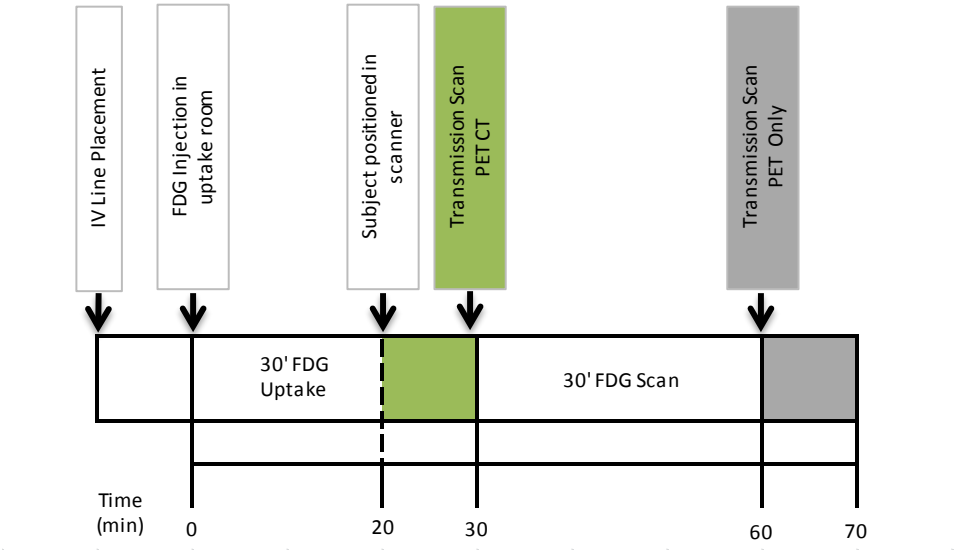
- **PiB: 6 x 300 second frames starting at 40 minutes post PiB injection**



Example 5: Standard 6 x 300 sec Frame Dynamic FDG (Single Day)

Framing Sequence

- **FDG: 6 x 300 second frames starting at 30 minutes post FDG injection**

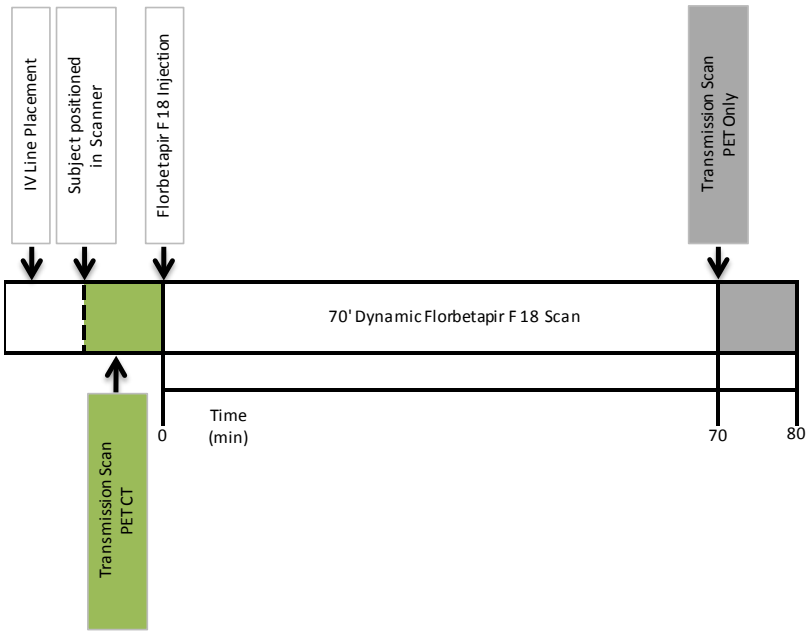


Example 6: 70 min Extended Dynamic Florbetapir F 18 Only (Single Day)

Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.

Framing Sequence

- **Florbetapir F 18: (4 x 15s)(8 x 30s)(9 x 60s)(2 x 180s)(10 x 300s) frames starting at time of florbetapir F 18 injection**

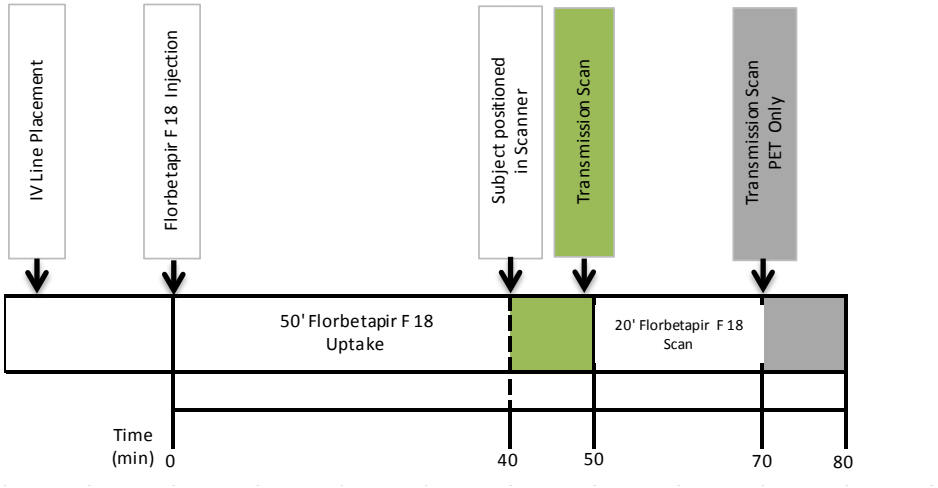


Example 7: Standard 4 x 300 sec Frame Dynamic Florbetapir F 18 (Single Day)

Site must be enrolled in the DIAN-TU or ADNI studies to use this tracer.

Framing Sequence

- **Florbetapir F 18: 4 x 300 second frames starting at 50 minutes post florbetapir F 18 injection**



Continuous Real Time Quality Control :

All MRI, PET PiB, PET florbetapir F 18, and PET FDG image data sets uploaded from any site will be quarantined in the CNDA until the data is passed by the appropriate image QC team. All review of images should occur within two working days and the performance site will be contacted if a study does not meet criteria.

After completion of the full QC procedures, a determination will be made as to whether the scan passes or fails. In the event of scans failing QC the Imaging Core will inquire with the performance site as to the suitability of returning the patient for rescanning or if appropriate, correcting the existing scan.

Protecting Confidentiality:

The raw image files (DICOM or ECAT format) will be received by the Informatics Core over secure, encrypted channels. Prior to upload, the header section of the files will be automatically edited to remove identifying fields (e.g. participant name, date of birth). All image files distributed to the quality control sites and investigators will be labeled with the anonymous subject and study accession numbers generated by the ADCS and CNDA.

Appendix B: Data Transfer to Central Neuroimaging Data Archive (CNDA)

Contents

A. CNDA Overview

The Central Neuroimaging Data Archive (CNDA) is a resource for managing biomedical imaging data. It can be accessed from a secure web application. The CNDA is hosted by the Neuroinformatics Research Group at Washington University. For more information, please contact Dr. Daniel Marcus (dmarcus@wustl.edu).

The CNDA can be accessed from a web browser at https://CNDA.wustl.edu.

B. System Requirements

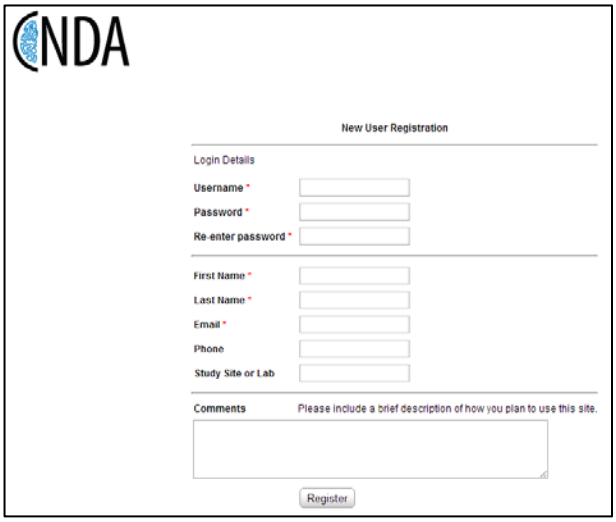
The CNDA can be accessed from a web browser on all common operating systems. The following browsers and versions are supported:

Internet Explorer Version 7+
Firefox Version 3+
Safari Version 3+

The CNDA also requires that the Java 1.4.2 (or higher) plug-in be installed in your browser. The plug-in can be obtained at http://www.java.com.

C. User Registration

Access to the CNDA requires a user account. To create an account, proceed to the CNDA website at https://CNDA.wustl.edu. Click on the "Register" link and complete the "New User Registration" page. In the Comments sections, include a statement that you are associated with the DIAN-L project and which site you are associated with. Users will be approved based on ADCS personnel logs or PI approval. After you submit the form, your account request will be reviewed by the CNDA administrator and your account will be enabled within 24 hours. Your account will be activated based on your role reported in the DIAN-L Personnel Log. Please ensure that the ADCS has received your site's most up to date Personnel Log.



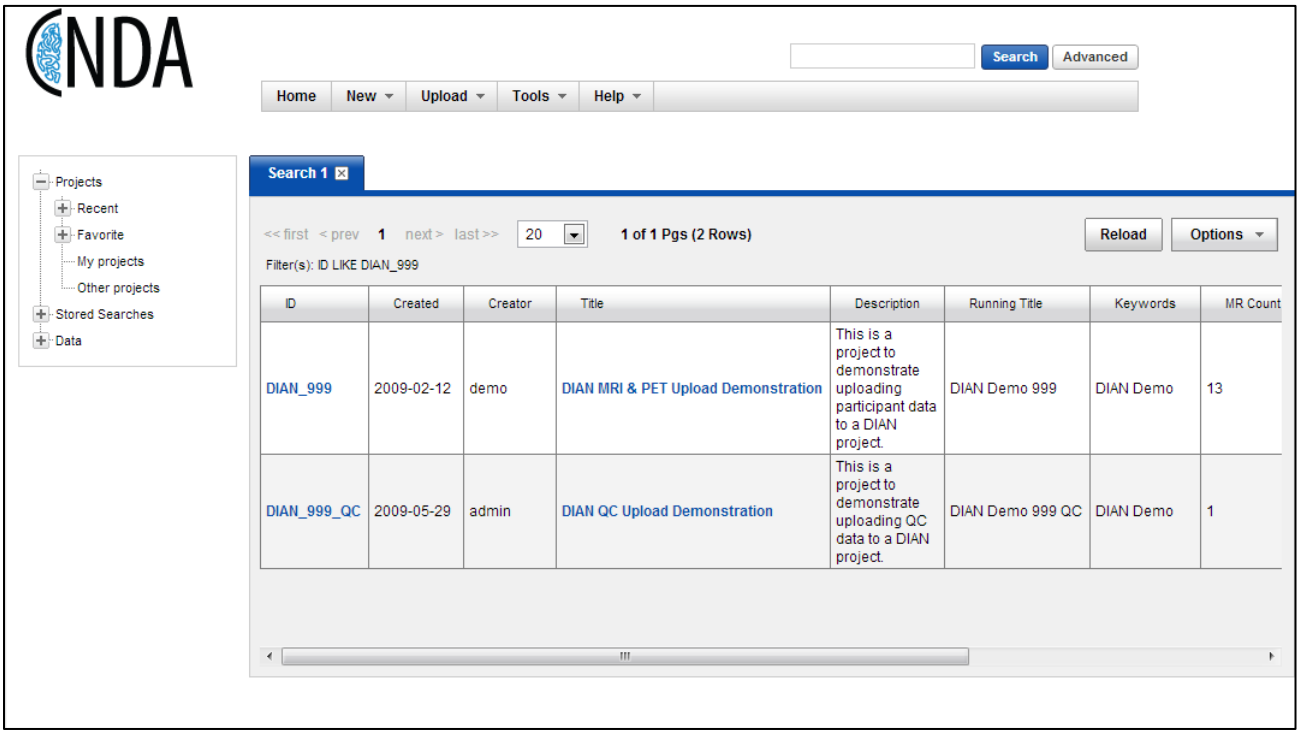
D. CNDA Login

Proceed to the CNDA homepage and enter the username and password you specified when you registered for an account.
If you have forgotten your username or password, click the 'Forgot login or password?' link on the front page and follow the provided instructions. You will receive an email with a link to reset your password.

E. CNDA Site Overview

The CNDA website enables users to review, retrieve, and upload image and non-image study data. Data within the CNDA are organized within separate projects. In order to interact with the data for a particular project, you must be granted explicit access to that project by the project owner.

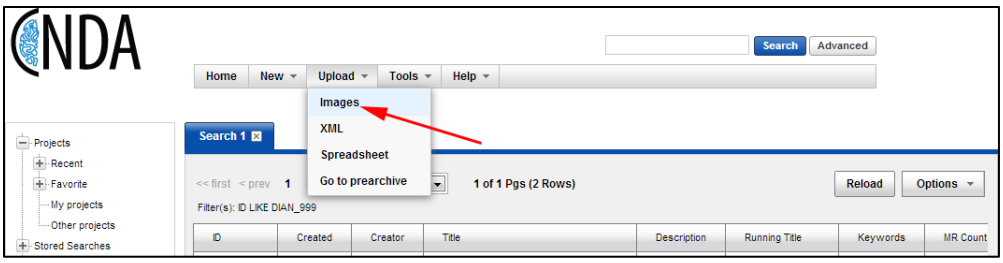
You should see two projects for your site's participation in the DIAN-L study, one for the quality control acquisitions (qualification volunteers and phantoms) and one for the actual study data. If you do not see these projects, please contact **CNDA-help@DIAN-info.org**.



The "My Projects" pages should include two projects for your DIAN-L study site, one for research participants and one for quality control data.

Please note that in the event that the scan is not completed but the transmission or CT was acquired, please contact CNDA-help@DIAN-info.org for further assistance.

F. Uploading Images

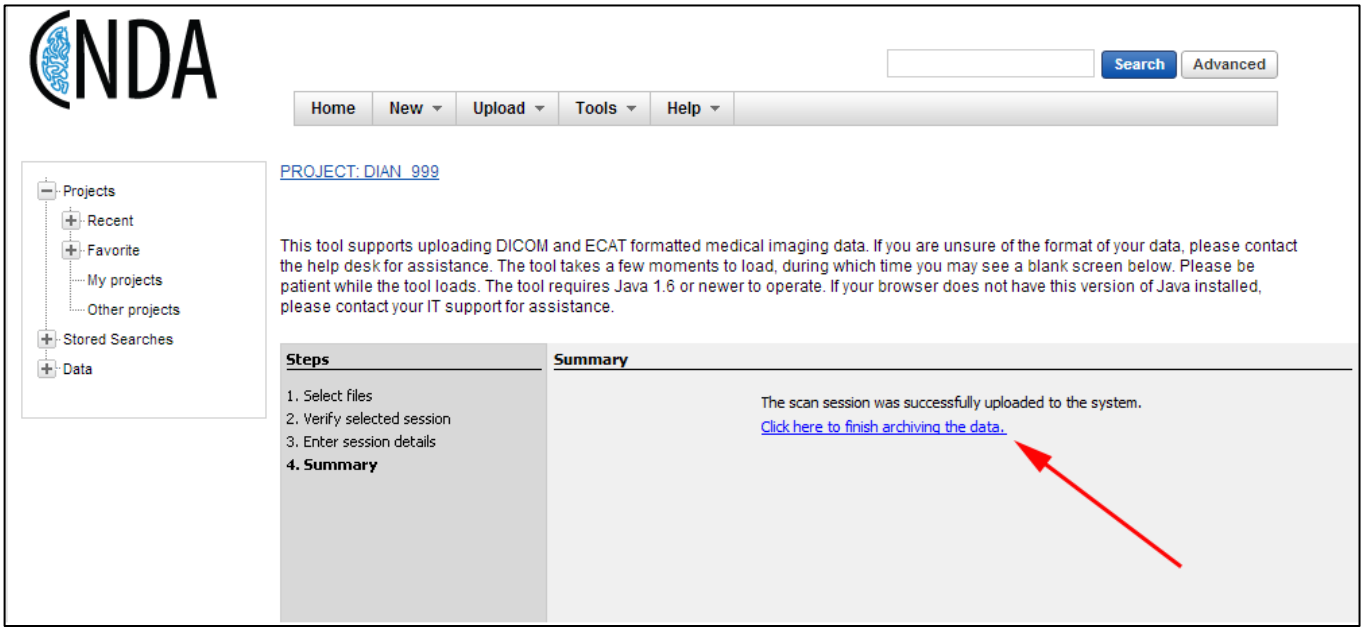


To upload the DICOM or ECAT images from a participant imaging session, click on the "Upload Tab" button on the homepage toolbar and select "Images". If you receive a warning, asking you to give this tool permission, approve the request. The tool will walk you through the upload procedure. If you do not see the appropriate projects and study participants listed in the upload tool menus, contact **CNDA-help@DIAN-info.org**.

You may be required to manually edit the visit identifier during upload to reflect what is noted on your metadata forms, as the system may not always populate with the accurate visit ID. Please check with the study coordinator regarding the correct visit identifier.

Note to Mac users: If you intend to upload files from a CD or DVD, the directory for the CD/DVD drives is tricky to find. From the pop-up menu at the top of the "Open" window, select the startup disk (usually the last item in the menu). Then, in the file browser, double-click the "Volumes" folder to open it. This folder contains entries for all disks mounted on your computer, including CD/DVD.

Note about de-identification: Prior to transferring the files to the central database, the upload tool removes all information from the image files that could identify your subjects.

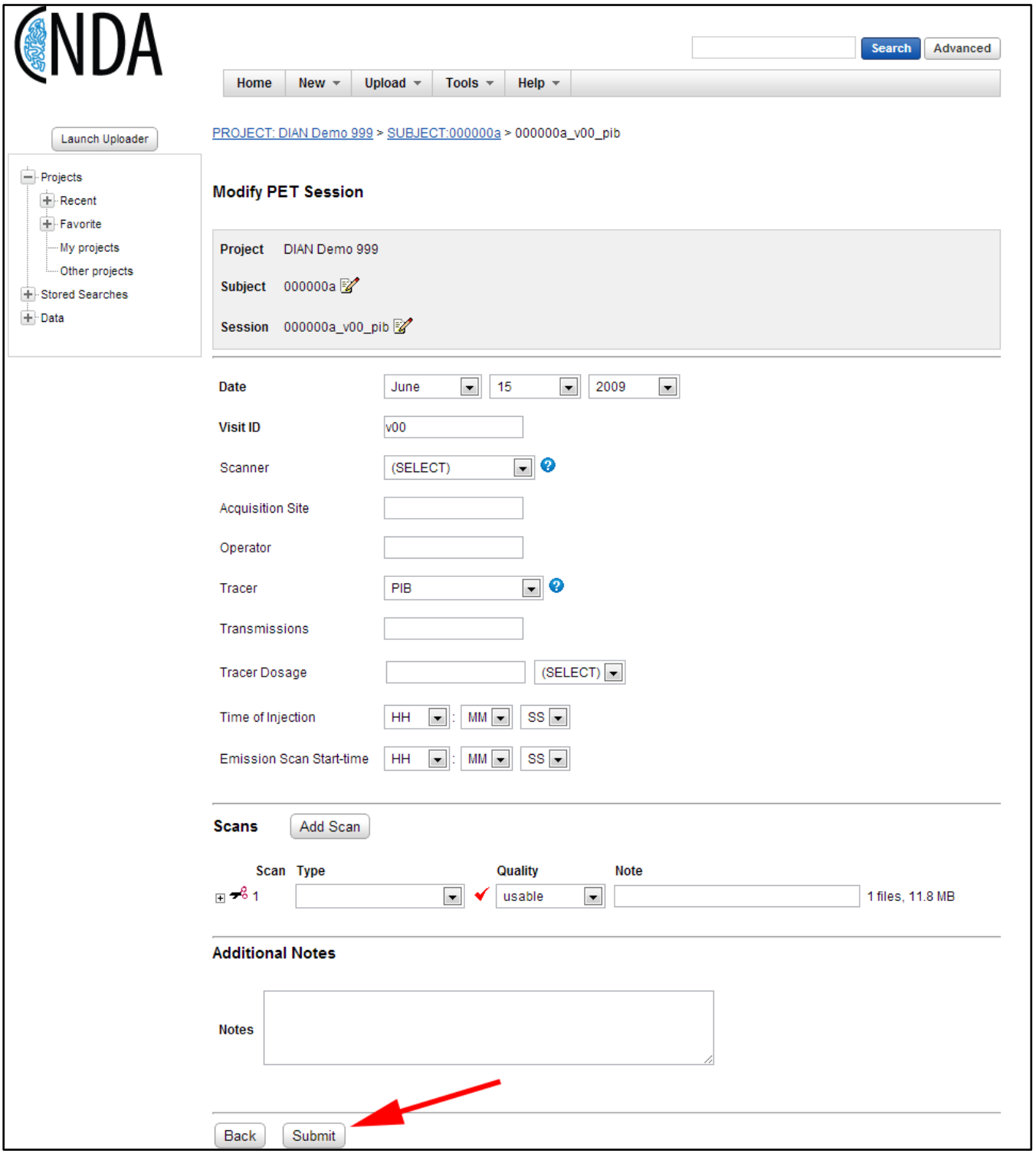


Once upload has completed, use the displayed session link (red arrow above) to take you to the session page where you may enter or review metadata.

Verify all of the series are present, the correct number of files have been uploaded, and the upload size is correct for each series. Fill in incomplete values in the form, including notes and tracer characteristics entered on the paper worksheets completed by the PET technician.

Click the "Submit" button (red arrow below).

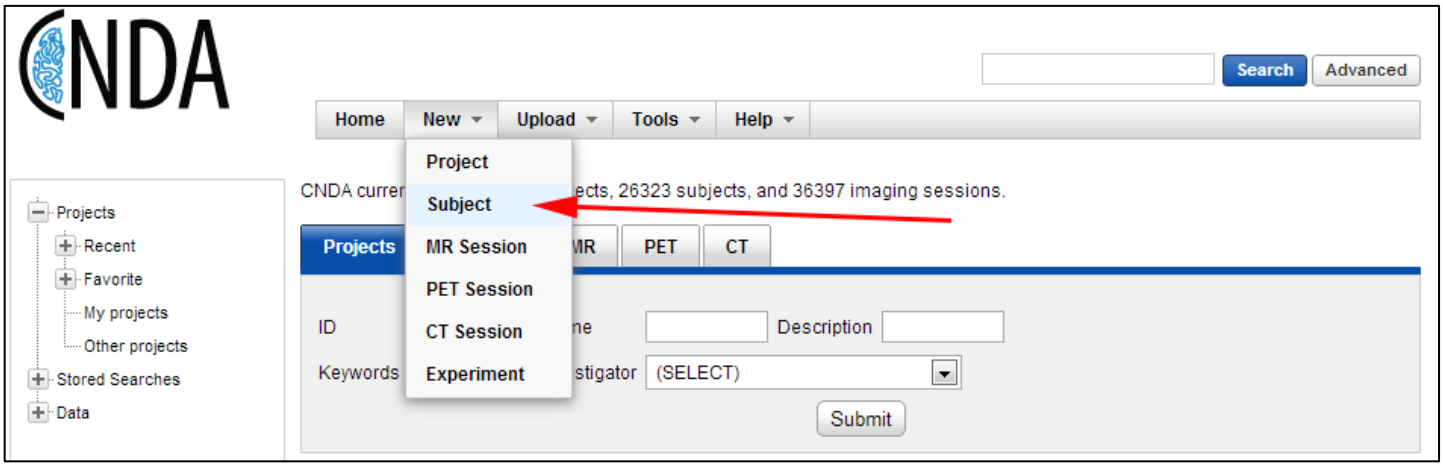
If there are discrepancies on the page, contact **CNDA-help@DIAN info.org**.



H. Uploading Quality Control Images

The process for uploading quality control images is the same as that for research participants, except that you may need to create a *Subject* in the CNDA before proceeding with the upload. If this is the first time you are scanning a particular phantom, you will need to create a new Subject. To do this, complete the New Subject form.

After logging in, click on the "New" item in the top menu and then click on "Subject". Select the QC project for



your site. Enter the Subject's ID. For PET phantoms, the Subject ID should be of the form DIAN_SITE # _ P (e.g., DIAN_999_P). The rest of the form can be left blank. Click the Submit button.

You can now proceed with the upload. When uploading quality control scans, make sure to select your site's QC project.

APPENDIX C: Florbetapir F 18 (^{18F}AV-45) Dose Request Forms

Note there are separate forms for North America (US form) and Rest of World (ROW)

DIAN-L
NORTH AMERICA
United States / Canada

Avid Radiopharmaceuticals
A wholly owned subsidiary of Eli Lilly and Company

DOSE REQUEST FORM

To be completed by the site					
Date:		Protocol:			
Site #:		Subject ID:			
Product:			Amount Requested (mCi):		
Requested Date of Imaging Session:			Requested Injection Time:		
Clinical Contact Name / Email:					
Imaging Site Contact Name / Email:					
Imaging Site:					
RAM license #:			Amendment:		
Authorized User:					
Comments/ Details for Avid:					
Preparer Signature and date:					

If you need assistance with this form, please email clinicalsupply@avidrp.com.
Fax completed form back to Avid at 215-689-4804
(A confirmation receipt will be sent via Email to the clinical contact and imaging contact listed above)

To be completed by Avid Radiopharmaceuticals	
Name of Receiver, Date and Time Request Received:	
Request approved by:	
Scheduled Manufacturer:	
Confirmation # or date (if applicable):	

To be completed by Manufacturer:			
Drug Request Received by (Print Name):		Date Received:	
Signature:			
Dose Scheduled for Manufacturing:	☐ Yes ☐ No (If no, provide reason in space below)		

Fax completed form back to Avid at 215-689-4804

DIAN-L

Rest Of World

Asia / Australia / Europe / South America / UK

Avid Radiopharmaceuticals

A wholly owned subsidiary of Eli Lilly and Company

Florbetapir ^{18}F (^{18}F-AV-45) Solution for Injection
DOSE REQUEST FORM

Name of Person Completing Form: _____

Name of PET Center: _____

Telephone of PET Center: _____

Protocol Number: _____ Sponsor: _____

Subject Number: _____ Site Number: _____

Dose Amount Requested (MBq): _____

Scheduled Date of Imaging: _____

Scheduled Time of Injection: _____

Signature/Date of Person Completing Form: _____

Please email or fax completed form to Avid Radiopharmaceuticals at:
Florbetapir.Order@avidrp.com or +1 215-689-4804
(In case of any problems, please contact Avid Radiopharmaceuticals at +1 215-298-0700)

TO BE COMPLETED BY MANUFACTURING SITE

Confirmation of dose request by MANUFACTURER:

Signature: _____ Date: _____ Time: _____

Dose Scheduled for Manufacturing: ☐ YES ☐ NO

Comments:

Please fax confirmed form to Avid at +1 215-689-4804

Version 3.0 (15Sept2011)