ADNI 2
PET Technical Procedures Manual
AV-45 (Florbetapir F 18) & FDG

V1.0
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General Information

ADNI2 continues the currently funded AD Neuroimaging Initiative (ADNI1), a public/private collaboration between academia and industry to study biomarkers of AD as well as a recently funded Grand Opportunities (GO) grant which supplements ADNI goals and activities. ADNI will inform the neuroscience of AD, identify diagnostic and prognostic markers, identify outcome measures that can be used in clinical trials, and help develop the most effective clinical trial scenarios.

The purpose of this manual is to further explain the PET imaging component of the ADNI2 protocol. Standard procedures are needed to ensure consistency of data collection in this longitudinal study.

This manual contains information for study-site clinical staff involved with the care of study participants during the imaging procedure and those involved with the processing and transfer of PET imaging data.

AV-45 PET and FDG PET imaging will be performed on all newly enrolled participants on 2 separate days (a minimum of 12 hours between scans is required). Scans may be performed in any order but both must be completed within 2 weeks before or 2 weeks after the in-clinic assessments at Baseline and at two-year intervals as funding permits.

CN and MCI subjects carried forward from ADNI1 and EMCI subjects carried forward from ADNI-GO will have AV-45 PET and FDG PET imagining every two years as funding permits. The timing of the initial AV-45 PET and FDG PET scans under ADNI2 will be based on the date of the last AV-45 and FDG PET scan under ADNI1 or ADNI-GO. 2 years from that date will be the "initial" AV-45 or FDG PET scan date under ADNI2.

> Note that while this manual continues the previous convention used in ADNI and ADNI-GO of referring to the amyloid imaging tracer as AV-45, the generic chemical name for this tracer is Florbetapir F 18.

Contact Information

If you have any questions or concerns regarding the FDG PET imaging please contact

adnipet@ucsd.edu

If you have any specific questions regarding AV-45 ordering or imaging please contact:
Jason Burns

burns@avidrp.com

If you have question regarding the scan uploading to the LONI website please contact

adni@loni.ucla.edu

If you have any questions or concerns regarding individual participants please contact the study coordinator at your referral site.

Site Qualification

PET Scanners

It is preferable for sites to use existing qualified ADNI scanners for both FDG and AV-45 imaging. If a new scanner must be introduced it will need to be qualified using standard ADNI scanner qualification before imaging can be performed.

Ideally, no hardware or software upgrades of the PET imaging system should occur during the duration of the study. In the event of such an upgrade, we ask that you inform the PET core *prior* to the anticipated upgrade. Depending on the nature of the upgrade the site may be asked to repeat the phantom scans prior to scanning any additional subjects.

> **Contact adnipet@ucsd.edu prior to imaging if a new scanner will be used for ADNI2 or if hardware / software upgrades have occurred.**

Regulatory

Sites must be appropriately licensed through appropriate state or federal agencies to receive and use AV-45 prior to imaging.

Sites must also receive both **IRB** approval and **radiation safety committee (RSC) or radioactive** approval, before scanning any subjects.

Continued Quality Monitoring During Execution Phase

To ensure scanner/ancillary equipment stability and quality throughout the project, each site is required to perform ongoing quality control procedures.

Dedicated PET Scanner:

➢ PET scanner should have an up to date calibration and normalization on the date of each imaging session.

➢ A daily QC/blank scan (empty port transmission) scan should be done at the beginning of the day the scanning is to be completed. This scan should be visually inspected for abnormalities. If there is a possibility that the

abnormality could impact the quality of the PET scan the study should be reschedule.

PET/CT Scanner:

➢ PET scanner should have an up to date calibration and normalization on the date of the imaging session.

➢ A daily QC check should be done at the beginning of the day the scanning is to be completed. This scan should be visually inspected for abnormalities. If there is a possibility that the abnormality could impact the quality of the PET scan the study should be rescheduled.

➢ Daily CT should be performed as recommended by the specific vendor, but typically should include a "checkup/calibration" procedure and a water phantom scan. The checkup/calibration procedure guarantees optimum image quality by warming up the x-ray tube and should be performed at startup and within 1 hour prior to any scan. The water phantom provides quality measurements of 3 parameters. The parameters are the CRT value of water calculated in Hounsfield units (HU), the pixel noise of images calculated as a standard deviation, and the tube voltages measured directly on the x-ray tubes. These three measurements should be determined for all available kVp values.

Ancillary Equipment:

➢ Quality control of blood glucose meter should be performed according to the manufacturer or institution's procedure to ensure proper functioning.

➢ Quality control of dose calibrator should be performed throughout the course of the study. This typically will include daily constancy, quarterly linearity and annual accuracy.

PET Pre-Scan Procedures / General Information

Participants 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 **40** minutes

➢ Total radiation dose exposure to the subject in any given year exceed the limits of annual and total dose commitment set forth in the US Code of Federal Regulations (CFR) Title 21 Section 361.1.

AV-45 Ordering

Study coordinators and PET technologists will need to reference the Avid Radiopharmaceuticals, Inc. **Clinical Supplies Guidance Document (CSGD)** for all relevant documents regarding ordering, shipping and receiving investigational unit doses of ^{18}F-AV-45 for injection. Packaging slips, quality control approval records and dose dispensing logs are included in the CSGD. Study coordinators will coordinate AV-45 ordering with the PET imaging facility using the AV-45 drug request form (DRF). Doses typically require a 2-3 day notification *prior* to the desired day of imaging to coordinate production and delivery.

Subject Preparation

FDG Scans:
Subjects to be imaged in the morning are asked to omit all food and fluids (except water) from midnight the night before the scan 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 the imaging session.

AV-45 Scans:
There are no specific dietary restrictions for the AV-45 PET scans.

Participant Positioning

Proper patient positioning is a key aspect of the successful completion of the PET exam. It is important to take the time necessary to ensure not only that the patient is properly positioned but can comfortably maintain that position throughout the duration of the scanning session. **Excessive motion and in particular a difference in the subjects' position between the emission scan and the transmission (or CT) scan used for attenuation correction is the single most common cause of failed studies.**

➢ Have the patient remove any bulky items from their pockets such as billfolds, keys, etc. In addition, they should remove eyeglasses, earrings, and hair clips/combs if present. If possible they should try and remove hearing aids also.

➢ Position the patient so that their head/neck are relaxed. It may be necessary to add additional pads beneath the neck to provide sufficient support. Use the lasers to ensure there is little or no rotation in either plane. The head should be approximately positioned parallel to the imaginary line between the external canthus of the eye and the external auditory meatus.

➢ Use support devices under the back and/or legs to help decrease the strain on these regions. This also will assist in the stabilization of motion in the lower body.

➢ Once the patient has been positioned foam pads can be placed alongside the head for additional support. Velcro straps and/or tape should also be used to secure the head position. Vacuum bean bags can also be used in this process.

➢ If using a dedicated PET system it is helpful to perform a short emission or transmission scan to determine optimal axial position.

➢ The patients should be offered a "panic button" or be reassured that someone is watching or able to hear them at all times.

➢ **Proper positioning of the subject to get the entire head in the field of view is critical to the success of the project.**

➢ **Checking the patient positioning and readjusting (if possible) the position of the subjects' head should be done often throughout the study.**

Ambient Conditions

FDG Scans:

Standardization of the environment during the 20-30 minutes following tracer administration is essential.

➢ During the uptake phase, subjects should be asked to remain still and keep awake with eyes open looking straight ahead (not into lights).

➢ Lights should be dimmed to a level similar to twilight. The subjects' position (e.g., sitting or lying), their visual environment, and the room's ambient light should be the same throughout the longitudinal study.

➢ The patient should be monitored periodically to be certain of compliance and to ensure that the eyes do not close and the patient remains awake.

> **IMPORTANT: The subjects' position during the uptake period, their visual environment, and the room's ambient light conditions should be the same across all scans of the longitudinal study. It is important to standardize these conditions as the PET scans are performed over multiple years.**

AV-45 Scans:

Contrary to FDG-PET imaging, standardization of the environment during the 50 minute uptake period following AV-45 administration is not essential.

Image File Identification

It is *VERY* important that each site follow standard file identification so that all scans can be easily identified. The file ID will be assigned by the Clinical Study Coordinator at the clinical site prior to the PET visit. The naming convention is SSS_C_#### where SSS is the three digit site ID, C is either S (subject) or P (phantom), and #### is the unique four digit number assigned by the site. For example, 129_S_0012 is the 12th subject enrolled in ADNI from site 129.

Additionally please ensure in the series description, the type of scan is identified being FDG or AV-45. Also ensure the header information is complete for each and every scan.

Documentation

The study coordinator must ensure the PET Technologist has a copy of the ^{18}F-AV-45 and FDG PET Scan Information Forms prior to each scan session. Be sure to complete the metadata sheet ***as the study is being acquired.*** A process should be established for transferring this form back to the study coordinator. The study coordinator will then need to ensure the appropriate data is entered online within 24 hours of the scan.

Assessments and Endpoints for ^{18}F-AV-45:

The following assessments will be performed for all AV-45 subjects:

➢ Informed consent for ADNI2 study;

➢ A 370 MBq (10 mCi +/- 10%) bolus injection of AV-45 will be administered (saline should not be added to the dose prior to administration) and 20 minute continuous brain PET imaging will begin approximately 50 minutes post-injection. The images will be reconstructed immediately after the 20 minute scan, and if motion artifact is detected, another 20 minute continuous scan will be acquired.

➢ Vital signs will be taken in a supine position immediately prior to administration of AV-45 (within 5 minutes prior to injection) and again at the end of the study visit, prior to discharge (approximately 70 minutes after AV-45 administration).

➢ During the imaging session subjects will be observed continuously for signs of adverse events or serious adverse events.

➢ The injection site will be observed for excessive inflammation or damage to the surrounding tissue.

➢ Either a physician or a person designated by the physician, appropriate by training and experience, should be present during the AV45 injection and present to approve the discharge of the subject from the PET suite.

Follow-up post AV45 administration:

Each study participant or authorized caregiver will be contacted by phone within one to two days after imaging to confirm their well being and inquire about any adverse events.

In the event of a sterility failure during the AV-45 synthesis:

Avid will have the following plans for notification and follow-up of a possible sterility failure:

➢ Avid will notify the investigator immediately when the sterility test of a dose of AV-45 injection shows growth (possible failure).

➢ Avid will conduct a sterility test failure investigation (which may take up to two weeks).

➢ Avid will notify the investigator of the outcome of the sterility test failure investigation (confirmed sterility failure and microbial identification or invalidated first test with a negative retest).

Avid recommends diligent monitoring of subjects who have received a dose having a possible failing or confirmed to have a failing sterility test result. The investigator should exercise appropriate medical judgment regarding treatment for possible or actual infection.

PET Imaging Protocols

AV-45:

➢ Have the patient use the restroom and empty their bladder.

➢ Allow them to lie comfortably in a bed or reclining chair in a room. Supply them with blankets/pillows as needed to maximize their comfort.

➢ Obtain intravenous access using a small angiocath.

- **Draw 370 MBq (10 mCi +/- 10%)** of AV-45 and assay with a dose calibrator. _**Record the assay time to the nearest minute.**_ Do not q.s. (add saline) to the dose prior to administration. Adding saline could potentially lead to precipitation out of solution form.

- Obtain pre-injection vitals (heart rate, respirations, blood pressure and temperature).

- Inject the AV-45. 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 approximately 30 minutes for the incorporation of AV-45 into the brain.

- At the end of the 30 minute incorporation period, have the patient use the restroom and empty their bladder.

- Position and secure the subject in the scanner using methods previously described. **Alignment marks should be put on the subject using the laser system, which can then be subsequently used to check alignment and reposition the subject as necessary.**

- Acquire a _dynamic_, 3D scan consisting of four-5 minute fames. Acquisition must start 50 minutes post injection.

- **It is crucial that the subject's position is checked several times throughout the 20 min PET** scan. A good idea is to check the patient's marks **using** the laser system at the **end** of each 5 min scan frame. The subject's position should be returned as closely as possible to the original position **just at the beginning of the next scan** frame.

- All images will need to be corrected using measured attenuation.
    - PET Only Scanners
        - Acquire an attenuation correction scan using rod sources for 5-6 minutes after the acquisition of the emission scan. **Again it is absolutely crucial that the subject is repositioned "on their marks" prior to acquiring the transmission scan. The single most common reason for unusable PET scans is motion between the emission and transmission scans.**
        - Segmentation and re-projection routines will be applied for attenuation correction.

    - PET/CT Scanners
        - Standard CT acquisition parameters

- The patient must undergo the CT scan starting at around 40 minutes post injection. Be sure to prepare the subject so that you are ready to press "start" for the PET scan at 50 minutes.

➢ Upon completion the subject can be removed from the scanner and encouraged to void. The subject should also be instructed to drink plenty of fluids and void frequently throughout the day to help reduce radiation exposure.

➢ Obtain post-scan vitals (heart rate, respirations, blood pressure and temperature).

➢ <u>Either a physician or a person designated by the physician, appropriate by training and experience, should be present to approve the discharge of the subject from the PET suite.</u>

➢ Reconstruct images using parameters specific to the system used for scanning. (See Appendix A in this document).

➢ Upon completion of the reconstruction, review all the images to assess for artifacts and motion.

➢ Archive **ALL** raw and processed study data including copies of the normalization and blank scans. It is necessary to archive and store raw and processed data at the imaging site for the duration of the project (approximately 5 years).

➢ Transfer image data to the Laboratory of Neuroimaging (LONI) at UCLA. Please upload only the fully corrected image set.

> **IMPORTANT: Data uploads to LONI should be performed as soon as the images have been acquired & reconstructed as it will be important to promptly QC the data to identify if the scan needs to be repeated. The timeframe should be 1-2 business days from acquisition.**

FDG**:**
➢ Upon arrival to the imaging center, compliance to the dietary requirements should be confirmed. If they have not complied with the preparation instructions then the following procedures should apply:
  o If < 2 hours have elapsed since food/drink, wait until 2 hours have elapsed from last ingestion.

  o Once >2 hour have elapsed since last ingestion, measure the blood glucose levels. If the blood glucose level is <180 mg/dL (9.9 mmol/L) then proceed with the scan. If not, the subject will need to wait an additional amount of time until the blood glucose levels meet the above criteria or reschedule.

➢ 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 as previously described. Supply them with blankets/pillows as needed to maximize their comfort.

➢ Obtain intravenous access using either a small butterfly needle or angiocath. Obtain baseline blood glucose level if not already performed.

➢ **Draw 185 MBq (5 mCi +/- 10%)** of [^{18}F]-FDG and assay with a dose calibrator. ***Record the assay time to the nearest minute.***

➢ Inject the [^{18}F]-FDG. 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 [^{18}F]-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 minutes incorporation period, have the patient use the restroom and empty their bladder.

> **IMPORTANT: This should be timed such that the patient will be on the scanner at 30 minutes after injection, ready for acquisition to begin.**

➢ Position and secure the subject in the scanner using methods previously described.

➢ Acquire a *dynamic*, 3D scan consisting of six-5 minute fames.

> **IMPORTANT: Biograph PET/CT users should acquire a single 30 minute frame since dynamic scanning capability is not currently available.**

➢ All images will need to be corrected using measured attenuation.
  o 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.
  o PET/CT Scanners
    ▪ Standard CT acquisition parameters

➢ Upon completion the subject can be removed from the scanner and encouraged to void. The subject should also be instructed to drink plenty of fluids and void frequently throughout the day to help reduce radiation exposure.

➢ Reconstruct images using parameters specific to the system used for scanning. (See Appendix A in this document).

➢ Upon completion of the reconstruction, review all the images to assess for artifacts and motion.

➢ Archive **ALL** raw and processed study data including copies of the normalization and blank scans. It is necessary to archive and store raw and processed data at the imaging site for the duration of the ADNI project (approximately 5 years).

➢ Transfer image data to the Laboratory of Neuroimaging (LONI) at UCLA. Please upload only the fully corrected image set.

> **IMPORTANT: Data uploads to LONI should be performed as soon as the images have been acquired & reconstructed as it will be important to promptly QC the data to identify if the scan needs to be repeated.**

Appendix A – LONI Access User Registration

➢ Click "**Click here to create an account**" on the Image Data Archive Sign-In page.
   https://ida.loni.ucla.edu (Fig. A-1)
   FIG. A- 1

➢ Complete the form, then click **Register.**

➢ Send an email to dba@loni.ucla.edu requesting to have your permissions set for uploading ADNI data. Please include the email address used when you created your account, the name of your site and the name of your site

Appendix B – Scanner Specific Reconstruction Parameters

GE Discovery STE and VCT - 47 slice PET/CT scanners

Acquisition Parameters:

Radiotracer:
        FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
        FDG: **30 min**;   AV-45: **50 min**

CT scan:
        FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition <u>promptly</u> at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
        FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Randoms Correction:
        <u>Singles</u> (not real-time subtraction)

Reconstruction Parameters: FDG and AV-45:

Primary Reconstruction Method: **Iterative** (fully 3D Iter; not 3D FORE IR):
                4 iterations; 20 subsets

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **3.27 mm**

Smoothing
   Filter: **NONE or 0.0** (for all filter options: loop filter, post-filter and z-axis filter)

All corrections '**On**'

***<u>Secondary Reconstruction Method</u>: If possible, we would like all subjects' images also to be reconstructed using **3D filtered back-projection** [also called **3DRP** (3D reprojection) or **3D Kinihan & Rogers**]. Use a **RAMP** filter. Headers should say "**<u>Rad:\rectangle\4.80000 mm\Ax:\rectangle\6.50000 mm</u>**" for the filter cutoffs (which relate to the Nyquist frequency).

***<u>**FDG scans on subjects continuing on from ADNI**</u> **must be reconstruction with both reconstruction methods.**

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

GE Discovery ST - 47 slice PET/CT scanners

Acquisition Parameters:

Radiotracer:
        FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
        FDG: **30 min**;   AV-45: **50 min**

CT scan:
        FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition <u>promptly</u> at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
        FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Randoms Correction:
        Singles (not real-time subtraction)

Reconstruction Parameters: FDG and AV-45**:**

Primary Reconstruction Method: **Iterative <u>if available</u>** (fully 3D Iter; not 3D FORE IR) Only if fully iterative is not available, as in some older systems, is it ok to use 3D FORE IR.
            4 iterations; 21 subsets

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **3.27 mm**

Smoothing
    Filter: **NONE or 0.0** (for all filter options: loop filter, post-filter and z-axis filter)

All corrections '**On**'

***<u>Secondary Reconstruction Method</u>: If possible, we would like all subjects' images also to be reconstructed using **3D filtered back-projection** [also called **3DRP** (3D reprojection) or **3D Kinihan & Rogers**]. Use a **RAMP** filter. Headers should say "**<u>Rad:\rectangle\6.30000 mm\Ax:\rectangle\6.50000 mm</u>**" for the filter cutoffs (which relate to the Nyquist frequency) (note: some software versions say 6.4 instead of 6.3 mm).

***<u>**FDG scans on subjects continuing on from ADNI**</u> **must be reconstruction with both reconstruction methods.**

> Questions: e-mail Robert Koeppe (koeppe@umich.edu)

GE Discovery RX - 47 slice (LYSO) PET/CT scanners

Acquisition Parameters:

Radiotracer:
        FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
        FDG: **30 min**;   AV-45: **50 min**

CT scan:
        FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
        FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Randoms Correction:
        Singles (not real-time subtraction)

Reconstruction Parameters: FDG and AV-45:

Primary Reconstruction Method: **Iterative** (3D Iter; not 3D FORE IR):
        4 iterations; 21 subsets

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **3.27 mm**

Smoothing
  Filter: **NONE or 0.0** (for all filter options: loop filter, post-filter and z-axis filter)

All corrections '**On**'

***Secondary Reconstruction Method: If possible, we would like all subjects' images also to be reconstructed using **3D filtered back-projection** [also called **3DRP** (3D reprojection) or **3D Kinihan & Rogers**]. Use a **RAMP** filter. Headers should say "**Rad:\rectangle\4.30000 mm\Ax:\rectangle\6.50000 mm**" for the filter cutoffs (which relate to the Nyquist frequency).

***<u>FDG scans on subjects continuing on from ADNI</u> must be reconstruction with both reconstruction methods.**

> Questions: e-mail Robert Koeppe (koeppe@umich.edu)

GE Discovery LS - 35 slice (PET/CT) scanners

Acquisition Parameters:

Radiotracer:
        FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
        FDG: **30 min**;   AV-45: **50 min**

CT scan:
        FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
        FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Randoms Correction:
        Singles (not real-time subtraction, unless singles correction not available)

Reconstruction Parameters: FDG and AV-45**:**

Primary Reconstruction Method: **FORE Iterative:**
                      4 iterations; 21 subsets

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **4.25 mm**

Smoothing
    Filter: **NONE or 0.0** (for all filter options: loop filter, post-filter and z-axis filter)

All corrections '**On**'

***Secondary Reconstruction Method: If possible, we would like all subjects' images also to be reconstructed using **3D filtered back-projection** [also called **3DRP** (3D reprojection) or **3D Kinihan & Rogers**]. Use a **RAMP** filter. Headers should say "**Rad:rectangle\4.00000 mm\Ax:rectangle\8.50000 mm**" for the filter cutoffs (which relate to the Nyquist frequency).

***__FDG scans on subjects continuing on from ADNI__ must be reconstruction with both reconstruction methods.**

> Questions: e-mail Robert Koeppe (koeppe@umich.edu)

GE Advance - 35 slice PET scanners

Acquisition Parameters:

Radiotracer:
       FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
       FDG: **30 min**;   AV-45: **50 min**

Transmission scan:
       FDG and AV-45: **Five or six min 2-D scan** acquired immediately **post**-emission scan; process with **segmentation**.

Scans and scan duration:
       FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Randoms Correction:
       Singles (not real-time subtraction, unless singles correction not available)

Reconstruction Parameters: FDG and AV-45:

Primary Reconstruction Method: **FORE Iterative:**
              4 iterations; 21 subsets

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **4.25 mm**

Smoothing
  Filter: **NONE or 0.0** (for all filter options: loop filter, post-filter and z-axis filter)

All corrections '**On**'

***Secondary Reconstruction Method: If possible, we would like all subjects' images also to be reconstructed using **3D filtered back-projection** [also called **3DRP** (3D reprojection) or **3D Kinihan & Rogers**]. Use a **RAMP** filter. Headers should say "**Rad:\rectangle\4.00000 mm\Ax:\rectangle\8.50000 mm**" for the filter cutoffs (which relate to the Nyquist frequency).

***<u>**FDG scans on subjects continuing on from ADNI**</u> **must be reconstruction with both reconstruction methods.**

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Philips Gemini TF - 90 slice PET/CT scanners

Acquisition Parameters:

Radiotracer:
  FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
  FDG: **30 min**;   AV-45: **50 min**

CT scan:
  FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (AV-45) min.

Acquisition Protocol: **Brain Protocol**

Scans and scan duration:
  FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Reconstruction Parameters: FDG and AV-45**:**

Reconstruction Method: **Iterative: LOR 3D Ramla** (*** Note: if only older software versions are available, 3D Ramla reconstruction is acceptable)

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **2.0 mm**

Smoothing: Set SMOOTH parameter to '**SHARP**'

All other parameters should be set to defaults for the "**Brain**" protocol

All corrections '**On**'

For LOR 3D Ramla reconstruction: The attenuation field should indicate "CTAC-SG" and the scatter field should indication "SS-Simul"

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Philips Gemini and Gemini GXL - 90 slice PET/CT scanners

Acquisition Parameters:

Radiotracer:
      FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
      FDG: **30 min**;   AV-45: **50 min**

CT scan:
      FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (AV-45) min.

Acquisition Protocol: **Brain Protocol**

Scans and scan duration:
      FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Reconstruction Parameters: FDG and AV-45**:**

Reconstruction Method: **Iterative: LOR 3D Ramla** (*** Note: if only older software versions are available, 3D Ramla reconstruction is acceptable)

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **2.0 mm**

Smoothing: Set SMOOTH parameter to '**SHARP**'

All other parameters should be set to defaults for the "**Brain**" protocol

All corrections '**On**'

For LOR 3D Ramla reconstruction: The attenuation field should indicate "CT-SEG" and the scatter field should indication "SS-Simul"

For 3D Ramla reconstruction: Attenuation and scatter fields should indicate "NonUni-BGSub"

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Philips Allegro - 90 slice PET scanners

Acquisition Parameters:

Radiotracer:
        FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
        FDG: **30 min**;   AV-45: **50 min**

Transmission scan:
        FDG and AV-45: **Five or six min 2-D scan** acquired immediately **post**-emission scan; process with **segmentation**.

Acquisition Protocol: **Brain Protocol**

Scans and scan duration:
        FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Reconstruction Parameters: FDG and AV-45**:**

Reconstruction Method: **Iterative: LOR 3D Ramla** (*** Note: if only older software versions are available, 3D Ramla reconstruction is acceptable)

Grid: **128 × 128**

FOV: **256 mm** (results in voxel size of 2.0 mm)

Slice Thickness: **2.0 mm**

Smoothing: Set SMOOTH parameter to '**SHARP**'

All other parameters should be set to defaults for the "**Brain**" protocol

All corrections '**On**'

For LOR 3D Ramla reconstruction: The attenuation field should indicate "CT-SEG" and the scatter field should indication "SS-Simul"

For 3D Ramla reconstruction: Attenuation and scatter fields should indicate "NonUni-BGSub"

> Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Philips Allegro

Acquisition Parameters:

Radiotracer:
        <u>FDG</u>: **4.5 – 5.5 mCi**;   <u>AV-45</u>: **8.0-10.0 mCi**

Scan start time post-injection:
        <u>FDG</u>: **30 min**;   <u>AV-45</u>: **50 min**

Transmission scan:
        FDG and AV-45: 5 min 2-D scan <u>post</u>-emission scan. Process with segmentation and re-projection

Scans and scan duration:
        <u>FDG</u>: **30 min, six × 5-min** frames;   <u>AV-45</u>: **20 min, four × 5-min** frames
        (this will be the human FDG acquisition protocol).

Reconstruction Parameters: FDG and AV-45:

Reconstruction Method: 3D-Ramla standard brain recon parameters **<u>except lambda = 0.016</u>**.

Grid: **128 × 128** (2 mm voxels is fine)

Attenuation and scatter fields should indicate "NonUni-BGSub"

> Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens ECAT Exact HR+ (BGO) 63-slice scanners

Acquisition Parameters:

Radiotracer:
  FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
  FDG: **30 min**;   AV-45: **50 min**

Acquisition mode:
  3-D

Scan duration and framing:
  FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Transmission scan:
  FDG and AV-45: **Five or six min 2-D scan** acquired immediately **post**-emission scan; process with **segmentation**.

Reconstruction Parameters, FDG and AV-45:

Method: **Iterative:** (FORE / OSEM-2D)
               4 iterations; 16 subsets

Grid: **128 × 128**

Brain Mode: **ON**

Zoom: **2.0**

Smoothing
  Filter: **NONE** (software version 7.2 says **'All Pass (Ramp)'**)
  Axial filtering: **NONE** (software version 7.2 says **'Off'**)

All corrections '**On**'

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens HRRT 207-slice scanners

Acquisition Parameters:

Radiotracer:
      FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
      FDG: **30 min**;   AV-45: **50 min**

Acquisition mode:
      3-D

Scan duration and framing:
      FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Transmission scan:
      FDG and AV-45: **Five or six min scan** acquired immediately **post**-emission scan;.

Reconstruction Parameters, FDG and AV-45:

Method: **Iterative:** (OSEM-3D)
                    6 iterations; 16 subsets

Grid: **256 × 256 × 207**

Voxel size: **1.219 mm^3**

Smoothing
   Filter: FDG: **2mm** Gaussian**;**   AV-45: **2mm** Gaussian

All corrections '**On**'

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens BioGraph <u>mCT</u> - 81 or 109 (TrueV) slice PET/CT scanners

Acquisition Parameters:

Radiotracer:
       <u>FDG</u>: **4.5 – 5.5 mCi**;   <u>AV-45</u>: **8.0-10.0 mCi**

Scan start time post-injection:
       <u>FDG</u>: **30 min**;   <u>AV-45</u>: **50 min**

CT scan:
       FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition <u>promptly</u> at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
    LIST-MODE: If your scanner <u>has</u> list-mode capability:
       <u>FDG</u>: **30 min, six × 5-min** frames;   <u>AV-45</u>: **20 min, four × 5-min** frames

    NO LIST-MODE: If your scanner does <u>not</u> have list-mode capability:
       <u>FDG</u>: **Two scans: 15-min each**;   <u>AV-45</u>: **Two scans: 10-min each**
       *** Note that reduce motion artifacts, two separate emission scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (AV-45) min. Do not repeat CT scan.

Reconstruction Parameters, FDG and AV-45**:**

Method: **Iterative: OSEM-3D**
                    4 iterations; 12 subsets

Grid: **400 × 400**

Zoom: **2.0** (results in voxel size of ~1.018 mm)

Smoothing
   Filter: **NONE** (or '0.0')

Match CT: '**Off' or 'No'** (results in PET slice thickness of ~2.027 mm)

All corrections '**On**'

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens BioGraph <u>TruePoint</u> - 81 or 109 (TrueV) slice PET/CT scanners
(Model 1093)

<u>Acquisition Parameters:</u>

Radiotracer:
        <u>FDG</u>: **4.5 – 5.5 mCi**;   <u>AV-45</u>: **8.0-10.0 mCi**

Scan start time post-injection:
        <u>FDG</u>: **30 min**;   <u>AV-45</u>: **50 min**

CT scan:
        FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition <u>promptly</u> at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
    LIST-MODE: If your scanner <u>has</u> list-mode capability:
        <u>FDG</u>: **30 min, six × 5-min** frames;   <u>AV-45</u>: **20 min, four × 5-min** frames

    NO LIST-MODE: If your scanner does <u>not</u> have list-mode capability:
        <u>FDG</u>: **Two scans: 15-min each**;   <u>AV-45</u>: **Two scans: 10-min each**
        *** Note that reduce motion artifacts, two separate emission scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (AV-45) min. Do not repeat CT scan.

<u>Reconstruction Parameters</u>, FDG and AV-45**:**

Method: **Iterative: FORE / OSEM-2D**
                     4 iterations; 14 subsets   (or **16** subsets if 14 is not an option with your software)

Grid: **336 × 336**
                   Note: if the software version you are running still allows "**TRIM**" to be set, then reconstruction can be down into a **168 × 168** matrix with TRIM '**ON**'

Zoom: **2.0** (results in voxel size of ~1.015 mm; or ~2.03 mm for the 168 × 168 grid)

Smoothing
  Filter: **NONE** (or '0.0')

Match CT: '**Off' or 'No'** (results in PET slice thickness of ~2.027 mm)

All corrections '**On**'

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens BioGraph <u>HiRes</u> - 81 slice PET/CT scanners (Model 1080)

<u>Acquisition Parameters</u>:

Radiotracer:
        <u>FDG</u>: **4.5 – 5.5 mCi**;   <u>AV-45</u>: **8.0-10.0 mCi**

Scan start time post-injection:
        <u>FDG</u>: **30 min**;   <u>AV-45</u>: **50 min**

CT scan:
        FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition <u>promptly</u> at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
      LIST-MODE: If your scanner <u>has</u> list-mode capability:
        <u>FDG</u>: **30 min, six × 5-min** frames;   <u>AV-45</u>: **20 min, four × 5-min** frames

      NO LIST-MODE: If your scanner does <u>not</u> have list-mode capability:
        <u>FDG</u>: **Two scans: 15-min each**;   <u>AV-45</u>: **Two scans: 10-min each**
        *** Note that reduce motion artifacts, two separate emission scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (AV-45) min. Do not repeat CT scan.

Reconstruction Parameters, FDG and AV-45**:**

Method: **Iterative: FORE / OSEM-2D**
                  4 iterations; 14 subsets   (or **16** subsets if 14 is not an option with your software)

Grid: **168 × 168**

TRIM: **'On'**

Zoom: **2.0** (results in voxel size of ~2.031 mm)

Smoothing
  Filter: **NONE** (or '0.0')

Match CT Slice location: '**Off' or 'No'** (results in PET slice thickness of ~2.000 mm)

All corrections '**On**'

> Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens BioGraph (LSO) <u>47-slice</u> PET/CT scanners
(also sold as **CTI Reveal**)

<u>Acquisition Parameters</u>:

Radiotracer:
<u>FDG</u>: **4.5 – 5.5 mCi**;   <u>AV-45</u>: **8.0-10.0 mCi**

Scan start time post-injection:
<u>FDG</u>: **30 min**;   <u>AV-45</u>: **50 min**

CT scan:
FDG and AV-45: Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition <u>promptly</u> at 30 (FDG) or 50 (AV-45) min.

Scans and scan duration:
<u>FDG</u>: **Two scans: 15-min each**;   <u>AV-45</u>: **Two scans: 10-min each**
*** Note that reduce motion artifacts, two separate emission scans will be acquired as closely together as possible. The first is to be started at 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 (see below) prior to scanning

<u>Reconstruction Parameters</u>, FDG and AV-45**:**

Method: **Iterative:** (FORE / OSEM-2D)
6 iterations; 16 subsets (or **14** subsets if 16 is not an option)

Grid: **128 × 128**

TRIM: **ON**

Zoom: **2.0**

Smoothing
Filter: **NONE** (or '0.0')

All corrections '**On**'

If your scanner software version has on option for "**Match CT Slice location**", this must be left '**OFF**' (e.g. box is <u>un</u>checked)

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Siemens ECAT Exact (BGO) and Accel (LSO) 47-slice scanners

Acquisition Parameters:

Radiotracer:
        FDG: **4.5 – 5.5 mCi**;   AV-45: **8.0-10.0 mCi**

Scan start time post-injection:
        FDG: **30 min**;   AV-45: **50 min**

Acquisition mode:
        3-D

Scan duration and framing:
        FDG: **30 min, six × 5-min** frames;   AV-45: **20 min, four × 5-min** frames

Transmission scan:
        FDG and AV-45: **Five or six min 2-D scan** acquired immediately **post**-emission scan; process with **segmentation**.

Reconstruction Parameters, FDG and AV-45**:**

Method: **Iterative:** (FORE / OSEM-2D)
                        6 iterations; 16 subsets

Grid: **128 × 128**

Brain Mode: **ON**

Zoom: **2.0**

Smoothing
    Filter: **NONE** (software version 7.2 says **'All Pass (Ramp)'**)
    Axial filtering: **NONE** (software version 7.2 says **'Off'**)

All corrections '**On**'

Questions: e-mail Robert Koeppe (koeppe@umich.edu)

Appendix C – Example PET Scan Information Sheets

FDG-Pet Scan Information — Page 1 of 5

Version 1

Alzheimer's Disease Cooperative Study

ADCS

ADNI PARTICIPANT NUMBER [ ][ ][ ]–S–[ ][ ][ ]   EXAMINER INITIALS [ ][ ][ ]   EXAMINATION DATE [ ][ ] [ ][ ] [ ][ ] MONTH DAY YEAR

To be completed by Study Coordinator:
Study Coordinator Name: _____
Telephone #: _____
ADNI Participant Initials: [ ][ ][ ]

Scheduled Date: [ ][ ] [ ][ ] [ ][ ] MONTH DAY YEAR

Instructions: FDG Pet Scan is to be performed only every two years.

Date of previous FDG Pet Scan: [ ][ ] [ ][ ] [ ][ ] Month Day Year
☐ N/A Participant has not had previous FDG Scan under ADNI or ADNI GO

Was Scan Conducted? ☐ Yes ☐ No
Reason why the scan was not conducted:
☐ Illness
☐ Participant unavailable
☐ Participant unwilling
☐ Software/scanner error
☐ Administrative problems
☐ Withdrawn consent
☐ Not called for by the protocol
☐ Other (specify) _____
If no, was radiotracer administered? ☐ Yes ☐ No

Scan Date: [ ][ ] [ ][ ] [ ][ ] Month Day Year   **Technologist Initials:** [ ][ ][ ]

Select one of the following scanner vendors and models:
☐ GE:
  ☐ Advance
  ☐ Discovery LS
  ☐ Discovery ST
  ☐ Discovery RX
  ☐ Discovery STE/VCT
☐ Siemens:
  ☐ ACCEL/EXACT
  ☐ Biograph (Model 1023/1024)
  ☐ Biograph HiRes (Model 1080)
  ☐ BioGraph TruePoint (Model 1093/1094)
  ☐ BioGraph mCT
  ☐ HR+
  ☐ HRRT
☐ Phillips:
  ☐ Allegro
  ☐ Gemini
  ☐ Gemini - GXL
  ☐ Gemini - TF

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ADNI PARTICIPANT NUMBER [ ][ ][ ]–S–[ ][ ][ ]

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: < 180 mg/dL*)
[ ] **mg/dL**

Time of FDG dose assay (*Enter '00' for seconds portion of the time if seconds are unavailable.*)
[ ][ ] : [ ][ ] : [ ][ ] **HH:MM:SS**

FDG dose assay [*Corrected for Residual Activity (Proper dose is 4.5 – 5.5 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:
_____
_____
_____
_____

Emission Scan Start Time: *Enter '00' for seconds portion of the time if seconds are unavailable.*
[ ][ ] : [ ][ ] : [ ][ ] **HH:MM:SS**

Target start time is 30 min FDG post-injection. Provide an explanation if start time is not between **28** and **32** min post-injection.
_____ 108
_____
_____
_____

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FDG-Pet Scan Information — Page 3 of 5

Version 1

Alzheimer's Disease Cooperative Study

ADCS

ADNI PARTICIPANT NUMBER [ ][ ][ ]–S–[ ][ ][ ]

SECTION II. SCAN PROTOCOL INFORMATION
Any variations from protocol during FDG uptake?
☐ Yes
☐ No
If Yes, describe: _____
Predefined Acquisition Protocol ID: _____

Which framing rate was used?
☐ 6 frames, 5 min/frame (6x300s)
☐ 2 scans, 15 min each (2 x 900s) (only for BioGraph scanners without list-mode)
☐ 1 frame, 30 min (1x1800s) (only for the oldest BioGraph scanners; Models 1023 or 1024)
If any deviations, describe: _____

Subject motion problems:
☐ Yes
☐ No
If Yes, describe: _____

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)
☐ OSEM3D (Siemens) (If HRRT scanners using OP, please select OSEM3D)
☐ 3D Iterative (GE)
☐ FORE/Iterative (GE)
☐ 3D - Ramla (Philips)
☐ 3D Back-projection (GE)

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ADNI PARTICIPANT NUMBER [ ][ ][ ]–S–[ ][ ][ ]

If FORE/2D-OSEM, OSEM3D, or 3D Iterative:
Subsets:
  ☐ 14
  ☐ 16
  ☐ 20
  ☐ 21
  ☐ Other
  If Other, specify: _____

Iterations:
  ☐ 4
  ☐ 6
  ☐ Other
  If Other, specify: _____

If 3D Ramla, please complete either:
Lambda = _____ (relaxation parameter)
OR
Was "Smooth" parameter set to "Sharp"?
  ☐ Check here to confirm

If 3D Back-Projection, Ramp filter?
  ☐ Check here to confirm

If FORE/2D-OSEM select one of the following
  ☐ Brain mode "ON" for PET-only Siemens scanners
  ☐ TRIM "ON" for PET/CT Siemens scanners (older software versions)
  ☐ TRIM not available for PET/CT Siemens scanners (new software versions)
  If TRIM not available, must reconstruct with a zoom of 2.0 into a 336x366 grid for BioGraph TruePoint or 400x400 grid for BioGraph mCT

No post-process smoothing:
  ☐ Check here to confirm

Attenuation Correction:
  ☐ CT
  ☐ Ge - 68 + Segmentation
  ☐ Cs - 137 + Segmentation

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FDG-Pet Scan Information
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ADNI PARTICIPANT NUMBER
☐☐☐☐ S ☐☐☐☐

SECTION IV. DATA TRANSFER AND ARCHIVE:

Was data transferred to LONI within 24 hours of scan?

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

☐ Yes
☐ No

Transfer Date: ☐☐ ☐☐ ☐☐☐☐
　　　　　　Month　Day　Year

Comments: _____
_____
_____
_____
_____

Was all raw PET data archived locally to be able to do complete reconstruction of PET Scan if needed?

If No, please explain under comments

☐ Yes
☐ No

Archive Medium: _____

Comments: _____
_____
_____
_____
_____

SECTION V. LUMBAR PUNCTURE DATA:

Was a Lumbar Puncture completed prior to the PET scan?
☐ Yes
☐ No

If Yes, what was the interval between LP and PET?
☐ Less than 6 hours
☐ 6-12 hours
☐ 13-24 hours　　　　　　111
☐ 25-48 hours
☐ 49-72 hours
☐ More than 72 hours

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AV-45 Pet Scan Information
Page 1 of 5

ADNI PARTICIPANT NUMBER　　EXAMINER INITIALS　　EXAMINATION DATE
☐☐☐☐ S ☐☐☐☐　　☐☐☐　　☐☐ ☐☐ ☐☐☐☐
　　　　　　　　　　　　　　　　　　　　MONTH　DAY　YEAR

To be completed by Study Coordinator:

Study Coordinator Name: _____　Scheduled Date:

Telephone #: _____　☐☐ ☐☐ ☐☐☐☐
　　　　　　　　　　　　　　　　MONTH　DAY　YEAR

ADNI Participant Initials: ☐☐☐

Instructions: AV-45 Pet Scan is to be performed only every two years.

Date of previous AV-45 Pet Scan: ☐☐ ☐☐ ☐☐☐☐　☐ N/A Participant has not had previous
　　　　　　　　　　　　　MONTH　DAY　YEAR　　　AV-45 Scan under ADNI or ADNI GO

Was scan conducted?　☐ Yes　☐ No
　　Reason why the scan was not conducted:
　　☐ Illness
　　☐ Participant unavailable
　　☐ Participant unwilling
　　☐ Administrative problems
　　☐ Software/scanner error
　　☐ Withdrawn consent
　　☐ Not called for by the protocol
　　☐ Other (specify) _____
　　If no, was radiotracer administered?　☐ Yes ☐ No

Scan Date: ☐☐ ☐☐ ☐☐☐☐　　**Technologist Initials** ☐☐☐
　　　　　MONTH　DAY　YEAR

Select one of the following scanner vendors and models:
☐ GE:　　☐ Advance
　　　　　☐ Discovery LS
　　　　　☐ Discovery ST
　　　　　☐ Discovery RX
　　　　　☐ Discovery STE/CT
☐ Siemens:　☐ ACCEL/EXACT
　　　　　☐ Biograph (Model 1023/1024)
　　　　　☐ Biograph HiRes (Model 1080)
　　　　　☐ BioGraph TruePoint (Model 1093/1094)
　　　　　☐ BioGraph mCT
　　　　　☐ HR+
　　　　　☐ HRRT
☐ Phillips:　☐ Allegro
　　　　　☐ Gemini
　　　　　☐ Gemini - GXL
　　　　　☐ Gemini - TF

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AV-45 Pet Scan Information
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ADNI PARTICIPANT NUMBER
☐☐☐☐ S ☐☐☐☐

Time of today's Scanner QC (*Enter '00' for seconds portion of the time if seconds are unavailable.*)

☐☐ : ☐☐ : ☐☐　**HH:MM:SS**

Time of AV-45 dose assay (*Enter '00' for seconds portion of the time if seconds are unavailable.*)

☐☐ : ☐☐ : ☐☐　**HH:MM:SS**

AV-45 dose assay [*Corrected for Residual Activity (Proper dose is 8 - 10 mCi)*]

☐☐☐　**mCi**

AV-45 Volume

☐☐☐　**mL**

Time of AV-45 injection (*Enter '00' for seconds portion of the time if seconds are unavailable.*)

☐☐ : ☐☐ : ☐☐　**HH:MM:SS**

Emission Scan Start Time: *Enter '00' for seconds portion of the time if seconds are unavailable.*

☐☐ : ☐☐ : ☐☐　**HH:MM:SS**

Target start time is 50 min AV-45 post-injection. Provide an explanation if start time is not between **48** and **52** min post-injection.

_____
_____
_____
_____

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AV-45 Pet Scan Information
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ADNI PARTICIPANT NUMBER
☐☐☐☐ S ☐☐☐☐

SECTION II.　SCAN PROTOCOL INFORMATION

Any variations from protocol during AV-45 uptake?
☐ Yes
☐ No
If Yes, describe: _____

Predefined Acquisition Protocol ID: _____
Which framing rate was used?
☐ 4 frames, 5 min/frame (4 x 300s)
☐ 2 scans, 10 min each (2 x 600s) (only for BioGraph scanners without list-mode)
☐ 1 frame, 20 min (1x1200s) (Only for the oldest BioGraph scanners, Models 1023 or 1024)
If any deviations, describe: _____

Subject motion problems:
☐ Yes
☐ No
If Yes, describe: _____

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)
☐ OSEM3D (Siemens) (If HRRT scanners using OP, please select OSEM3D)
☐ 3D Iterative (GE)
☐ FORE/Iterative (GE)
☐ 3D - Ramla (Philips)　　　114
☐ 3D Back-projection (GE)

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AV-45 Pet Scan Information
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ADNI PARTICIPANT NUMBER
☐ ☐ ☐ — S — ☐ ☐ ☐ ☐

If FORE/2D-OSEM, OSEM3D, or 3D Iterative:
 # Subsets:
  ☐ 14
  ☐ 16
  ☐ 20
  ☐ 21
  ☐ Other
  If Other, specify: _____

 # Iterations:
  ☐ 4
  ☐ 6
  ☐ Other
  If Other, specify: _____

If 3D Ramla, please complete either:
 Lambda = _____ (relaxation parameter)
 OR
 Was "Smooth" parameter set to "Sharp"?
  ☐ Check here to confirm

If 3D Back-Projection, Ramp filter?
 ☐ Check here to confirm

If FORE/2D- OSEM select one of the following
 ☐ Brain mode "ON" for PET-only Siemens scanners
 ☐ TRIM "ON" for PET/CT Siemens scanners (older software versions)
 ☐ TRIM not available for PET/CT Siemens scanners (new software versions)
   If TRIM not available, must reconstruct with a zoom of 2.0 into a 336x366 grid for BioGraph TruePoint
   or 400x400 grid for BioGraph mCT

No post-process smoothing:
 ☐ Check here to confirm

Attenuation Correction:
 ☐ CT
 ☐ Ge - 68 + Segmentation   115
 ☐ Cs - 137 + Segmentation

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ADCS

AV-45 Pet Scan Information
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ADNI PARTICIPANT NUMBER
☐ ☐ ☐ — S — ☐ ☐ ☐ ☐

SECTION IV. DATA TRANSFER AND ARCHIVE:
Was data transferred to LONI within 24 hours of scan?
Data must be transmitted to LONI within 24 hours of the PET scan. If your site is unable to complete the transfer with 24 hours please indicate the problem in the "Comments" section below.
 ☐ Yes
 ☐ No

Transfer Date: ☐ ☐ ☐ ☐ ☐ ☐
            Month   Day   Year
Comments:
_____
_____
_____
_____

Was all raw PET data archived locally to be able to do complete reconstruction of PET Scan if needed?
 If No, please explain under comments
  ☐ Yes
  ☐ No
Archive Medium: _____
Comments:
_____
_____
_____
_____

SECTION V. LUMBAR PUNCTURE DATA:
Was a Lumbar Puncture completed prior to the AV-45 scan?
 ☐ Yes
 ☐ No
If Yes, what was the interval between LP and AV-45?
 ☐ Less than 6 hours
 ☐ 6-12 hours
 ☐ 13-24 hours   116
 ☐ 25-48 hours
 ☐ 49-72 hours
 ☐ More than 72 hours

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AV-45 Pre and Post Injection Vitals Form

ADNI PARTICIPANT NUMBER   EXAMINER INITIALS   EXAMINATION DATE
☐ ☐ ☐ — S — ☐ ☐ ☐ ☐   ☐ ☐ ☐   ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
                                                      MONTH   DAY   YEAR

Was scan conducted?
 ☐ Yes
 ☐ No
AV-45 Scan date ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
              MONTH   DAY   YEAR

PRE-INJECTION VITALS: Vital signs will be taken in a supine position immediately prior to administration of AV-45 (within 5 minutes prior to injection).

Heart Rate: ☐ ☐ ☐ (bpm)

Respiration: ☐ ☐ ☐ (per min)

Blood Pressure: ☐ ☐ ☐ / ☐ ☐ ☐ (systolic/diastolic)

Temperature: ☐ ☐ ☐ . ☐
Temperature Source: ☐ Oral ☐ Tympanic ☐ Other
 Units: ☐ Farenheit
        ☐ Celsius

POST-INJECTION VITALS: At the end of the imaging session prior to discharge (approximately 70 minutes after AV-45 administration).

Heart Rate: ☐ ☐ ☐ (bpm)

Respiration: ☐ ☐ ☐ (per min)

Blood Pressure: ☐ ☐ ☐ / ☐ ☐ ☐ (systolic/diastolic)

Temperature: ☐ ☐ ☐ . ☐
Temperature Source: ☐ Oral ☐ Tympanic ☐ Other
 Units: ☐ Farenheit
        ☐ Celsius

_____   _____
Name/Signature of person filling out form   Date

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AV-45 24-48 Hour Follow-Up

ADNI PARTICIPANT NUMBER   EXAMINER INITIALS   EXAMINATION DATE
☐ ☐ ☐ — S — ☐ ☐ ☐ ☐   ☐ ☐ ☐   ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
                                                      MONTH   DAY   YEAR

Was 24-48 hours post imaging follow-up telephone contact made?
 ☐ Yes
 ☐ No
 ☐ N/A - No AV-45 scan conducted
  If No, please comment:
  _____
  _____
  _____

If Yes, document below:
Initials of staff who conducted telephone contact:

☐ ☐ ☐

Date of telephone contact:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
MONTH   DAY   YEAR
Time of telephone contact:

☐ ☐ : ☐ ☐   HH : MM

Person who was contacted:
 ☐ Participant
 ☐ Study Partner

Were any Adverse Events reported?
 ☐ Yes
 ☐ No
 If any **Adverse Events** are reported, complete the AE eCRF page.

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