

## ADNI MRI Imaging Protocol Questions & Answers

This page lists several expected questions about the ADNI MRI imaging protocol and their answers.

**Q: What happens if we upgrade the MRI scanner being used in the ADNI study?**

A: You *must* inform the ADNI MRI Team at Mayo ([ADNIMRI@Mayo.edu](mailto:ADNIMRI@Mayo.edu)) as soon as you learn about the anticipated upgrade. Because this is a longitudinal study, upgrades might impact the overall consistency of the data. Therefore, any changes that can be caused by an MRI equipment upgrade must be carefully evaluated. Consequently, it is likely that you will be asked to perform a number of test studies including a phantom and (or) a volunteer prior to the upgrade. Similarly, after the upgrade, your site might be asked to scan a phantom and (or) a volunteer prior to continuation of patient scanning. In general, you will also need to get a different electronic protocol from your vendor. You might also need to get a new version of the pulse sequence as well.

**Q: Which vendor's scanners are supported?**

A: Scanners from General Electric (GE) Healthcare, Philips Medical Systems, and Siemens Medical Solutions are supported.

**Q: Are all of the scanner platforms from these three vendors supported?**

A: No. Most of the scanner recent models from these three vendors are supported, but some older models cannot be used for the ADNI study. For example, the Siemens Vision scanners, GE scanners running software revision 8.x or earlier, and revision 10.x are not supported.

**Q: What if we have a question that is specific to one particular vendor?**

A: The ADNI has set up an electronic bulletin board. Each of the vendors has its own dedicated forum on that bulletin board. To access a forum, click the "Billboard" link on the ADNI home page [www.loni.ucla.edu/ADNI](http://www.loni.ucla.edu/ADNI), then "MRI Core", and then choose the appropriate vendor.

**Q: What field strengths are supported by the ADNI study?**

A: 1.5 Tesla (i.e., 1.5T) and 3.0T.

**Q: Our site is participating in the ADNI study. Should we download the appropriate .pdf documentation file, and then manually enter the protocol into our scanner?**

A: No! Your site will receive an electronic protocol from the appropriate vendor. (In many cases your site will have to complete the appropriate paperwork with that vendor first.) It is very important that you use the electronically-loaded protocol, rather than trying to manually enter the parameters, because it is easy to mistype a value, which would invalidate the ADNI data collected at your site.

**Q: What series comprise the protocol for the patient scanning?**

A: The ADNI imaging protocol series consists of:

- 1) 3-plane localizer
- 2) Sagittal 3D MP-RAGE
- 3) Sagittal 3D MP-RAGE-repeat
- 4) Sagittal B1-calibration scan (phased array)
- 5) Sagittal B1- calibration scan (body coil)
- 6) Axial PD/T2 dual echo FSE/TSE

**Q: Can our site add sequences of local interest to the ADNI MRI imaging protocol?**

A: Absolutely not. This practice is strictly forbidden to minimize the burden on the subjects.

**Q: What if the subject cannot tolerate all the MRI imaging series?**

A: Because all the imaging series (not including phantom scanning) typically can be acquired in 30 minutes or less, this should be a rare event. But if a subject cannot complete all of the imaging series, then that exam will be classified as an exam failure, and the subject will need to be re-scanned.

**Q: Can we sedate the subject for the MRI exam?**

A: No.

**Q: When is the phantom scanning performed?**

A: The phantom scanning is first performed when you are enrolled in the study to qualify your site. Phantom scanning is also performed immediately after each patient exam. Consult the ADNI Multi-Site Scanning Manual for more details about the phantom scanning.

**Q: Suppose we have two ADNI patient studies on the same day. Do we need to acquire two sets of phantom scans on that day?**

A: Yes.

**Q: The imaging protocol that we received from the vendor for my specific scanner does not include the sagittal B1-calibration scans (series 4 and 5 listed above). Why?**

A: The B1-calibration scans are omitted if your system uses a single-channel birdcage coil or the B1-calibration is automatically performed by your system.

**Q: The MRI scanner that we used for site qualification is down. Can we use a different scanner to image an ADNI patient?**

A: No. The same MRI scanner that was used for site qualification must be used to scan the patient. This is true even if the two scanners in question are from the same vendor and are exactly same model, running the same software.

**Q: Can we switch to a different head coil during the ADNI study?**

A: No. Sites must use the same head coil throughout. If an issue arises, for example, related to an upgrade or coil malfunction, contact the ADNI MRI Team at Mayo ([ADNIMRI@Mayo.edu](mailto:ADNIMRI@Mayo.edu)).

**Q: Why is the sagittal MP-RAGE scan run twice?**

A: The sagittal MP-RAGE is run twice (series 2 and 3) for several reasons. Often, patients move to varying degrees during MRI acquisitions, so that either the first or second MP-RAGE acquisition will be of superior quality. In that case, the ADNI Image Analysis Team will use the better of the two, thereby reducing the need to call the patient back for a re-scan. Second, having two identical image sets gives the ADNI analysis team an internal consistency check of the data from your site. Finally, in some cases, it is possible to retrospectively average the two data sets to improve the signal-to-noise ratio.

**Q: We have an older scanner that does not have the 3-plane graphic prescription feature. What type of localizer should we use?**

A: If your scanner does not have a 3-plane graphic prescription capability, use an axial localizer image instead.

**Q: Why are there slight differences among the various protocols, even at a single field strength, like 1.5T?**

A: There are differences in the step size that the various commercial scanners provide for MRI image parameters such as receiver bandwidth or field of view. Another reason is the differences among RF head coils. For example, single-channel birdcage head coils generally produce noisier images than phased-array head coils with 8 or more channels. Some of the systems supported in the ADNI study only have access to single-channel head coils, so consequently, the imaging protocol has been adjusted to compensate for their lower signal-to-noise ratio.

**Q: Our site is participating in the ADNI study. We believe we can get better results by tailoring an imaging parameter such as field of view to the specific patient. May we do this?**

A: No! Any such change could invalidate the MRI image data from your site.

**Q: Why isn't parallel imaging such as SENSE or ASSET used to reduce the acquisition time of the 3D exam?**

A: Parallel imaging requires a phased array coil. Phased array head coils are not available for all of the imaging platforms that are supported. Also, we observed artifacts on several image examples provided by sites and vendors that were acquired with parallel imaging. Although these artifacts are intermittent, often subtle, and typically can be “read through” by an experienced Radiologist, they can confuse the automated image analysis programs used in ADNI analysis. Consequently, parallel imaging such as SENSE is not used in the ADNI MRI imaging protocol.

**Q: Do we need a work-in-progress (WIPs) (also called a “research” or “custom” pulse sequence) to run the ADNI protocol?**

A: The answer depends on the vendor, and might also change over time. As of June 2005, GE Healthcare and Siemens Medical Solutions are supplying a WIPs pulse sequence to participants in the ADNI study who are using their respective scanners.

**Q: Why are the acquisition times for the 3.0T MP-RAGE scans longer than their some of their 1.5T counterparts?**

A: The MRI Core group of the ADNI felt that one of the main potential advantages of 3.0T over 1.5T is the ability to use 3.0T's increased signal-to-noise ratio to improve the spatial resolution. This is reflected in the protocols, where the acquired voxel size (i.e., not including any zero-filling interpolation done during image reconstruction) at 1.5T is 1.25mm x 1.25mm x 1.20mm. At 3.0T the voxel size is 1.0mm x 1.0mm x 1.20mm, which represents about a 36% reduction in voxel volume. To retain coverage, the improved spatial resolution at 3.0T often requires increased acquisition time.