SCAN PET Data Quick Start Guide:
Working with SCAN Prospective and Mixed Protocol Data

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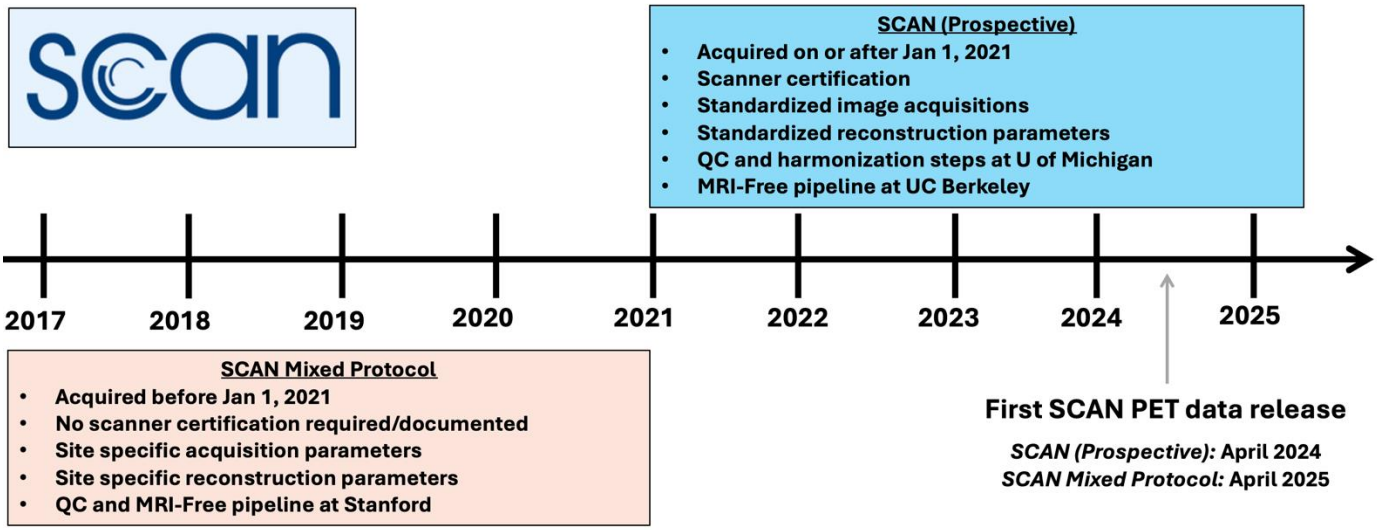
This guide is for approved users of *SCAN PET numerical/quantitative data* and is intended to help them understand the different files provided by the National Alzheimer's Coordinating Center (NACC). *SCAN PET images* are available at the Laboratory for Neuroimaging (LONI) and can be requested separately via NACC. Separate documentation is available for SCAN PET images.

Overview

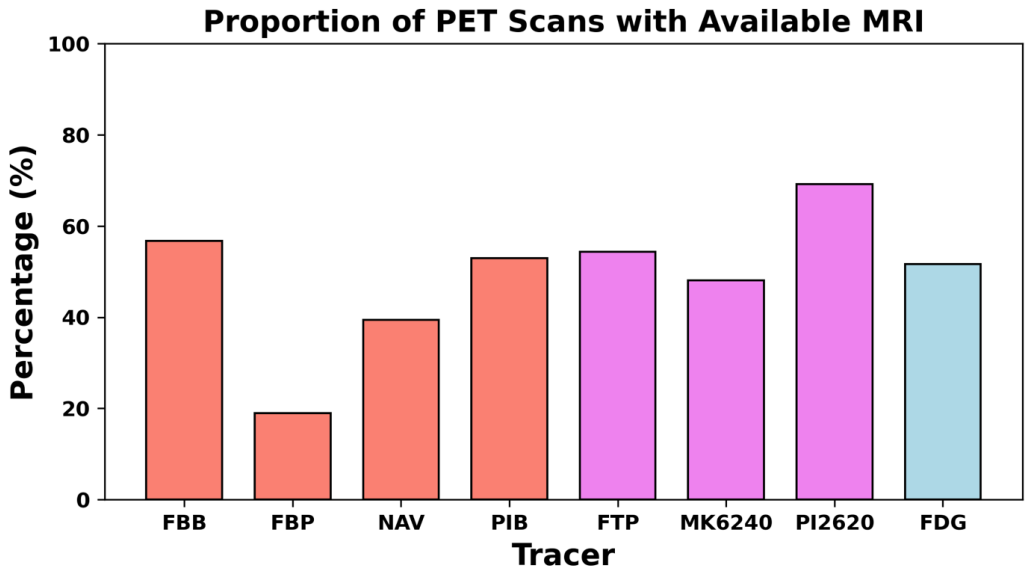
Most SCAN PET data, including amyloid tracers, tau tracers and FDG, are analyzed as part of the SCAN (Prospective) study. For amyloid tracers, there is a second category of PET data that have been analyzed by the SCAN initiative and are currently available at NACC: SCAN Mixed Protocol PET (**Figure 1**). Future releases of SCAN Mixed Protocol PET data will include tau PET data.

Figure 1:



SCAN (Prospective) data collection across Alzheimer's Disease Research Centers (ADRCs) began January 1, 2021, and requires specific protocols for PET acquisition and data reconstruction. SCAN (Prospective) PET data are QC-ed at the University of Michigan and analyzed at UC Berkeley following nearly identical workflows as ADNI. Unlike ADNI, many SCAN (Prospective) PET scans do not have a corresponding MRI from the same individual. As of July 2024, 51% of submitted PET scans across SCAN (Prospective) tracers have an available MRI (shown by tracer in **Figure 2**). Because of this, SCAN (Prospective) PET data are processed using an MRI-free pipeline that was validated against the gold-standard MRI-dependent pipeline used in ADNI.[1,2] SCAN (Prospective) currently accepts 5 amyloid tracers (PiB, FBB, FBP, NAV, FLUTE), 4 tau tracers (FTP, MK6240, PI2620, GTP1), and FDG PET. All SCAN (Prospective) images are defaced.

Figure 2:



SCAN Mixed Protocol PET data includes amyloid tracers (PiB, FBB, FBP). Unlike the coordinated efforts supporting SCAN (Prospective) data, SCAN Mixed Protocol PET data were predominantly collected before January 1, 2021, using site-specific protocols and therefore are not standardized. Scans collected after January 1, 2021, were also included if they were not compliant with SCAN (Prospective) protocol. Although these Mixed Protocol data are similar to the standardized acquisitions required by SCAN (Prospective), there is variability in acquisition windows, scanner qualification was not a requirement, and reconstruction parameters are also site-specific. This lack of standardization will result in greater variability in SCAN Mixed Protocol data compared to SCAN (Prospective) data. Identical MRI-free pipelines were used to process both the SCAN (Prospective) and Mixed Protocol amyloid PET data, the latter of which was processed at Stanford University. SCAN Mixed Protocol images are currently not defaced.

Table 1 is a summary of all the PET data analyzed by SCAN investigators and available in separate csv files through NACC.

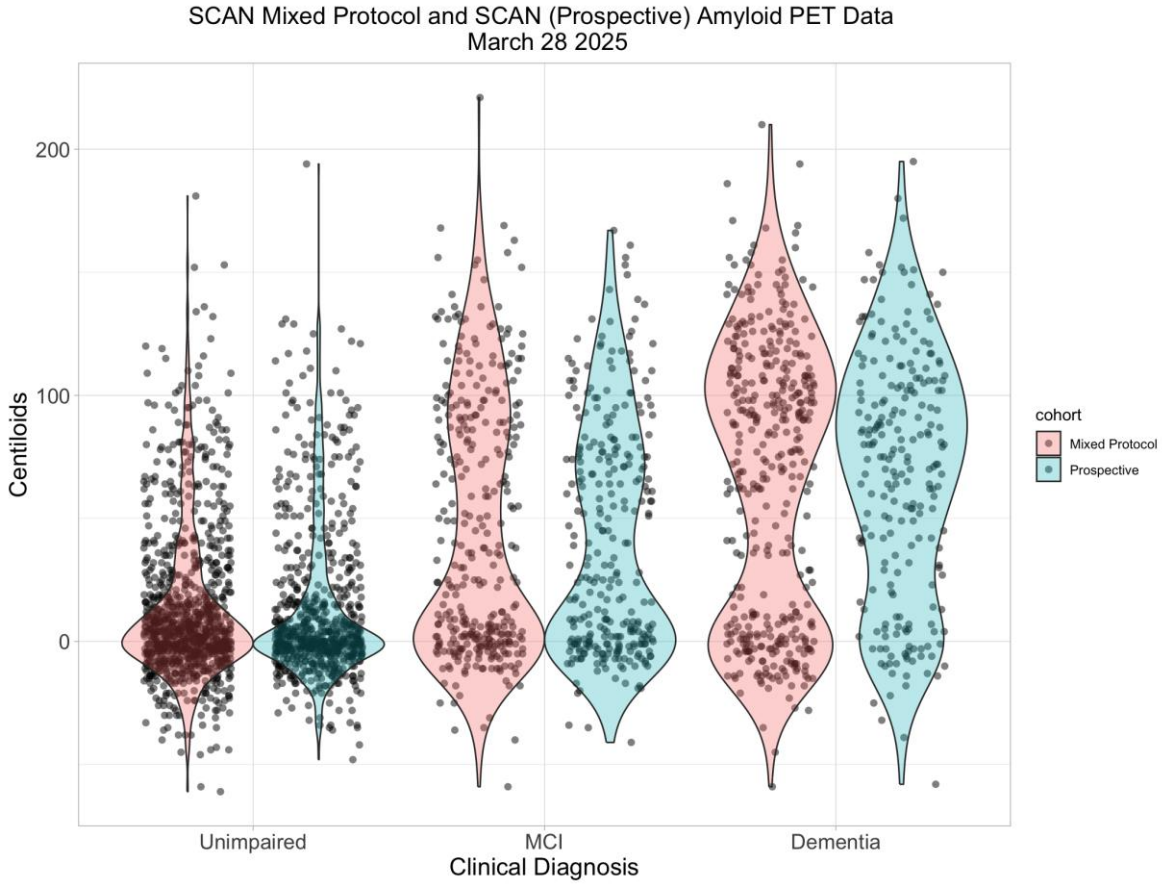
Table 1:

Modality	Datasets	Brief Description	Lab	Detailed Methods Documentation
All	investigator_scan_petqc_*	PET Quality Control *for SCAN (Prospective) Only*	U Michigan	N/A
Amyloid	investigator_scan_amyloidpetgaain_*	SCAN (Prospective) Amyloid-PET SUVRs using the GAAIN regions; processed with an MRI-free pipeline	UC Berkeley	UCBerkeley_SCAN_Amyloid_MRIfree_Methods.pdf
	investigator_scan_amyloidpetnpdka_*	SCAN (Prospective) Regional Amyloid-PET SUVRs using the NPDKA; processed with an MRI-free pipeline		
	investigator_harmonized_mp_amyloidpetgaain_*	SCAN Mixed Protocol Amyloid-PET SUVRs using the GAAIN regions; processed with an MRI-free pipeline	Stanford	SCAN_MixedProtocol_PET_Methods_Document.pdf
	investigator_harmonized_mp_amyloidpetnpdka_*	SCAN Mixed Protocol Regional Amyloid-PET SUVRs using the NPDKA; processed with an MRI-free pipeline		
Tau	investigator_scan_taupetnpdka_*	SCAN (Prospective) Regional Tau-PET SUVRs using the NPDKA; processed with an MRI-free pipeline	UC Berkeley	UCBerkeley_SCAN_Tau_MRIfree_Methods.pdf
FDG	investigator_scan_fdgpetnpdka_*	SCAN (Prospective) Regional FDG-PET SUVRs using the NPDKA and a meta-ROI; processed with an MRI-free pipeline	UC Berkeley	UCBerkeley_SCAN_FDG_Methods.pdf

Combining SCAN (Prospective) and SCAN Mixed Protocol Data

Because SCAN (Prospective) and SCAN Mixed Protocol use the same MRI-free pipeline, merging of amyloid PET data from these two efforts is possible. Although SCAN Mixed Protocol data will contain greater variability given a lack of standardization across sites, the high signal to noise associated with amyloid PET data means combining SCAN Mixed Protocol and SCAN (Prospective) data is possible. Side by side comparison of resulting centiloid values in SCAN Mixed Protocol and SCAN (Prospective) by cognitive diagnosis reveals a similar pattern (**Figure 3**). A variety of strategies could be implemented by investigators interested in combining SCAN Mixed Protocol and SCAN (Prospective) data. For instance, they may consider adjusting for SCAN Mixed Protocol versus SCAN (Prospective) and/or performing sensitivity analyses restricted to SCAN (Prospective) data only.

Figure 3:



References:

1. Landau, Susan M, Harrison, Theresa M, Baker, Suzanne L., Boswell, Martin S., Taggett, Jacinda, Ward, Tyler, Chadwick, Trevor, Murphy, Alice, DeCarli, Charles, Schwarz, Christopher G., Vemuri, Prashanthi, Jack, Cliff R., Koeppe, Robert A., Jagust, William J. PET harmonization in the Alzheimer's Disease Neuroimaging Initiative: A scalable and rigorous approach to multisite amyloid and tau quantification. Alzheimer's & Dementia. In Press;

2. Landau SM, Ward TJ, Murphy A, Iaccarino L, Harrison TM, La Joie R, Baker S, Koeppe RA, Jagust WJ, Alzheimer's Disease Neuroimaging Initiative. Quantification of amyloid beta and tau PET without a structural MRI. Alzheimers Dement. 2023 Feb;19(2):444–455. PMID: 35429219