Daniel H. Silverman, MD, PhD
Nuclear Medicine Clinic, Div. Biological Imaging
Dept. Molecular and Medical Pharmacology
University of California, Los Angeles

## Appendix I - BRAIN PET SCAN VISUAL INTERPRETATION

Examine for (and document where appropriate):

a) adequacy of the technical quality of scan acquisition, reconstruction, and display,
b) presence of any evident structural abnormality, including rating the degree of atrophy as either none, slight, mild, moderate, or severe,
c) assessment of global level of cortical metabolism, relative to the levels visually evident in basal ganglia, thalamus, and cerebellum,
d) presence of any focal cortical abnormalities (with locations specified as left or right dorsolateral prefrontal, medial prefrontal, anterior cingulate, inferior frontal, sensorimotor, superior parietal, inferior parietal, parietotemporal, superior temporal, mid-to-inferior anterior lateral temporal, mid-to-inferior posterior lateral temporal, mesial temporal, primary visual occipital, associative visual occipital, or posterior cingulate cortex),
e) presence of any focal non-cortical abnormalities, including in left or right caudate nucleus head, lentiform nucleus, thalamus, cerebellar cortex, midbrain, pons, and
f) any additional findings.

The cerebral metabolic findings noted from this systematic review of the PET should be correlated whenever possible with the structural information documented on CT or MRI, with respect to cerebrovascular disease, atrophic changes, and other structural imaging findings.
Metabolic evidence of neurodegenerative processes (e.g., Alzheimer's disease, Pick's disease, and other frontotemporal dementia, dementia with Lewy bodies, dementia of Parkinson's disease, Huntington's disease) is most strongly supported by identification of areas of regional hypometabolism unmatched by structural findings (i.e., greater than could be expected for the degree of any generalized structural atrophic changes noted, and not accounted for by cerebrovascular changes).

## Brain PET Scan CATEGORIES FOR DEMENTIA EVALUATIONS

Scans obtained in the evaluation of cognitive impairment can be classified into one of 7 main interpretive categories (**Figure 1**, adapted from Silverman et al., JAMA, 2001;
286:2120-2127) – normal (*N1*) or normal except for age-appropriate atrophic changes (*N2*); abnormal only in a non-neurodegenerative pattern (*N3*); abnormal in a neurodegenerative pattern involving posterior cortical hypometabolism consistent with presence of AD (*P1*); abnormal in a neurodegenerative pattern that includes posterior cortical hypometabolism but is nevertheless inconsistent with AD as the most likely or sole cause of cognitive impairment (*P1+*) (e.g., due to involvement of brain regions known to be preserved in AD, and/or lack of involvement of inferior parietal and posterior cingulate cortex); abnormal in a neurodegenerative pattern that is most consistent with frontotemporal dementia (*P2*), or a predominantly subcortical neurodegenerative process (*P3*).

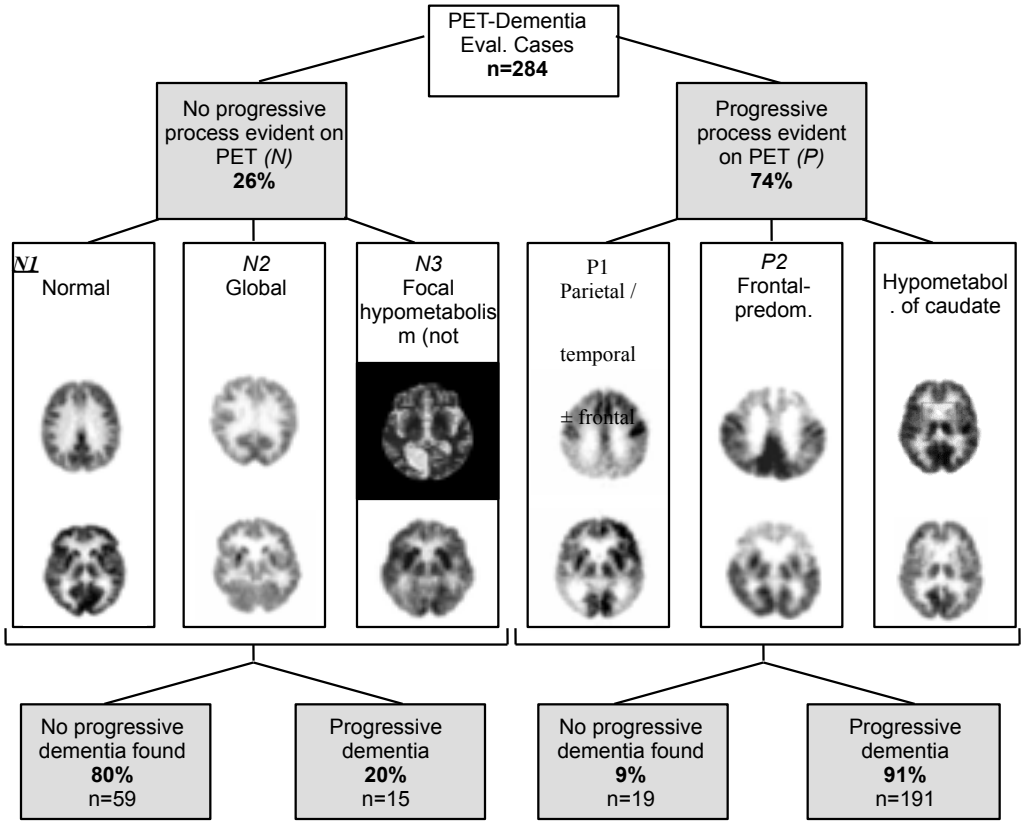


**Figure 1. PET patterns and presence of progressive disease in patients undergoing evaluation for dementia.** PET scans typical of each of six categories of cerebral metabolic patterns (designated *N1, N2, N3, P1, P2, P3*) are demonstrated. Images displaying *N1, P1,* and *P3* patterns were acquired with a Siemens ECAT EXACT HR+ scanner; those displaying *N2, N3,* and *P2* patterns were acquired with a Siemens ECAT 931 scanner. Image set in black background was acquired using a GE Signa 1.5 T MRI scanner, TR=2100, TE=80. H, diagnosis established by histopathologic examination. L, outcome established by longitudinal monitoring.