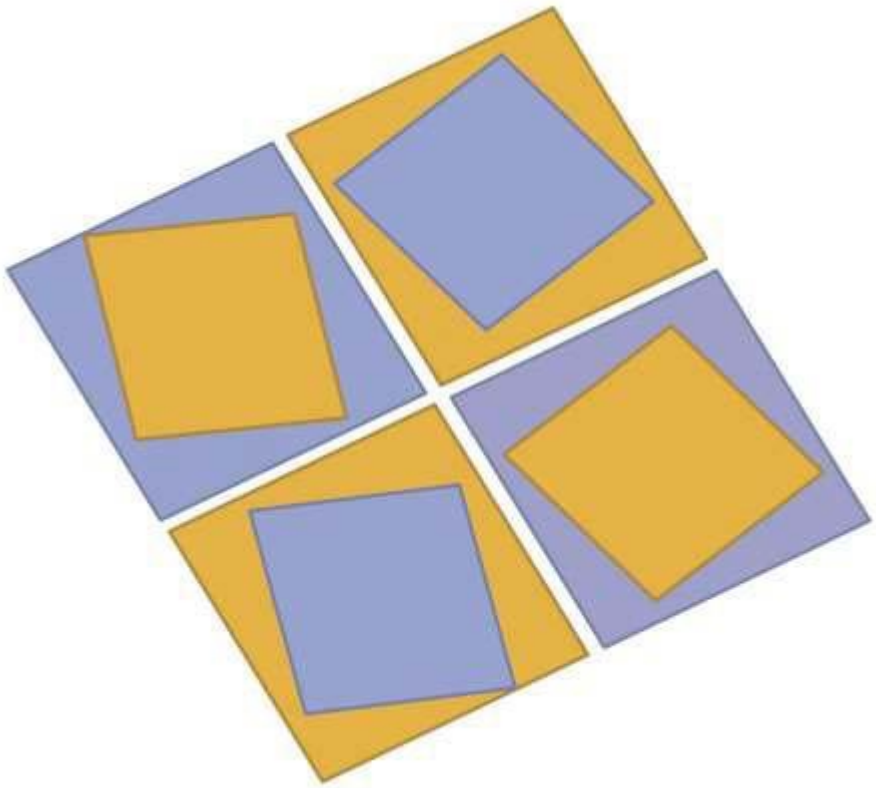

The BIOCARD Study

Biomarkers of Cognitive Decline
Among Normal Individuals

MRI Data – FreeSurfer:
Longitudinal Subcortical Volume
Limited Dataset
May 2020

Glossary of Terms

Term	Description
Allowable Codes	codes (and their meanings) allowed to be values for that variable
Audit Findings	error rates based on BIOCARD or NIH phase audits error rates are calculated as number of errors / total number of variables examined
Baseline visit	date admitted to NIH phase of BIOCARD study *[Note: some data may have been collected prior to this date]*
Collection	when the variable information was collected (i.e., Baseline, Follow-up)
Comments	further information about the variable not covered in the above fields
Data Type	numeric or character *[Note: Dates are numeric data]* numeric or character classifications are strictly related to how the data are stored and not how the data should be analyzed
JHU phase	the study phase at JHU from 2009 - present
Missing OK If	instances (such as skips) or reasons why a blank or missing value is acceptable
NA	not applicable for this variable
NIH / NIH phase	the study phase that was performed at the NIH from 1995-2005
Question Text	the question as it appears on the NACC or BIOCARD data collection forms
Short Description	a short explanation of what the variable means
Source	the name of the NACC form, BIOCARD form, or NIH dataset containing the variable information (or "DERIVED" if the variable was derived) and the variable question number located on the form or in the dataset, if applicable
Unknown Code	the codes for the "unknown", "don't know", or missing values for the variable
Variable Name	the name of the variable in the provided dataset *[Note: Variables will follow the NACC naming scheme as closely as possible]*

Acronyms and Definitions

AD	Alzheimer's Disease
CDR	Clinical Dementia Rating
CERAD	Consortium to Establish a Registry for Alzheimer's Disease
CNS	Central Nervous System
CSF	Cerebrospinal Fluid
CVD	Cardiovascular Disease
CVLT	California Verbal Learning Test
FAQ	Functional Assessment Questionnaire
FTD	Frontotemporal Degenerations
GDS	Geriatric Depression Scale
JHU	The Johns Hopkins University
MCI	Mild Cognitive Impairment
MMSE	Mini-Mental State Examination
NACC	National Alzheimer's Coordinating Center
NIA	National Institute on Aging
NINDS	National Institute of Neurological Disorders and Stroke
NPI-Q	Neuropsychiatric Inventory Questionnaire
UPDRS	Unified Parkinson's Disease Rating Scale
WAIS	Wechsler Adult Intelligence Scale
WMS	Wechsler Memory Scale

FREE SURFER MRI Data Limited DatasetCharacteristics

Number of variables: 67

Order of variables:

1)	JHUANONID	*Participant ID Anonymized byJHU*
2)	VISITNO	*MRI visit number*
3)	MRIMOBL	*Months from baseline*
4)	MISSINGNESS	*Indicator variable; 1 if scan includes at least one missing region due to unreliable FreeSurfer labeling (e.g., regions of overestimation or underestimation; inconsistency with structural boundaries) or poor scan quality (e.g., poor contrast; movement artifact; global failure of FreeSurfer pipeline)*
5)	LEFT_LATERAL_VENTRICLE	*Left lateral ventricle volume*
6)	LEFT_INF_LAT_VENT	*Left inferior lateral ventricle volume*
7)	LEFT_CEREBELLUM_WHITE_MATTER	*Left cerebellum white matter volume*
8)	LEFT_CEREBELLUM_CORTEX	*Left cerebellum cortex volume*
9)	LEFT_THALAMUS_PROPER	*Left thalamus proper volume*
10)	LEFT_CAUDATE	*Left caudate volume*
11)	LEFT_PUTAMEN	*Left putamen volume*
12)	LEFT_PALLIDUM	*Left pallidum volume*
13)	THIRD_VENTRICLE	*Third ventricle volume*
14)	FOURTH_VENTRICLE	*Fourth ventricle volume*
15)	BRAIN_STEM	*Brain stem volume*
16)	LEFT_HIPPOCAMPUS	*Left hippocampus volume*
17)	LEFT_AMYGDALA	*Left amygdala volume*
18)	CSF	*Cerebrospinal fluid volume*
19)	LEFT_ACCUMBENS_AREA	*Left accumbens area volume*
20)	LEFT_VENTRALDC	*Left ventral DC volume*
21)	LEFT_VESSEL	*Left vessel volume*
22)	LEFT_CHOROID_PLEXUS	*Left choroid plexus volume*
23)	RIGHT_LATERAL_VENTRICLE	*Right lateral ventricle volume*
24)	RIGHT_INF_LAT_VENT	*Right inferior lateral ventricle volume*
25)	RIGHT_CEREBELLUM_WHITE_MATTER	*Right cerebellum white matter volume*
26)	RIGHT_CEREBELLUM_CORTEX	*Right cerebellum cortex volume*
27)	RIGHT_THALAMUS_PROPER	*Right thalamus proper volume*

28)	RIGHT_CAUDATE	*Right caudate volume*
29)	RIGHT_PUTAMEN	*Right putamen volume*
30)	RIGHT_PALLIDUM	*Right pallidum volume*
31)	RIGHT_HIPPOCAMPUS	*Right hippocampus volume*
32)	RIGHT_AMYGDALA	*Right amygdala volume*
33)	RIGHT_ACCUMBENS_AREA	*Right accumbens area volume*
34)	RIGHT_VENTRALDC	*Right ventral DC volume*
35)	RIGHT_VESSEL	*Right vessel volume*
36)	RIGHT_CHOROID_PLEXUS	*Right choroid plexus volume*
37)	FIFTH_VENTRICLE	*Fifth ventricle volume*
38)	WM_HYPOINTENSITIES	*White matter hypointensities volume*
39)	LEFT_WM_HYPOINTENSITIES	*Left white matter hypointensities volume*
40)	RIGHT-WM-HYPOINTENSITIES	*Right white matter hypointensities volume*
41)	NON_WM_HYPOINTENSITIES	*Non-white matter hypointensities volume*
42)	LEFT_NON_WM_HYPOINTENSITIES	*Left non-white matter hypointensities volume*
43)	RIGHT_NON_WM_HYPOINTENSITIES	*Right non-white matter-hypointensities volume*
44)	OPTIC_CHIASM	*Optic chiasm volume*
45)	CC_POSTERIOR	*Corpus callosum posterior volume*
46)	CC_MID_POSTERIOR	*Corpus callosum mid-posterior volume*
47)	CC_CENTRAL	*Corpus callosum central volume*
48)	CC_MID_ANTERIOR	*Corpus callosum mid-anterior volume*
49)	CC_ANTERIOR	*Corpus callosum anterior volume*
50)	BRAINSEGVOL	*Brain segmentation volume*
51)	BRAINSEGVOLNOTVENT	*Brain segmentation volume without ventricles*
52)	BRAINSEGVOLNOTVENTSURF	*Brain segmentation volume without ventricles from surface*
53)	LHCORTEXVOL	*Left hemisphere cortex volume*
54)	RHCORTEXVOL	*Right hemisphere cortex volume*
55)	CORTEXVOL	*Cortex volume*
56)	LHCORTICALWHITEMATTERVOL	*Left hemisphere cortical white matter volume*
57)	RHCORTICALWHITEMATTERVOL	*Right hemisphere cortical white matter volume*
58)	CORTICALWHITEMATTERVOL	*Cortical white matter volume*
59)	SUBCORTGRAYVOL	*Subcortical gray volume*
60)	TOTALGRAYVOL	*Total gray volume*
61)	SUPRATENTORIALVOL	*Supratentorial volume*

62) SUPRATENTORIALVOLNOTVENT *Supratentorial volume without ventricles*

63) SUPRATENTORIALVOLNOTVENTVOX *Supratentorial volume voxel count*

64) MASKVOL *Mask volume*

65) BRAINSEGVOL_TO_ETIV *Ratio of brain segmentation volume to eTIV*

66) MASKVOL_TO_ETIV *Ratio of mask volume to eTIV*

67) ESTIMATEDTOTALINTRACRANIALVOL *Estimated total intracranial volume (eTIV)*

1)	Variable Name	**JHUANONID**
	Short Description	Participant ID Anonymized by JHU
	Source	NA
	Question Text	NA
	Time of Collection	Baseline
	Data Type	Character
	Allowable Codes	JHU + 6 numbers
	Missing OK If	NA
	Audit Findings	NA
	Comments	None
2)	Variable Name	**VISITNO**
	Short Description	MRI visit number
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	NIH visit: Integers and decimals from 0 to 10, where a visit 0 represents a visit that occurred prior to the established baseline date JHU visit: 101, 102, 103, 104, ….. 1XX where XX is from 01 to 99 Visit number 999 used for all participants that have died before a 101 visit for forms: A4, A5, A5a, B1, B2, B3, B3a, B8, B9, and D1. For participants that are alive, an A5 may have a 999 visit number to capture medical data acquired during the NIH phase of the study.
	Missing OK If	NA
	Audit Findings	No NIH or JHU audit
	Comments	Visit when MRI was completed

3) Variable Name **MRIMOBL**

Short Description	Months from baseline
Source	DERIVED
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = 0 Max = 999
Missing OK If	NA
Audit Findings	NA
Comments	Calculated as months between the baseline start date and the recorded MRI date.

4) Variable Name **MISSINGNESS**

68) Short Description	Indicator variable; 1 if scan includes at least one missing region due to unreliable FreeSurfer labeling (e.g., regions of overestimation or underestimation; inconsistency with structural boundaries) or poor scan quality (e.g., poor contrast; movement artifact; global failure of FreeSurfer pipeline)
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	None.

5) Variable Name **LEFT_LATERAL_VENTRICLE**

Short Description	Left lateral ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

6) Variable Name **LEFT_INF_LAT_VENT**

Short Description	Left inferior lateral ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

7) Variable Name **LEFT_CEREBELLUM_WHITE_MATTER**

Short Description	Left cerebellum white matter volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

8) Variable Name **LEFT_CEREBELLUM_CORTEX**

Short Description	Left cerebellum cortex volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

9) Variable Name **LEFT_THALAMUS_PROPER**

Short Description	Left thalamus proper volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

10) Variable Name **LEFT_CAUDATE**

Short Description	Left caudate volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

11) Variable Name **LEFT_PUTAMEN**

Short Description	Left putamen volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

12) Variable Name **LEFT_PALLIDUM**

Short Description	Left pallidum volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

13) Variable Name **THIRD_VENTRICLE**

Short Description	Third ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

14) Variable Name **FOURTH_VENTRICLE**

Short Description	Fourth ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

15) Variable Name **BRAIN_STEM**

Short Description	Brain stem volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

16) Variable Name **LEFT_HIPPOCAMPUS**

Short Description	Left hippocampus volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

17)	Variable Name	**LEFT_AMYGDALA**
	Short Description	Left amygdala volume
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

18)	Variable Name	**CSF**
	Short Description	Cerebrospinal fluid volume
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

19) Variable Name **LEFT_ACCUMBENS_AREA**

Short Description	Left accumbens area volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

20) Variable Name **LEFT_VENTRALDC**

Short Description	Left ventral DC volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

21) Variable Name **LEFT_VESSEL**

Short Description	Left vessel volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

22) Variable Name **LEFT_CHOROID_PLEXUS**

Short Description	Left choroid plexus volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

23) Variable Name **RIGHT_LATERAL_VENTRICLE**

Short Description	Right lateral ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

24) Variable Name **RIGHT_INF_LAT_VENT**

Short Description	Right inferior lateral ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

25) Variable Name **RIGHT_CEREBELLUM_WHITE_MATTER**

Short Description	Right cerebellum white matter volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

26) Variable Name **RIGHT_CEREBELLUM_CORTEX**

Short Description	Right cerebellum cortex volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

27) Variable Name **RIGHT_THALAMUS_PROPER**

Short Description	Right thalamus proper volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

28) Variable Name **RIGHT_CAUDATE**

Short Description	Right caudate volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

29) Variable Name **RIGHT_PUTAMEN**

Short Description	Right putamen volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

30) Variable Name **RIGHT_PALLIDUM**

Short Description	Right pallidum volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

31) Variable Name **RIGHT_HIPPOCAMPUS**

Short Description	Right hippocampus volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

32) Variable Name **RIGHT_AMYGDALA**

Short Description	Right amygdala volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

33) Variable Name **RIGHT_ACCUMBENS_AREA**

Short Description	Right accumbens area volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

34) Variable Name **RIGHT_VENTRALDC**

Short Description	Right ventral DC volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

35) Variable Name **RIGHT_VESSEL**

Short Description	Right vessel volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

36) Variable Name **RIGHT_CHOROID_PLEXUS**

Short Description	Right choroid plexus volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

37) Variable Name **FIFTH_VENTRICLE**

Short Description	Fifth ventricle volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

38) Variable Name **WM_HYPOINTENSITIES**

Short Description	White matter hypointensities volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

39) Variable Name **LEFT_WM_HYPOINTENSITIES**

Short Description	Left white matter hypointensities volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

40) Variable Name **RIGHT-WM-HYPOINTENSITIES**

Short Description	Right white matter hypointensities volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

41) Variable Name **NON_WM_HYPOINTENSITIES**

Short Description	Non-white matter hypointensities volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

42) Variable Name **LEFT_NON_WM_HYPOINTENSITIES**

Short Description	Left non-white matter hypointensities volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

43) Variable Name **RIGHT_NON_WM_HYPOINTENSITIES**

Short Description	Right non-white matter-hypointensities volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

44) Variable Name **OPTIC_CHIASM**

Short Description	Optic chiasm volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

45) Variable Name **CC_POSTERIOR**

Short Description	Corpus callosum posterior volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

46) Variable Name **CC_MID_POSTERIOR**

Short Description	Corpus callosum mid-posterior volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

47) Variable Name **CC_CENTRAL**

Short Description	Corpus callosum central volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

48) Variable Name **CC_MID_ANTERIOR**

Short Description	Corpus callosum mid-anterior volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

49) Variable Name **CC_ANTERIOR**

Short Description	Corpus callosum anterior volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

50) Variable Name **BRAINSEGVOL**

Short Description	Brain segmentation volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

51) Variable Name **BRAINSEGVOLNOTVENT**

Short Description	Brain segmentation volume without ventricles
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

52) Variable Name **BRAINSEGVOLNOTVENTSURF**

Short Description	Brain segmentation volume without ventricles from surface
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

53) Variable Name **LHCORTEXVOL**

Short Description	Left hemisphere cortex volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

54) Variable Name **RHCORTEXVOL**

Short Description	Right hemisphere cortex volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

55)	Variable Name	**CORTEXVOL**
	Short Description	Cortex volume
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

56)	Variable Name	**LHCORTICALWHITEMATTERVOL**
	Short Description	Left hemisphere cortical white matter volume
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

57) Variable Name **RHCORTICALWHITEMATTERVOL**

Short Description	Right hemisphere cortical white matter volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

58) Variable Name **CORTICALWHITEMATTERVOL**

Short Description	Cortical white matter volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

59) Variable Name **SUBCORTGRAYVOL**

Short Description	Subcortical gray volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

60) Variable Name **TOTALGRAYVOL**

Short Description	Total gray volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

61)	Variable Name	**SUPRATENTORIALVOL**
	Short Description	Supratentorial volume
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

62)	Variable Name	**SUPRATENTORIALVOLNOTVENT**
	Short Description	Supratentorial volume without ventricles
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

63) Variable Name **SUPRATENTORIALVOLNOTVENTVOX**

Short Description	Supratentorial volume voxel count
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

64) Variable Name **MASKVOL**

Short Description	Mask volume
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

65) Variable Name **BRAINSEGVOL_TO_ETIV**

Short Description	Ratio of brain segmentation volume to eTIV
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

66) Variable Name **MASKVOL_TO_ETIV**

Short Description	Ratio of mask volume to eTIV
Source	NA
Question Text	NA
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = TBD Max = TBD
Missing OK If	NA
Audit Findings	NA
Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

67)	Variable Name	**ESTIMATEDTOTALINTRACRANIALVOL**
	Short Description	Estimated total intracranial volume (eTIV)
	Source	NA
	Question Text	NA
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = TBD Max = TBD
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure obtained using the longitudinal FreeSurfer pipeline, version 5.3. For more information, see: Pettigrew C, Soldan A, Zhu Y, Cai Q, Wang MC, Moghekar A, Miller MI, Singh B, Martinez O, Fletcher E, DeCarli C, Albert M. Cognitive reserve and rate of change in Alzheimer's and cerebrovascular disease biomarkers among cognitively normal individuals. Neurobiology of Aging 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.