



The BIOCARD Study

Biomarkers of Cognitive Decline Among
Normal Individuals

**MRI Data - FreeSurfer:
Longitudinal Cortical Thickness
Limited Dataset**

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 <i>[Note: some data may have been collected prior to this date]</i>
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 <i>[Note: Dates are numeric data]</i> 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 <i>[Note: Variables will follow the NACC naming scheme as closely as possible]</i>

Acronyms and Definitions

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

FREE SURFER MRI Data Limited Dataset Characteristics

Number of variables: 74

Order of variables:

1) JHUANONID	<i>Participant ID Anonymized by JHU</i>
2) VISITNO	<i>MRI visit number</i>
3) MRIMOBL	<i>Months from baseline</i>
4) MISSINGNESS	<i>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)</i>
5) LH_BANKSSTS_THICKNESS	<i>Left hemisphere banks of the superior temporal sulcus thickness</i>
6) LH_CAUDALANTERIORCINGULATE_THICKNESS	<i>Left hemisphere caudal anterior cingulate thickness</i>
7) LH_CAUDALMIDDLEFRONTAL_THICKNESS	<i>Left hemisphere caudal middle frontal thickness</i>
8) LH_CUNEUS_THICKNESS	<i>Left hemisphere cuneus thickness</i>
9) LH_ENTORHINAL_THICKNESS	<i>Left hemisphere entorhinal thickness</i>
10) LH_FUSIFORM_THICKNESS	<i>Left hemisphere fusiform thickness</i>
11) LH_INFERIORPARIETAL_THICKNESS	<i>Left hemisphere inferior parietal thickness</i>
12) LH_INFERIORETEMPORAL_THICKNESS	<i>Left hemisphere inferior temporal thickness</i>
13) LH_ISTHMUSCINGULATE_THICKNESS	<i>Left hemisphere isthmus cingulate thickness</i>
14) LH_LATERALOCIPITAL_THICKNESS	<i>Left hemisphere lateral occipital thickness</i>
15) LH_LATERALORBITOFRONTAL_THICKNESS	<i>Left hemisphere lateral orbitofrontal thickness</i>
16) LH_LINGUAL_THICKNESS	<i>Left hemisphere lingual thickness</i>
17) LH_MEDIALORBITOFRONTAL_THICKNESS	<i>Left hemisphere medial orbitofrontal thickness</i>
18) LH_MIDDLETEMPORAL_THICKNESS	<i>Left hemisphere middle temporal thickness</i>
19) LH_PARAHIPPOCAMPAL_THICKNESS	<i>Left hemisphere parahippocampal thickness</i>
20) LH_PARACENTRAL_THICKNESS	<i>Left hemisphere paracentral thickness</i>
21) LH_PARSOPERCULARIS_THICKNESS	<i>Left hemisphere pars opercularis thickness</i>
22) LH_PARSORBITALIS_THICKNESS	<i>Left hemisphere pars orbitalis thickness</i>
23) LH_PARSTRIANGULARIS_THICKNESS	<i>Left hemisphere pars triangularis thickness</i>
24) LH_PERICALCARINE_THICKNESS	<i>Left hemisphere pericalcarine thickness</i>
25) LH_POSTCENTRAL_THICKNESS	<i>Left hemisphere postcentral thickness</i>
26) LH_POSTERIORCINGULATE_THICKNESS	<i>Left hemisphere posterior cingulate thickness</i>
27) LH_PRECENTRAL_THICKNESS	<i>Left hemisphere precentral thickness</i>

28) LH_PRECUNEUS_THICKNESS	<i>Left hemisphere precuneus thickness</i>
29) LH_ROSTRALANTERIORCINGULATE_THICKNESS	<i>Left hemisphere rostral anterior cingulate thickness</i>
30) LH_ROSTRALMIDDLEFRONTAL_THICKNESS	<i>Left hemisphere rostral middle frontal thickness</i>
31) LH_SUPERIORFRONTAL_THICKNESS	<i>Left hemisphere superior frontal thickness</i>
32) LH_SUPERIORPARIETAL_THICKNESS	<i>Left hemisphere superior parietal thickness</i>
33) LH_SUPERIORETEMPORAL_THICKNESS	<i>Left hemisphere superior temporal thickness</i>
34) LH_SUPRAMARGINAL_THICKNESS	<i>Left hemisphere supramarginal thickness</i>
35) LH_FRONTALPOLE_THICKNESS	<i>Left hemisphere frontal pole thickness</i>
36) LH_TEMPORALPOLE_THICKNESS	<i>Left hemisphere temporal pole thickness</i>
37) LH_TRANSVERSETEMPORAL_THICKNESS	<i>Left hemisphere transverse temporal thickness</i>
38) LH_INSULA_THICKNESS	<i>Left hemisphere insula thickness</i>
39) LH_MEANTHICKNESS_THICKNESS	<i>Left hemisphere mean thickness thickness</i>
40) RH_BANKSSTS_THICKNESS	<i>Right hemisphere banks of the superior temporal sulcus thickness</i>
41) RH_CAUDALANTERIORCINGULATE_THICKNESS	<i>Right hemisphere caudal anterior cingulate thickness</i>
42) RH_CAUDALMIDDLEFRONTAL_THICKNESS	<i>Right hemisphere caudal middle frontal thickness</i>
43) RH_CUNEUS_THICKNESS	<i>Right hemisphere cuneus thickness</i>
44) RH_ENTORHINAL_THICKNESS	<i>Right hemisphere entorhinal thickness</i>
45) RH_FUSIFORM_THICKNESS	<i>Right hemisphere fusiform thickness</i>
46) RH_INFERIORPARIETAL_THICKNESS	<i>Right hemisphere inferior parietal thickness</i>
47) RH_INFERIORETEMPORAL_THICKNESS	<i>Right hemisphere inferior temporal thickness</i>
48) RH_ISTHMUSCINGULATE_THICKNESS	<i>Right hemisphere isthmus cingulate thickness</i>
49) RH_LATERALOCIPITAL_THICKNESS	<i>Right hemisphere lateral occipital thickness</i>
50) RH_LATERALORBITOFRONTAL_THICKNESS	<i>Right hemisphere lateral orbitofrontal thickness</i>
51) RH_LINGUAL_THICKNESS	<i>Right hemisphere lingual thickness</i>
52) RH_MEDIALORBITOFRONTAL_THICKNESS	<i>Right hemisphere medial orbitofrontal thickness</i>
53) RH_MIDDLETEMPORAL_THICKNESS	<i>Right hemisphere middle temporal thickness</i>
54) RH_PARAHIPPOCAMPAL_THICKNESS	<i>Right hemisphere parahippocampal thickness</i>
55) RH_PARACENTRAL_THICKNESS	<i>Right hemisphere paracentral thickness</i>
56) RH_PARSOPERCULARIS_THICKNESS	<i>Right hemisphere pars opercularis thickness</i>
57) RH_PARSORBITALIS_THICKNESS	<i>Right hemisphere pars orbitalis thickness</i>
58) RH_PARSTRIANGULARIS_THICKNESS	<i>Right hemisphere pars triangularis thickness</i>
59) RH_PERICALCARINE_THICKNESS	<i>Right hemisphere pericalcarine thickness</i>

60) RH_POSTCENTRAL_THICKNESS	<i>Right hemisphere postcentral thickness</i>
61) RH_POSTERIORCINGULATE_THICKNESS	<i>Right hemisphere posterior cingulate thickness</i>
62) RH_PRECENTRAL_THICKNESS	<i>Right hemisphere precentral thickness</i>
63) RH_PRECUNEUS_THICKNESS	<i>Right hemisphere precuneus thickness</i>
64) RH_ROSTRALANTERIORCINGULATE_THICKNESS	<i>Right hemisphere rostral anterior cingulate thickness</i>
65) RH_ROSTRALMIDDLEFRONTAL_THICKNESS	<i>Right hemisphere rostral middle frontal thickness</i>
66) RH_SUPERIORFRONTAL_THICKNESS	<i>Right hemisphere superior frontal thickness</i>
67) RH_SUPERIORPARIETAL_THICKNESS	<i>Right hemisphere superior parietal thickness</i>
68) RH_SUPERIORTEMPORAL_THICKNESS	<i>Right hemisphere superior temporal thickness</i>
69) RH_SUPRAMARGINAL_THICKNESS	<i>Right hemisphere supramarginal thickness</i>
70) RH_FRONTALPOLE_THICKNESS	<i>Right hemisphere frontal pole thickness</i>
71) RH_TEMPORALPOLE_THICKNESS	<i>Right hemisphere temporal pole thickness</i>
72) RH_TRANSVERSETEMPORAL_THICKNESS	<i>Right hemisphere transverse temporal thickness</i>
73) RH_INSULA_THICKNESS	<i>Right hemisphere insula thickness</i>
74) RH_MEANTHICKNESS_THICKNESS	<i>Right hemisphere mean thickness thickness</i>

Free Surfer MRI Data

- 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
	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 **LH_BANKSSTS_THICKNESS**
- Short Description Left hemisphere banks of the superior temporal sulcus thickness
- 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 **LH_CAUDALANTERIORCINGULATE_THICKNESS**
- Short Description Left hemisphere caudal anterior cingulate thickness
- 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 **LH_CAUDALMIDDLEFRONTAL_THICKNESS**
- Short Description Left hemisphere caudal middle frontal thickness
- 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 **LH_CUNEUS_THICKNESS**
- Short Description Left hemisphere cuneus thickness
- 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 **LH_ENTORHINAL_THICKNESS**
- Short Description Left hemisphere entorhinal thickness
- 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 **LH_FUSIFORM_THICKNESS**
- Short Description Left hemisphere fusiform thickness
- 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	LH_INFERIORPARIETAL_THICKNESS
	Short Description	Left hemisphere inferior parietal thickness
	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	LH_INFERIORETEMPORAL_THICKNESS
	Short Description	Left hemisphere inferior temporal thickness
	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** **LH_ISTHMUSCINGULATE_THICKNESS**
- Short Description** Left hemisphere isthmus cingulate thickness
- 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** **LH_LATERALOCIPITAL_THICKNESS**
- Short Description** Left hemisphere lateral occipital thickness
- 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	LH_LATERALORBITOFRONTAL_THICKNESS
	Short Description	Left hemisphere lateral orbitofrontal thickness
	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	LH_LINGUAL_THICKNESS
	Short Description	Left hemisphere lingual thickness
	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	LH_MEDIALORBITOFRONTAL_THICKNESS
	Short Description	Left hemisphere medial orbitofrontal thickness
	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	LH_MIDDLETEMPORAL_THICKNESS
	Short Description	Left hemisphere middle temporal thickness
	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	LH_PARAHIPPOCAMPAL_THICKNESS
	Short Description	Left hemisphere parahippocampal thickness
	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	LH_PARACENTRAL_THICKNESS
	Short Description	Left hemisphere paracentral thickness
	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	LH_PARSOPERULARIS_THICKNESS
	Short Description	Left hemisphere pars opercularis thickness
	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	LH_PARSORBITALIS_THICKNESS
	Short Description	Left hemisphere pars orbitalis thickness
	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	LH_PARSTRIANGULARIS_THICKNESS
	Short Description	Left hemisphere pars triangularis thickness
	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	LH_PERICALCARINE_THICKNESS
	Short Description	Left hemisphere pericalcarine thickness
	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 **LH_POSTCENTRAL_THICKNESS**
- Short Description Left hemisphere postcentral thickness
- 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 **LH_POSTERIORCINGULATE_THICKNESS**
- Short Description Left hemisphere posterior cingulate thickness
- 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** **LH_PRECENTRAL_THICKNESS**
- Short Description** Left hemisphere precentral thickness
- 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** **LH_PRECUNEUS_THICKNESS**
- Short Description** Left hemisphere precuneus thickness
- 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	LH_ROSTRALANTERIORCINGULATE_THICKNESS
	Short Description	Left hemisphere rostral anterior cingulate thickness
	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	LH_ROSTRALMIDDLEFRONTAL_THICKNESS
	Short Description	Left hemisphere rostral middle frontal thickness
	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	LH_SUPERIORFRONTAL_THICKNESS
	Short Description	Left hemisphere superior frontal thickness
	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	LH_SUPERIORPARIETAL_THICKNESS
	Short Description	Left hemisphere superior parietal thickness
	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	LH_SUPERIORTEMPORAL_THICKNESS
	Short Description	Left hemisphere superior temporal thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
34)	Variable Name	LH_SUPRAMARGINAL_THICKNESS
	Short Description	Left hemisphere supramarginal thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

35)	Variable Name	LH_FRONTALPOLE_THICKNESS
	Short Description	Left hemisphere frontal pole thickness
	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	LH_TEMPORALPOLE_THICKNESS
	Short Description	Left hemisphere temporal pole thickness
	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	LH_TRANSVERSETEMPORAL_THICKNESS
	Short Description	Left hemisphere transverse temporal thickness
	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	LH_INSULA_THICKNESS
	Short Description	Left hemisphere insula thickness
	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	LH_MEANTHICKNESS_THICKNESS
	Short Description	Left hemisphere mean thickness thickness
	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	RH_BANKSSTS_THICKNESS
	Short Description	Right hemisphere banks of the superior temporal sulcus thickness
	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	RH_CAUDALANTERIORCINGULATE_THICKNESS
	Short Description	Right hemisphere caudal anterior cingulate thickness
	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	RH_CAUDALMIDDLEFRONTAL_THICKNESS
	Short Description	Right hemisphere caudal middle frontal thickness
	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	RH_CUNEUS_THICKNESS
	Short Description	Right hemisphere cuneus thickness
	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	RH_ENTORHINAL_THICKNESS
	Short Description	Right hemisphere entorhinal thickness
	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	RH_FUSIFORM_THICKNESS
	Short Description	Right hemisphere fusiform thickness
	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	RH_INFERIORPARIETAL_THICKNESS
	Short Description	Right hemisphere inferior parietal thickness
	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	RH_INFERIORTEMPORAL_THICKNESS
	Short Description	Right hemisphere inferior temporal thickness
	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	RH_ISTHMUSCINGULATE_THICKNESS
	Short Description	Right hemisphere isthmus cingulate thickness
	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	RH_LATERALOCIPITAL_THICKNESS
	Short Description	Right hemisphere lateral occipital thickness
	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	RH_LATERALORBITOFRONTAL_THICKNESS
	Short Description	Right hemisphere lateral orbitofrontal thickness
	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	RH_LINGUAL_THICKNESS
	Short Description	Right hemisphere lingual thickness
	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	RH_MEDIALORBITOFRONTAL_THICKNESS
	Short Description	Right hemisphere medial orbitofrontal thickness
	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	RH_MIDDLETEMPORAL_THICKNESS
	Short Description	Right hemisphere middle temporal thickness
	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	RH_PARAHIPPOCAMPAL_THICKNESS
	Short Description	Right hemisphere parahippocampal thickness
	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	RH_PARACENTRAL_THICKNESS
	Short Description	Right hemisphere paracentral thickness
	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	RH_PARSOPERCULARIS_THICKNESS
	Short Description	Right hemisphere pars opercularis thickness
	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	RH_PARSORBITALIS_THICKNESS
	Short Description	Right hemisphere pars orbitalis thickness
	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	RH_PARSTRIANGULARIS_THICKNESS
	Short Description	Right hemisphere pars triangularis thickness
	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	RH_PERICALCARINE_THICKNESS
	Short Description	Right hemisphere pericalcarine thickness
	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	RH_POSTCENTRAL_THICKNESS
	Short Description	Right hemisphere postcentral thickness
	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	RH_POSTERIORCINGULATE_THICKNESS
	Short Description	Right hemisphere posterior cingulate thickness
	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	RH_PRECENTRAL_THICKNESS
	Short Description	Right hemisphere precentral thickness
	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 **RH_PRECUNEUS_THICKNESS**
- Short Description Right hemisphere precuneus thickness
- 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 **RH_ROSTRALANTERIORCINGULATE_THICKNESS**
- Short Description Right hemisphere rostral anterior cingulate thickness
- 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	RH_ROSTRALMIDDLEFRONTAL_THICKNESS
	Short Description	Right hemisphere rostral middle frontal thickness
	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	RH_SUPERIORFRONTAL_THICKNESS
	Short Description	Right hemisphere superior frontal thickness
	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	RH_SUPERIORPARIETAL_THICKNESS
	Short Description	Right hemisphere superior parietal thickness
	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.
68)	Variable Name	RH_SUPERIORTEMPORAL_THICKNESS
	Short Description	Right hemisphere superior temporal thickness
	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.

69)	Variable Name	RH_SUPRAMARGINAL_THICKNESS
	Short Description	Right hemisphere supramarginal thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
70)	Variable Name	RH_FRONTALPOLE_THICKNESS
	Short Description	Right hemisphere frontal pole thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

71)	Variable Name	RH_TEMPORALPOLE_THICKNESS
	Short Description	Right hemisphere temporal pole thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
72)	Variable Name	RH_TRANSVERSETEMPORAL_THICKNESS
	Short Description	Right hemisphere transverse temporal thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

73)	Variable Name	RH_INSULA_THICKNESS
	Short Description	Right hemisphere insula thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
74)	Variable Name	RH_MEANTHICKNESS_THICKNESS
	Short Description	Right hemisphere mean thickness thickness
	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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.



The BIOCARD Study

Biomarkers of Cognitive Decline Among
Normal Individuals

**MRI Data - FreeSurfer:
Longitudinal Cortical Volume
Limited Dataset**

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 <i>[Note: some data may have been collected prior to this date]</i>
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 <i>[Note: Dates are numeric data]</i> 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 <i>[Note: Variables will follow the NACC naming scheme as closely as possible]</i>

Acronyms and Definitions

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

FREE SURFER MRI Data Limited Dataset Characteristics

Number of variables: 72

Order of variables:

1)	JHUANONID	<i>Participant ID Anonymized by JHU</i>
2)	VISITNO	<i>MRI visit number</i>
3)	MRIMOBL	<i>Months from baseline</i>
4)	MISSINGNESS	<i>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)</i>
5)	LH_BANKSSTS_VOLUME	<i>Left hemisphere banks of the superior temporal sulcus volume</i>
6)	LH_CAUDALANTERIORCINGULATE_VOLUME	<i>Left hemisphere caudal anterior cingulate volume</i>
7)	LH_CAUDALMIDDLEFRONTAL_VOLUME	<i>Left hemisphere caudal middle frontal volume</i>
8)	LH_CUNEUS_VOLUME	<i>Left hemisphere cuneus volume</i>
9)	LH_ENTORHINAL_VOLUME	<i>Left hemisphere entorhinal volume</i>
10)	LH_FUSIFORM_VOLUME	<i>Left hemisphere fusiform volume</i>
11)	LH_INFERIORPARIETAL_VOLUME	<i>Left hemisphere inferior parietal volume</i>
12)	LH_INFERIORETEMPORAL_VOLUME	<i>Left hemisphere inferior temporal volume</i>
13)	LH_ISTHMUSCINGULATE_VOLUME	<i>Left hemisphere isthmus cingulate volume</i>
14)	LH_LATERALOCIPITAL_VOLUME	<i>Left hemisphere lateral occipital volume</i>
15)	LH_LATERALORBITOFRONTAL_VOLUME	<i>Left hemisphere lateral orbitofrontal volume</i>
16)	LH_LINGUAL_VOLUME	<i>Left hemisphere lingual volume</i>
17)	LH_MEDIALORBITOFRONTAL_VOLUME	<i>Left hemisphere medial orbitofrontal volume</i>
18)	LH_MIDDLETEMPORAL_VOLUME	<i>Left hemisphere middle temporal volume</i>
19)	LH_PARAHIPPOCAMPAL_VOLUME	<i>Left hemisphere parahippocampal volume</i>
20)	LH_PARACENTRAL_VOLUME	<i>Left hemisphere paracentral volume</i>
21)	LH_PARSOPERCULARIS_VOLUME	<i>Left hemisphere pars opercularis volume</i>
22)	LH_PARSORBITALIS_VOLUME	<i>Left hemisphere pars orbitalis volume</i>
23)	LH_PARSTRIANGULARIS_VOLUME	<i>Left hemisphere pars triangularis volume</i>
24)	LH_PERICALCARINE_VOLUME	<i>Left hemisphere pericalcarine volume</i>
25)	LH_POSTCENTRAL_VOLUME	<i>Left hemisphere postcentral volume</i>
26)	LH_POSTERIORCINGULATE_VOLUME	<i>Left hemisphere posterior cingulate volume</i>
27)	LH_PRECENTRAL_VOLUME	<i>Left hemisphere precentral volume</i>

28) LH_PRECUNEUS_VOLUME	<i>Left hemisphere precuneus volume</i>
29) LH_ROSTRALANTERIORCINGULATE_VOLUME	<i>Left hemisphere rostral anterior cingulate volume</i>
30) LH_ROSTRALMIDDLEFRONTAL_VOLUME	<i>Left hemisphere rostral middle frontal volume</i>
31) LH_SUPERIORFRONTAL_VOLUME	<i>Left hemisphere superior frontal volume</i>
32) LH_SUPERIORPARIETAL_VOLUME	<i>Left hemisphere superior parietal volume</i>
33) LH_SUPERIORTEMPORAL_VOLUME	<i>Left hemisphere superior temporal volume</i>
34) LH_SUPRAMARGINAL_VOLUME	<i>Left hemisphere supramarginal volume</i>
35) LH_FRONTALPOLE_VOLUME	<i>Left hemisphere frontal pole volume</i>
36) LH_TEMPORALPOLE_VOLUME	<i>Left hemisphere temporal pole volume</i>
37) LH_TRANSVERSETEMPORAL_VOLUME	<i>Left hemisphere transverse temporal volume</i>
38) LH_INSULA_VOLUME	<i>Left hemisphere insula volume</i>
39) RH_BANKSSTS_VOLUME	<i>Right hemisphere banks of the superior temporal sulcus volume</i>
40) RH_CAUDALANTERIORCINGULATE_VOLUME	<i>Right hemisphere caudal anterior cingulate volume</i>
41) RH_CAUDALMIDDLEFRONTAL_VOLUME	<i>Right hemisphere caudal middle frontal volume</i>
42) RH_CUNEUS_VOLUME	<i>Right hemisphere cuneus volume</i>
43) RH_ENTORHINAL_VOLUME	<i>Right hemisphere entorhinal volume</i>
44) RH_FUSIFORM_VOLUME	<i>Right hemisphere fusiform volume</i>
45) RH_INFERIORPARIETAL_VOLUME	<i>Right hemisphere inferior parietal volume</i>
46) RH_INFERIORTEMPORAL_VOLUME	<i>Right hemisphere inferior temporal volume</i>
47) RH_ISTHMUSCINGULATE_VOLUME	<i>Right hemisphere isthmus cingulate volume</i>
48) RH_LATERALOCIPITAL_VOLUME	<i>Right hemisphere lateral occipital volume</i>
49) RH_LATERALORBITOFRONTAL_VOLUME	<i>Right hemisphere lateral orbitofrontal volume</i>
50) RH_LINGUAL_VOLUME	<i>Right hemisphere lingual volume</i>
51) RH_MEDIALORBITOFRONTAL_VOLUME	<i>Right hemisphere medial orbitofrontal volume</i>
52) RH_MIDDLETEMPORAL_VOLUME	<i>Right hemisphere middle temporal volume</i>
53) RH_PARAHIPPOCAMPAL_VOLUME	<i>Right hemisphere parahippocampal volume</i>
54) RH_PARACENTRAL_VOLUME	<i>Right hemisphere paracentral volume</i>
55) RH_PARSOPERCULARIS_VOLUME	<i>Right hemisphere pars opercularis volume</i>
56) RH_PARSORBITALIS_VOLUME	<i>Right hemisphere pars orbitalis volume</i>
57) RH_PARSTRIANGULARIS_VOLUME	<i>Right hemisphere pars triangularis volume</i>
58) RH_PERICALCARINE_VOLUME	<i>Right hemisphere pericalcarine volume</i>
59) RH_POSTCENTRAL_VOLUME	<i>Right hemisphere postcentral volume</i>
60) RH_POSTERIORCINGULATE_VOLUME	<i>Right hemisphere posterior cingulate volume</i>
61) RH_PRECENTRAL_VOLUME	<i>Right hemisphere precentral volume</i>
62) RH_PRECUNEUS_VOLUME	<i>Right hemisphere precuneus volume</i>

63)	RH_ROSTRALANTERIORCINGULATE_VOLUME	<i>Right hemisphere rostral anterior cingulate volume</i>
64)	RH_ROSTRALMIDDLEFRONTAL_VOLUME	<i>Right hemisphere rostral middle frontal volume</i>
65)	RH_SUPERIORFRONTAL_VOLUME	<i>Right hemisphere superior frontal volume</i>
66)	RH_SUPERIORPARIETAL_VOLUME	<i>Right hemisphere superior parietal volume</i>
67)	RH_SUPERIORTEMPORAL_VOLUME	<i>Right hemisphere superior temporal volume</i>
68)	RH_SUPRAMARGINAL_VOLUME	<i>Right hemisphere supramarginal volume</i>
69)	RH_FRONTALPOLE_VOLUME	<i>Right hemisphere frontal pole volume</i>
70)	RH_TEMPORALPOLE_VOLUME	<i>Right hemisphere temporal pole volume</i>
71)	RH_TRANSVERSETEMPORAL_VOLUME	<i>Right hemisphere transverse temporal volume</i>
72)	RH_INSULA_VOLUME	<i>Right hemisphere insula volume</i>

Free Surfer MRI Data

- 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

Free Surfer MRI Data

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
73)	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 **LH_BANKSSTS_VOLUME**
- Short Description Left hemisphere banks of the superior temporal sulcus
- 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 **LH_CAUDALANTERIORCINGULATE_VOLUME**
- Short Description Left hemisphere caudal anterior cingulate 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 **LH_CAUDALMIDDLEFRONTAL_VOLUME**
- Short Description Left hemisphere caudal middle frontal 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 **LH_CUNEUS_VOLUME**
- Short Description Left hemisphere cuneus 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 **LH_ENTORHINAL_VOLUME**
- Short Description Left hemisphere entorhinal 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 **LH_FUSIFORM L_VOLUME**
- Short Description Left hemisphere fusiform 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	LH_INFERIORPARIETAL_VOLUME
	Short Description	Left hemisphere inferior parietal 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	LH_INFERIOREMPORAL_VOLUME
	Short Description	Left hemisphere inferior temporal 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	LH_ISTHMUSCINGULATE_VOLUME
	Short Description	Left hemisphere isthmus cingulate 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	LH_LATERALOCIPITAL_VOLUME
	Short Description	Left hemisphere lateral occipital 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	LH_LATERALORBITOFRONTAL_VOLUME
	Short Description	Left hemisphere lateral orbitofrontal 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
16)	Variable Name	LH_LINGUAL_VOLUME
	Short Description	Left hemisphere lingual 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

17)	Variable Name	LH_MEDIALORBITOFRONTAL_VOLUME
	Short Description	Left hemisphere medial orbitofrontal 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	LH_MIDDLETEMPORAL_VOLUME
	Short Description	Left hemisphere middle temporal 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	LH_PARAHIPPOCAMPAL_VOLUME
	Short Description	Left hemisphere parahippocampal 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	LH_PARACENTRAL_VOLUME
	Short Description	Left hemisphere paracentral 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** **LH_PARSOPERULARIS_VOLUME**
- Short Description** Left hemisphere pars opercularis 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** **LH_PARSORBITALIS_VOLUME**
- Short Description** Left hemisphere pars orbitalis 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	LH_PARSTRIANGULARIS_VOLUME
	Short Description	Left hemisphere pars triangularis 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	LH_PERICALCARINE_VOLUME
	Short Description	Left hemisphere pericalcarine 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	LH_POSTCENTRAL_VOLUME
	Short Description	Left hemisphere postcentral 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	LH_POSTERIORCINGULATE_VOLUME
	Short Description	Left hemisphere posterior cingulate 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	LH_PRECENTRAL_VOLUME
	Short Description	Left hemisphere precentral 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
28)	Variable Name	LH_PRECUNEUS_VOLUME
	Short Description	Left hemisphere precuneus 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

29)	Variable Name	LH_ROSTRALANTERIORCINGULATE_VOLUME
	Short Description	Left hemisphere rostral anterior cingulate 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	LH_ROSTRALMIDDLEFRONTAL_VOLUME
	Short Description	Left hemisphere rostral middle frontal 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** **LH_SUPERIORFRONTAL_VOLUME**
- Short Description** Left hemisphere superior frontal 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** **LH_SUPERIORPARIETAL_VOLUME**
- Short Description** Left hemisphere superior parietal 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	LH_SUPERIORTEMPORAL_VOLUME
	Short Description	Left hemisphere superior temporal 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	LH_SUPRAMARGINAL_VOLUME
	Short Description	Left hemisphere supramarginal volume Source
	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	LH_FRONTALPOLE_VOLUME
	Short Description	Left hemisphere frontal pole 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	LH_TEMPORALPOLE_VOLUME
	Short Description	Left hemisphere temporal pole 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	LH_TRANSVERSETEMPORAL_VOLUME
	Short Description	Left hemisphere transverse temporal 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	LH_INSULA_VOLUME
	Short Description	Left hemisphere insula 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** **RH_BANKSSTS_VOLUME**
- Short Description** Right hemisphere banks of the superior temporal sulcus 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** **RH_CAUDALANTERIORCINGULATE_VOLUME**
- Short Description** Right hemisphere caudal anterior cingulate 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	RH_CAUDALMIDDLEFRONTAL_VOLUME
	Short Description	Right hemisphere caudal middle frontal 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
42)	Variable Name	RH_CUNEUS_VOLUME
	Short Description	Right hemisphere cuneus 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

- 43)** Variable Name **RH_ENTORHINAL_VOLUME**
- Short Description Right hemisphere entorhinal 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 **RH_FUSIFORM_VOLUME**
- Short Description Right hemisphere fusiform 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	RH_INFERIORPARIETAL_VOLUME
	Short Description	Right hemisphere inferior parietal 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	RH_INFERIORETEMPORAL_VOLUME
	Short Description	Right hemisphere inferior temporal 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	RH_ISTHMUSCINGULATE_VOLUME
	Short Description	Right hemisphere isthmus cingulate 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
48)	Variable Name	RH_LATERALOCIPITAL_VOLUME
	Short Description	Right hemisphere lateral occipital 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

49)	Variable Name	RH_LATERALORBITOFRONTAL_VOLUME
	Short Description	Right hemisphere lateral orbitofrontal 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	RH_LINGUAL_VOLUME
	Short Description	Right hemisphere lingual 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	RH_MEDIALORBITOFRONTAL_VOLUME
	Short Description	Right hemisphere medial orbitofrontal 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.
52)	Variable Name	RH_MIDDLETEMPORAL_VOLUME
	Short Description	Right hemisphere middle temporal 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.

53)	Variable Name	RH_PARAHIPPOCAMPAL_VOLUME
	Short Description	Right hemisphere parahippocampal 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	RH_PARACENTRAL_VOLUME
	Short Description	Right hemisphere paracentral 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	RH_PARSOPERULARIS_VOLUME
	Short Description	Right hemisphere pars opercularis 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	RH_PARSORBITALIS_VOLUME
	Short Description	Right hemisphere pars orbitalis 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	RH_PARSTRIANGULARIS_VOLUME
	Short Description	Right hemisphere pars triangularis 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.
58)	Variable Name	RH_PERICALCARINE_VOLUME
	Short Description	Right hemisphere pericalcarine 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. <i>Neurobiology of Aging</i> 2020; in press. doi: 10.1016/j.neurobiolaging.2019.12.003.

59)	Variable Name	RH_POSTCENTRAL_VOLUME
	Short Description	Right hemisphere postcentral 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	RH_POSTERIORCINGULATE_VOLUME
	Short Description	Right hemisphere posterior cingulate 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	RH_PRECENTRAL_VOLUME
	Short Description	Right hemisphere precentral 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	RH_PRECUNEUS_VOLUME
	Short Description	Right hemisphere precuneus 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.

63)	Variable Name	RH_ROSTRALANTERIORCINGULATE_VOLUME
	Short Description	Right hemisphere rostral anterior cingulate 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.
64)	Variable Name	RH_ROSTRALMIDDLEFRONTAL_VOLUME
	Short Description	Right hemisphere rostral middle frontal 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	RH_SUPERIORFRONTAL_VOLUME
	Short Description	Right hemisphere superior frontal 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.
66)	Variable Name	RH_SUPERIORPARIETAL_VOLUME
	Short Description	Right hemisphere superior parietal 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.

67)	Variable Name	RH_SUPERIORTEMPORAL_VOLUME
	Short Description	Right hemisphere superior temporal 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.
68)	Variable Name	RH_SUPRAMARGINAL_VOLUME
	Short Description	Right hemisphere supramarginal 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.

69)	Variable Name	RH_FRONTALPOLE_VOLUME
	Short Description	Right hemisphere frontal pole 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.
70)	Variable Name	RH_TEMPORALPOLE_VOLUME
	Short Description	Right hemisphere temporal pole 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.

71)	Variable Name	RH_TRANSVERSETEMPORAL_VOLUME
	Short Description	Right hemisphere transverse temporal 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.
72)	Variable Name	RH_INSULA_VOLUME
	Short Description	Right hemisphere insula 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.



The BIOCARD Study

Biomarkers of Cognitive Decline Among
Normal Individuals

**MRI Data-FreeSurfer:
Longitudinal Subcortical Volume
Limited Dataset**

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 <i>[Note: some data may have been collected prior to this date]</i>
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 <i>[Note: Dates are numeric data]</i> 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 <i>[Note: Variables will follow the NACC naming scheme as closely as possible]</i>

Acronyms and Definitions

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

FREE SURFER MRI Data Limited Dataset Characteristics

Number of variables: 67

Order of variables:

1) JHUANONID	<i>Participant ID Anonymized by JHU</i>
2) VISITNO	<i>MRI visit number</i>
3) MRIMOBL	<i>Months from baseline</i>
4) MISSINGNESS	<i>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)</i>
5) LEFT_LATERAL_VENTRICLE	<i>Left lateral ventricle volume</i>
6) LEFT_INF_LAT_VENT	<i>Left inferior lateral ventricle volume</i>
7) LEFT_CEREBELLUM_WHITE_MATTER	<i>Left cerebellum white matter volume</i>
8) LEFT_CEREBELLUM_CORTEX	<i>Left cerebellum cortex volume</i>
9) LEFT_THALAMUS_PROPER	<i>Left thalamus proper volume</i>
10) LEFT_CAUDATE	<i>Left caudate volume</i>
11) LEFT_PUTAMEN	<i>Left putamen volume</i>
12) LEFT_PALLIDUM	<i>Left pallidum volume</i>
13) THIRD_VENTRICLE	<i>Third ventricle volume</i>
14) FOURTH_VENTRICLE	<i>Fourth ventricle volume</i>
15) BRAIN_STEM	<i>Brain stem volume</i>
16) LEFT_HIPPOCAMPUS	<i>Left hippocampus volume</i>
17) LEFT_AMYGDALA	<i>Left amygdala volume</i>
18) CSF	<i>Cerebrospinal fluid volume</i>
19) LEFT_ACCUMBENS_AREA	<i>Left accumbens area volume</i>
20) LEFT_VENTRALDC	<i>Left ventral DC volume</i>
21) LEFT_VESSEL	<i>Left vessel volume</i>
22) LEFT_CHOROID_PLEXUS	<i>Left choroid plexus volume</i>
23) RIGHT_LATERAL_VENTRICLE	<i>Right lateral ventricle volume</i>
24) RIGHT_INF_LAT_VENT	<i>Right inferior lateral ventricle volume</i>
25) RIGHT_CEREBELLUM_WHITE_MATTER	<i>Right cerebellum white matter volume</i>
26) RIGHT_CEREBELLUM_CORTEX	<i>Right cerebellum cortex volume</i>
27) RIGHT_THALAMUS_PROPER	<i>Right thalamus proper volume</i>

Free Surfer MRI Data

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

62)	SUPRATENTORIALVOLNOTVENT	<i>Supratentorial volume without ventricles</i>
63)	SUPRATENTORIALVOLNOTVENTVOX	<i>Supratentorial volume voxel count</i>
64)	MASKVOL	<i>Mask volume</i>
65)	BRAINSEGVOL_TO_ETIV	<i>Ratio of brain segmentation volume to eTIV</i>
66)	MASKVOL_TO_ETIV	<i>Ratio of mask volume to eTIV</i>
67)	ESTIMATEDTOTALINTRACRANIALVOL	<i>Estimated total intracranial volume (eTIV)</i>

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

Free Surfer MRI Data

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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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. <i>Neurobiology of Aging</i> 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.