The BIOCARD Study

Biomarkers of Cognitive Decline Among Normal Individuals

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

Acronyms and Definitions

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

White Matter Hyperintensity MRI Data Limited Dataset Characteristics

Number of variables: 10

Order of variables:

1)	JHUANONID	*Participant ID Anonymized by JHU*
2)	VISITNO	*MRI chronological visit number*
3)	MRIMOBL	*Months since baseline visit*
4)	ICV	*Intracranial volume (in unit mm3)*
5)	WMH	*Global white matter hyperintensity (WMH) volume (in unit mm3)*
6)	FrontalWMH	*Frontal lobe WMH volume (in unit mm3)*
7)	ParietalWMH	*Parietal lobe WMH volume (in unit mm3)*
8)	TemporalWMH	*Occipital lobe WMH volume (in unit mm3)*
9)	OccipitalWMH	*Mean connectivity in sub-network A of default-mode network*
10)	LimbicWMH	*Limbic WMH volume (in unit mm3)*

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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 chronological 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 since baseline visit
	Source	DERIVED
	Question Text	NA
	Time of Collection	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	**ICV**
	Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
	Source	MRI scans
	Question Text	Intracranial volume (in unit mm3)
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = 1072410 Max = 2272590
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf); see also Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi:10.3233/JAD-220846).

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5)

Variable Name	**WMH**
Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
Source	MRI scans
Question Text	Global white matter hyperintensity (WMH) volume (in unit mm3)
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = 0 Max = 126881
Missing OK If	NA
Audit Findings	NA
Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf); see also Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi:10.3233/JAD-220846).

6)

Variable Name	**FrontalWMH**
Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
Source	MRI scans
Question Text	Frontal lobe WMH volume (in unit mm3)
Time of Collection	Baseline and Follow-up
Data Type	Numeric
Allowable Codes	Min = 0 Max = 5488
Missing OK If	NA
Audit Findings	NA
Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf). Regional masks were created using MRICloud and applied to the global WMH mask, as described in Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi: 10.3233/JAD-220846).

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7)	Variable Name	**ParietalWMH**
	Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
	Source	MRI scans
	Question Text	Parietal lobe WMH volume (in unit mm3)
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = 0 Max = 8874
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf). Regional masks were created using MRICloud and applied to the global WMH mask, as described in Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi: 10.3233/JAD-220846).
8)	Variable Name	**TemporalWMH**
	Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
	Source	MRI scans
	Question Text	Occipital lobe WMH volume (in unit mm3)
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = 0 Max = 1178
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf). Regional masks were created using MRICloud and applied to the global WMH mask, as described in Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi: 10.3233/JAD-220846).

9)	Variable Name	**OccipitalWMH**
	Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
	Source	MRI scans
	Question Text	Mean connectivity in sub-network A of default-mode network
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = 0 Max = 4962
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf). Regional masks were created using MRICloud and applied to the global WMH mask, as described in Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi: 10.3233/JAD-220846).
10)	Variable Name	**LimbicWMH**
	Short Description	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II
	Source	MRI scans
	Question Text	Limbic WMH volume (in unit mm3)
	Time of Collection	Baseline and Follow-up
	Data Type	Numeric
	Allowable Codes	Min = 0 Max = 3018
	Missing OK If	NA
	Audit Findings	NA
	Comments	Measure derived from the axial FLAIR scans and quantified using an automated method described by Decarli et al. (2013; Four Tissue Segmentation in ADNI II; https://www.alz.washington.edu/WEB/adni_proto.pdf). Regional masks were created using MRICloud and applied to the global WMH mask, as described in Newton et al. (2023; Regional White Matter Hyperintensities and Alzheimer's Disease Biomarkers Among Older Adults with Normal Cognition and Mild Cognitive Impairment; Journal of Alzheimer's Disease; doi: 10.3233/JAD-220846).