

Healthy Aging & ADRD ECHO

7-16-2024



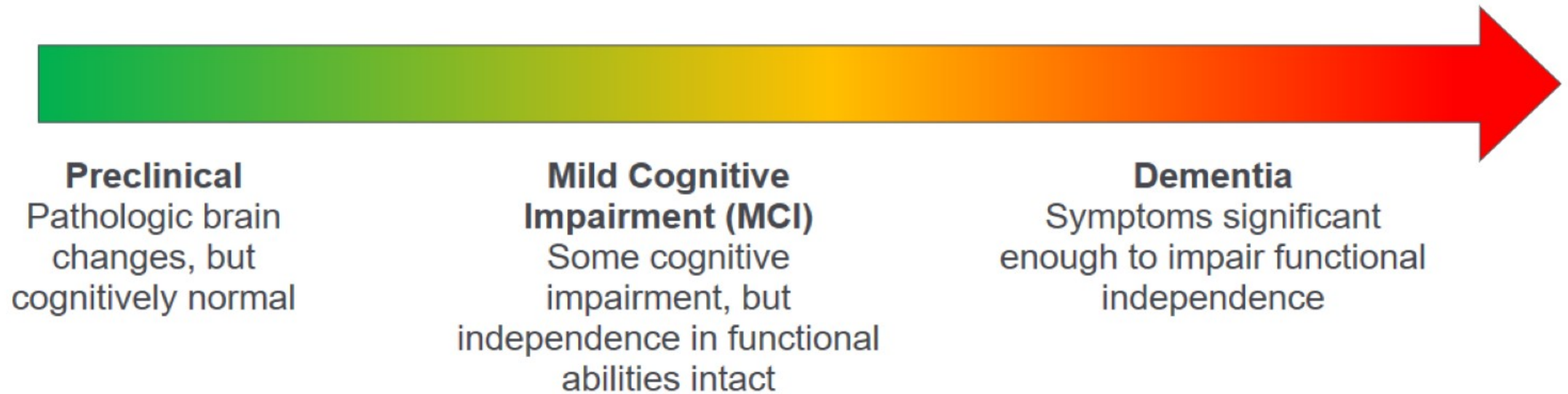
Didactic Presentation

Diseases Causing Dementia
Anne L. Foundas MD. FAAN

Learning Objectives

- To understand the cognitive continuum
- To understand different causes of cognitive decline
- To understand challenges specific to Louisiana

Cognitive Continuum



AA, Alzheimer's Association; NIA, National Institute on Aging.

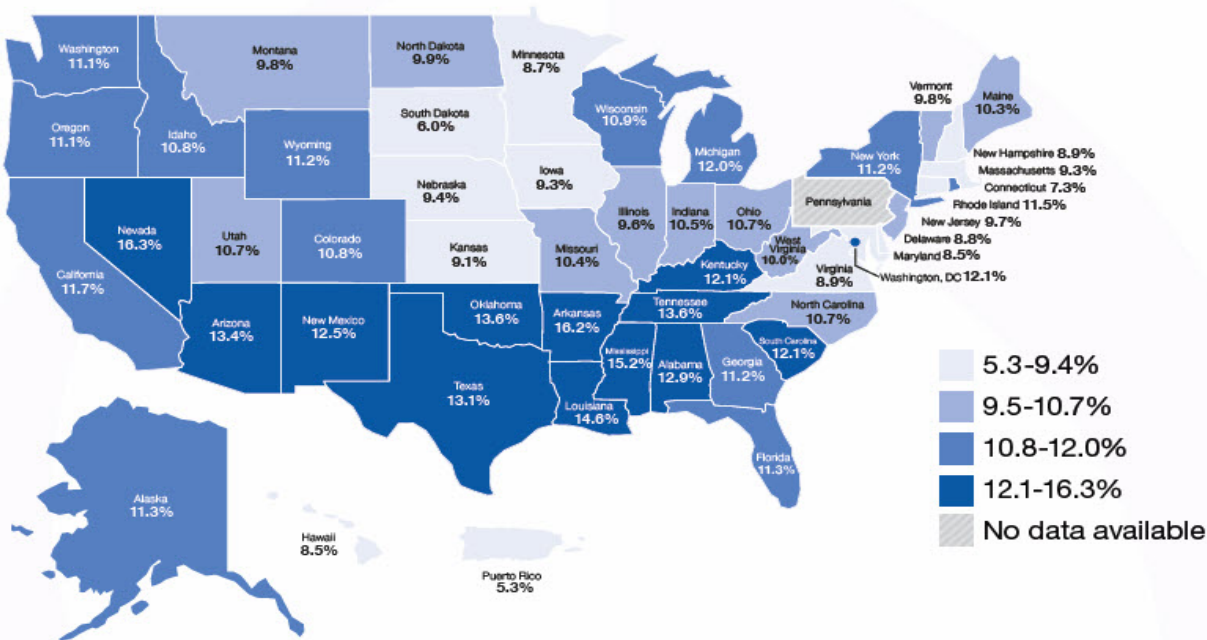
a. Lloret A, et al. Int J Mol Sci. 2019;20:5536; b. Jack Jr CR, et al. Alzheimers Dement. 2018;14:535-562.

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Cognitive Decline in Louisiana

Prevalence of Subjective Cognitive Decline in the U.S.

Figure 1: Adults 45 years of age and older with Subjective Cognitive Decline



LOUISIANA POPULATION DATA

45-54	528,974	11.42%
65-74	493,078	10.65%
75-84	232,006	5.01%
85+	85,306	1.84%

Total >45 yrs 1,339,364

Total State Population 2021 = 4,624,000

29% of the State Population is over 45 years of age

According to the CDC, 14.6% of Louisiana residents over 45 years of age have Subjective Cognitive Decline (SCD) and are at risk for dementia. Based on current population data, about 195, 547 Louisiana citizens are at risk.

LOUISIANA

SUBJECTIVE COGNITIVE DECLINE

LA

2019 Behavioral Risk Factor Surveillance System (BRFSS): People Aged 45 Years and Older

1 in 7

people aged 45 years and older are experiencing

Subjective Cognitive Decline



SCD is self-reported **MEMORY PROBLEMS** that have been **GETTING WORSE** over the past year.

86%

of people with SCD have at least one chronic condition



50% of people with SCD had to give up day-to-day activities



less than half

of people with SCD have discussed their symptoms with a healthcare provider



nearly half

of people with SCD say it interfered with social activities, work, or volunteering



44%

of people with SCD need help with household tasks



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

alzheimer's
association

cdc.gov/aging

CDC 50A003-A May 2021



Mild Cognitive Impairment (MCI) - *Definition*

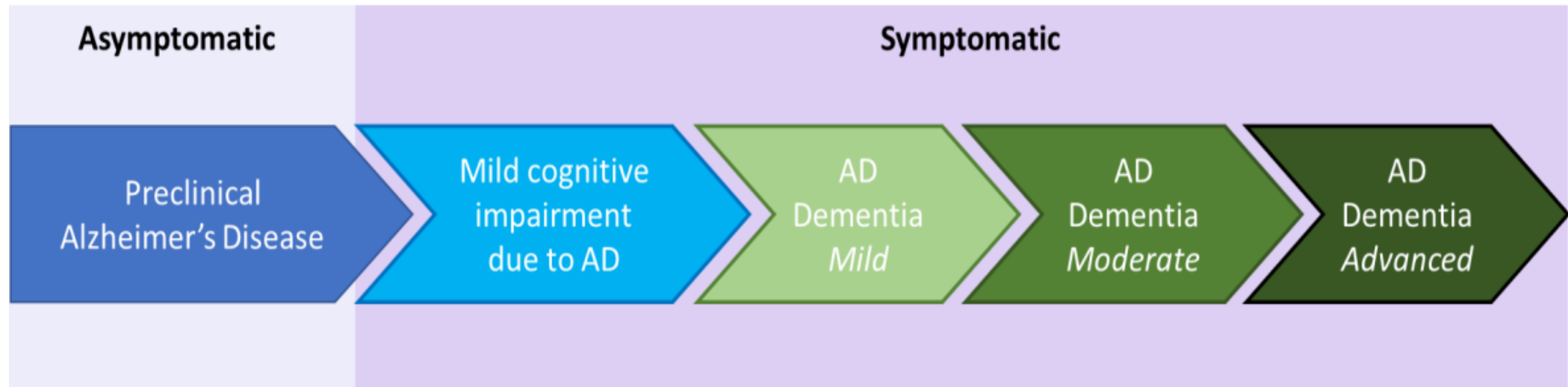
Cognitive decline

- Deficits on objective cognitive testing
- Deficits can be in a Single or Multiple Cognitive domains

Functionally independent

- No significant functional changes

Not all patients with a diagnosis of MCI progress to dementia

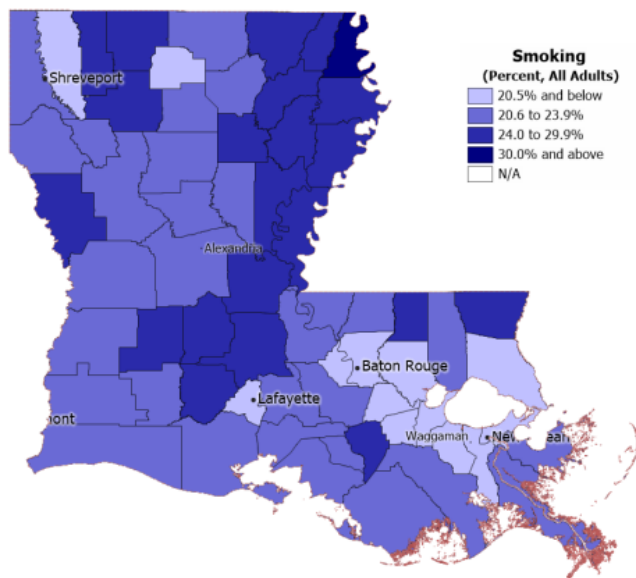


Alzheimer's disease (AD) continuum, based on the 2011 NIA-AA diagnostic guidelines



Risk Factors for Cognitive Decline Louisiana

Smoking



Statewide Rate 19.5%

NOTE: Statewide rate may differ from other published figures due to differences in data year, age group, and survey question.

Source: Public Health Center of Excellence on Dementia Risk Reduction at the Alzheimer's Association, based on data from PLACES, Centers for Disease Control and Prevention, October 2023.
Mapping Software: © 2023 CALIPER

This Fact Sheet is supported by the Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling \$2,973,948. The contents are those of the Alzheimer's Association and do not necessarily represent official views of nor an endorsement by, CDC, HHS, or the U.S. government.

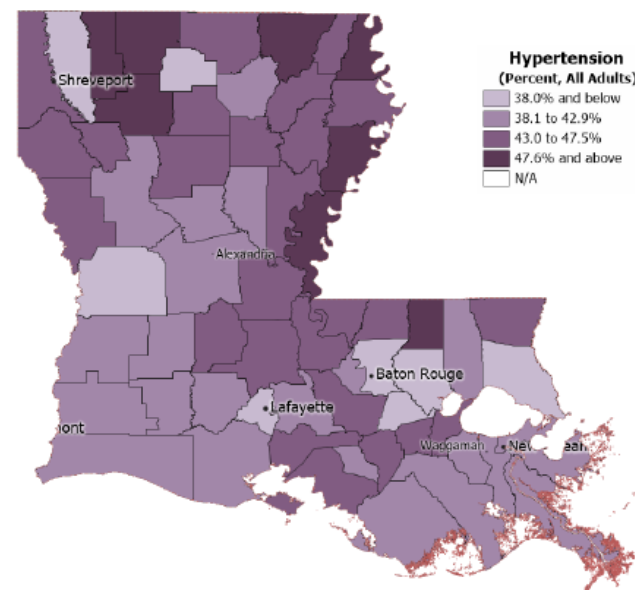
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Risk Factors for Cognitive Decline Louisiana

Hypertension



Statewide Rate 40.2%

NOTE: Statewide rate may differ from other published figures due to differences in data year, age group, and survey question.

Source: Public Health Center of Excellence on Dementia Risk Reduction at the Alzheimer's Association, based on data from PLACES, Centers for Disease Control and Prevention, October 2023.
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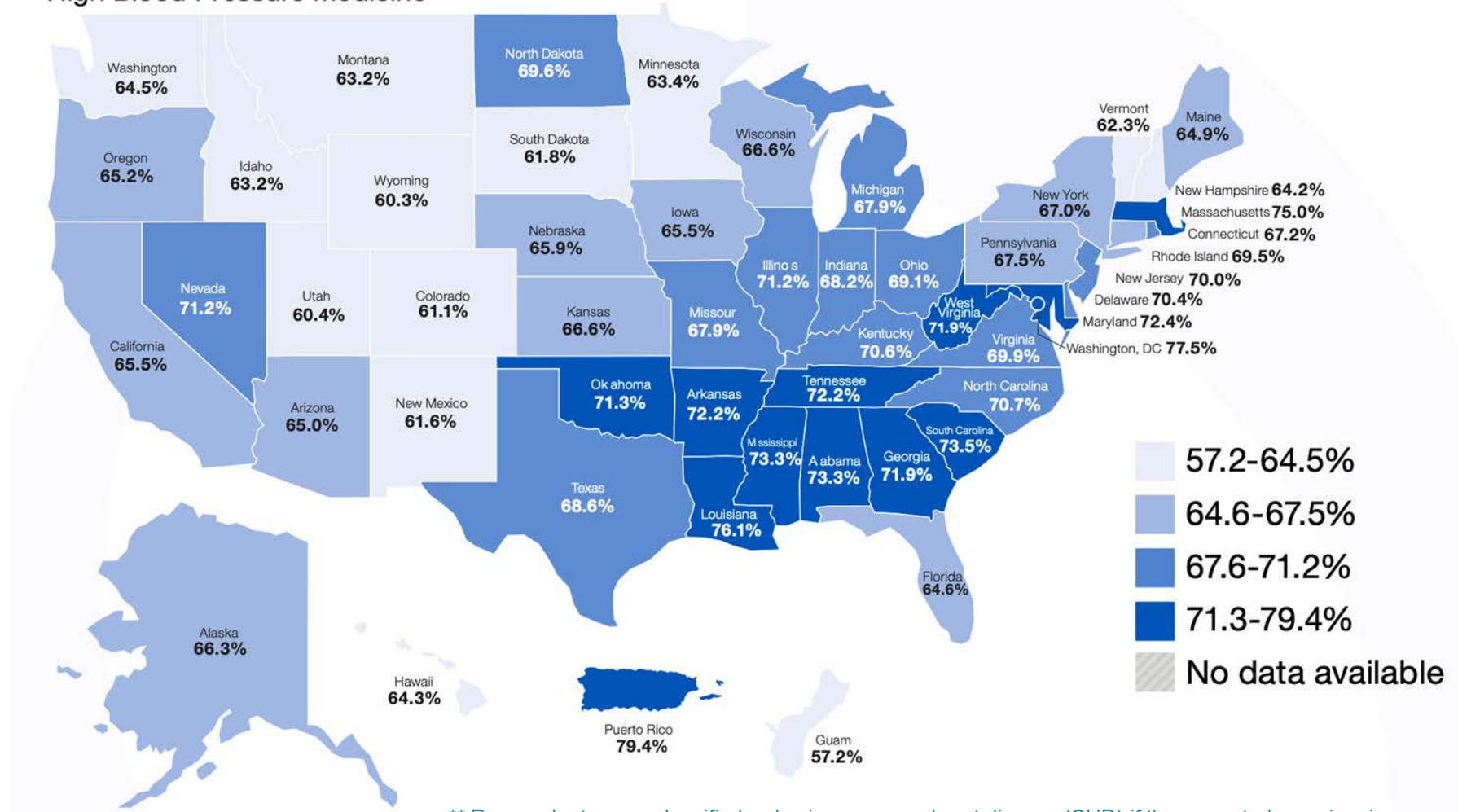
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Health Status: Taking Medications for High Blood Pressure Among Adults with CHD or a Stroke, or Both

Figure 4: Adults Aged 45 years and Older with CHD, or a Stroke, or Both and Reported Taking High Blood Pressure Medicine



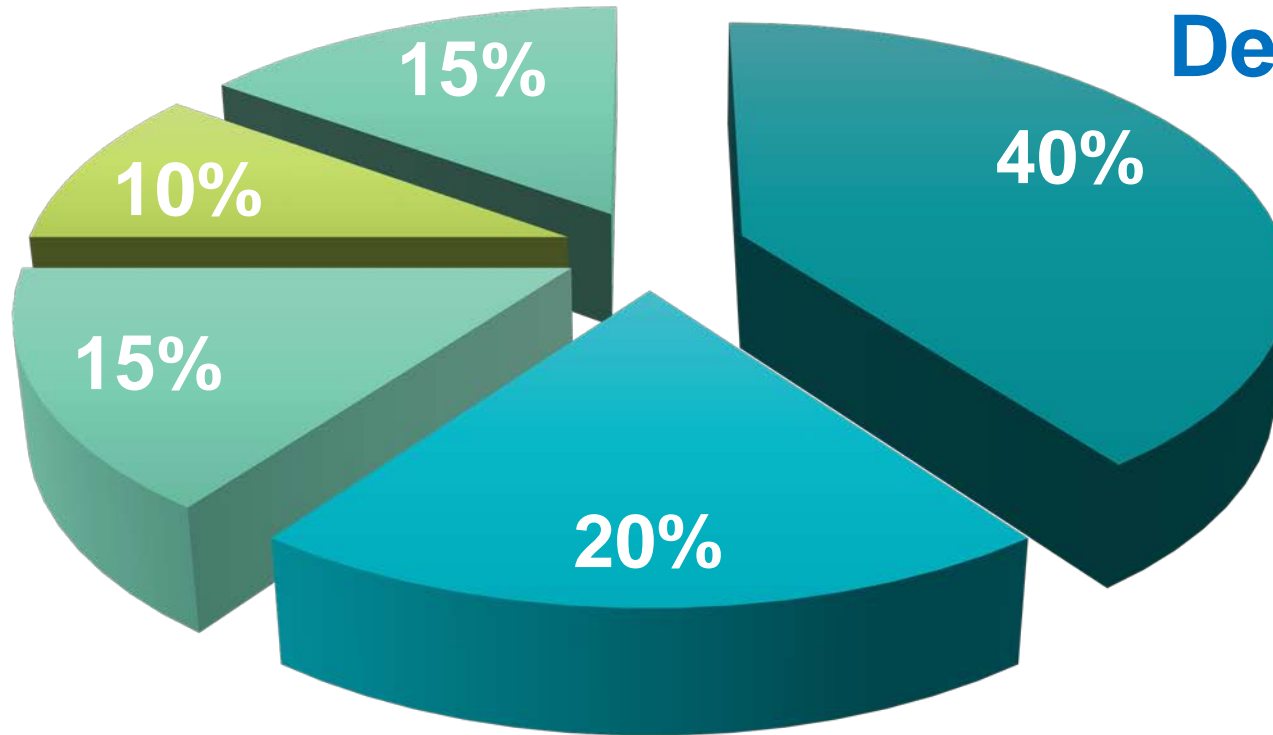
** Respondents were classified as having coronary heart disease (CHD) if they reported experiencing a heart attack (i.e., myocardial infarction) or angina

Statement of the Problem

- **50 million people worldwide have dementia**
- **Alzheimer's disease (AD) is the most common cause of dementia**
 - 1 in 9 people over 65 years have AD
 - > 6 million Americans; 7th leading cause of death
- **The percentage of people with AD doubles**
 - In every 5-year age group beyond 65 years
- **Age of Onset is younger in Louisiana**
- **Annual costs for the care of individuals with AD**
 - In 2022 dementia cost the United States > \$321 billion
 - Caregivers provided >18.1 billion hours of unpaid care

Statement of the Problem – Worldwide Prevalence of Dementia

Dementia Subtypes



- Alzheimer's disease (40%)
- Vascular dementia (20%)
- Mixed dementia (15%)
- Frontal dementias (10%)
- Other (15%)

REFERENCE: Rougus-Pulia, Foundas, Mueller (2020) Chapter 14, Neurologic and Neurodegenerative Diseases of the Larynx

TABLE - Dementia Subtypes

Degenerative Dementias	Percent	Subtypes	Symptoms	Pathology
Alzheimer's disease (AD)	40%	Early-onset (before age 65) Late-onset (after age 65)	Profound memory loss; Cognitive decline	Amyloid (AB 42) plaques; Neurofibrillary (tau) tangles
Frontal Dementias (FTD)	10%	Frontotemporal dementia (FTD) behavioral variant; Pick's disease; Semantic dementia; Primary Progressive Aphasia	Variable; Less memory loss than AD	Heterogeneous; Tau vs. Non-tau types
Mixed Dementia types	15%	AD plus VaD; Lewy body disease; Corticobasal degeneration	Variable	Heterogeneous
Vascular Dementia (VaD)	20%		Variable	Vascular disease
Multi-infarct dementia (large-vessel stroke); Small-vessel disease (chronic microvascular disease); Mixed type (Large and small vessel disease)			Variable	Vascular disease
Other Dementia types	15%	Subtypes	Symptoms	Pathology
Parkinson's Disease (PD) with dementia		Degenerative disease with about 30% of PD patients developing dementia; 60-80% have depression	Variable	Lewy body; Alpha synuclein
Traumatic Brain Injury (TBI)		Concussion; Intracranial hemorrhage; Hematomas – subdural; epidural	Greater Executive function deficits	Heterogeneous
Toxic, Metabolic, Endocrine, Deficiency		Alcoholic Dementia; B12 deficiency; Hypothyroidism		Deficiency states; Endocrine
Infectious/Inflammatory/ Autoimmune		Creutzfeldt-Jacob disease (CJD); Herpes simplex encephalitis; HIV dementia; Multiple sclerosis/demyelinating disorders		Heterogeneous
Chronic medical diseases		Chronic Renal disease; Hepatic disorders		Toxic/metabolic
Others disorders with cognitive decline		Multiple sclerosis; Brain tumors; Normal pressure hydrocephalus; Huntington's disease; Chronic major psychiatric disorders; Substance abuse syndromes		Heterogeneous

Criteria for Diagnosis

What does Alzheimer's Disease Look Like?

Cognitive decline with objective cognitive deficits

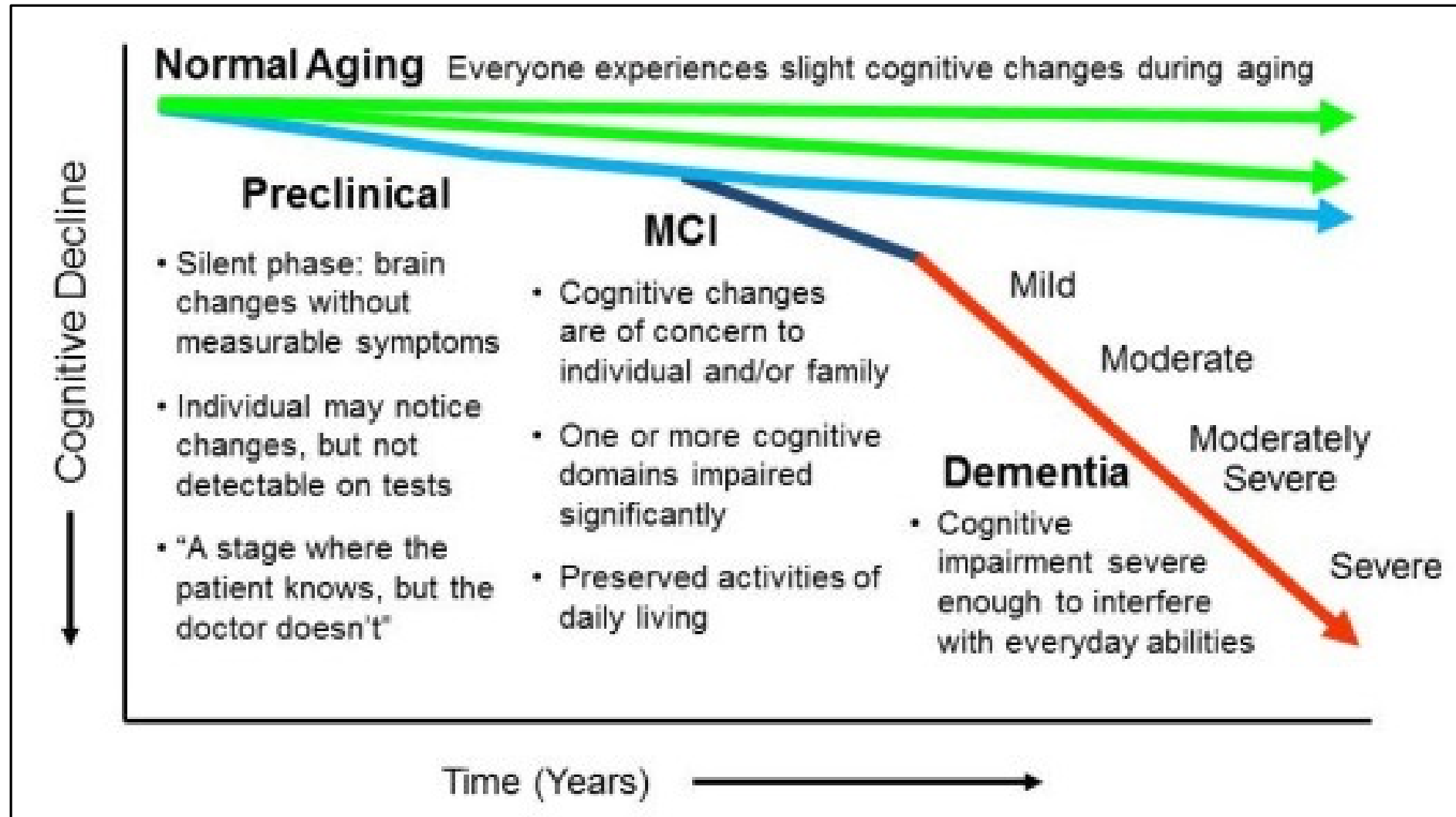
- Memory impairment and at least one of the following: *aphasia, apraxia, agnosia*, or a *disturbance in executive functioning*

Required criteria

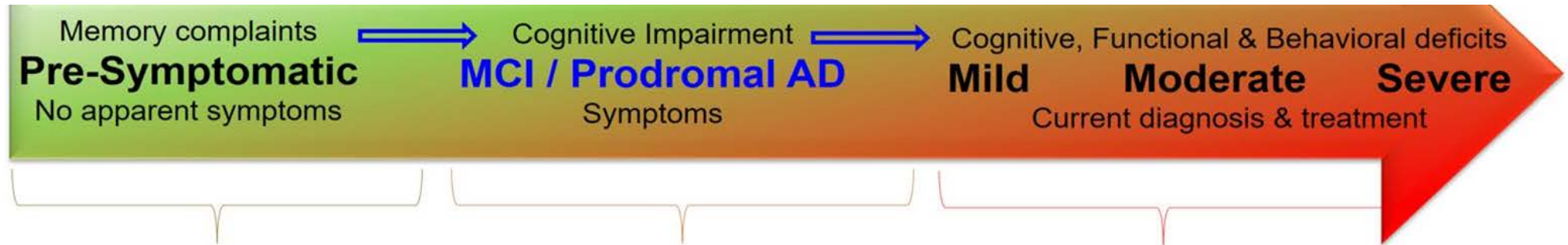
- *Decline* from previous higher cognitive function
- *Functional deficits* - Severe enough to impair occupational or social function

Gradual & slowly progressive cognitive decline

The Continuum of Alzheimer's Disease & Dementia



Sperling RA et. al. *Alzheimer's Dementia*. 2011; 7: 280-292



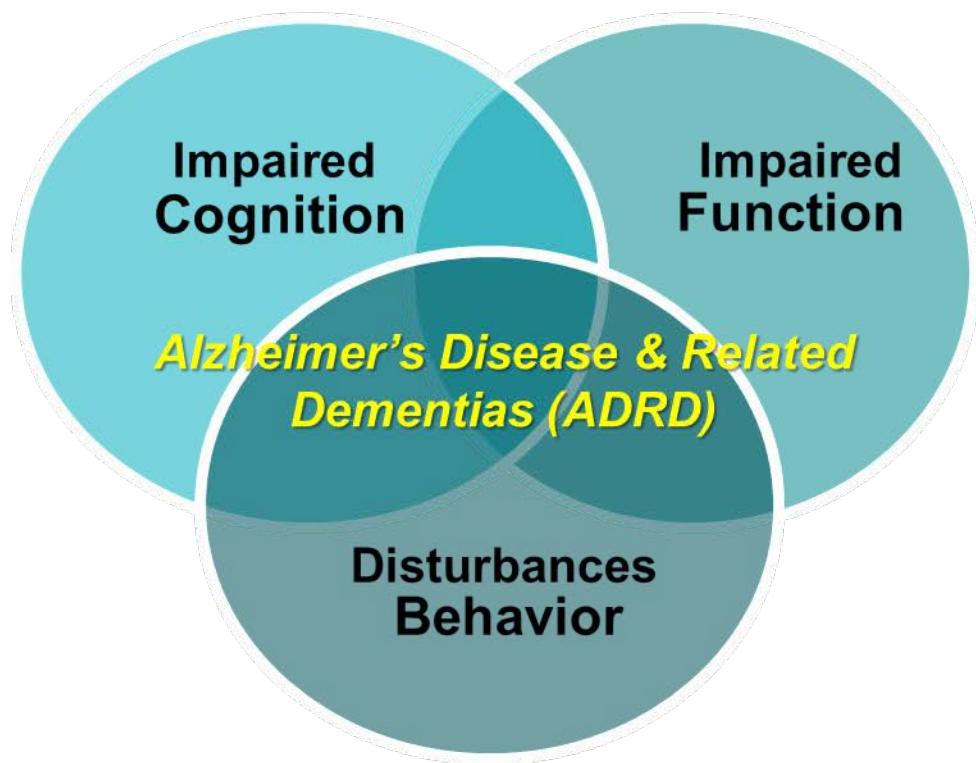
- Risk factors; family history, old age, ApoE4 genotype, TBI, mutations
- No symptoms, or subtle cognitive deficits
- Emerging biomarker evidence of AD pathology
- Mild cognitive impairment (MCI)
- Amnesic Mild Cognitive Impairment (aMCI) – episodic memory deficits
- aMCI combined with Emerging biomarker evidence of AD pathology
- AD diagnosis based on clinical symptoms; cognitive deficits & dementia of the AD type
- Biomarker evidence of AD pathology may increase specificity of diagnosis



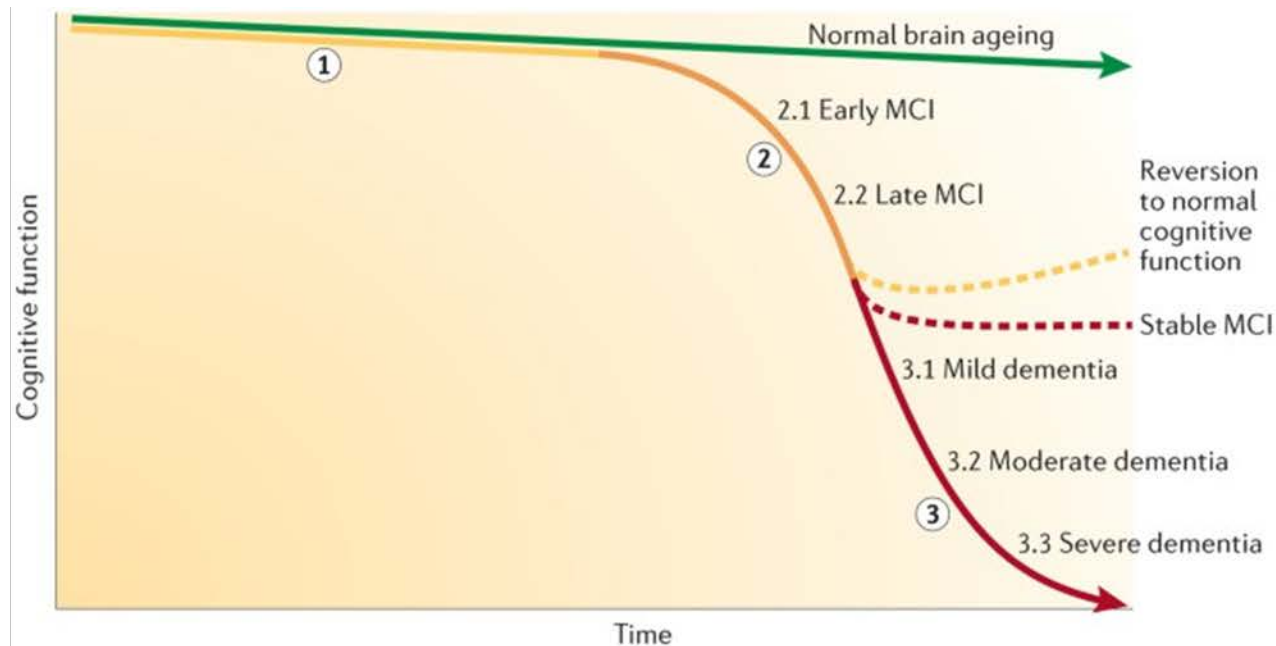
Preclinical
Pathologic brain changes, but cognitively normal

Mild Cognitive Impairment (MCI)
Some cognitive impairment, but independence in functional abilities intact

Dementia
Symptoms significant enough to impair functional independence



Reference: Hampel & Lista (2016) The rising tide of cognitive impairment. *Nature Reviews Neurology*. 12, 131-132.



1. Preclinical stage: asymptomatic, at-risk
Duration: decades

- Amyloid- β accumulates in the brain
- Tau hyperphosphorylation gradually leads to neuronal loss
- Pathology does not yet noticeably affect cognition
- Biomarkers and genetic profile can indicate the risk of disease progression and reveal underlying AD

2. Prodromal stage: MCI
Duration: ~7 years
Subtypes:

- Progressive MCI
- MCI caused by AD
- Amnesic syndrome of the hippocampal type
- Deficits in memory and/or other cognitive domains noticeable to the person affected and/or others, but not severe enough to interfere with activities of daily living
- Biomarkers can determine the aetiological diagnosis

3. Syndromal stage: dementia
Duration: ~7 years; followed by total loss of independent function

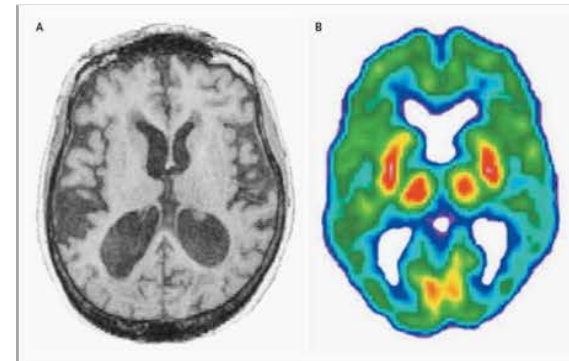
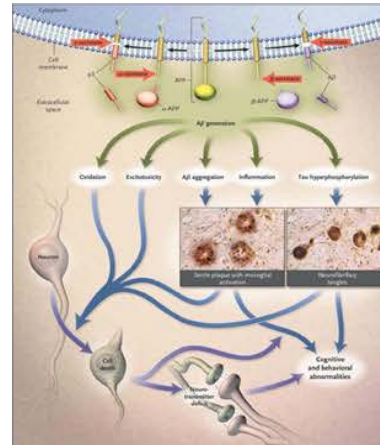
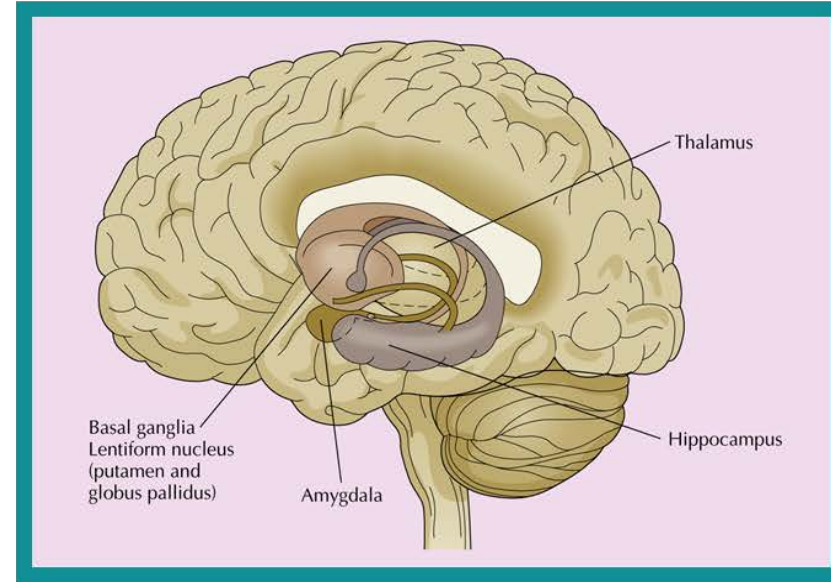
- Notable loss of intellectual ability affecting memory and at least one other cognitive domain
- The impairment interferes with activities of daily living

Cognitive & Behavioral Change: *Is it Degenerative or Something Else?*

- **Degenerative Dementia**
 - Alzheimer's disease
 - Frontotemporal dementia
 - FTD, Semantic dementia, Pick's disease
 - Primary progressive aphasia
- **Mixed Etiology**
 - Alzheimer's disease & Vascular disease
 - Alzheimer's disease & Depression/ Substance Use Disorder
 - Lewy Body disease – AD & PD

The Brain & Behavior

Will You Remember Me? Understanding Alzheimer's & Dementia



Clinical Assessment

Cognitive, Functional, Behavioral Domains

Cognition

MMSE – Mini-Mental State Examination
MoCA – Montreal Cognitive Assessment
ADAS-COG – Alzheimer's Disease Assessment Scale-Cognitive

Function

ADFACS – Alzheimer's Disease Functional Assessment & Change Scale
DAD – Disability Assessment for Dementia


Behavior

NPI – Neuropsychiatric Inventory
GDS – Geriatric Depression Scale

Global function

CIBIC - Clinicians' Global Impression of Change
GDS – Global Deterioration Scale

Mini-Mental Status Examination (MMSE)

Mini-Mental State Examination		
Maximum score	Score	
Orientation		
5	_____	What is the (year) (season) (date) (day) (month)?
5	_____	Where are we: (state) (county) (town or city) (hospital) (floor)?
Registration		
3	_____	Name three common objects (e.g., "apple," "table," "penny"): Take one second to say each. Then ask the patient to repeat all three after you have said them. Give one point for each correct answer. Then repeat them until he or she learns all three. Count trials and record. Trials: _____
Attention and calculation		
5	_____	Spell "world" backwards. The score is the number of letters in correct order. (D _ L _ R _ O _ W _)
Recall		
3	_____	Ask for the three objects repeated above. Give one point for each correct answer. (Note: recall cannot be tested if all three objects were not remembered during registration.)
Language		
2	_____	Name a "pencil" and "watch." Repeat the following: "No ifs, ands or buts."
1	_____	Follow a three-stage command:
3	_____	"Take a paper in your right hand, fold it in half and put it on the floor." Read and obey the following:
1	_____	Close your eyes.
1	_____	Write a sentence.
1	_____	Copy the following design.
		
Total score: _____		

COGNITIVE DOMAINS

- Orientation
- Attention
- Memory
 - Immediate
 - Short-term recall
 - Long-term memory
- Executive Function
- Left Brain Function
 - Speech & Language
 - Praxis
- Right Brain Function
 - Visuospatial Processing
 - Reproduction

FAQ (Pfeffer et al, 1982)

Functional Activities Questionnaire

Rate level of performance on each of the following tasks using this scale: 0 = normal; 1=has difficulty but does by self; 2=requires assistance; 3=dependent.

- _____ Writing checks, paying bills, keeping financial records (eg, balancing a checkbook)
- _____ Assembling tax records and making out business and insurance papers
- _____ Shopping alone for clothes, household necessities, or groceries
- _____ Playing a game of skill (eg, bridge or chess) or working on a hobby
- _____ Heating water for a cup of coffee or tea and turning off the stove
- _____ Preparing a balanced meal
- _____ Keeping track of current events
- _____ Paying attention to and understanding a television show, book, or magazine
- _____ Remembering appointments, family occasions, and medications
- _____ Traveling out of the neighborhood (eg, driving or arranging to take buses)

Score: _____

Scoring: The score is obtained by adding together the points for the 10 items. A total of 30 points is possible.

Score interpretation: The higher the score, the poorer the function (i.e., the greater the impairment).



Risk Factors for Alzheimer's Disease

- Atherosclerotic vascular disease
- Hypertension & high cholesterol levels
- Lower educational attainment
- Obesity/high BMI
- Major and/or multiple Head injury
- Depression

- Armstrong, Richard A. Risk factors for Alzheimer's disease. *Folia neuropathologica* 57.2 (2019): 87-105.
- Silva, Marcos Vinícius Ferreira, et al. Alzheimer's disease: risk factors and potentially protective measures. *Journal of biomedical science* 26 (2019): 1-11.
- Zhang, X-X., et al. The epidemiology of Alzheimer's disease modifiable risk factors and prevention. *The journal of prevention of Alzheimer's disease* 8 (2021): 313-321.

Criteria for AD Dementia Diagnosis: What Alzheimer's Disease Looks Like

- Cognitive deficits not due to other conditions
 - Cerebrovascular disease, Parkinson's disease, Other degenerative dementias like FTD behavioral variant, Pick's disease, Semantic dementia, Lewy Body disease
 - Hypothyroidism, vitamin B₁₂ – vitamin D deficiency, hypercalcemia
 - Alcohol intoxication or other substance-induced conditions
 - Other more rare disorders: Huntington's disease, Creutzfeldt-Jakob disease, subdural hematoma, normal-pressure hydrocephalus, brain tumor
 - Infectious Diseases: HIV infection, neurosyphilis, COVID
- Symptoms occur not only during delirium
- Symptoms not because of Psychiatric disorder
 - Major depressive disorder, Schizophrenia, Bipolar disorder