



Social Determinants of Health: Wisconsin Longitudinal Study and Alzheimer's

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Definition

- Social Determinants of Health:

Conditions in the environments in which people are born, live, work, play, worship, and age that impact a wide array of health, functioning, quality-of-life outcomes and risks*





CDC Health Impact Pyramid

Factors that Affect Health



Check the Tarrant County Public Health Web site to learn more.
<http://health.tarrantcounty.com>



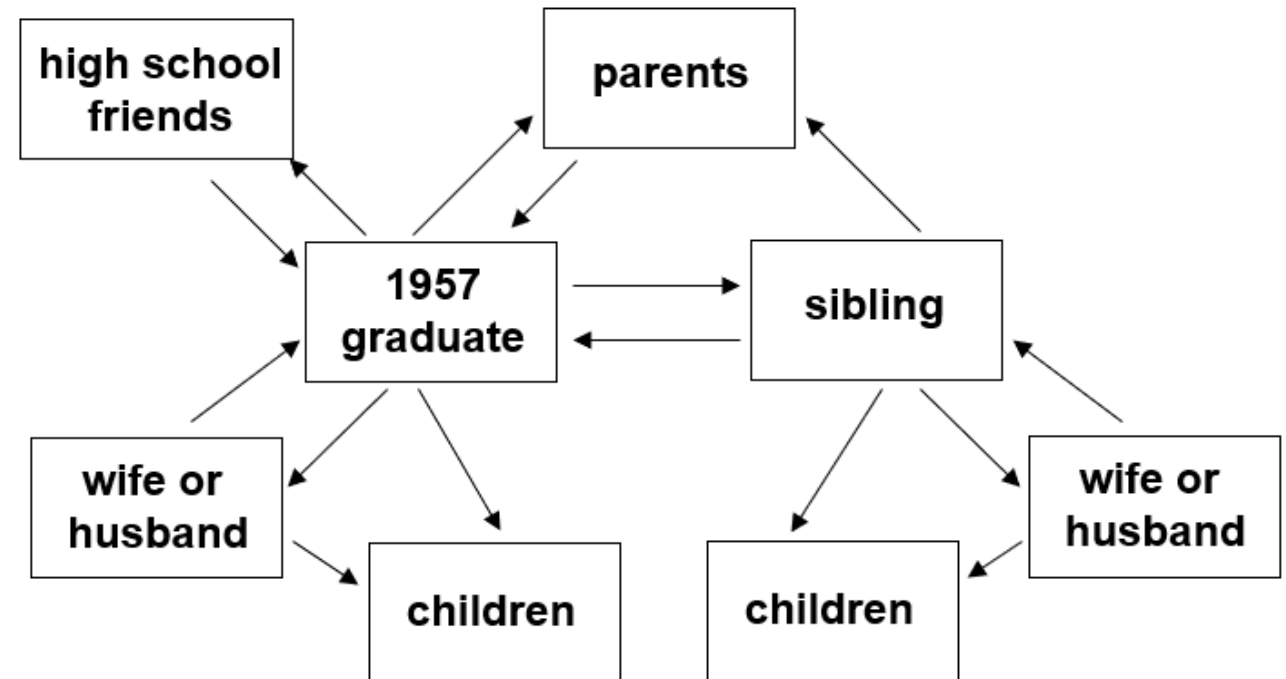
1957: The Wisconsin Longitudinal Study (WLS) is born

- NIH-funded since 1957
- 1/3 of all high school graduates
 - 10,317
- Social sciences-based study
- Data collection focused on:
 - Education, family life, aspirations, etc.
- Community-based sample
 - Rural and urban
 - All ranges of SES represented
 - 20% below poverty line at study enrollment
 - Largely a white, non-Hispanic sample
- Has become a world-class study
 - Nearly 500 different papers have come from this data



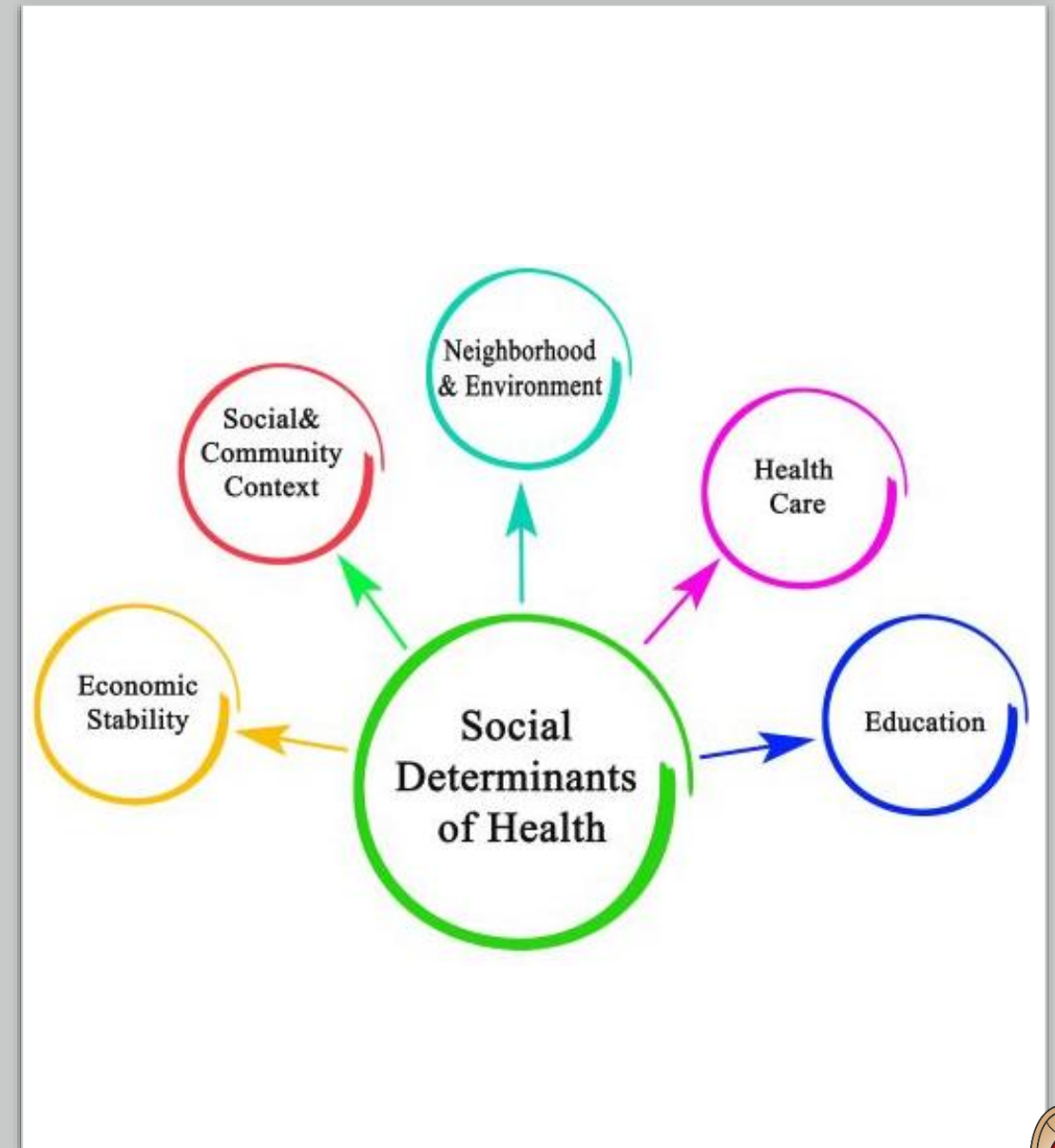
60+ years of data collection!

- Since 1957, WLS has had multiple waves of data collection:
 - 1964
 - 1975 – siblings added
 - 1993
 - 2003
 - 2011
 - NOW!



WLS has collected a wealth of data!

- Data collected from prior waves:
 - Participant and family wealth and income
 - Employment history
 - Educational history
 - Mental and physical health history
 - Social activities
 - Religious affiliation
 - Childhood IQ
 - Cognitive testing
 - Genetics



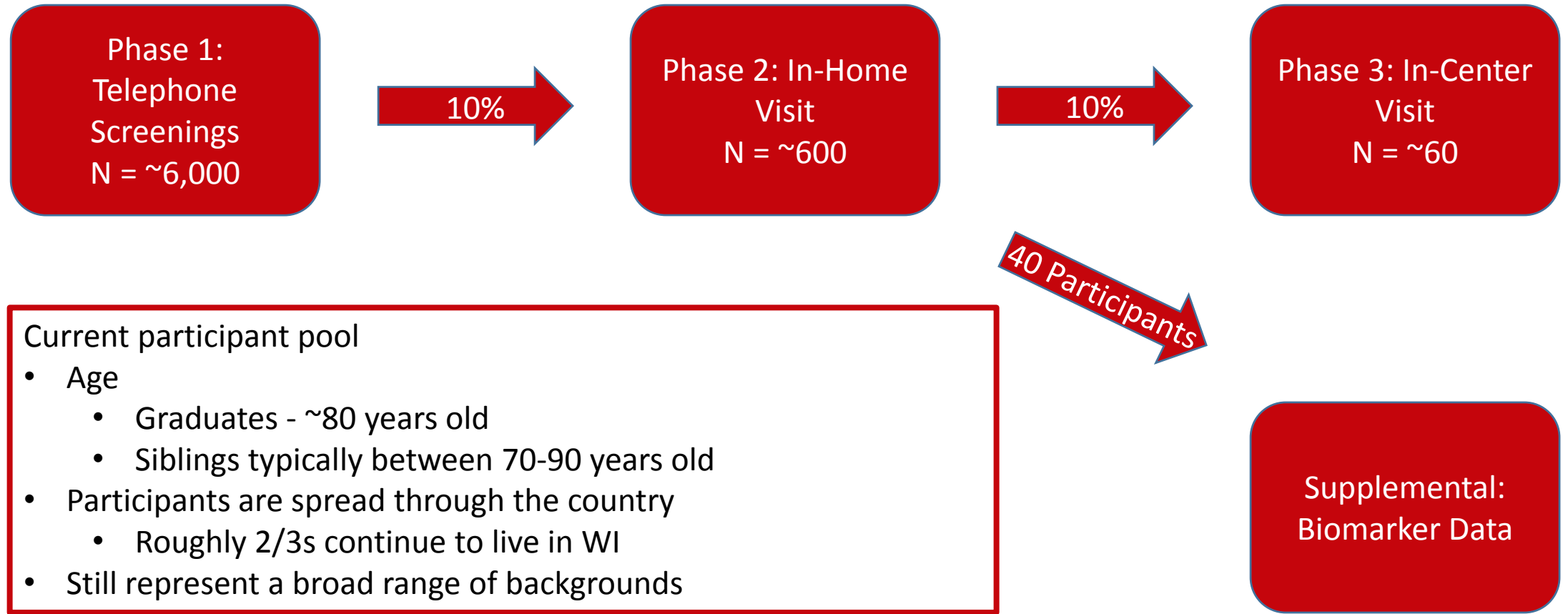
ILIAD Aims

Track	Track the progression of dementia across cognitive phenotypes (normal, AD dementia, non-AD dementia), including the use of rigorous AD diagnostic protocols, in the full population-based WLS cohort.
Test	Test the role of early life disadvantage/ advantage on the risk for AD/ADRD in later life.
Test	Test whether early life disadvantage may be offset by adult behavioral protective factors.
Test	Test whether adolescent IQ and educational attainment moderate genetic risk for AD/ADRD.
Create	Create a public good: a data resource that can facilitate cutting edge dementia research.



WLS Current Wave: ILIAD!

Initial Lifetime's Impact on Alzheimer's Disease and Related Dementias



Phase 1: Telephone Screenings

Phase 1:
Telephone
Screenings
N = ~6,000

- Utilizes the Telephone Interview for Cognitive Status – Modified (TICS-m)
 - Out of 50
 - 28 cutoff point
 - Adjustments for education level
- Collects updates on data from prior waves
- Roughly 10% of participants will move on to Phase 2
- Pros:
 - Gathering updated data on much of the cohort
- Cons:
 - Our participants are 80 and hearing is an issue

Phase 2: In-Home
Visit
N = ~600

Phase 3: In-Center
Visit
N = ~60

Supplemental:
Biomarker Data



Phase 2: “In-Home” Visits

Pre-COVID:

- Phase 1: Telephone Screenings
- Visits completed by a field interviewer and a nurse practitioner
 - Visit includes:
 - Fully-clothed physical exam
 - Neurological exam
 - Cognitive testing
 - Study partner interview
 - Culminates with a consensus conference
 - Roughly 10% moving on for Phase 3 visit

Phase 2: In-Home Visit
N = ~600

Post-COVID:

- Phase 3: In-Center Visit
N = ~60
- Restarted this month
 - Phone “visit” includes:
 - Modified cognitive testing
 - Fewer tests
 - Study partner interview
 - Discussion of medical history
 - Will be longer and more in-depth than the Phase 1 Phone Screener
 - Culminates with a consensus conference
 - Could result in greater than 10% moving on for Phase 3



Phase 3: In-Center Visits

- Restarting within the next couple months
 - Enhanced COVID safety protocols to be modeled off Dane County and CDC recommendations
 - In-person AD research has restarted on other studies
- Visit includes:
 - MRI
 - Blood draw
 - Basic Metabolic Panel
 - Lipid Panel
 - Hs-CRP
- Case returns to consensus after visit



Phase 3: In-Center
Visit
N = ~60



Supplemental:
Biomarker Data

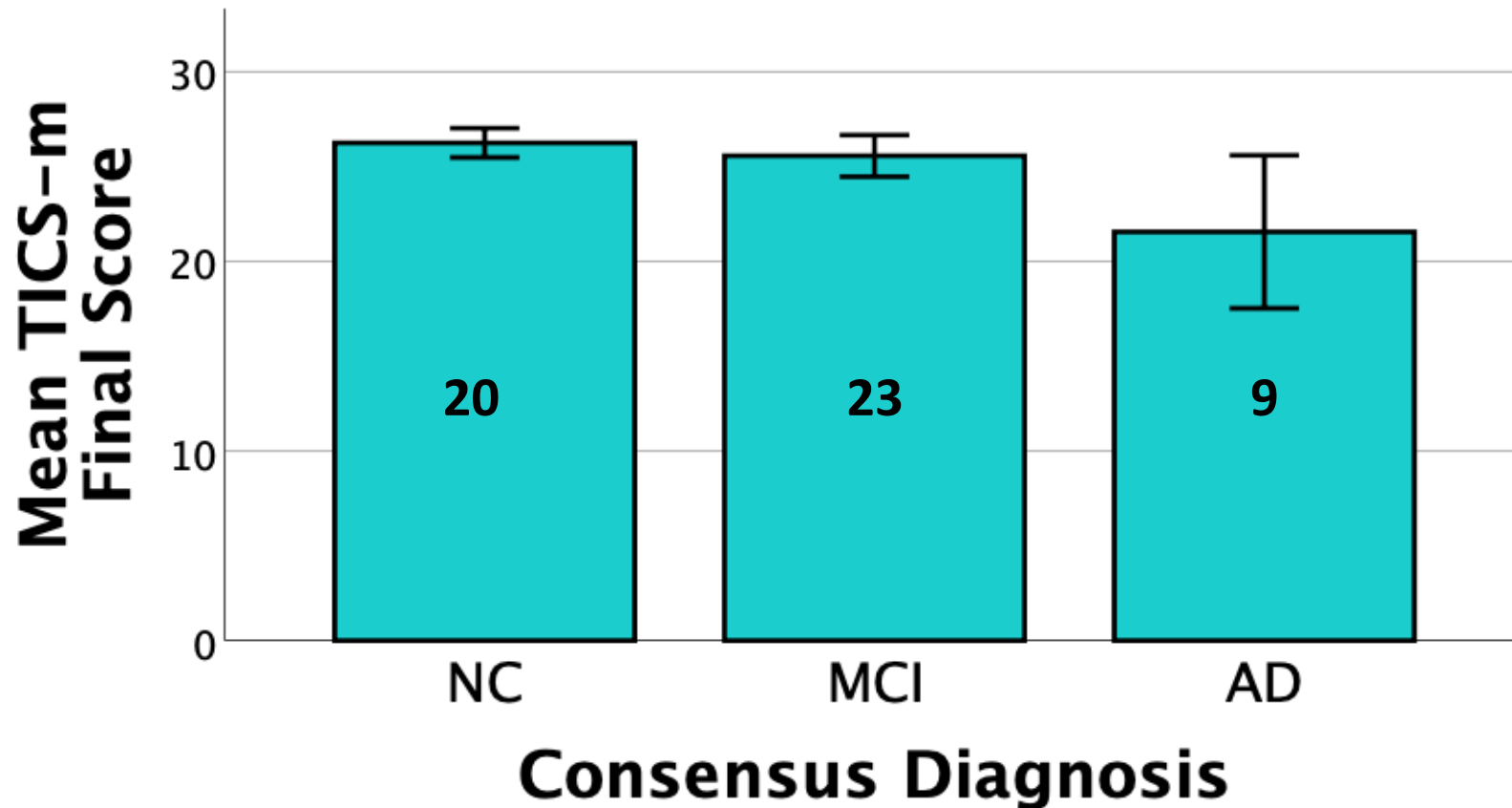


Cognitive score sheet

	Raw Score	Standard	Percentile	Description
GENERAL COGNITION				
CDR Global (1 SOB)	0.5			Normal
MoCA	22 /30	-0.79	21	Low Average
ATTENTION / PROCESSING SPEED				
Trailmaking Part A (0 errors)	58 sec	-0.97	17	Low Average
Number Span Forward - Total	5 /14	-1.38	8	Borderline
Number Span Forward - Span Length	5 /9	-1.33	8	Borderline
Number Span Backwards - Total	3 /14	-1.71	4	Borderline
Number Span Backwards - Span Length	3 /8	-1.50	6	Borderline
WAIS-R Digit Symbol	35	12	75	Average
LANGUAGE				
MINT	28 /32	-0.27	38	Average
Animal Fluency	16	-0.37	35	Average
Vegetable Fluency	6	-2.31	1	Impaired
F+L Words	21	-0.71	23	Low Average
F+L+C Words	33	10.00	50	Average
F Words	11	-0.65	25	Average
L Words	10	-0.65	25	Average
VISUOSPATIAL				
Benson Figure Copy	16 /16	0.44	67	Average
MEMORY				
Benson Delay (0% retained; Recog = N)	0 /16	-3.03	1	Impaired
Craft Immediate - Verbatim	5 /44	-2.43	1	Impaired
Craft Immediate - Paraphrase	3 /25	-3.05	1	Impaired
Craft Delay - Verbatim (80% retained)	4 /44	-1.86	3	Borderline
Craft Delay - Paraphrase (100% retained)	3 /25	-2.31	1	Impaired
RAVLT Total Learning (4, 6, 7, 6, 6)	29 /75	-1.08	13	Low Average
RAVLT Distractor List	3 /15	-0.56	28	Average
RAVLT Short Delay	0 /15	-2.26	1	Impaired
RAVLT Long Delay (0% retained)	0 /15	-2.92	1	Impaired
RAVLT Recognition (TP=12; TN=12)	80 %	7	16	Low Average
EXECUTIVE FUNCTIONING				
Trailmaking Part B (2 errors)	163 sec	-0.82	20	Low Average
Clock Drawing Test	2 /3	---	---	Impaired
MOOD				
GDS-15 (Depression Symptoms)	0 /15	---	---	Minimal



TICS-m Score by Consensus Diagnosis

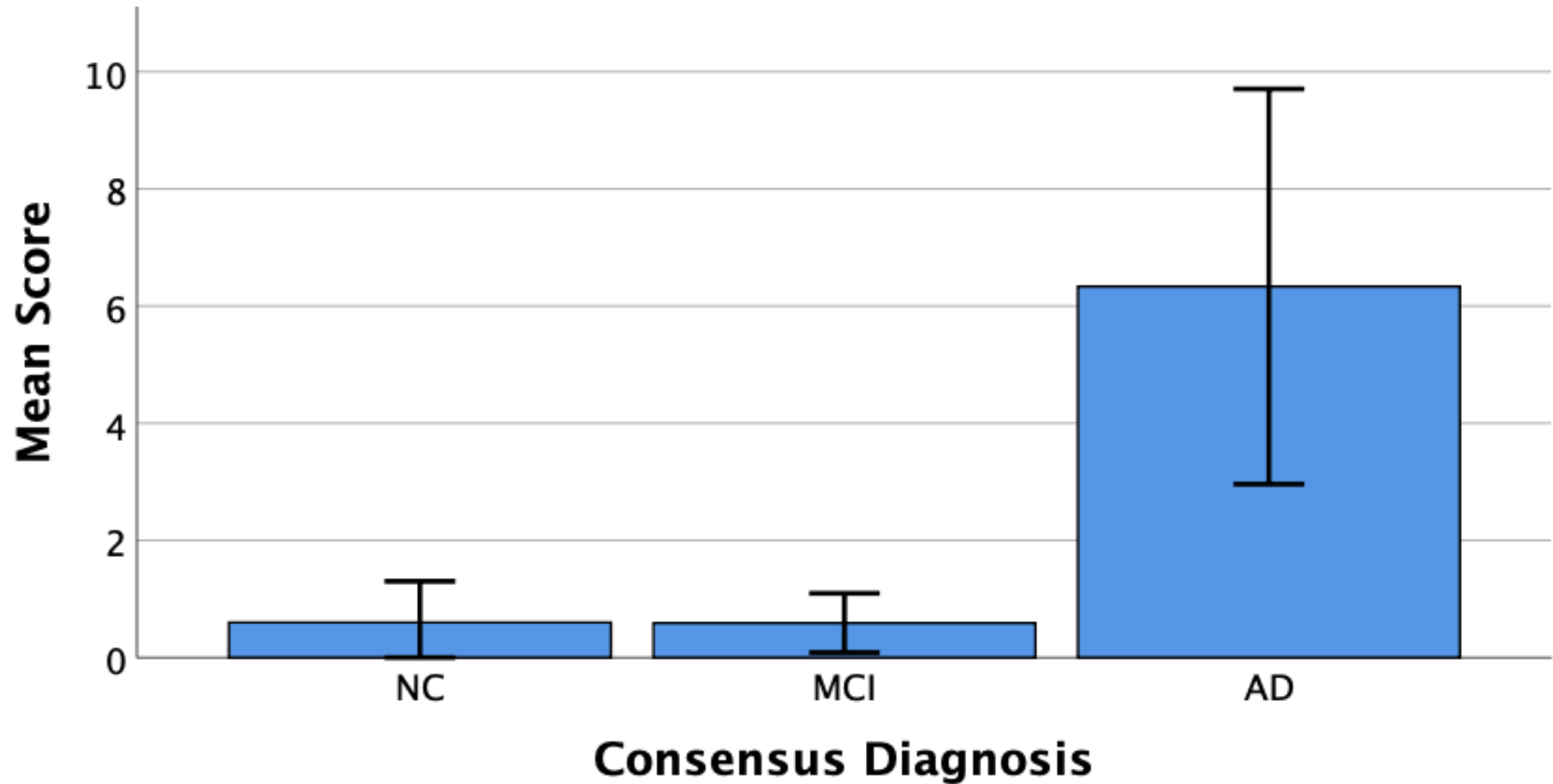


Error Bars: 95% CI

TICS-m score significantly predicted diagnosis overall ($F(49)=8.55$, $p=0.001$). There was a significant difference in TICS-m score between AD and both MCI ($p=0.003$) and normal controls ($p=0.001$), but not between NC and MCI ($p=0.722$).



NACC Functional Assessment Scale (FAS)



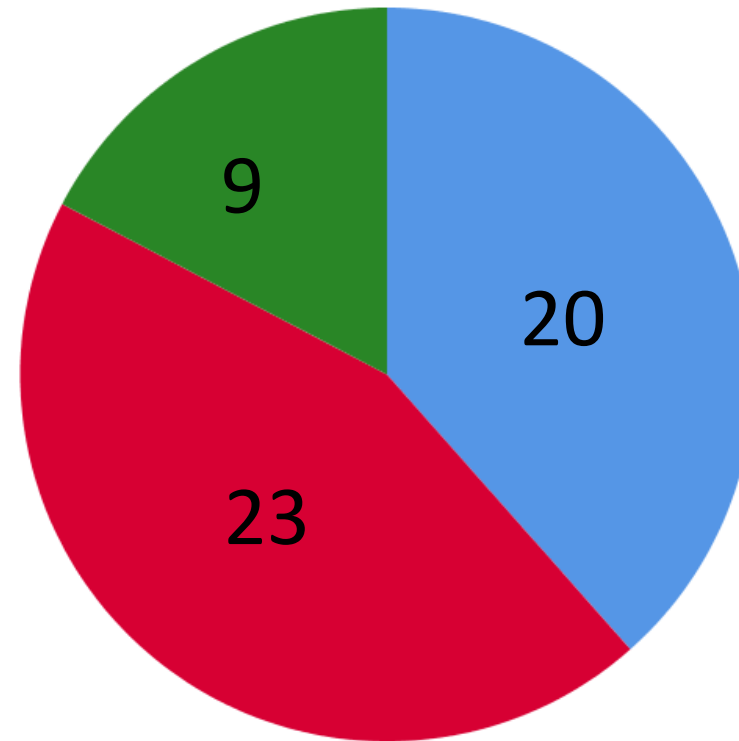
Error Bars: 95% CI



Research Diagnosis

Diagnosis

- Normal Cognition
- MCI
- Dementia



Consensus Diagnosis



The Future of WLS

- Supplemental Biomarker Data
 - Newly approved addition to WLS
 - Feasibility study (to start!)
 - Visit includes:
 - PET imaging
 - MRI
 - Blood draw
 - Lumbar puncture
 - Cognitive testing
 - Physical exam
 - Possibly visiting participant's children in the future??

Phase 2: In-Home Visit
N = ~600

10%

Phase 3: In-Center Visit
N = ~60

40 Participants

Supplemental:
Biomarker Data



Summary

- Several social factors likely affect the risk and progression of dementia
- The WLS is a landmark study evaluating the potential effects of life long exposure to various social factors and risk of dementia
- Findings from WLS will also assess if certain lifestyle and other factors can protect against dementia
- Plans are to seek additional funding from NIH and other sources to expand Alzheimer's biomarkers data on a larger number of WLS participants

Questions?



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