

# Short-Term Reliability of Anthropometric, Cardiovascular, and Biomarker Data in Wave VI of Add Health: An Intra-Individual Variation (IIV) Sub-Study

Presented to the NIA-Funded Biomarker Network  
St. Louis, Missouri

May 6, 2026

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\* The opinions expressed in this presentation are the author's own and do not reflect the view of the National Institute on Aging, the National Institutes of Health, the Department of Health and Human Services, or the United States government.

# Outline of Talk

## Main Presentation:

- 1) Brief Background of Wave VI
- 2) Brief Look at Wave VI Home Exam Protocol
- 3) IIV Sub-Study
- 4) IIV Sub-Study Results
- 5) Implications

## And ... a Little Lagniappe:

- 6) Accessing Add Health Data
- 7) Add Health Ancillary Studies
- 8) Acknowledgements

# 1. Brief Background on Add Health, Focusing on Wave VI

# Goals for Add Health Wave VI

(Average age = 44)

Collect & disseminate high-quality data on life course determinants and trajectories of health, cognition, health behavior, and health disparities among a large, nationally representative cohort aging into midlife.

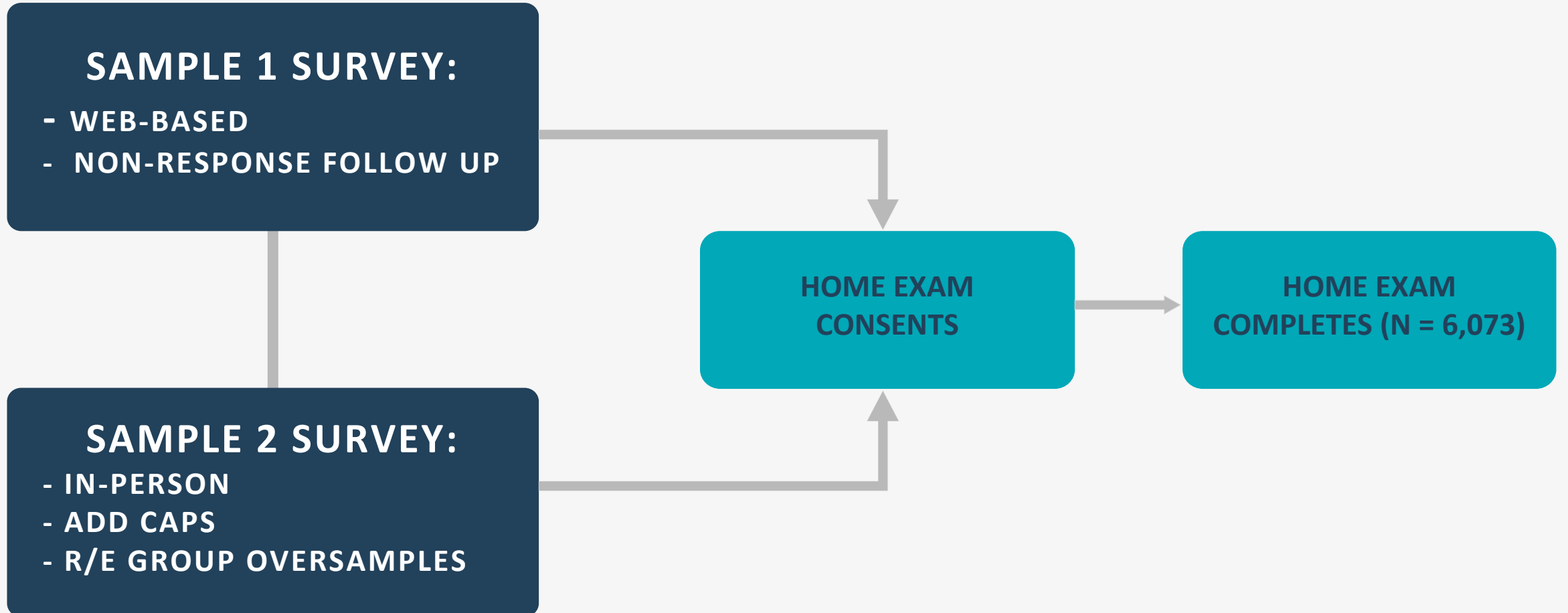
- Substantial attention to racial/ethnic and socioeconomic heterogeneity of sample
- Substantial attention to ‘pulls and tugs’ of early midlife
- Substantial attention to quality control in data production & dissemination
- Substantial attention to confidentiality and protection of Add Health participants

# Add Health Longitudinal, Multi-level, Intergenerational Design

(Each wave also includes contextual and environmental data specific to various geographic levels)

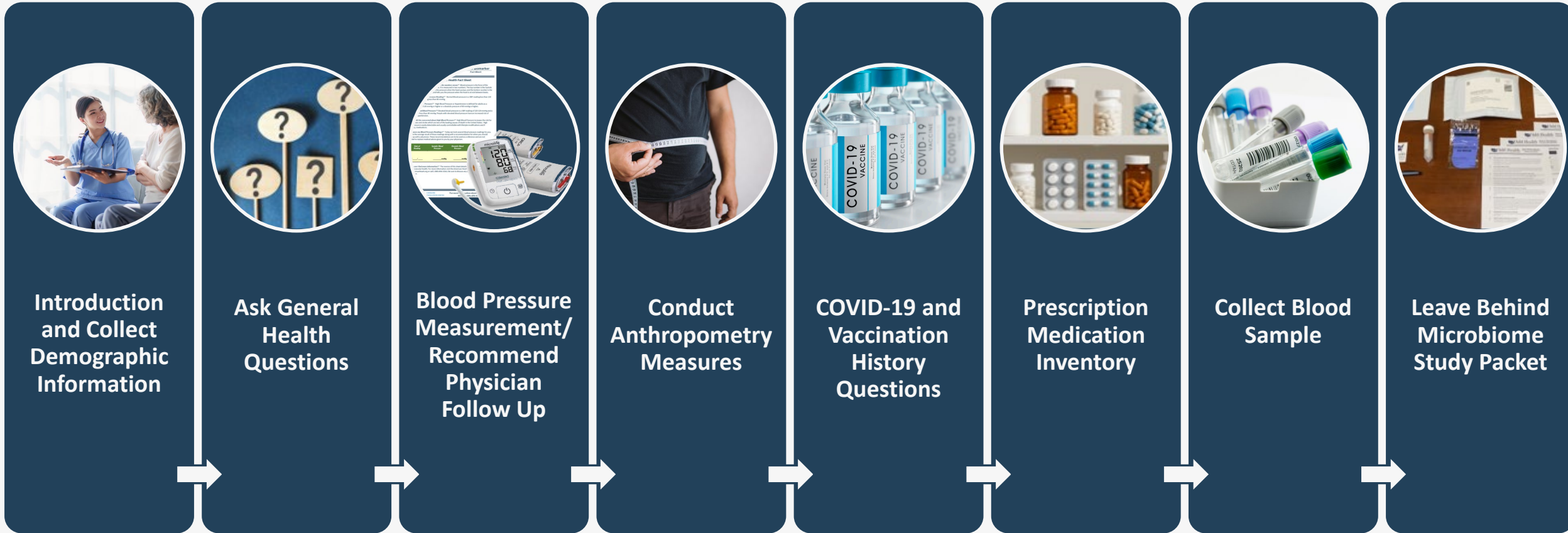
Wave	Administrative	Survey Administration	Biological Data Collection	Cognitive Assessments
Wave I 1994-95	Students N = 90,118 School Admin N = 144	Adolescents in Grades 7-12 N = 20,745 Parent N=17,670	Height, weight	Self-Reported GPA and Intelligence, Picture Vocabulary Test
Wave II 1996	School Admin N = 128	Adolescents in Grades 8-12 N = 14,738	Height, weight	Self-Reported GPA and Intelligence, Picture Vocabulary Test
Wave III 2001-02	High School Transcripts	Young adults Aged 18-26 N = 15,197 Partner N=1,507	Height, weight, STI, HIV, genetic (buccal cell DNA)	High School Transcripts: Grades & Coursework
Wave IV 2008-09		Adults Aged 24-32 N = 15,701	Height, weight, waist, metabolic, immune, inflammation, cardiovascular, medications, candidate genes, GWAS	Number & Word Recall Tests
Wave V 2016-18	Birth & Death Records	Adults Aged 33-43 N = 12,300 Parent N=3,000 Sexual Orientation & Health N=2,665	Height, weight, waist, metabolic, immune, inflammation, cardiovascular, renal, hepatic, neurocognitive, medications, gene expression, epigenetic, microbiome	Number & Word Recall Tests
Wave VI 2022-25	Birth & Death Records; College Records	Adults Aged 39-51 N=11,979 Parent N~5,000	Height, weight, waist, metabolic, immune, inflammation, cardiovascular, renal, hepatic, infection, neurocognitive, medications, microbiome	Number & Word Recall + Full Add CAPS Battery

# Wave VI Two Sample + Home Exam Design



## 2. Wave VI Brief Overview of Home Exam Protocol

# Wave VI Home Exam Protocol



# 3. Wave VI Intra-Individual Variation(IIV) Sub-Study

# Rationale for IIV Sub-Study

Field-based data collection where a lot can go wrong;  
quality control

Integrity of results depend on the reliability & validity of  
data we collect

Measures can't be valid unless they are reliable

Reliability can be estimated by repeating observations on  
same participants



# Wave VI IIV Sub-Study: Selecting Participants

Based on power calculations, non-pregnant race/sex stratified sample asked to participate in repeat home exam, with the following conditions:

Participant completed all parts of initial exam

Second exam occurred within 1-2 weeks of first exam

Second exam occurred on same day of week and time of day as first exam

Same protocol was repeated in full, with same examiner, for 2nd exam



# Wave VI Stratified IIV Sub-Study Sample N

	Female	Male	Total
Hispanic	14	21	35
Black	22	27	49
Asian/Native American/Other	18	10	28
White	16	15	31
Total	70	73	143

# Use Intra-Class Coefficient (ICC) to Measure Short-Term Reliability

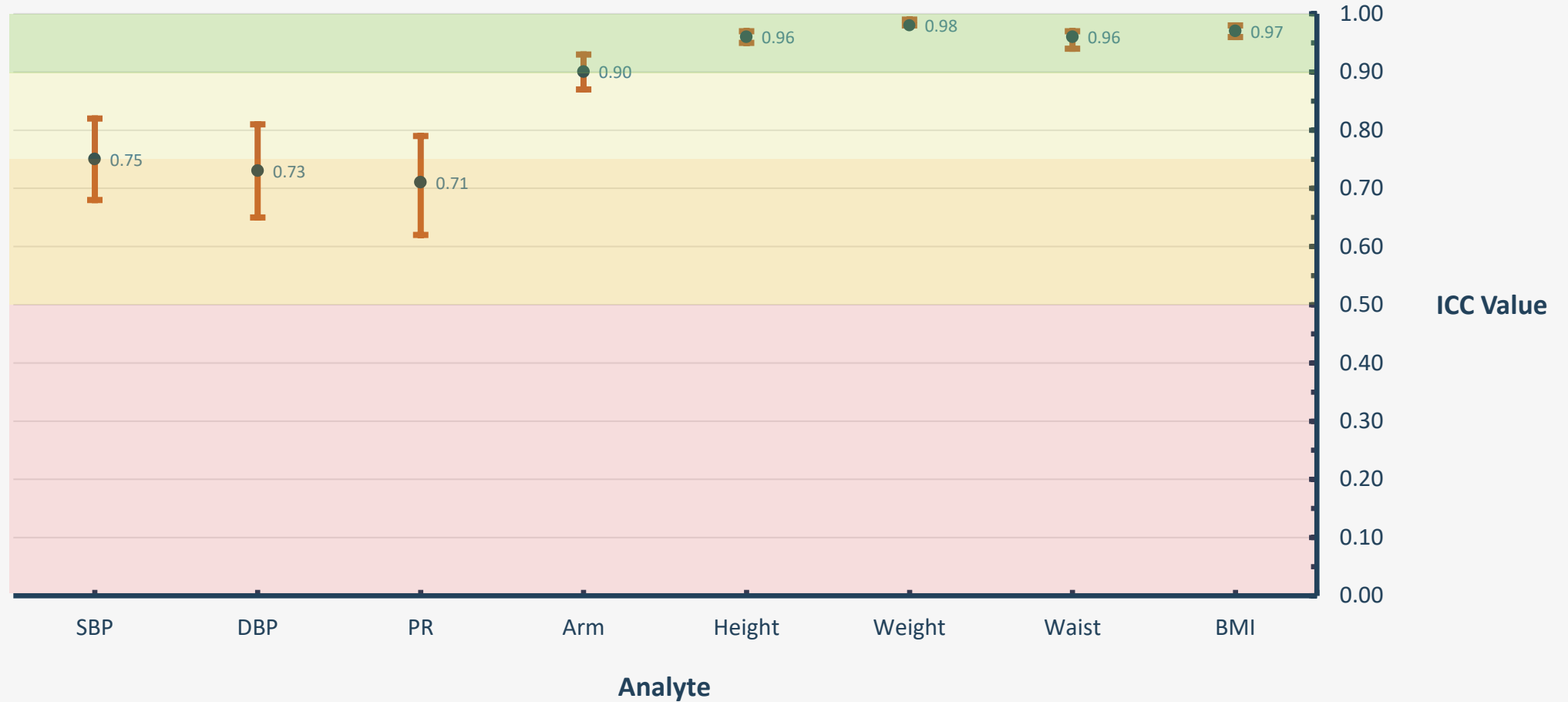
Somewhat arbitrary guide to ICC:

- 0.00-0.50     Poor
- 0.50-0.75     Moderate
- 0.75-0.90     Good
- 0.90-1.00     Excellent

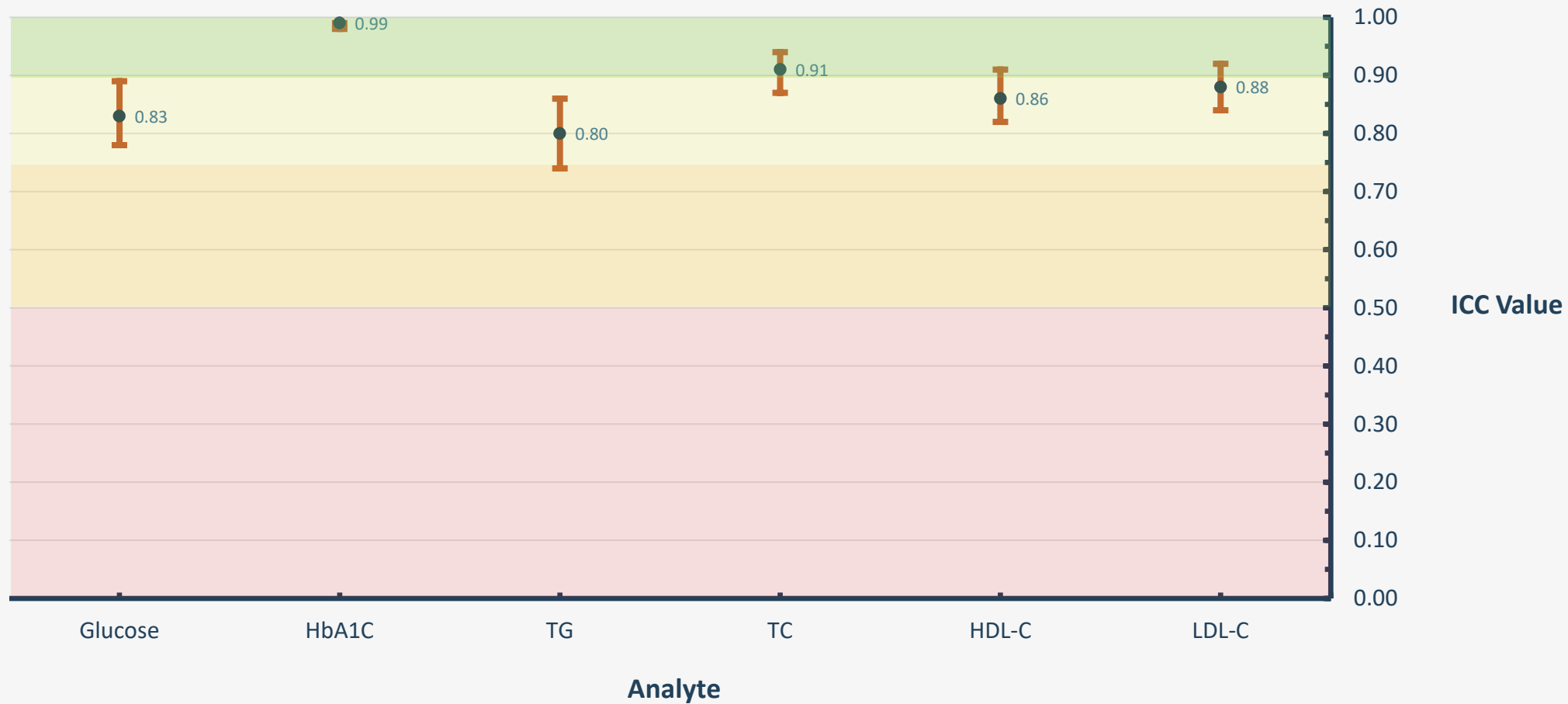
Koo TK, Li MY. 2016. "A Guideline for Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research." J Chiropr Med 15(2): 155-163.

# 4. IIV Sub-Study Results

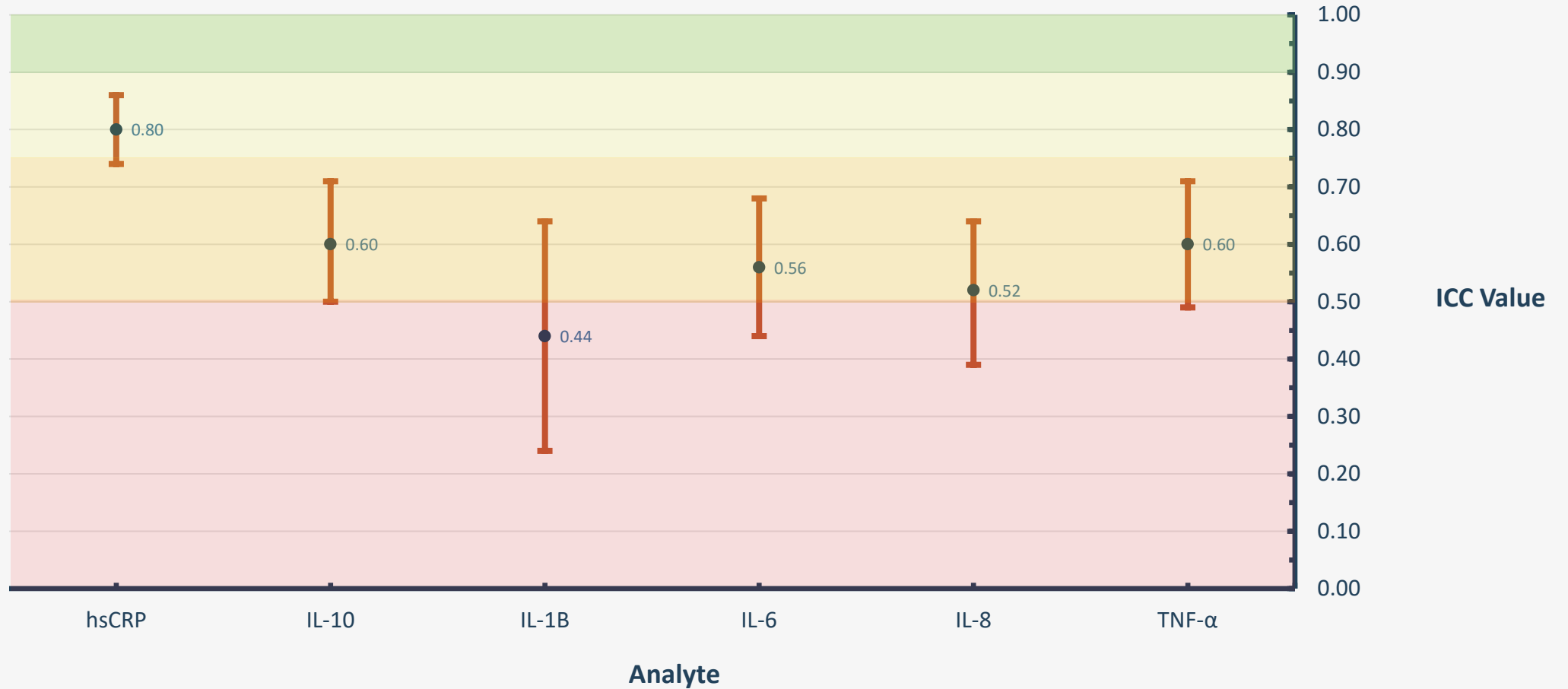
# ICCs for Cardiovascular & Anthropometric Measures



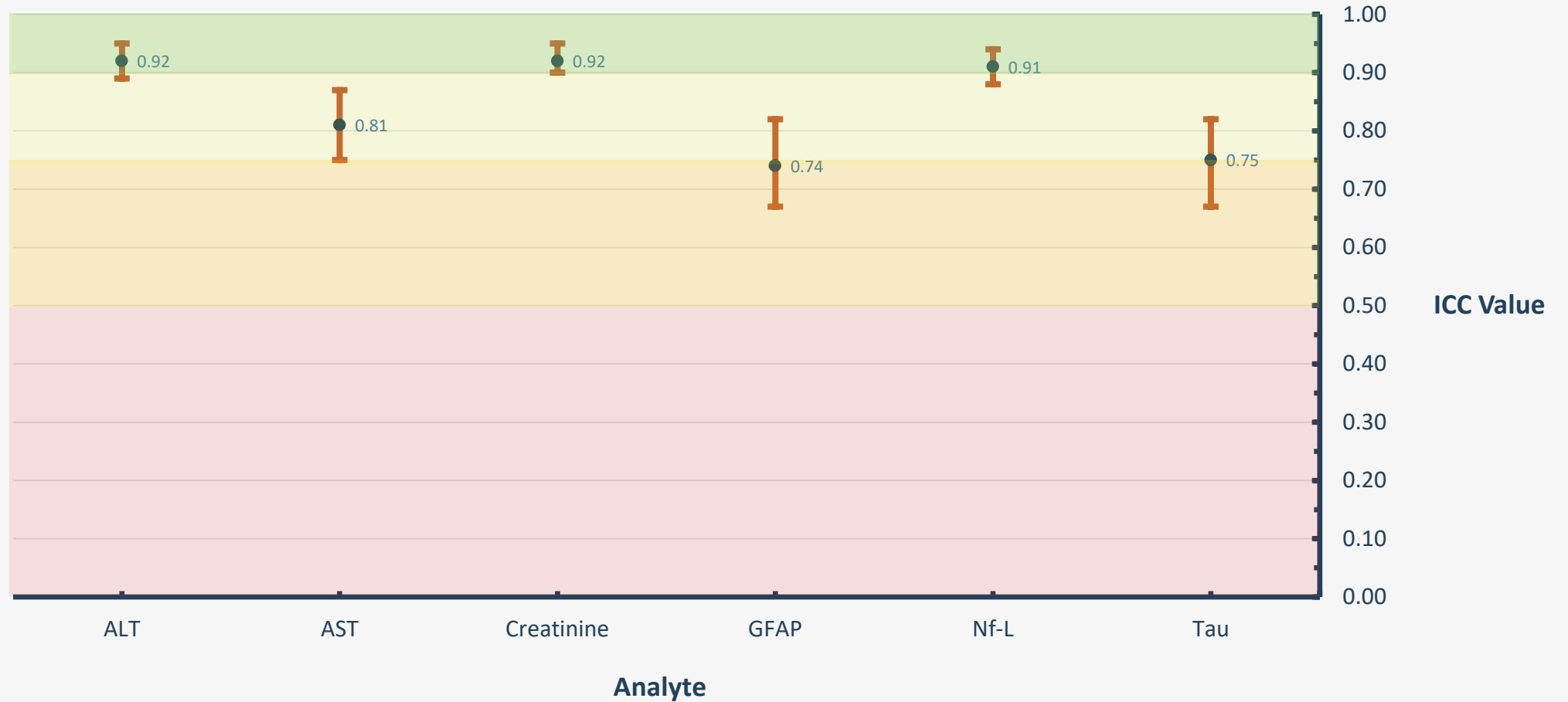
# ICCs for Metabolic Biomarkers



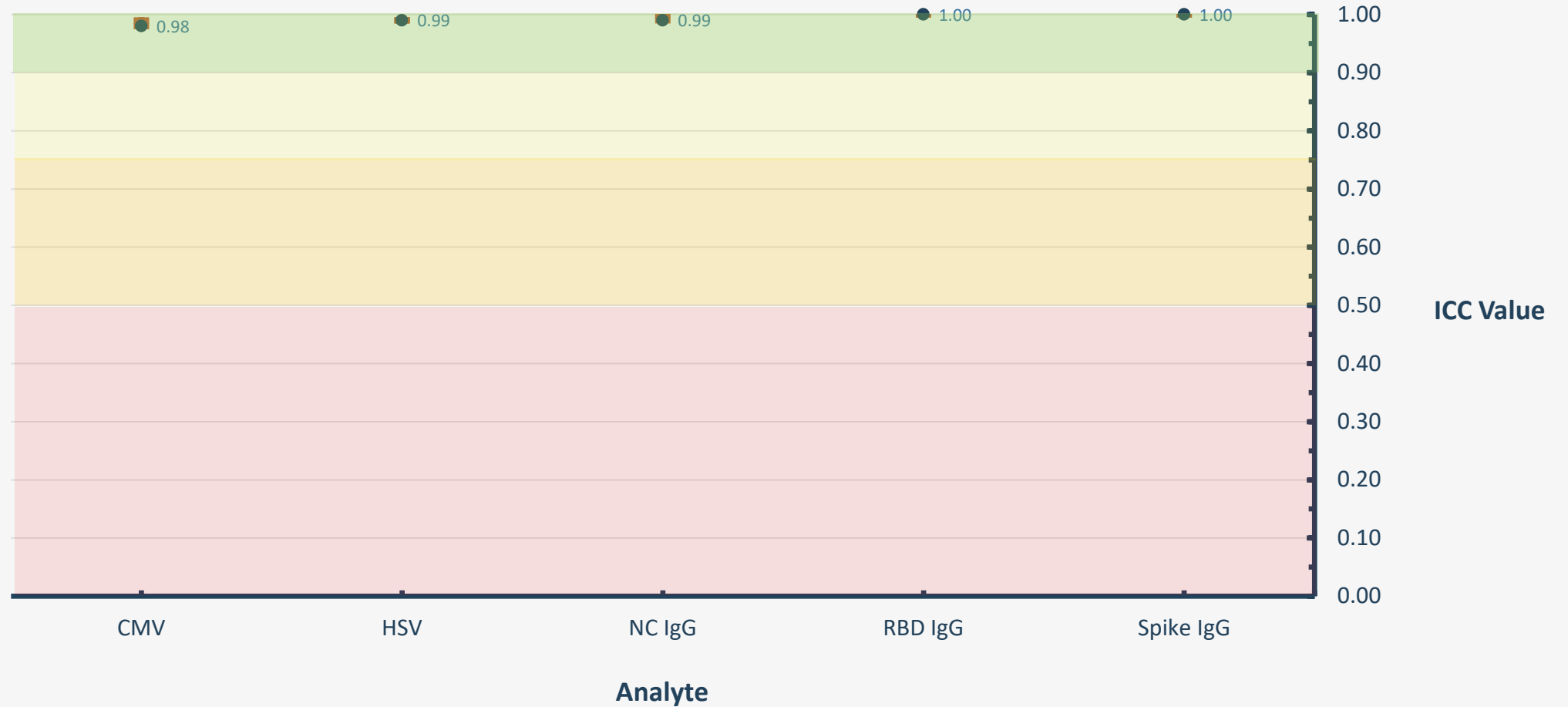
# ICCs for Inflammation & Immune Function Markers



# ICCs for Hepatic, Renal Function & Neurodegeneration Markers



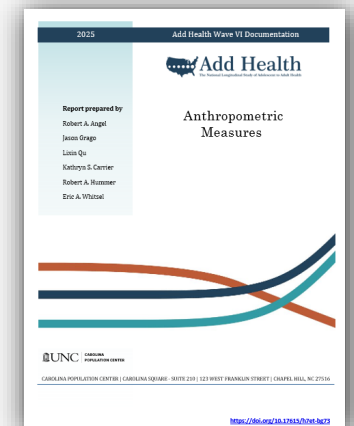
# ICCs for Infection Markers



# 5. Implications

# Implications

- \* Reliability of most Wave VI biomarkers “Good” or “Excellent”
- \* Similar to or higher than those from earlier waves of Add Health
- \* Similar or slightly lower than HRS that used volunteers (Crimmins et al. 2017)
- \* Cytokines lower (e.g., Koelman et al. 2019; Navarro et al. 2012); caution...
  - Both in cross-section and perhaps especially with longitudinal change
- \* Documented with suggestions for users in Add Health User Guides ...  
<https://addhealth.cpc.unc.edu/documentation/user-guides/>



# 6. Accessing Add Health Data

# Add Health Users

## Restricted-Use Data

- Access requirement: Approved 5-year contract with UNC (renewable)
- ~400 current contracts, average 6 users apiece
- Many use our Secure Research Workspace (SRW); others use secure server at home institution
- Please visit the project website (<https://addhealth.cpc.unc.edu>) ... click on “Data”

## Public-Use Data Through ICPSR or Data Verse

- Access requirement: Data use agreement
- ~50,000+ researchers over the years
- Most highly-utilized data set in ICPSR’s archive in recent years

# 7. Ancillary Studies

# Available Biospecimens for Ancillary Studies

Wave	Serum	Plasma	DNA	RNA	Dried Blood Spots	Stool Microbiome	Oral Microbiome
IV	-	-	-	-	n 4860 7 punches	-	-
V	n 4670 250 uL	n 4576 250 uL	n 4516 1 ug	-	-	n 763 variable volume	n 776 variable volume
VI	n 5069 250 uL	n 5052 250 uL	n 5052 1 ug	n 5167 0.5 ug	-	n 1411 variable volume	-

# Ancillary Study Policies and Procedures

## Contextual Study Researcher Guidelines



## Biospecimen Study Researcher Guidelines



# 8. Acknowledgements

# Wave VI Acknowledgements

Wave VI of Add Health is supported by two cooperative agreements from the National Institute on Aging (1U01AG071448, principal investigator Robert A. Hummer, and 1U01AG071450, principal investigators Robert A. Hummer and Allison E. Aiello) to the University of North Carolina at Chapel Hill. Co-funding for Wave VI is being provided by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, the National Institute on Minority Health and Health Disparities, the National Institute on Drug Abuse, the NIH Office of Behavioral and Social Science Research, and the NIH Office of Disease Prevention. Waves I-V data are from the Add Health Program Project, grant P01 HD31921 (Kathleen Mullan Harris) from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. The content of this presentation is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health or the University of North Carolina at Chapel Hill.

Add Health was originally designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill. Add Health is currently directed by Robert A. Hummer; it was previously directed by Kathleen Mullan Harris (2004-2021) and J. Richard Udry (1994-2004).