

NATIONAL CONSORTIUM ON ALCOHOL & NEURODEVELOPMENT IN ADOLESCENCE

Directors: Sandra A. Brown
& Susan Tapert

DAR Directors: Adolf Pfefferbaum
& Kilian Pohl



Investigators: Susan Tapert, Edith Sullivan, Fiona Baker, Duncan Clark, Ian Colrain, Michael De Bellis, Bonnie Nagel, Kate Nooner, Wes Thompson, Ty Brumbach

NATIONAL CONSORTIUM ON ALCOHOL & NEURODEVELOPMENT IN ADOLESCENCE

Directors: Sandra A. Brown
& Susan Tapert

DAR Directors: Adolf Pfefferbaum
& Kilian Pohl



Investigators: Susan Tapert, Edith Sullivan, Fiona Baker, Duncan Clark, Ian Colrain, Michael De Bellis, Bonnie Nagel, Kate Nooner, Wes Thompson, Ty Brumback

NCANDA ORGANIZATIONAL STRUCTURE



Administrative Resource

MPI: Sandra Brown (Coordinator) & Susan Tapert
Associate Directors: Bonnie Nagel & Duncan Clark
Marc Schuckit, Ty Brumback, Patrick Mercier, Kara Bagot

**Committees
Workgroups
SOPs**

Data Resource

MPI: Adolf Pfefferbaum & Kilian Pohl
Edith Sullivan, Rosemary Fama, Eric Peterson,
Wesley Thompson, Dongjin Kwon, Eva Müller-Oehring

Steering Committee

Chair: Sandra Brown
Duncan Clark, Ian Colrain, Michael De Bellis,
Bonnie Nagel, Adolf Pfefferbaum,
Edith Sullivan, Susan Tapert, Ben Xu

Scientific Advisory Board

Chair: Ken Sher
Arpana Agrawal, Andrea Hussong,
Edythe London, María Luisa Zúñiga

DUKE

PI: Michael De Bellis
James Voyvodic
Kate Nooner

OHSU

PI: Bonnie Nagel
Damien Fair,
Chris Kroenke,
Sarah Feldstein-
Ewing

PITTSBURGH

PI: Duncan Clark
Tammy Chung,
Beatriz Luna,
Chris Martin,
Peter Franzen

SRI

**MPI: Fiona Baker
& Ian Colrain**
Massimiliano de
Zambotti,
Devin Prouty

UC San Diego

PI: Susan Tapert
Ty Brumback,
Tom Liu

NCANDA AIMS



1. Effects of alcohol on neurodevelopment trajectories
2. Effects of timing, dose, duration on brain development
3. Malleability of effects with abstinence
4. Biopsychosocial factors and neurodevelopment
 - Sex
 - Puberty
 - Family history alcoholism
 - Trauma
 - Sleep
5. Risk, protective & resilience factors of addiction & psychopathology
6. Implications for education, prevention and intervention



ACCOMPLISHMENTS



- Targeted sample **recruitment & follow up** — transitioning into and through high risk age (sufficient use rates)
- **Accessible data bases** – open science model
- High quality, stable **support staff**
- Rigorous **training and fidelity** assurance (multiple site visits)
- **Productive:** 17 publications, 23 presentations & 21 trainees
- Interface with other **large scale efforts** (NADIA; COGA)
- Emerging **new findings** and separate **practice effects** from **developmental neuropsych effects** with our age range
- **Multisite measurement, methods and analytic advances**

DESIGN FEATURES



- **Accelerated longitudinal design**
- **Replicability** of science:
 - Each specialty projects at 2+ sites
 - Each MRI platform (GE, Siemens) at 2+ sites
- **Developmental hypotheses**
- **Scientific and clinical expertise and experience** at each site (for emergent issues)
- **Data integration and meticulous data hygiene**
- **Quality control & results based accountability metrics:** Standardized battery, training, protocol, measurement, ongoing monitoring (Annual site review/ human phantom visits)



NCANDA RECRUITMENT

Enriched sample

2500 screened-1400 eligible-
831 selected

Major risk factors:

1. FH alcohol use disorder
2. 1+ externalizing symptoms
3. 2+ internalizing symptoms
4. First drink < age 15

50% endorsed risk

- 30% 1 risk factor
- 20% 2+ risk factors

5 Sites

>50,000 reached via school and
community recruitment

>7,500 responded

831 enrolled

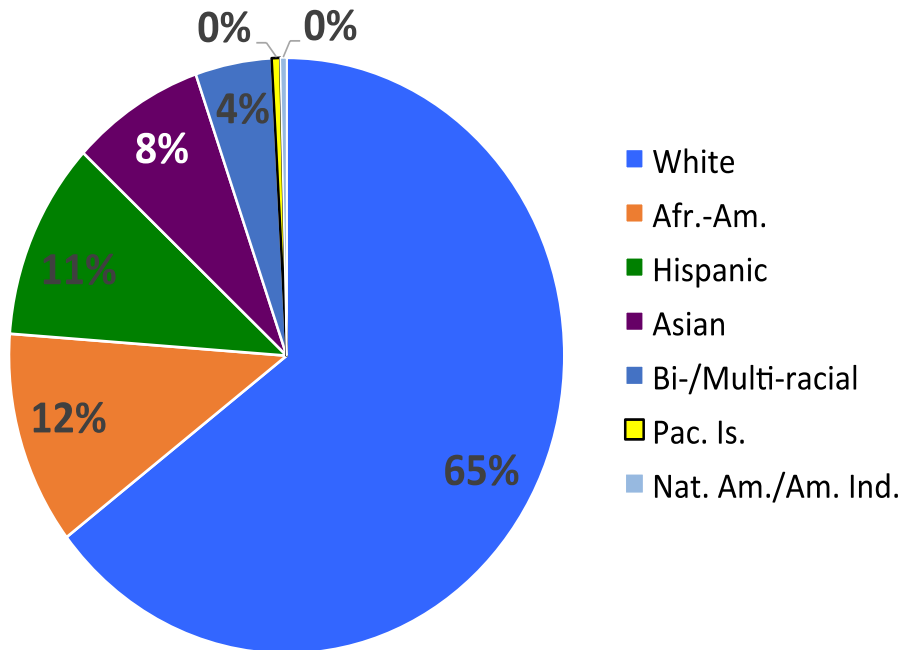
692
No or Limited
Drinking Experience
85%

139
Mod. Drinking
Experience
15%

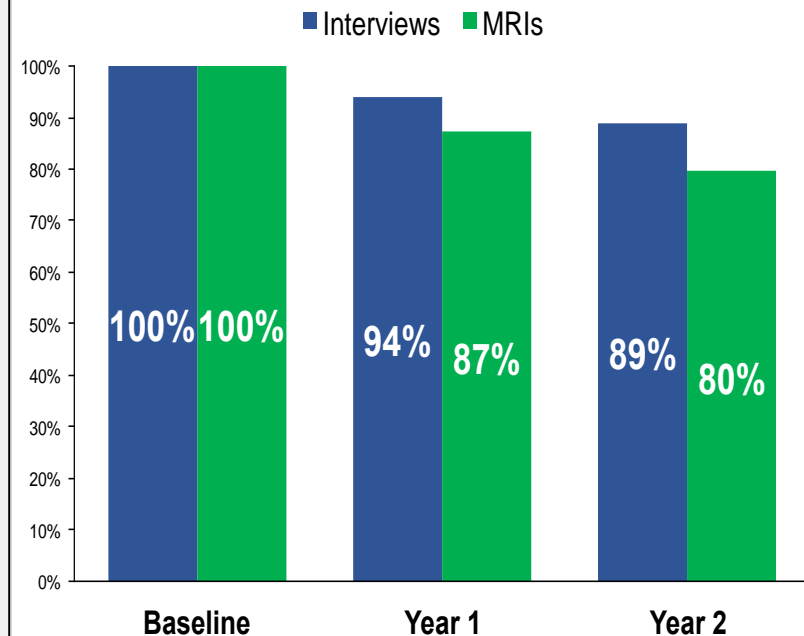
3 annual follow-ups
(~25% heavy drinkers)

SUCCESSFUL FOLLOW UP MAINTAINS REPRESENTATIVE SAMPLE

Racial/Ethnic Distribution of NCANDA



Follow Up Rates



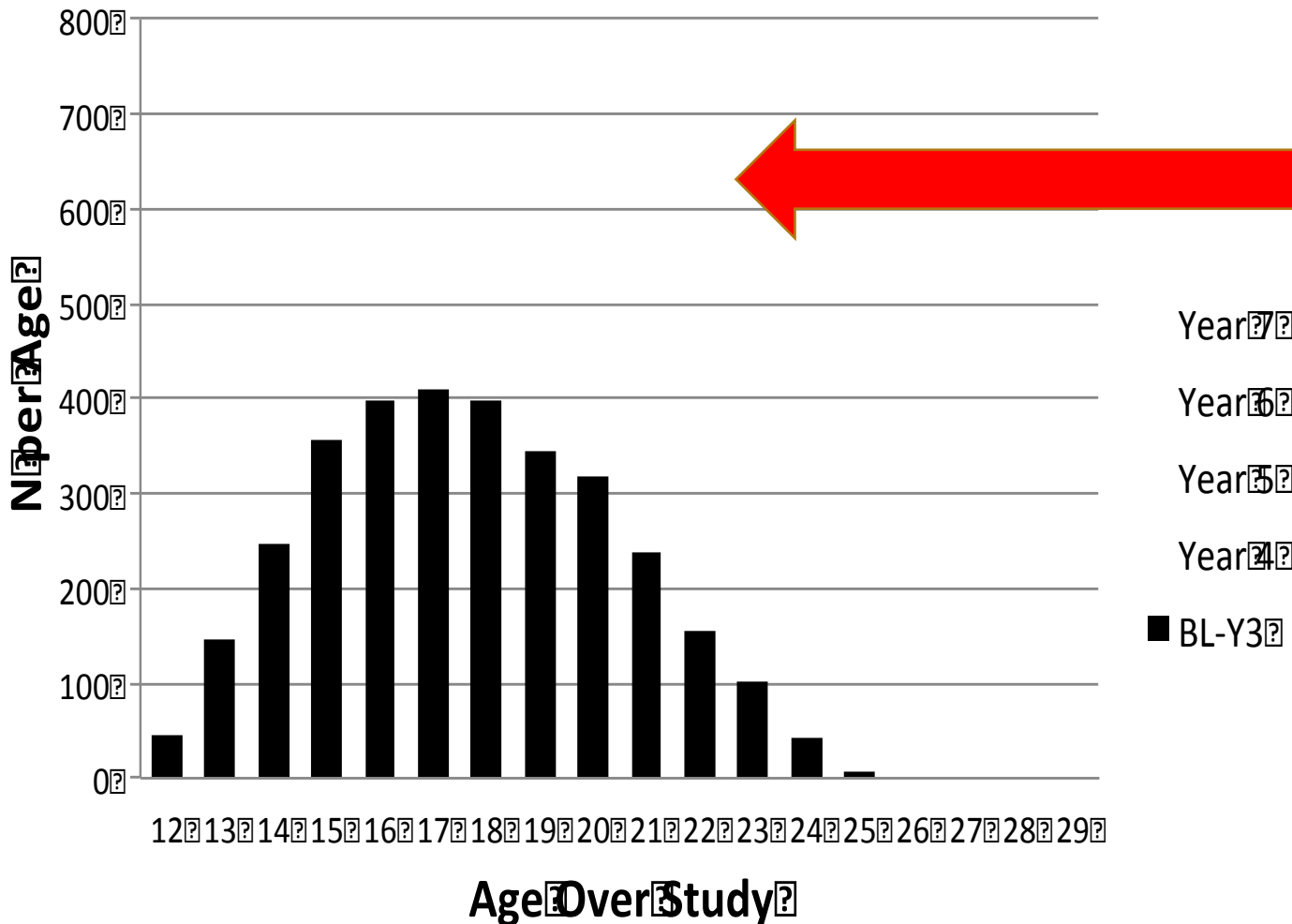
Baseline = Follow up

Demographics = local demographics at sites
& Using sample = Non users at baseline

Hi Risk = slightly higher AA & Hispanics

Minimal withdrawals (<3%);
equally distributed over
demographics and substance use

EXPANDING AGE RANGE OF ACCELERATED LONGITUDINAL DESIGN

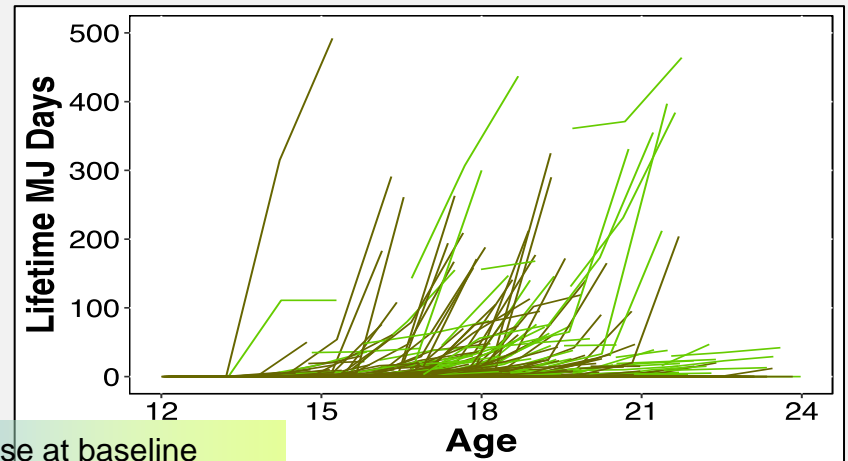
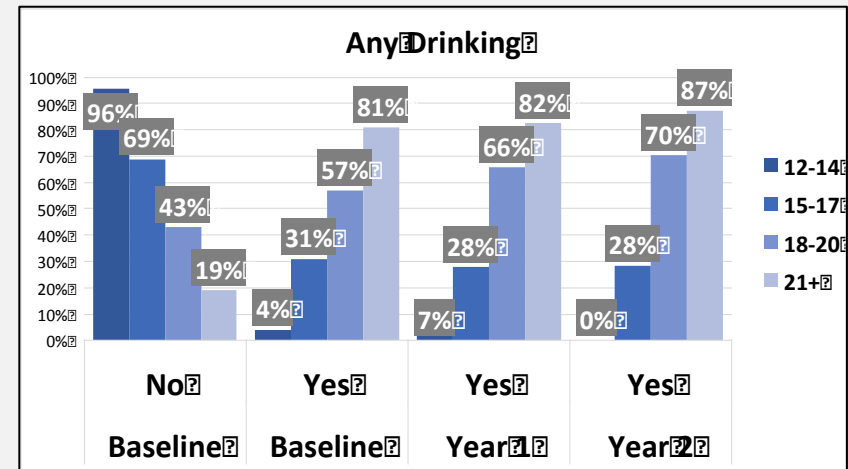
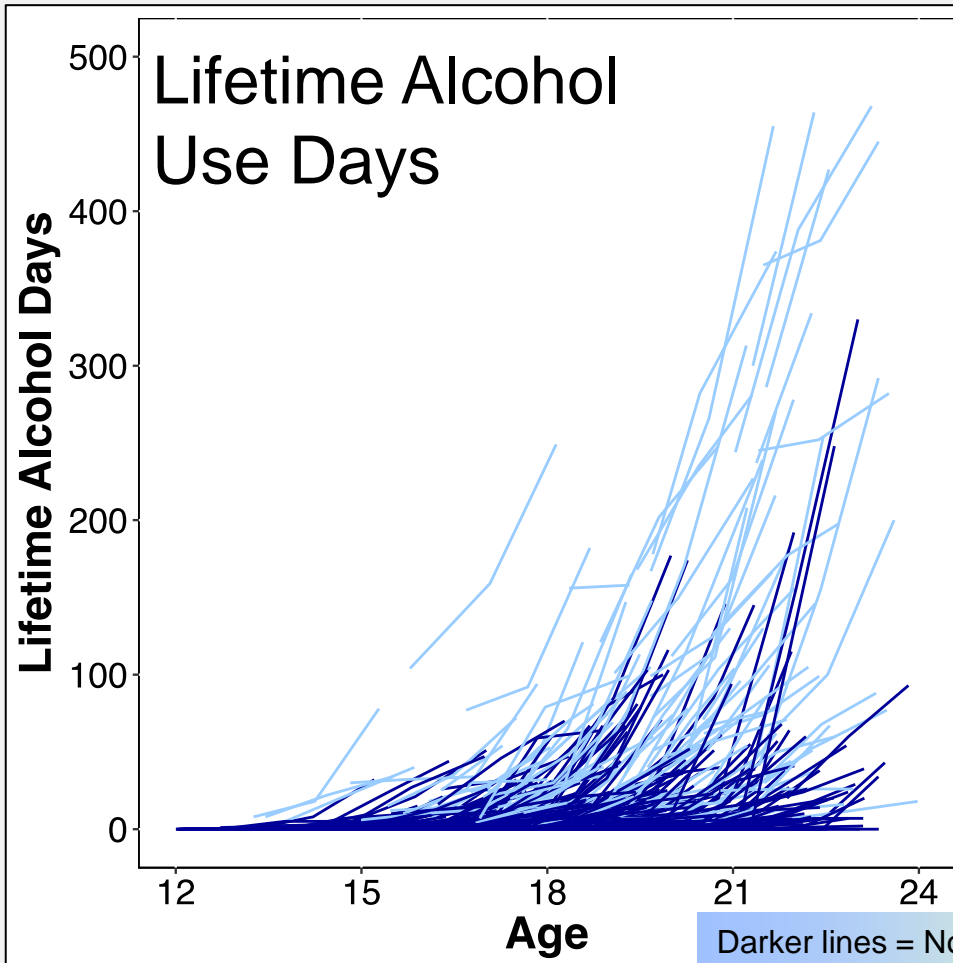


**NCANDA2
doubles
observations in
critical age
range**

- **Binge**
- **Onset AD**
- **Onset SUD**
- **Onset MH**

Year 7
Year 6
Year 5
Year 4
■ BL-Y3

ALCOHOL USE, ESCALATION AND CHANGE



Substance use increases as anticipated with age, Baseline to Y2:

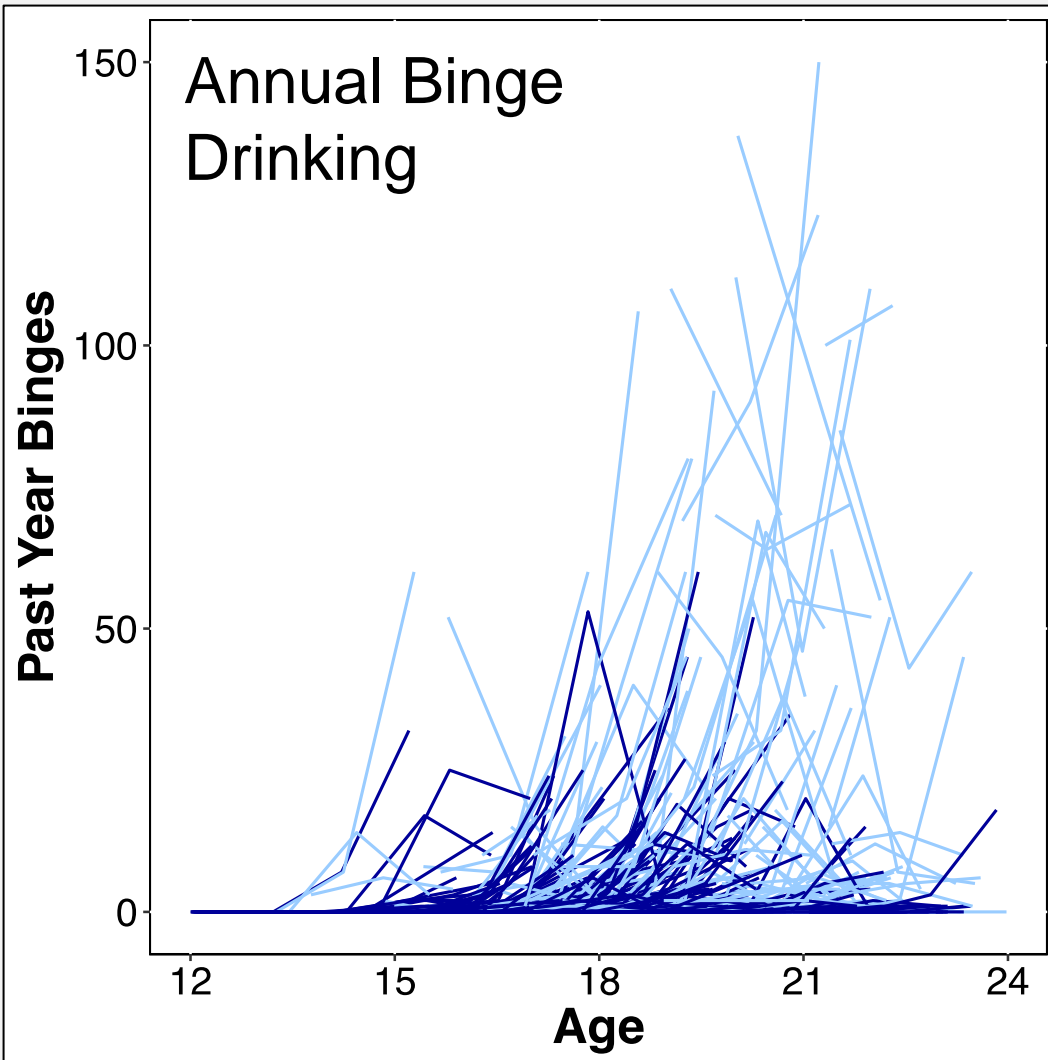
Nicotine: 12% to 22%

MJ: 19% to 38%

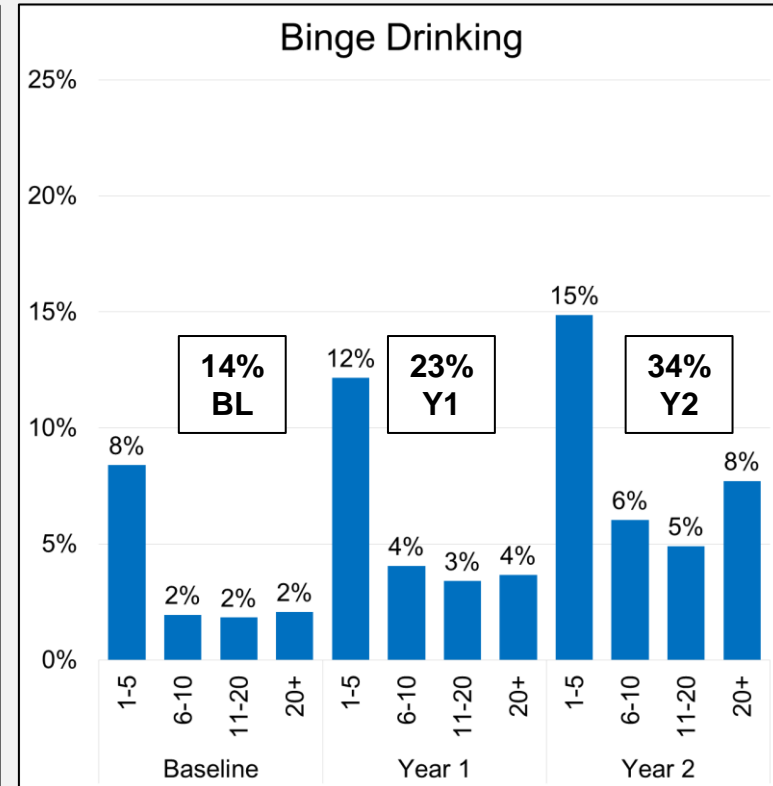
Amphetamines: 1% to 4%

Ecstasy: 1% to 3%

HEAVY EPISODIC DRINKING ONSET INCREASES WITH AGE, VARIES OVER TIME



Darker lines = No use at baseline



Overall increased drinking, with individual variation over time:

- 13% had >10 binges at Y2

FUTURE GOALS OF NCANDA2



- Comprehensively assess well described sample of youth through **highest risk period of heavy use** to examine impact of alcohol (other substances) on neurodevelopment
- Address primary aim of evaluating characteristics of alcohol (other drugs) **exposure on brain, cognition, developmental trajectories, outcomes and problems commonly emerging during adolescence**
- Develop **methods and technologies** for more refined imaging metrics and measures of alcohol measurement in the **natural environment** to aid hypothesis driven science

CONTINUED NCANDA EFFORTS



- **Opportunities with this sample:**
 - Aging through highest risk period
 - Expected natural reductions in use levels
- **Analytic opportunities:**
 - Better powered to determine how alcohol and other substance use may alter neurodevelopment
 - Risk profiles – variability in trajectories?
 - Excellent prevention education information