NCANDA-2
INNOVATIONS IN RESEARCH DESIGN AND ASSESSMENTS

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NCANDA DESIGN INNOVATIONS

- Accelerated longitudinal design
- Mobile health application
- Nanobioengineered sensor
- Computerized neuropsychological test battery
- Multimodal neuroimaging protocol
NCANDA SCREENING

Step-down screening approach
>50,000 reached, >7,500 responded

Completed Screens: 2548
Ineligible: 1110
Eligible: 1438
Enrolled: 831
Non/Limited Drinking: 692
Exceeded Drinking Thresholds: 139

252: MRI / Physical / No parent
310: Substance use
548: Meds / Prenatal / LD
607: not enrolled
(target N met with representation & ~50% at-risk)
Annual assessments through age 22

Age-based assessments at 24 and 27 for older cohort
ACCELERATED LONGITUDINAL DESIGN

N per Age

Age Over Study

Cohort 1
Cohort 2
Cohort 3
Cohort 4
Cohort 5
Cohort 6

Age

Year 7
Year 6
Year 5
Year 4
BL-Y3
mNCANDA: MOBILE HEALTH APP

Fine-grained data:
- Substance Use
- Mood
- Health

App Statistics:
- >97% acceptability
- 90% follow-up rate
- 82% completed ALL ASSESSMENTS
MONTHLY ASSESSMENT
In the past 30 days:

1. How many days did you drink alcohol?
   2

2. On days you drank, what was your AVERAGE number of drinks?
   1

3. Most alcohol you had on an occasion? (# drinks)
   1

4. Days you drank 5 or more drinks?
   0

5. Days used tobacco/nicotine?
   0

(3 Groups)

Sleep Assessment

1. What time did you fall asleep last night?
   11:00 PM

2. What time did you wake up this morning?
   6:45 AM

3. Rate how sleepy you felt during the day YESTERDAY (0 - not at all 10 - hard to stay awake)
   4

YESTERDAY ASSESSMENT
Yesterday (including all of last night):

[No additional information provided]
mNCANDA: MOBILE HEALTH APP

- Ecological Momentary Assessment
  - Before & after substance use events
EMA Assessments

- Time-sensitive responses
- Behavioral triggers
- Tailored probes and scheduling
mNCANDA: MOBILE HEALTH APP

- Integrates with wearable biosensors

Noninvasive Alcohol Monitoring Using a Wearable Tattoo-Based Iontophoretic-Biosensing System

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WEARABLE BIOSENSORS

BAC = .07
5-WEEK MONITORED ABSTINENCE

Monitored Abstinence Period:
- Utox 3x/week
- Daily app mood ratings
- activity, sleep, HR

Baseline
MRI (Cue Reactivity)
NP
Interview
<5 days abstinent

+4 weeks
MRI (Cue Reactivity)
NP
Interview
~30 days abstinent
SLEEP & ACTIVITY TRACKING

- Fitbit worn throughout 5 weeks
- Approximates PSG measures
- Provides continuous HR and activity levels

de Zambotti et al. (2016) *Chronobiology International*
HEART RATE VARIABILITY (HRV)

Allen, Matthews & Kenyon, 2000; Quintana et al., 2013; Eddie et al., 2015, Lehrer & Gevirtz, 2014
CUE REACTIVITY & CRAVING

- Pre-Post fMRI Cue Reactivity task
- Daily craving ratings (in mNCANDA app)
### OTHER DATA COLLECTED

<table>
<thead>
<tr>
<th>All Sites</th>
<th>Specialty Projects at 2 Sites</th>
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</thead>
<tbody>
<tr>
<td>MRI: T1, T2, DTI, &amp; resting state fMRI</td>
<td>Sleep studies – SRI &amp; Pittsburg</td>
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<tr>
<td>Samples for genetic and epigenetic analyses, pubertal hormones, and drug screening</td>
<td>Stroop fMRI task – SRI &amp; UCSD</td>
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<td>Anti-saccade fMRI task – Duke &amp; Pittsburg</td>
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<td>Recovery protocol – UCSD, OHSU, &amp; Duke</td>
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- NIAAA Program Staff
- NCANDA Scientific Advisory Board
- NCANDA Co-Investigators
- NCANDA Research Associates