NATIONAL CONSORTIUM ON ALCOHOL & NEURODEVELOPMENT IN ADOLESCENCE (NCANDA):
TOWARDS SHAPING THE FUTURE OF ADOLESCENT ALCOHOL AND ADDICTION RESEARCH

• John Matochik, NIAAA - Introduction
• Susan Tapert - NCANDA Clinical And Neuropsychological Assessment
• Adolf Pfefferbaum – Harmonization of Multimodal Neuroimaging to Examine Age, Sex, and Alcohol-Related Changes in Brain Structure through Adolescence and Young Adulthood
• Ty Brumback - Harnessing Mobile Technology to Monitor Alcohol Use
• Kilian Pohl - Public Access to NCANDA Data
• Sandra Brown - Discussant
The National Consortium on Alcohol and Neurodevelopment in Adolescence (NCANDA): Clinical & Neuropsychological Assessment Battery
NCANDA Overview

- Design overview
- Measures collected
- Sample characteristics
NCANDA SCREENING

2548 Completed Screens

1110 Ineligible

252: MRI/Physical/No parent
310: Substance use
548: Meds/Prenatal/LD

607 not enrolled (target N met with representation & ~50% at-risk)

1438 Eligible

831 Enrolled

692 Non/Limited Drinking

139 Exceeded Drinking Thresholds

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

Brown et al., 2015, JSAD
Assessment Timeline

- Annual assessments through age 22
- Age-based assessments at 24 and 27

Protocol Schedule:
- Annual Scan, NP, & Interview through age 22
- Phone Interview every 6 months, SMS/App monthly
- Age 24 Scan, NP, & Interview
- Age 27 Scan, NP, & Interview
Ages Represented per Time Point

![Bar chart showing the distribution of ages represented over study time points. The x-axis represents age over study (12 to 29 years), and the y-axis represents N per age. Each bar is color-coded to represent different years: Year 7 (dark blue), Year 6 (yellow), Year 5 (gray), Year 4 (orange), and BL-Y3 (black). The chart illustrates the peak representation of ages in the mid-aged group (18 to 21 years) for all years, with a decrease in representation as age increases and decreases.]
NCANDA Data Collection at Follow-ups

In progress

94% overall
89% overall

Duke
OHSU
PITT
SRI
UCSD
Neuropsych Composite Scores: Accuracy, Speed

Sullivan et al., 2016, Neuropsychology
Accuracy Composites

General Ability

Boys

Girls

Abstraction

Attention

Emotion

Episodic Memory

Working Memory

Balance

Age (Years) →

Sullivan et al., 2016, Neuropsychology
Speed Composites

Abstraction

Attention

Emotion

Episodic Memory

Working Memory

Motor Speed

Age (Years) →

Sullivan et al., 2016, Neuropsychology
### Other NCANDA Data Collected

<table>
<thead>
<tr>
<th>All 5 Sites</th>
<th>Specialty Projects at 2-3 Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI: T1, T2, DTI, resting state fMRI</td>
<td>Sleep studies: SRI &amp; Pittsburg</td>
</tr>
<tr>
<td>Toxicology: Breathalyzer, urine drug screen</td>
<td>Stroop fMRI task: SRI &amp; UCSD</td>
</tr>
<tr>
<td>Saliva: stored for genetic/epigenetic analyses &amp; assayed for pubertal hormones</td>
<td>Anti-saccade fMRI task: Duke &amp; Pittsburgh</td>
</tr>
<tr>
<td></td>
<td>Recovery protocol: UCSD, OHSU, &amp; Duke</td>
</tr>
</tbody>
</table>
Substance Use Risk Characteristics

Sample enriched for substance use risk:

1. Alcohol use onset <15.
2. Family history (FH) of alcohol or drug problems.
3. Endorsement of Externalizing symptoms.
4. Endorsement of Internalizing symptoms.
NCANDA Participant Demographics

<table>
<thead>
<tr>
<th>Gender</th>
<th>51% Female</th>
<th>49% Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance Use Hx</td>
<td>692 no/low use</td>
<td>139 exceeded use threshold</td>
</tr>
</tbody>
</table>

Brown et al., 2015, JSAD
Alcohol and Marijuana Use and Escalation

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

- Nicotine: 12% to 22%
- Marijuana (MJ): 19% to 38%
- Amphetamines: 1% to 4%
- Ecstasy: 1% to 3%

Darker lines = No use at baseline
Binge Drinking Increases with Age & Time

- 13% had >10 binges at Y2
- Expect >50% with 10+ binges in next 5 years
Mental Health of Cohort at Baseline

- Clinical Interview Dx
- T-score >65
- Either

Brown et al., 2015, JSAD
### STRESS & TRAUMA
61% of NCANDA sample experienced 1+ trauma

<table>
<thead>
<tr>
<th>Event</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stabbed</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Mugged or threatened with a weapon, or robbery</td>
<td>37</td>
<td>5%</td>
</tr>
<tr>
<td>Sexual abuse by relative</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>Sexual Assault</td>
<td>15</td>
<td>2%</td>
</tr>
<tr>
<td>Natural Disasters</td>
<td>82</td>
<td>12%</td>
</tr>
<tr>
<td>Life Threatening Accidents</td>
<td>55</td>
<td>8%</td>
</tr>
<tr>
<td>Life Threatening Illness</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Traumatic Death of Family/Friends</td>
<td>217</td>
<td>32%</td>
</tr>
<tr>
<td>Witnessing a Violent Death</td>
<td>50</td>
<td>7%</td>
</tr>
<tr>
<td>Unexpectedly discovering a Dead Body</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>Hearing about above happening to loved one</td>
<td>148</td>
<td>22%</td>
</tr>
<tr>
<td>Other</td>
<td>144</td>
<td>21%</td>
</tr>
</tbody>
</table>

De Bellis, Nooner et al.
NCANDA Summary

- 10 year study of 831 12-21 year-olds
- Detailed neuropsychological, substance use, and mental health measures
- Substance use increasing over time
ACKNOWLEDGEMENTS

- NIAAA Program Staff
- NCANDA Scientific Advisory Board
- NCANDA Co-Investigators
- NCANDA Site Staff

U24 AA021695 (Brown/Tapert)  U01 AA021690 (Clark)
U24 AA021697 (Pohl/Pfefferbaum)  U01 AA021691 (Nagel)
U01 AA021692 (Tapert)  U01 AA021696 (Baker/Colrain)
U01 AA021681 (De Bellis)  VA Addictions Fellowship (Brumback)