NCANDA-2 INNOVATIONS IN RESEARCH DESIGN AND ASSESSMENTS

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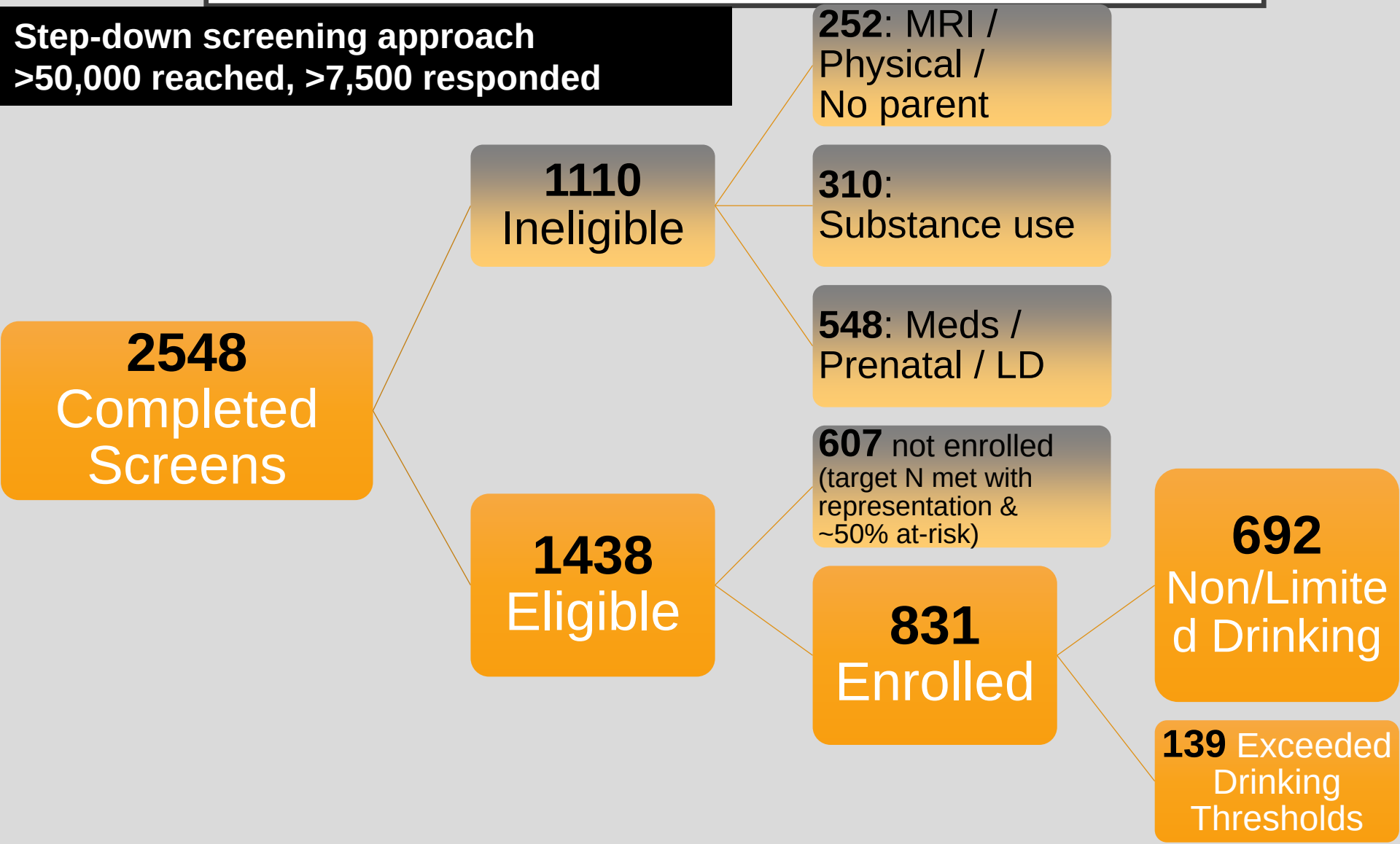
NCANDA DESIGN INNOVATIONS

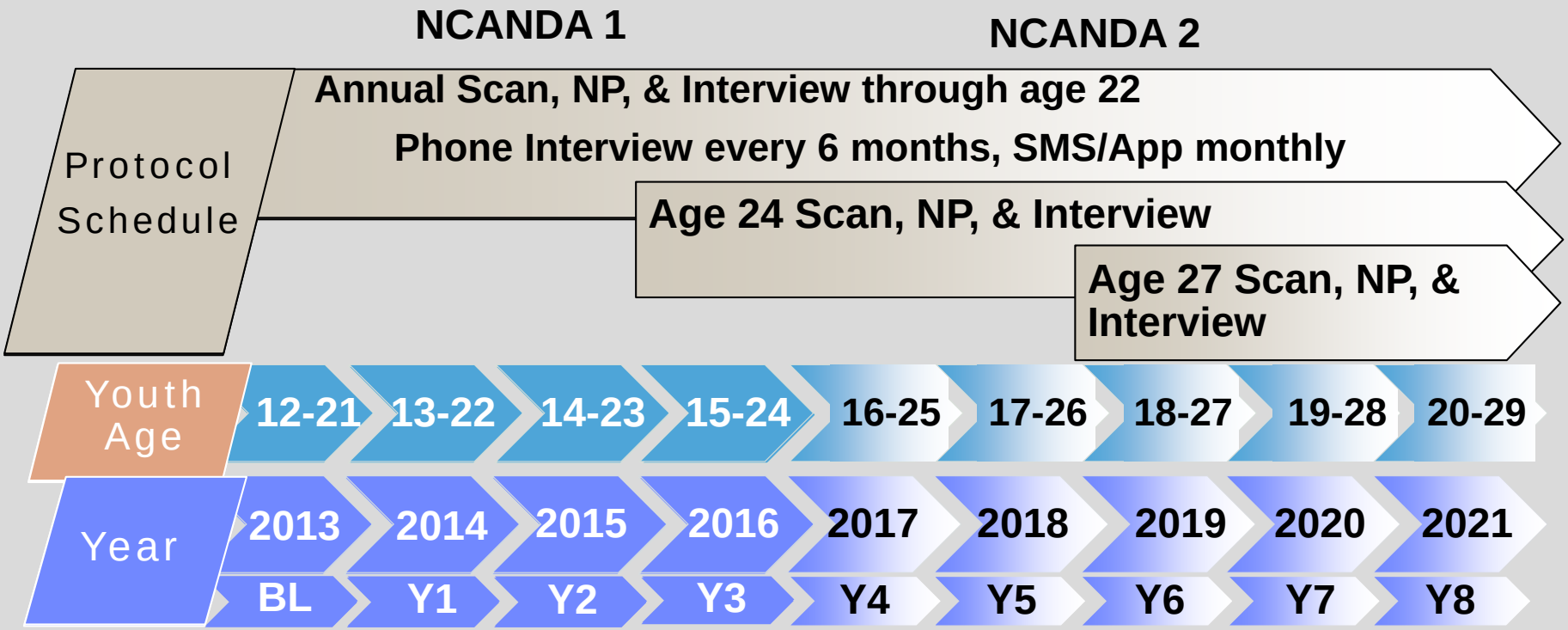
- Accelerated longitudinal design
- Mobile health application
- Nanobioengineered sensor
- Computerized neuropsychological test battery
- Multimodal neuroimaging protocol

NCANDA SCREENING

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

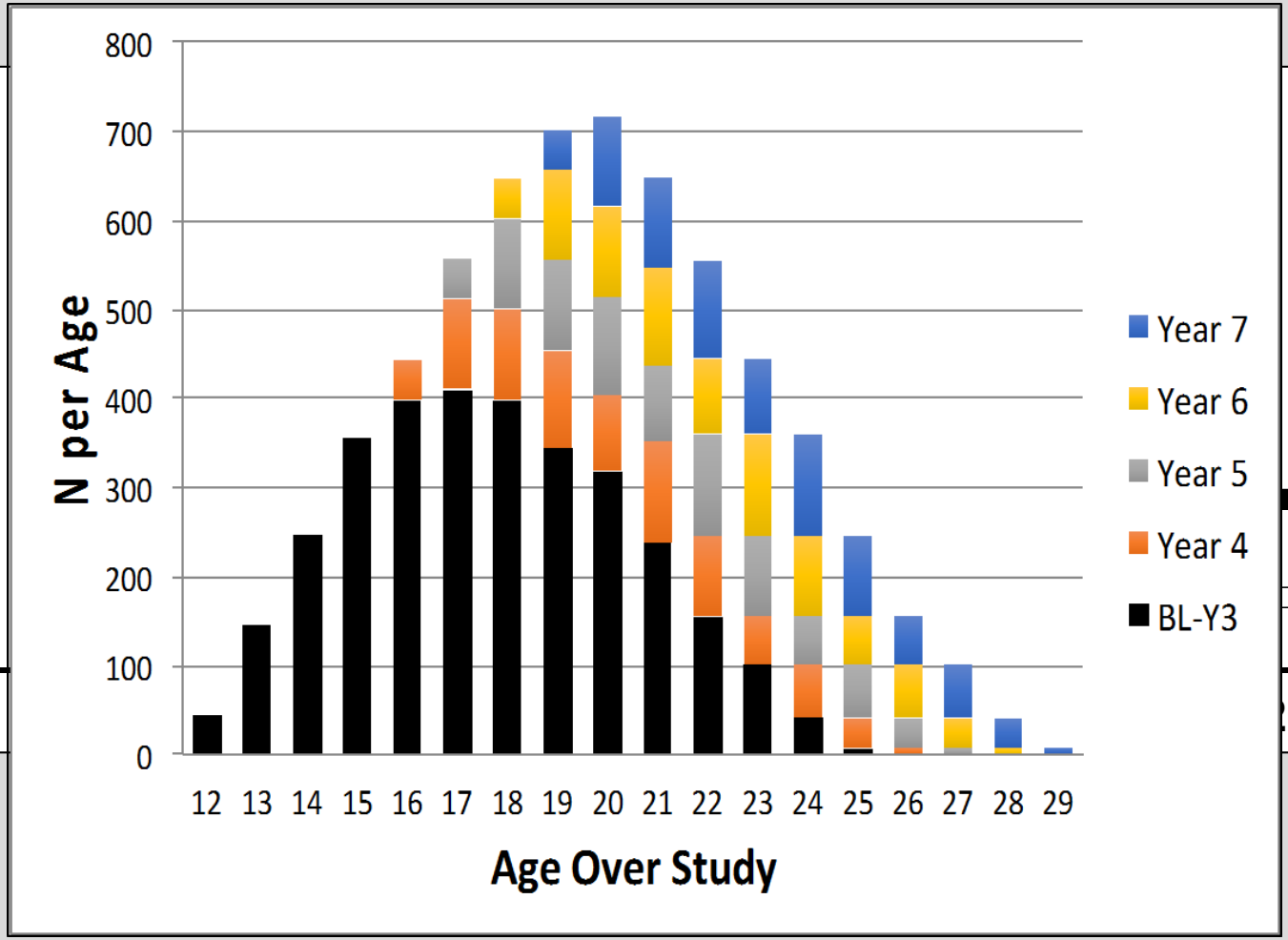


ASSESSMENT TIMELINE



- **Annual assessments through age 22**
- **Age-based assessments at 24 and 27 for older cohort**

ACCELERATED LONGITUDINAL DESIGN



Cohort 1

Cohort 2

Cohort 3

Cohort 4

Cohort 5

Cohort 6

Age

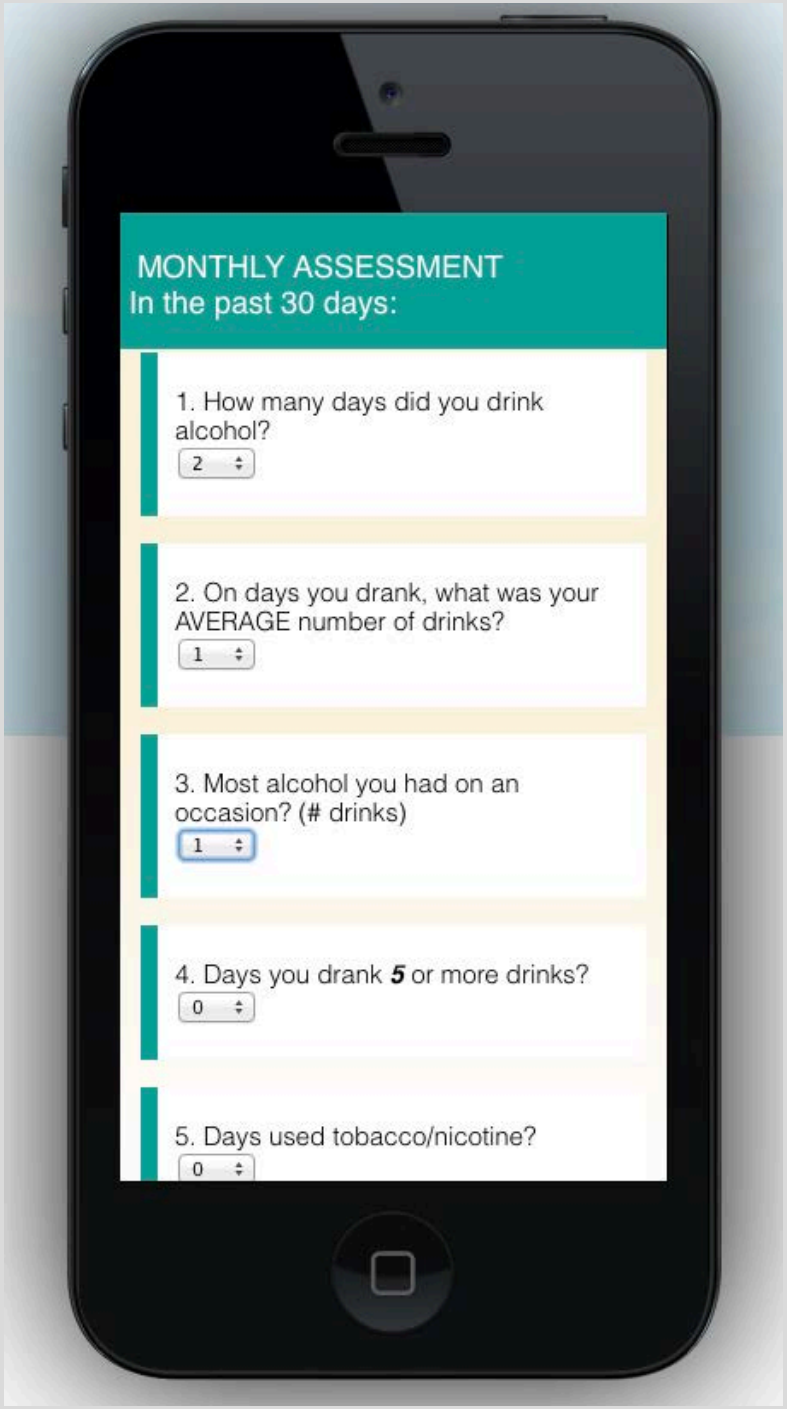
6 27 28

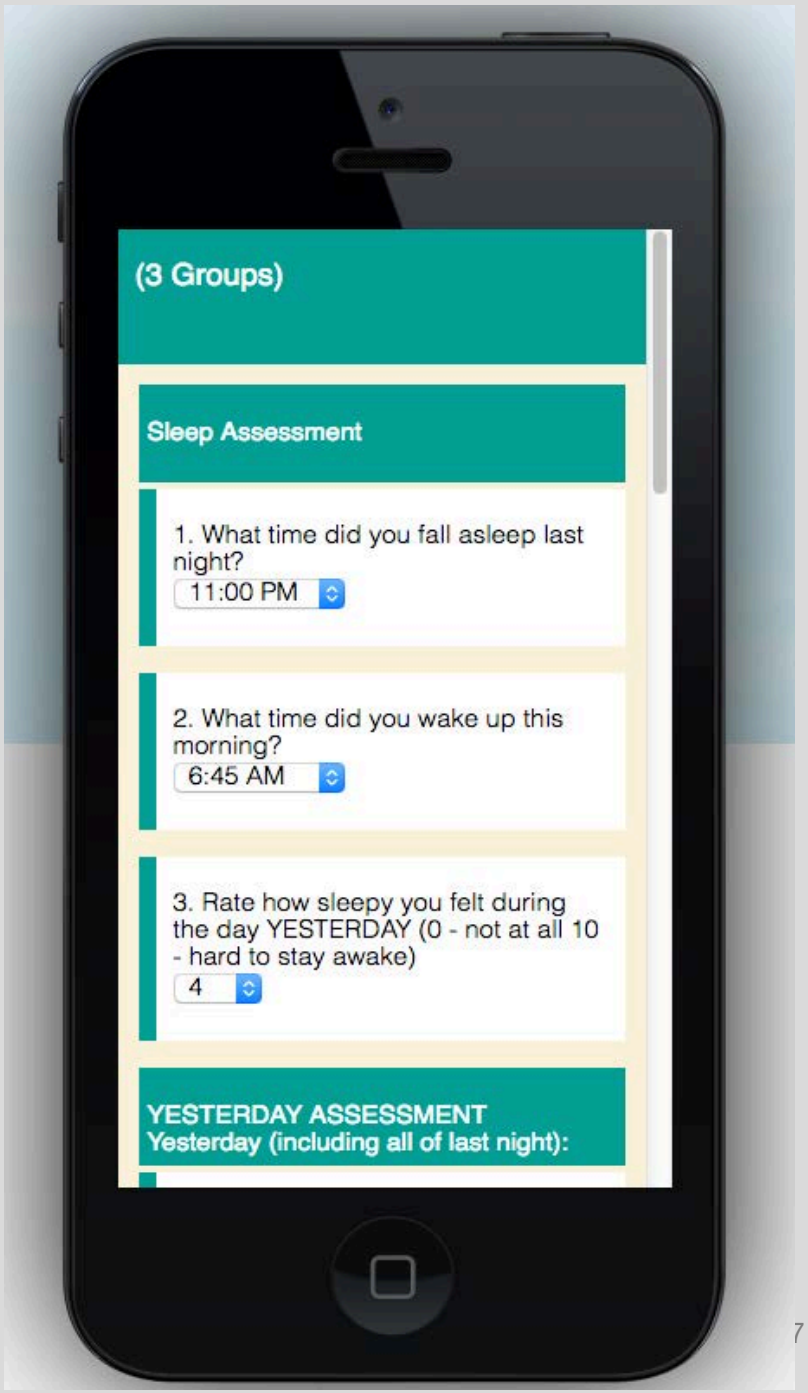
mNCANDA: MOBILE HEALTH APP

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

App Statistics:

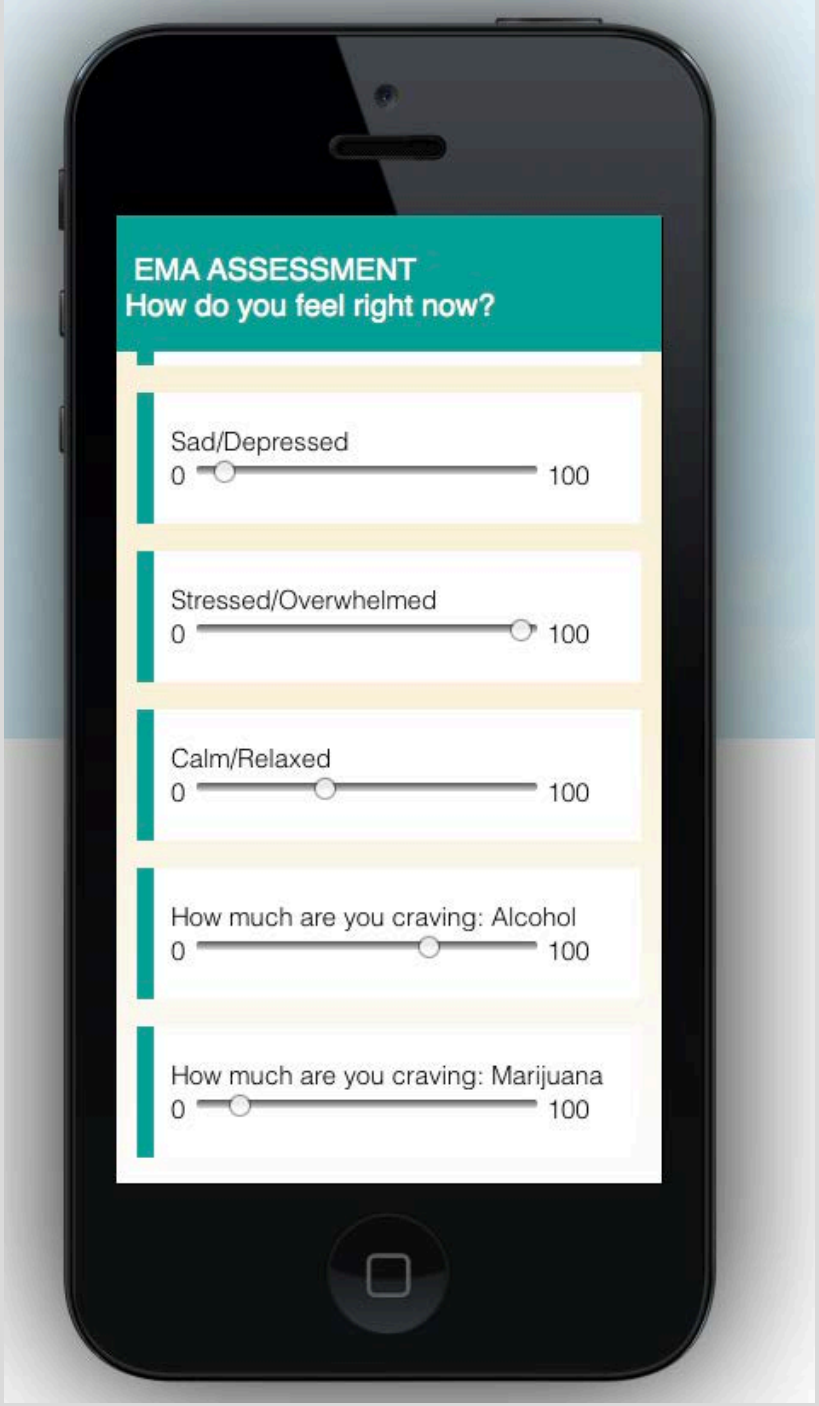
- >97% acceptability
- 90% follow-up rate
- 82% completed ALL ASSESSMENTS


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):

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

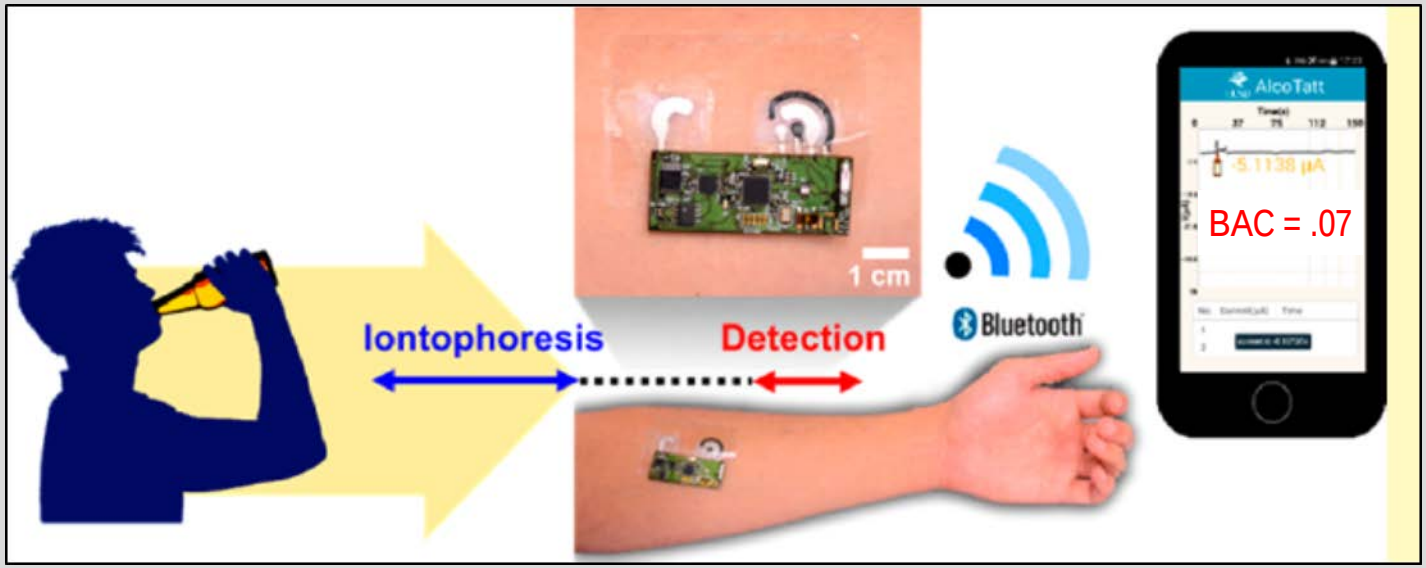
- **Integrates with wearable biosensors**

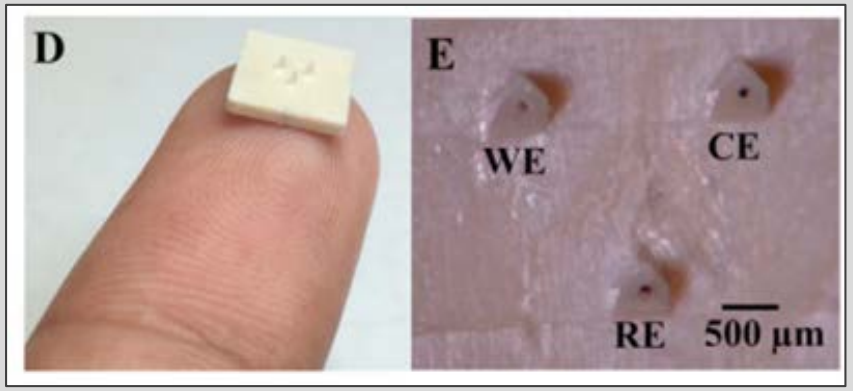
Noninvasive Alcohol Monitoring Using a Wearable Tattoo-Based Iontophoretic-Biosensing System

Jayoung Kim,[†,∥] Itthipon Jeerapan,[†,∥] Somayeh Imani,[‡,∥] Thomas N. Cho,[†] Amay Bandodkar,[†] Stefano Cinti,[†] Patrick P. Mercier,[*,‡] and Joseph Wang[*,†]

[†]Department of Nanoengineering and [‡]Department of Electrical & Computer Engineering, University of California, San Diego, La Jolla, California 92093, United States

WEARABLE BIOSENSORS





5-WEEK MONITORED ABSTINENCE

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

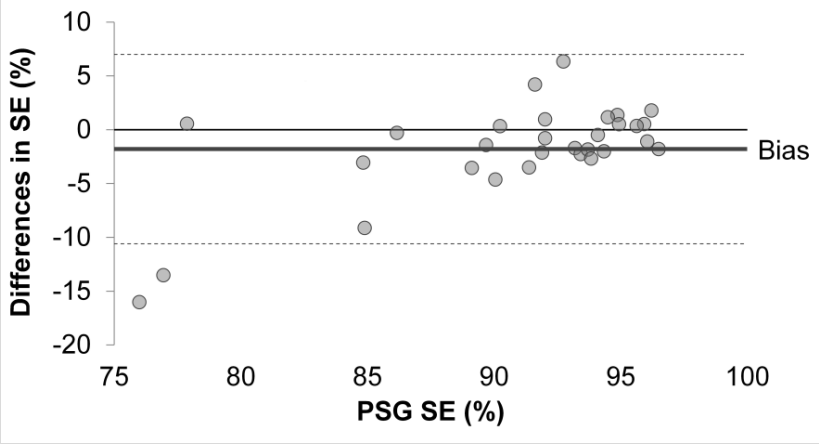
Baseline

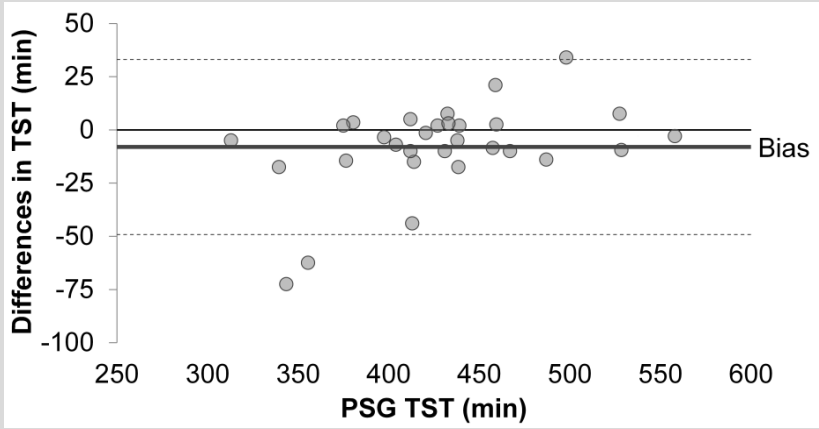
MRI (Cue Reactivity)
NP
Interview
<5 days abstinent

+4 weeks

MRI (Cue Reactivity)
NP
Interview
~30 days abstinent

SLEEP & ACTIVITY TRACKING

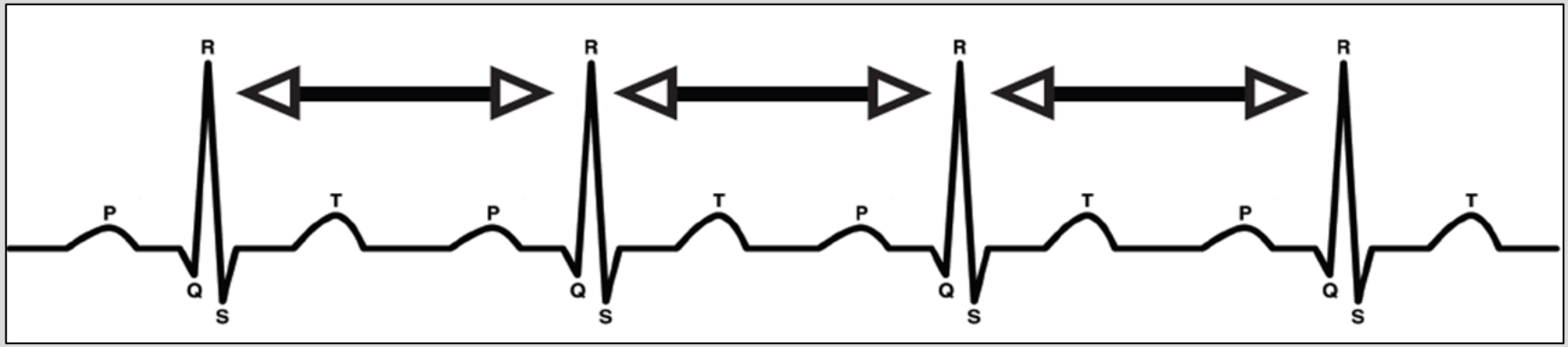




- Fitbit worn throughout 5 weeks
- Approximates PSG measures
- Provides continuous HR and activity levels

de Zambotti et al. (2016) *Chronobiology International*

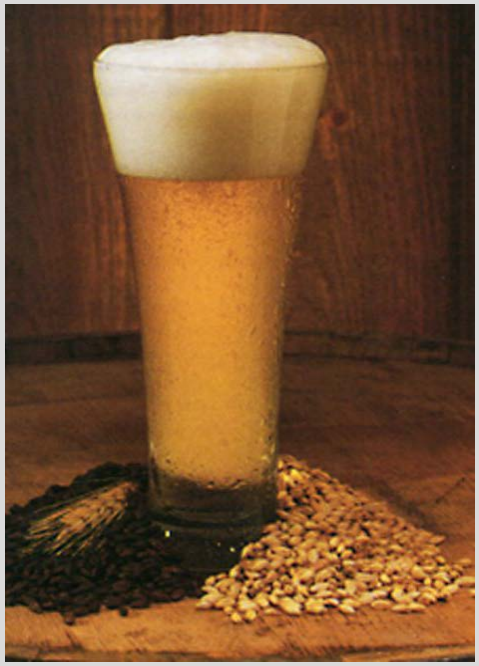
HEART RATE VARIABILITY (HRV)



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

All Sites	MRI: T1, T2, DTI, & resting state fMRI
	Samples for genetic and epigenetic analyses, pubertal hormones, and drug screening
Specialty Projects at 2 Sites	Sleep studies – SRI & Pittsburg
	Stroop fMRI task – SRI & UCSD
	Anti-saccade fMRI task – Duke & Pittsburg
	Recovery protocol – UCSD, OHSU, & Duke

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NIH National Institute on Alcohol Abuse and Alcoholism

- NIAAA Program Staff
- NCANDA Scientific Advisory Board
- NCANDA Co-Investigators
- NCANDA Research Associates