Active Methamphetamine Use is Associated with Antrietroviral Medication Nonadherence

D.J. Moore, A.S. Rooney, J.L. Montoya, K.B. Casaletto, B. Gouaux, C.A. Depp, J. H. Atkinson, and the HNRP group

June 10th, 2014
9th International Conference on HIV Treatment and Prevention Adherence

HNRP
HIV NEUROBEHAVIORAL RESEARCH PROGRAMS

UCSD

HIV and METH Use

- Strong association between methamphetamine (METH) use among MSMs and continued high incidence of HIV/AIDS in the US (CDC HIV/AIDS Fact sheet, 2007)

- Rates of functional dependence are higher among dually affected HIV+/METH persons than in either group alone (Blackstone et al., 2013)

- Stimulant dependence is correlated with poor ART adherence (Des Jarlais, 1999; Ferrando et al., 1996)

- When compared to other HIV+ persons, individuals who use METH are especially non-adherent to ART (Moore et al., 2012)

- Among HIV-infected persons, a lifetime METH use diagnosis is associated with higher rates of detectable plasma and CSF viral loads (Moore et al., 2012)

Texting Improves ART Adherence

- **Meta-analysis of 9 RCTs using text messaging to improve ART adherence showed:**
  - » Text Messaging yielded higher adherence than control conditions
  - » Studies with larger effects on adherence 1) sent less than daily messages, 2) supported bidirectional communication,* 3) had personalized content,* and 4) were matched to participants' dosing schedule*

- **Studies have shown feasibility and acceptability of texting to improve ART adherence in HIV+ substance using cohorts**

* = components of current intervention

Finitsis, Pellowski, & Johnson, PLoS One, 2014; Moore et al., ART, 2013 Ingersoll et al., J Sub Abuse Tx, 2014

iTAB-M Study Methods

- iTAB-M (individualized Texting for Adherence Building-Methamphetamine)

- Ongoing 6-week RCT of iTAB-M for ART adherence (NCT01317277)

- Random assignment to iTAB-M or CTRL (2:1)

- Present findings = 50 participants in aggregate; total study target = 75

- Inclusion criteria:
  » HIV+ individuals, 18 years or older, METH use within 60 days of enrollment and diagnosed with lifetime METH dependence or abuse & taking ART

- **Bi-directional Automated Text Messages**
  » Both arms received texts asking about METH use
  » iTAB-M pts received additional texts reminding them to take their ART; content derived from focus group, at preferred time, personalized, texts chosen by participant from 40 texts

Methamphetamine Use Text

- To protect the participants, the term METH was not directly used in the text messages

- During the education presentation participants were instructed how to respond to a question asking if they had "done anything"

Conversation, Daily Meth

Messages   Edit

iTAB (12:00 PM): Have you done anything in the past 24 hours? Please respond A) Yes, D) No.

Smith (12:12 PM): A

iTAB (12:13 PM): Thank you for your response.

Send

Adherence Methods

- **Medication Adherence Education (psychoeducation)**
  - » Included components of previously successful interventions and barriers to successful medication adherence among substance users
  - » Presented the health benefits of adherence to ART, adverse METH use effects, problems of adherence for METH users and medication adherence strategies

- **Adherence Measure**
  - » A "sentinel" ARV medication tracked using Medication Event Monitoring System (MEMS) for 6 weeks

Hinkin et al., 2007; Marquez et al., 2009; Johnson et al., 2003; Roberts, 2000; Moore, et al., 2012

Baseline Characteristics

	N=50
Demographics	
Age (mean, SD)	46.1 (8.6)
Sex (n, % male)	48 (96%)
Education (mean, SD)	13.4 (2.7)
Ethnicity (n, % Caucasian)	26 (52%)
HIV disease characteristics	
Det. Plasma VL (visit 1; n, %)[a]	15 (34%)
CD4 (median, IQR)[c]	548 (356, 656)
Tracked ARV (n, % 1x day)	47 (94%)
ACTG 4-day skipped (n, %)[d]	12 (26%)

[a]n=44, [b]n=49, [c]n=42, [d]n=47
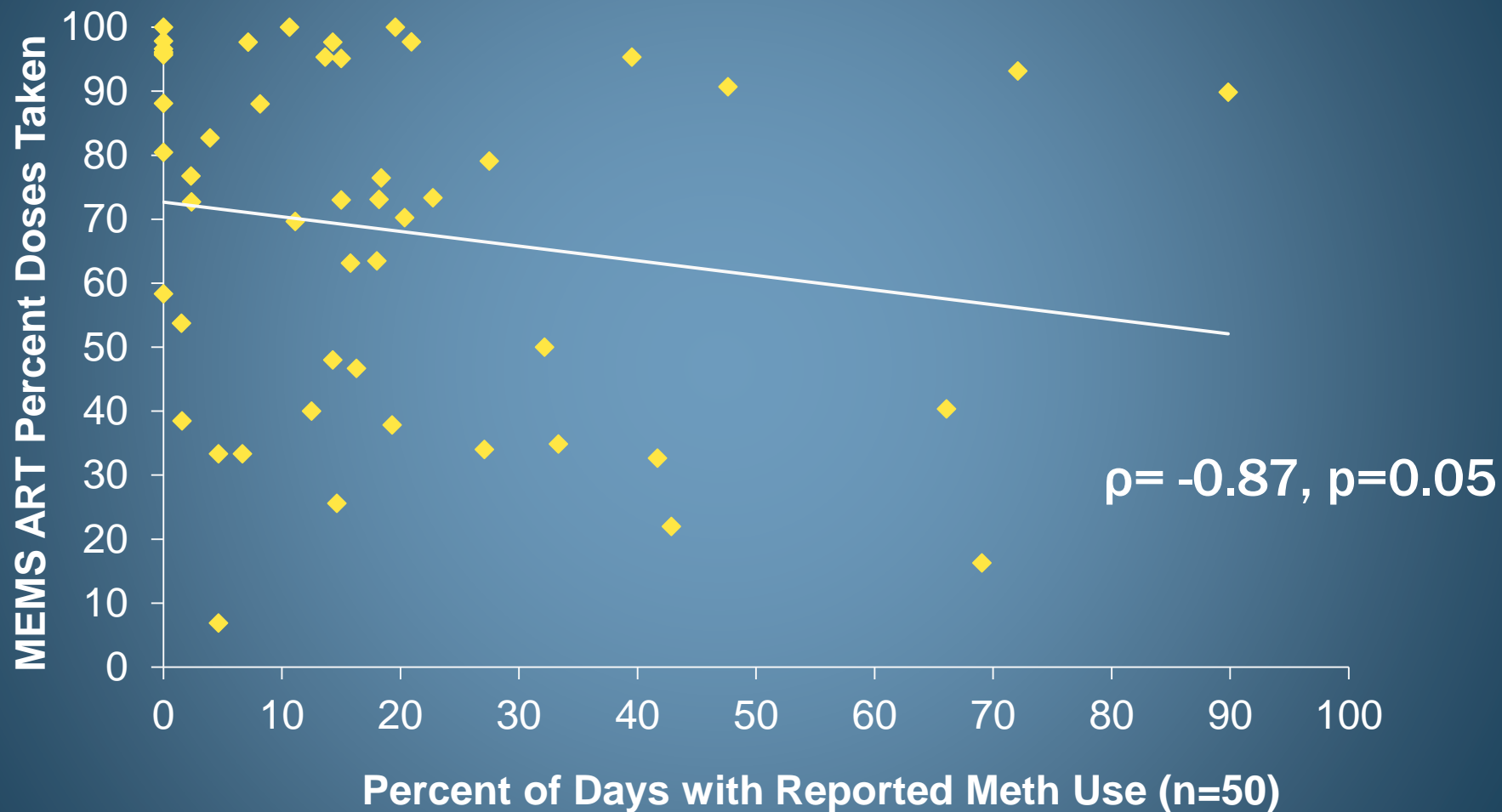
Baseline Methamphetamine Data

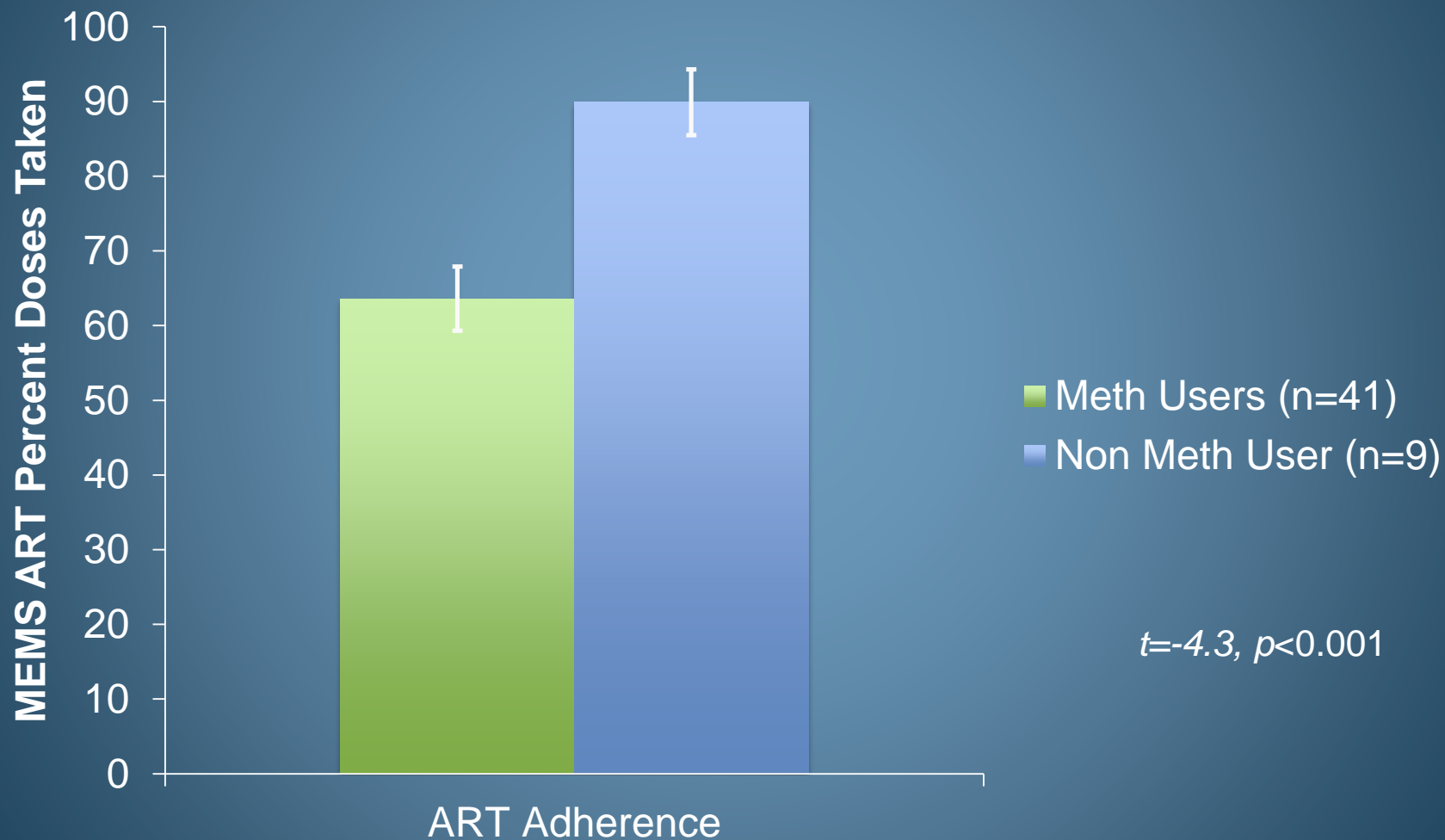| Mean (SD)	Participants (N=50)
Age at First METH Use	27.2 (11.4)
Last METH Use (days)	9.9 (13.9)
Cumulative duration METH use (years)	4.3 (6.5)
Cumulative METH quantity (grams)	1,315 (3,063)

Methamphetamine Use Responses

Pie chart:
- Used: 19.1%
- Didn't Use: 54.9%
- No Response: 26.0%
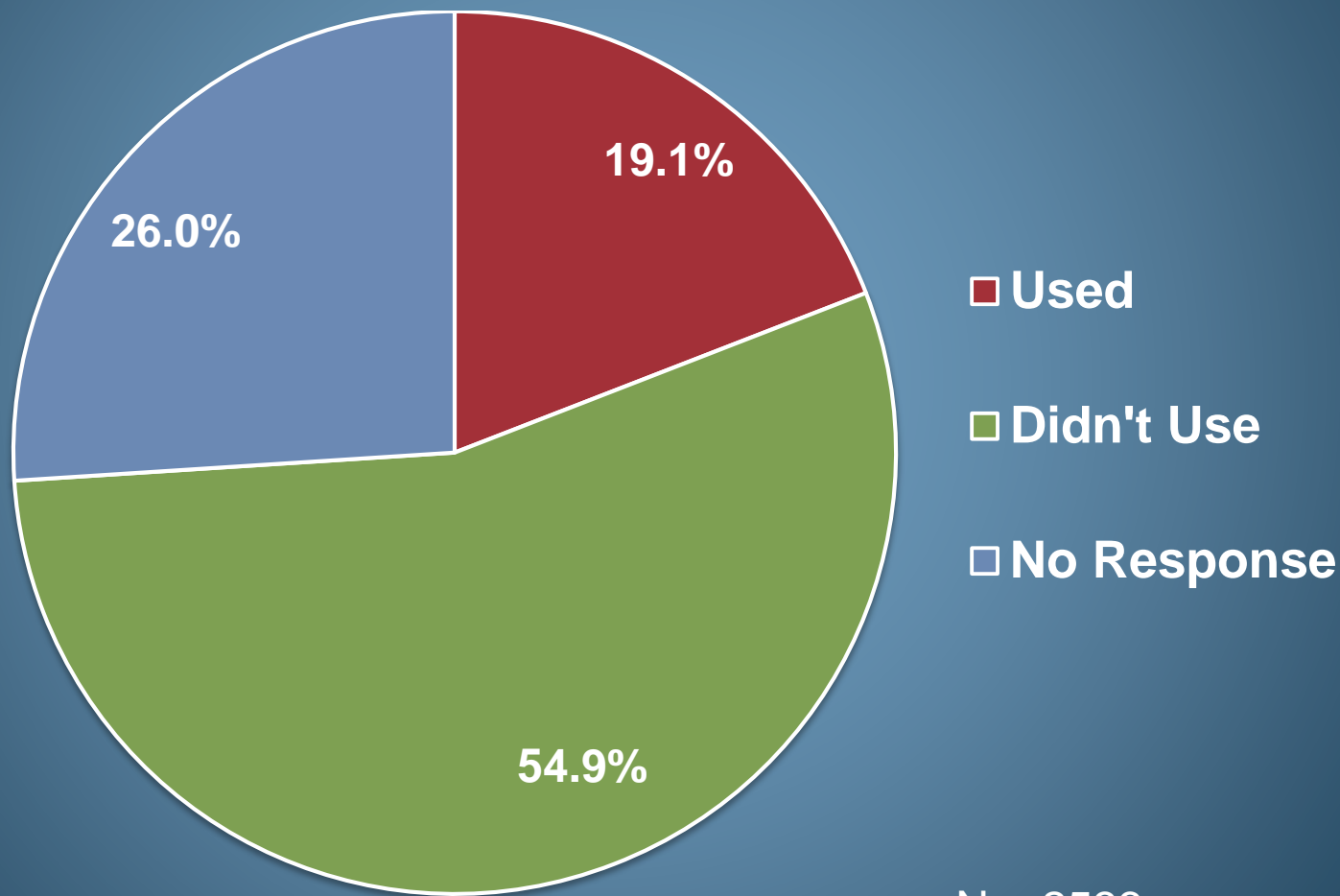
N = 2533 messages out

METH Use Days & ART Adherence

$\rho= -0.87, p=0.05$

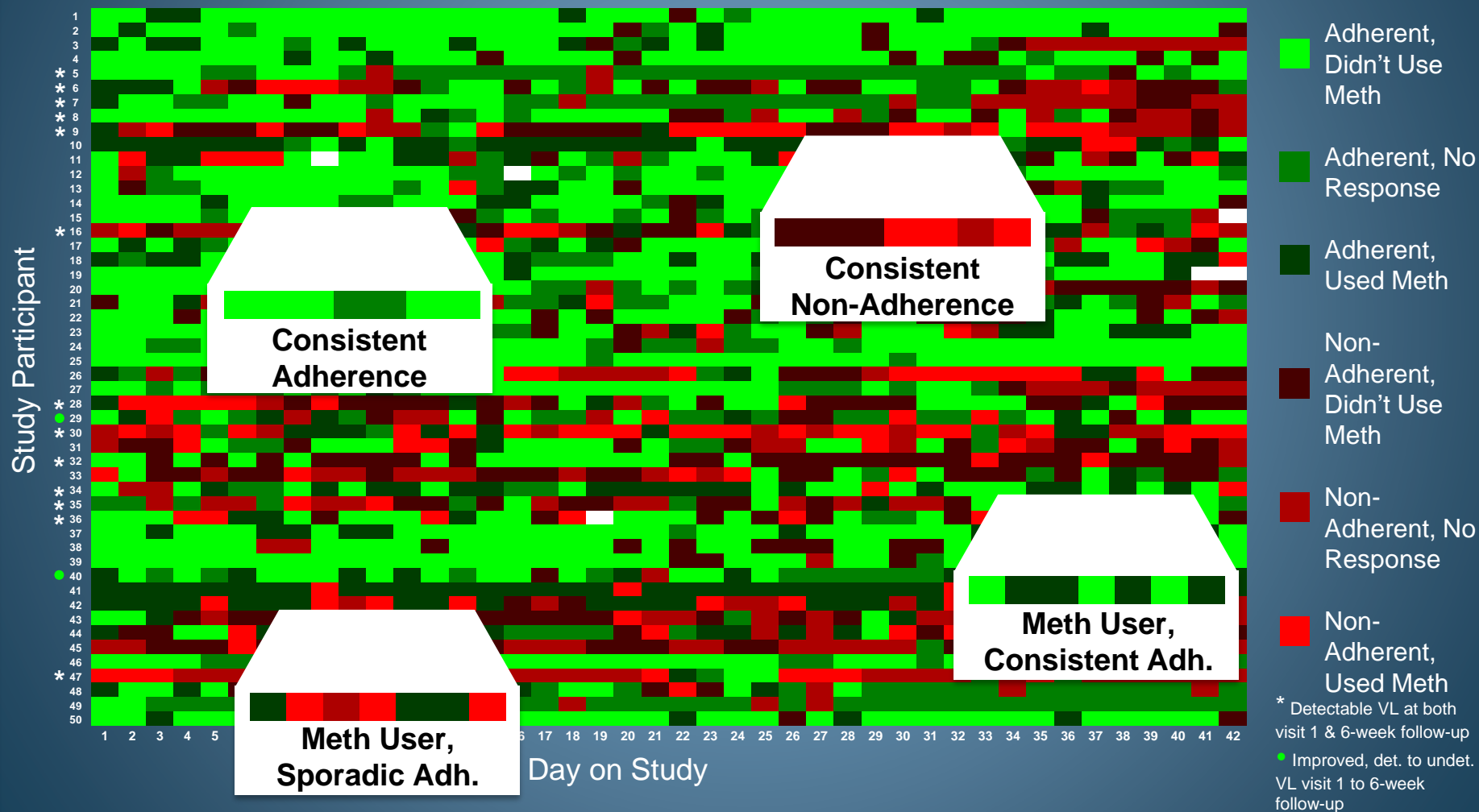# ART Adherence On-Study METH Use

t=-4.3, p<0.001

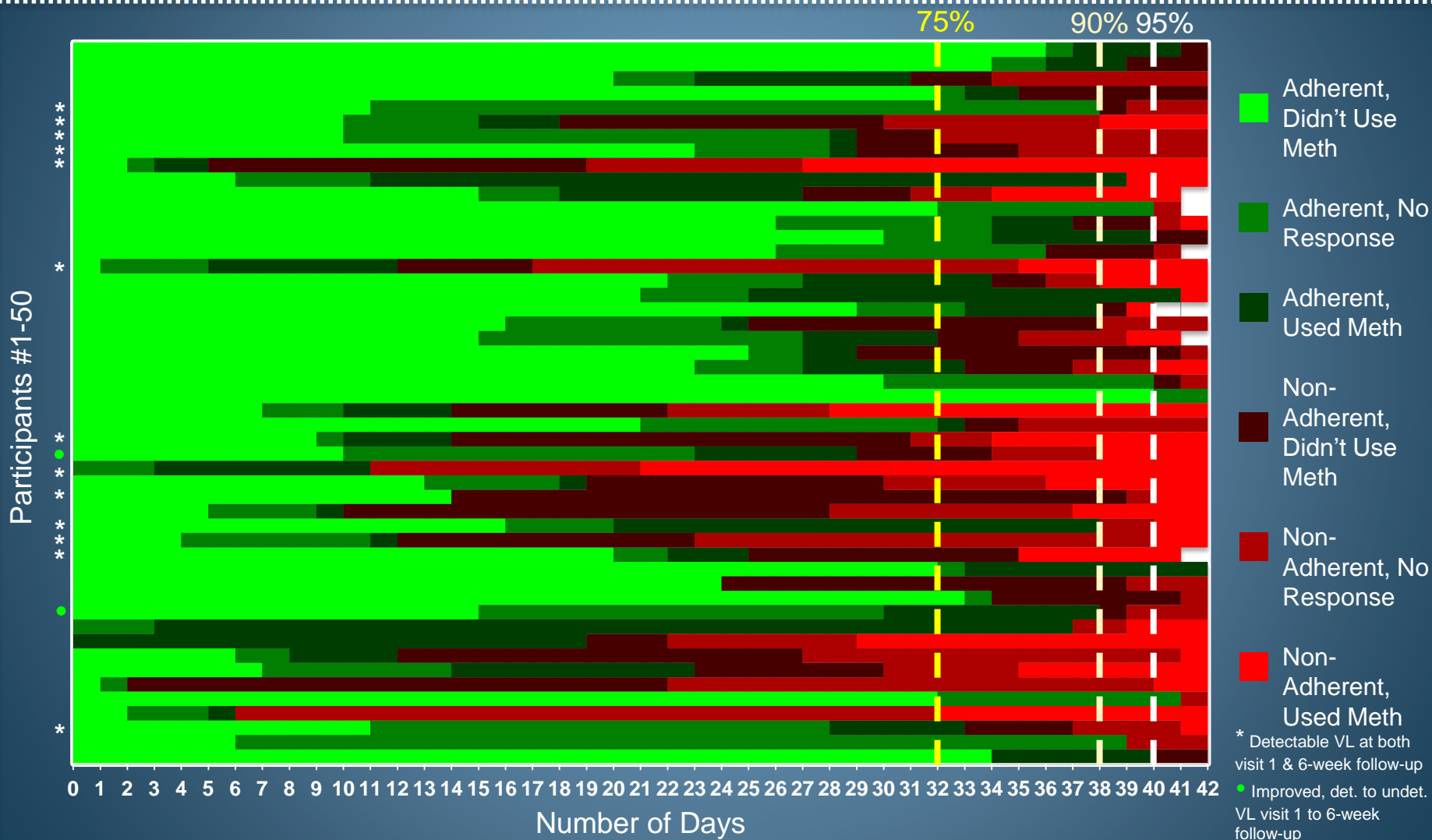Meth Users (n=41)
Non Meth User (n=9)

Interestingly...there was no significant association between day-specific METH use (yes/no) and day-specific ART adherence (yes/no), which led to...

Adherence Patterns by METH Use

Methamphetamine Use Responses

Chart legend:

- **Adherent, Didn't Use Meth** (bright green)
- **Adherent, No Response** (green)
- **Adherent, Used Meth** (dark green)
- **Non-Adherent, Didn't Use Meth** (dark red)
- **Non-Adherent, No Response** (red)
- **Non-Adherent, Used Meth** (bright red)

Vertical reference lines: 75% (yellow dashed), 90% and 95% (white dashed)

Y-axis: Participants #1-50
X-axis: Number of Days — 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

* Detectable VL at both visit 1 & 6-week follow-up

• Improved, det. to undet. VL visit 1 to 6-week follow-up

Conclusions

- Feasible to gather METH use data via text

- On-study METH users have worse ART adherence than those who did not use on study; trend toward more days used and worse ART adherence

- Relationship between adherence and METH complex; not simply persons are less adherent on days when they use

- Visual examination of data shows intricacy of patterns and provides suggestions for future intervention, dispels idea that adherence cannot be achieved in context of METH use

- Pending results of RCT as to effect of current intervention

Future Directions

- **Immediate:** Assess if iTAB-M, as compared to CTRL, shows better adherence, better pattern & better dose timing

- **Long-Term:** Consider messages that target patterns of nonadherence in real-time:
  - » Consistent Adherence regardless of METH status → current intervention appropriate?
  - » METH user with Sporadic Adherence or NonAdherence → perhaps need to target METH use to improve adherence?
  - » No METH use while on study → perhaps self-monitoring good for ↓ METH use?

- **Importance of avoiding consecutive nonadherent days**

- **Examine over longer periods of time**

- **Focus on message content; words matter**

"...the content of the adherence app messaging is at the nascent stage of development."

Dayer et al., J Am Pharm Assoc. 2013;53(2):172-181

Acknowledgments

- **Participants**
- **Funding Support**
  - » NIDA R34 DA31058
  - » NIDA P50 DA026306
  - » California HIV/AIDS Research Program ID-09-047, EI-11-SD-005
  - » NIMH/CSPAR P30 MH062512
- **Co-investigators/Consultants**
  - » J. Hampton Atkinson, M.D.
  - » Colin Depp, Ph.D.
  - » Igor Grant, M.D.
  - » Richard Haubrich, M.D.
  - » Scott Letendre, M.D.
  - » Sheldon Morris, M.D., M.P.H.
  - » Tom Patterson, Ph.D.
  - » Steven Safren, Ph.D.
- **Students**
  - » Kaitlin Blackstone
  - » Jessica Montoya

- **Fellows**
  - » Pariya Fazeli, Ph.D.
  - » Maria Marquine, Ph.D.
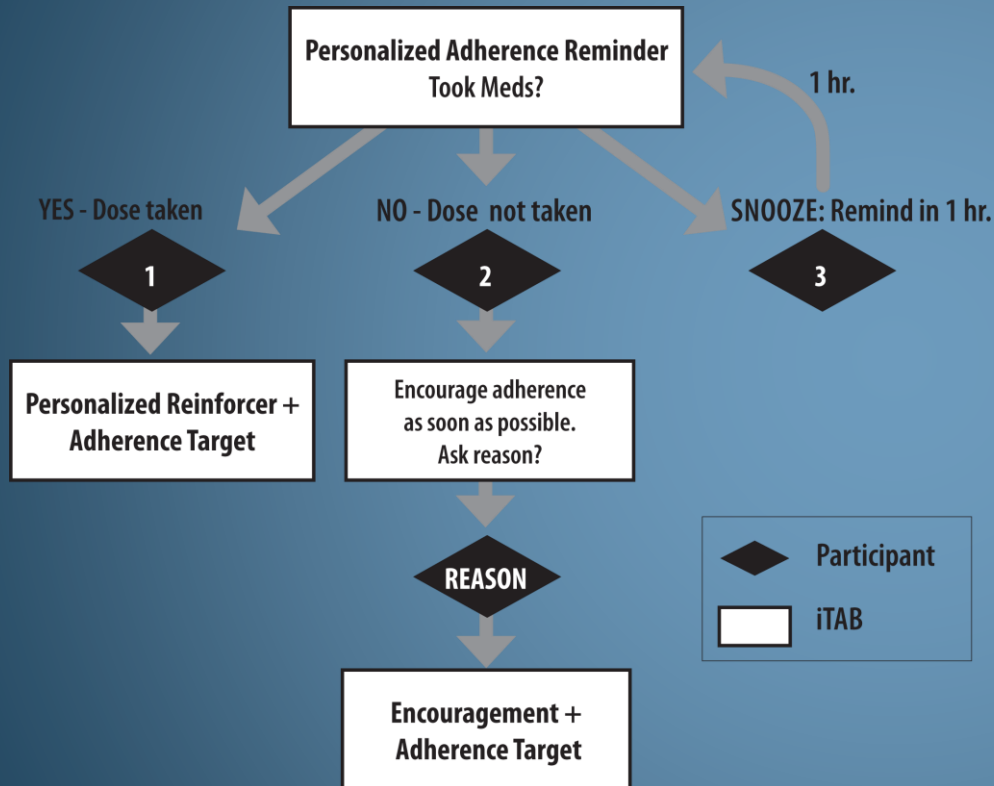- **Staff**
  - » Jayraan Badiee
  - » Eric Ellorin
  - » Roberto Gallardo
  - » Ben Gouaux*
  - » Jennifer Marquie-Beck
  - » Amelia Poquette
  - » Alexandra Rooney*
  - » Crossby Vargas
- **Cal-IT2 Technical Experts**
  - » Kevin Patrick, M.D., M.S.
  - » Allison Flick
  - » Fred Raab
  - » Mark Sullivan

iTAB Decision Tree

Other iTAB components:
- 3 consecutive days of non-responses get a "noncompliance" text
- 5 consecutive days of non-responses, call from RA
- Adherence Targets: "Ur current adherence: xx%. Adhr when u take ur next dose: xx% (x/x doses)"
- Personalized Reinforcer

iTAB-M: 8 Thematic Reminder Stems

» **Social Support/responsibility to others**
  - People care about u. Pls take ur...

» **Self-Esteem**
  - U are special. Pls take ur...

» **Dangers on non-adherence**
- Not taking ur meds could make u resistant. Take ur...

» **Harm reduction focus**
- You can have fun and take ur meds. Time 4 ur...

» **Time/focus**
  - It's pill time! Take ur...

» **Spirituality**
- God grant me the serenity to do this. It's time 4 ur...

» **Celebration of health**
  - 2 help keep u feeling good, rmber 2 take ur...

» **Disease control**
  - Ur health is impt, rmbr 2 take ur meds. Take ur...