

# Using Incentives to Treat Co-Occurring Disorders

**Michael McDonell, PhD**

*Director, Behavioral Health Innovations*

*Associate Professor*

*Elson S. Floyd School of Medicine*

*Washington State University*



# Contingency Management





# # of cocaine choices





# Principles of Contingency Management (CM) for Drug Abuse

- 1. Frequently monitor target behavior (drug abstinence)**
  - Urine drug tests 2-3 times per week
- 2. Provide a reinforcer when the target behavior occurs**
- 3. Remove the reinforcer when the target behavior does not occur**



# Why talk about CM?

- Laboratory models of CM suggest that drug abusers will forego opportunities to self-administer a drug in exchange for small monetary reinforcers.
- In a meta-analysis: relative to all other psychosocial treatments for drug abuse, CM is the most effective/powerful at inducing abstinence (*Dutra et al., 2008*).
- <https://www.youtube.com/watch?v=XOv79ifAeCg>

# Treatment for Alcohol Use Disorders in Seriously Mentally Ill Adults Using the Ethyl Glucuronide Biomarker

Michael G. McDonell et al.

American Journal of Psychiatry 2017

Supported by NIAAA/OBSSR  
R01 AA020248, R01 AA022070

# Rates of Alcohol Use are High in SMI adults

- 46% of adults with serious mental illness (SMI) will suffer from an alcohol use disorder (AUD) in their lifetime (*Regier et al., 1990*)
  - Co-occurring SMI and AUDs are associated with increased risk of:
    - **Severe psychiatric symptoms** (*DSHS, 2005*)
    - **Homelessness** (*DSHS, 2005*)
    - **Psychiatric hospitalization** (*DSHS, 2005*)
    - **HIV infection** (*Carey et al., 1997; Kalichman et al., 2007*)
    - **Nicotine use** (*Littleton et al., 2007; Lohr & Flynn, 2002*)
    - **Illicit drug abuse** (*Alterman et al., 2000; Corsi et al., 2007; Passos & Camacho 2000*)
    - **Treatment attrition** (*Amodeo 2008; Kreyenbuhl 2009; Passos & Camacho 2000; Smelson 2006*)

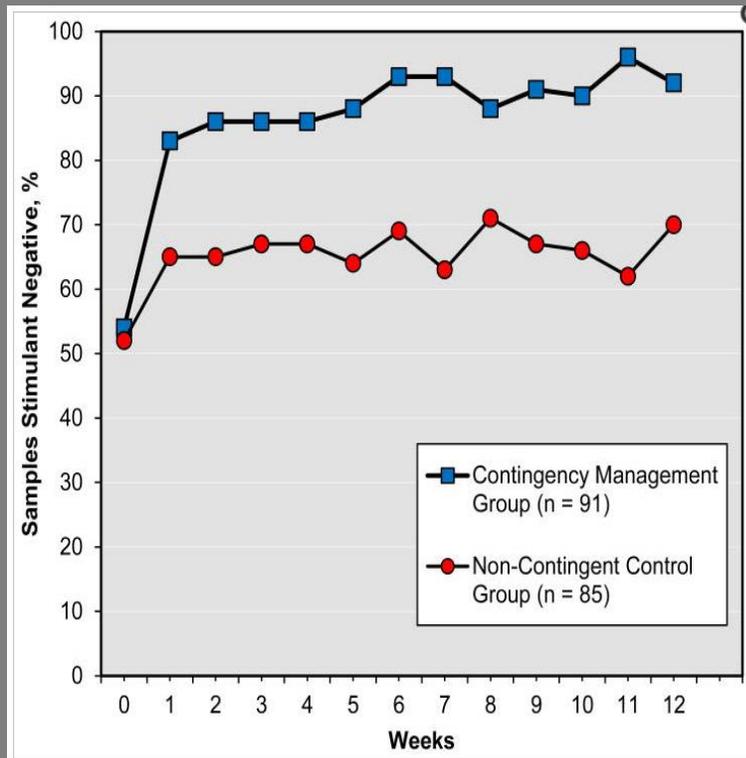


# Contingency Management Treatment for Outpatients with AUDs and SMI

- Contingency management: tangible reinforcers for demonstrating drug abstinence
- Abstinence is confirmed by urine drug test 2-3 times per week
  - Five meta-analyses support the efficacy of CM for illicit drug use (e.g., *Benishek et al., 2014*)
- CM is effective for outpatients with SMI and drug use disorders (*Bellack et al., 2006; McDonnell et al., 2013*)
- There are few trials of CM for AUDs in any population due to lack of alcohol biomarker that can detect use for 2+ days



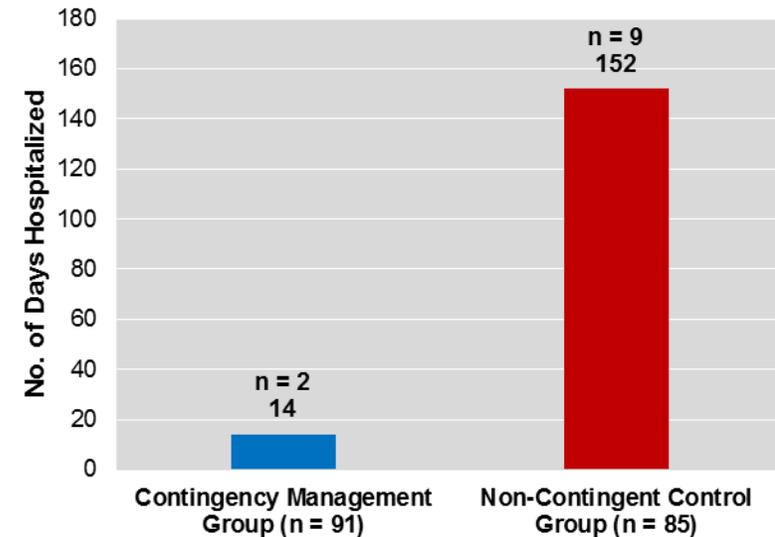
# CM for Stimulant Use in Adults with SMI



% of pts with stimulant-negative urine samples across the baseline (week 0) and 12-week treatment periods

CM pts were 2.4 (CI=1.9-3.0,  $p < 0.05$ ) more likely to submit a stimulant-negative urine test, relative to controls

## Inpatient psychiatric treatment days by treatment group



CM pts had fewer days inpatient psychiatric treatment post randomization

Cost of CM (~\$300/person) offset by the reduced cost of inpatient psychiatric care

(McDonell et al., 2013)



# Ethyl Glucuronide (EtG)

- Alcohol metabolite detected in urine for 5 days when using low cutoffs (i.e., 100-200 ng/mL)
- Conducted using immunoassay in clinic setting (*Leickly et al., 2015*)
  - Concerns about “false positive” results are unwarranted
- Also available as point of care test
- EtG may be a suitable biomarker for verifying alcohol abstinence in CM





# Study Aim

*To determine if CM intervention that provided reinforcers for alcohol abstinence (as assessed by EtG) and addiction treatment attendance resulted in increased levels of alcohol abstinence in 79 adults with AUDs and SMI receiving treatment-as-usual in a community mental health center.*





# Methods Overview

**Eligibility:** Alcohol dependence, SMI, no current drug dependence

## Study Interventions

- Participants received **treatment-as-usual**
- **CM:** variable magnitude reinforcement procedure for alcohol abstinence (EtG<150 ng/mL). \$5-\$10 provided weekly for addiction treatment attendance
- **Non-contingent control** participants given reinforcers equal to those of CM group but not contingent on abstinence or treatment attendance

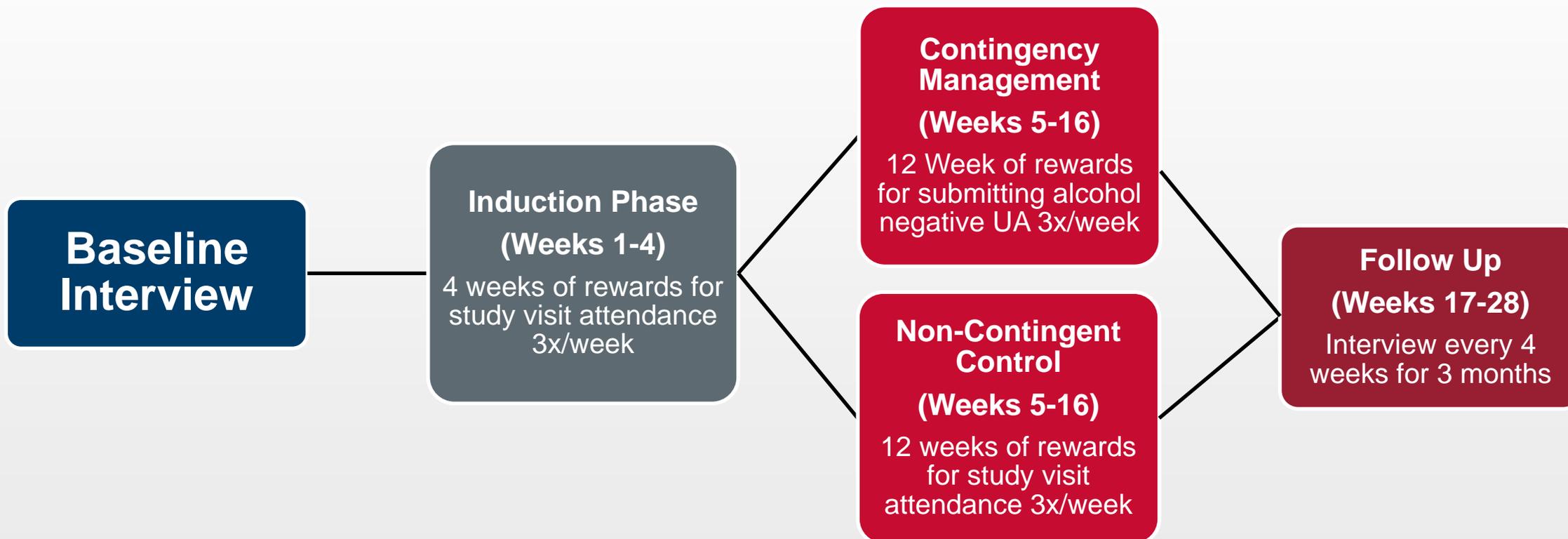
## Outcomes & Analyses

Proportions of individuals who attained >4 weeks of continuous abstinence were compared across groups using chi-squared analyses

Other alcohol outcomes were analyzed using GEE

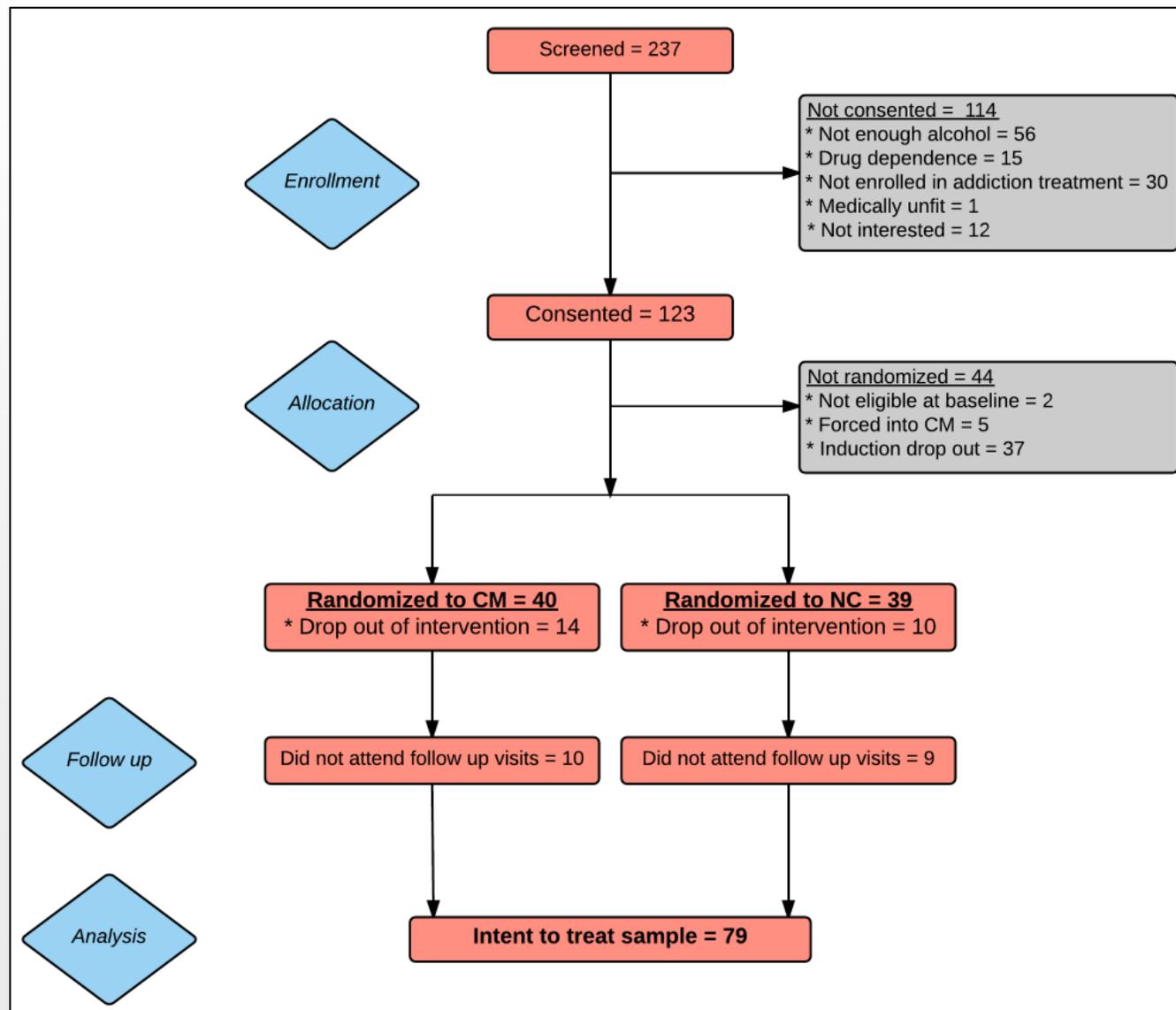


# Study Flow Chart



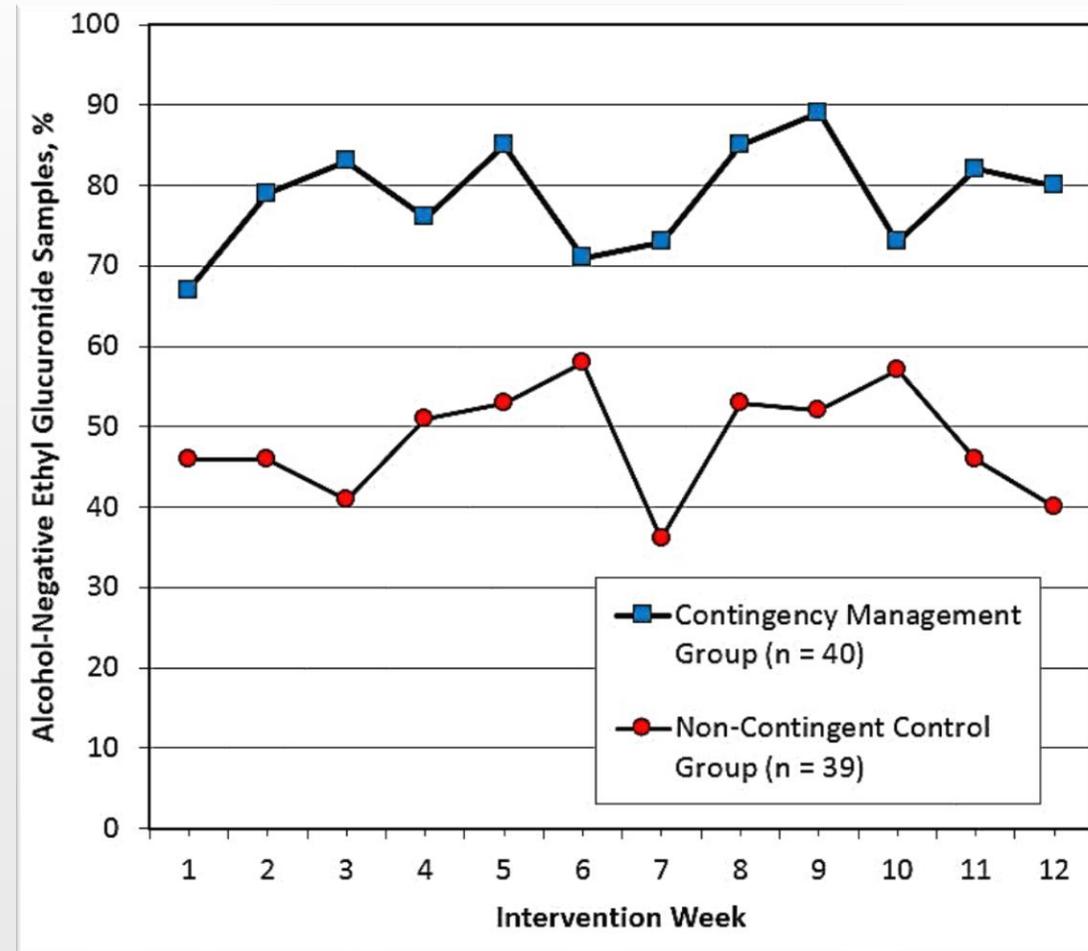


# Consort Diagram





# Differences in EtG assessed Abstinence



OR= 3.1(95% CI: 2.2-4.5)



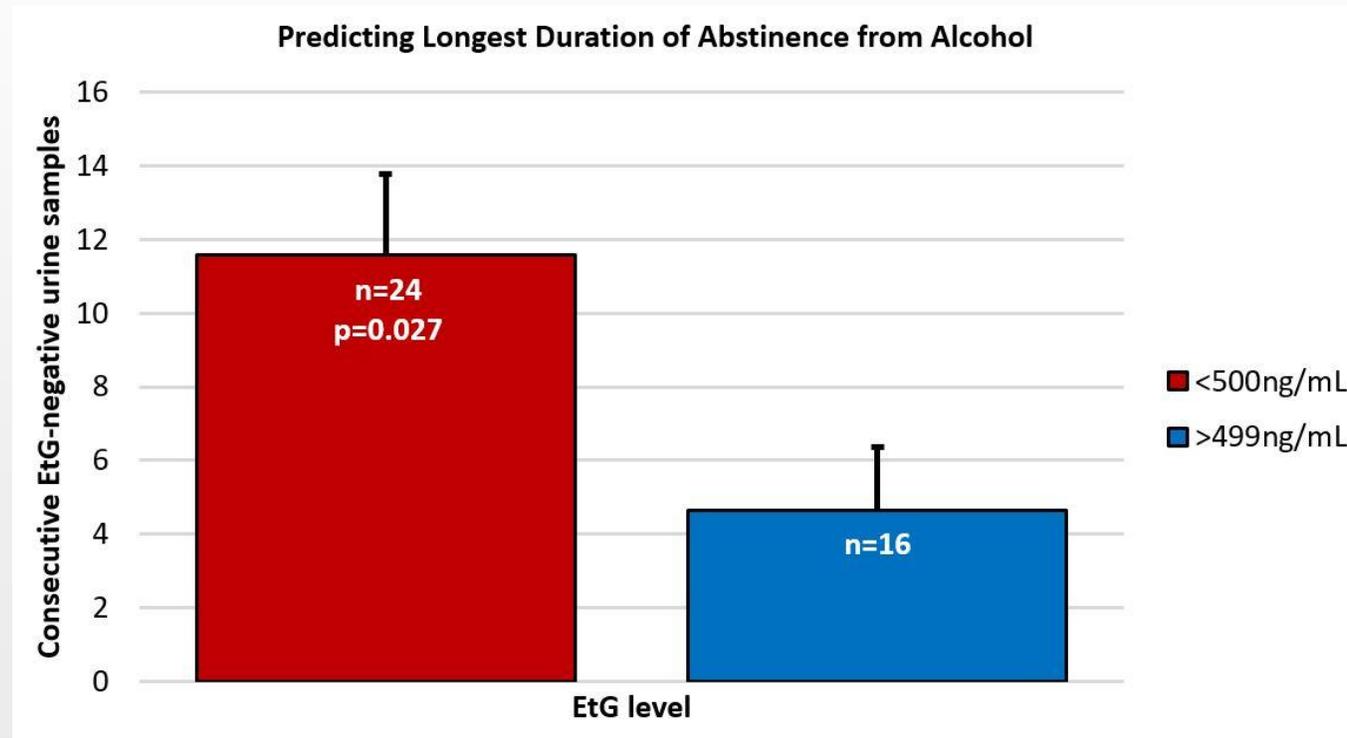
# Other Alcohol Outcomes

| <b>Outcome Variable</b>                                     | <b>Contingency Management<br/>(n=40)</b> |             | <b>Non-Contingent Control<br/>(n=39)</b> |             | <b>CI</b>                |
|---|--|-------------|--|-------------|--------------------------|
|   | <b>Mean</b>                              | <b>(SE)</b> | <b>Mean</b>                              | <b>(SE)</b> |                          |
| <b>% Alcohol Negative urine samples</b>                     | 50%                                      | (3%)        | 24%                                      | (3%)        | OR:3.13<br>2.18:4.50     |
| <b>EtG Value (ng/mL)</b>                                    | 408.86                                   | (39.57)     | 734.79                                   | (40.66)     | B=325.9<br>213.35:438.51 |
| <b>Self-reported days Alcohol Use Last 30 days</b>          | 3.72                                     | (1.57)      | 12.01                                    | (1.52)      | B=8.29<br>3.97:12.60     |
| <b>Self-reported days Alcohol Intoxication Last 30 Days</b> | 2.92                                     | (1.47)      | 9.35                                     | (1.43)      | B=6.43<br>2.40:10.47     |
| <b>Self-reported % Heavy drinking last 5 days</b>           | 13%                                      | (2%)        | 34%                                      | (3%)        | OR:3.48<br>2.32:5.23     |

**Note.** All differences were statistically significant,  $p < 0.05$



# Mean Number of Continuous EtG-Negative Samples in CM by Pre-treatment EtG results



(n=16, M=4.63, 95% CI=1.26-8),  $p<0.05$ )



# Conclusions

- EtG can be used to verify abstinence in a CM intervention.
- Participants who received CM were 3 times more likely to submit alcohol-negative urine samples.
- CM participants also had lower levels of alcohol use throughout the treatment and follow-up periods.
- CM participants were also less likely to use drugs and smoke cigarettes, compared to controls.
- People with a pretreatment EtG level of  $>499$  ng/mL did not respond to CM.

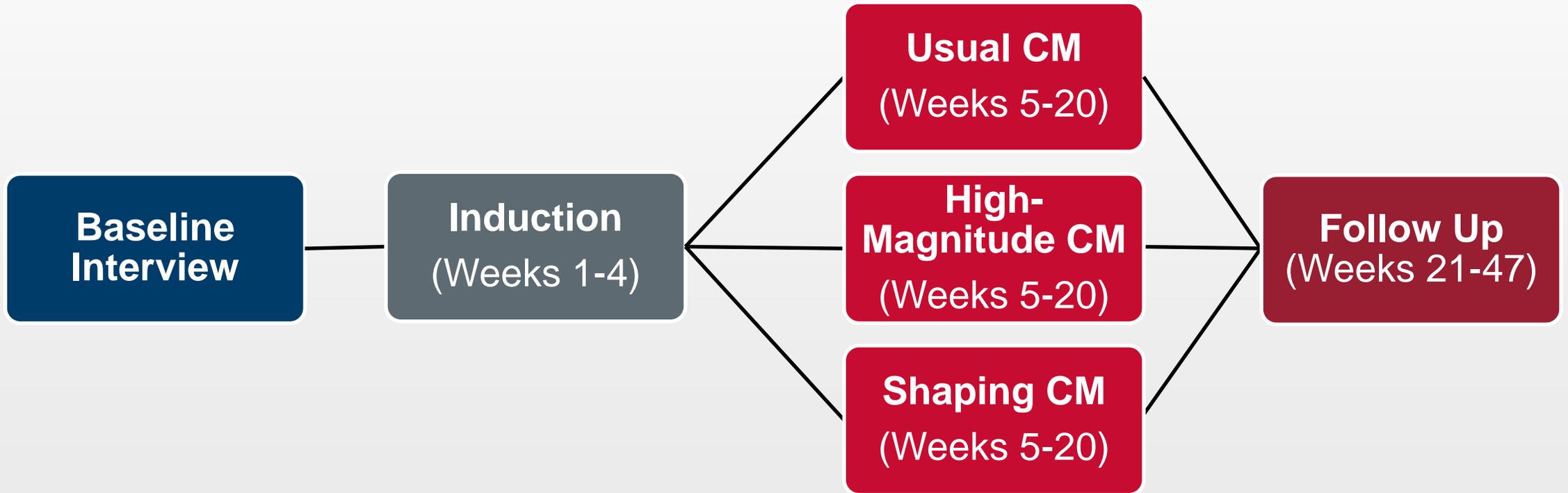


# Individualizing Incentives for Co-Occurring Disorders

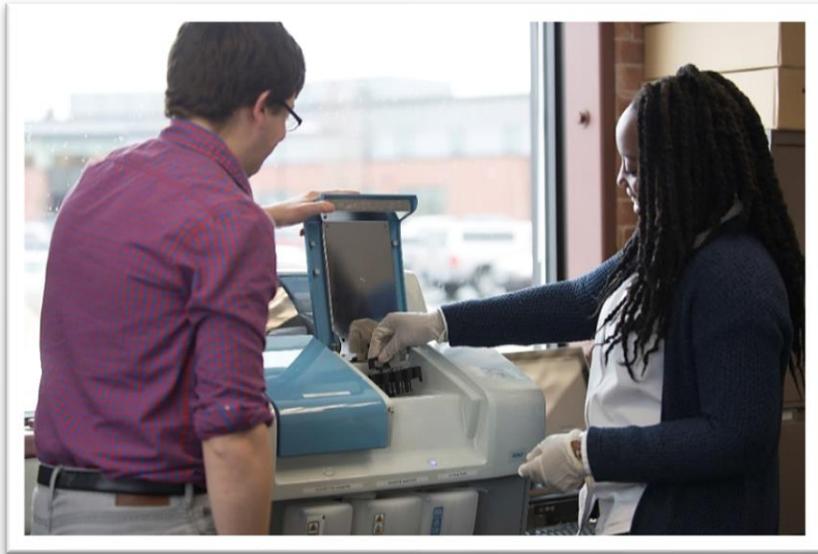
- 5 year NIH funded study
- 400 heavy drinkers with SMI will be recruited from community mental health centers in Spokane and Seattle
- Non responders will be randomized to one of three CM interventions
- We will use the NIAAA Addictions Neuroclinical Assessment Model to predict outcomes
- We will conduct a comprehensive economic evaluation of study interventions.



# Individualizing Incentives Study Flow Chart



# Thank you!



WSU: Kait Hirchak, MS, Jalene Herron, Jordan Skalisky, Hailey Reneau, Albert Foote Sr, Alexandra Granbois, Oladunni Oluwoye, PhD, Eka Burduli, PhD, Sterling McPherson, PhD, Celestina Barbosa Leiker, PhD, John Roll, PhD, Dedra Buchwald, MD

Partners: UW- Richard Ries, MD Debra Srebnik, PhD, Maria Monroe DaVita, PhD, Frontier Behavioral Health, Community Psychiatric Clinic, Catholic Charities Spokane, Empire Health Foundation, our Tribal Partners, NIAAA, SAMHSA, DBHR.