BIOMARKERS FOR MANAGING AUD:
FORMATION, ELIMINATION, AND CLINICAL CONSIDERATIONS

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ASAM American Society of Addiction Medicine

Biomarkers for AUD
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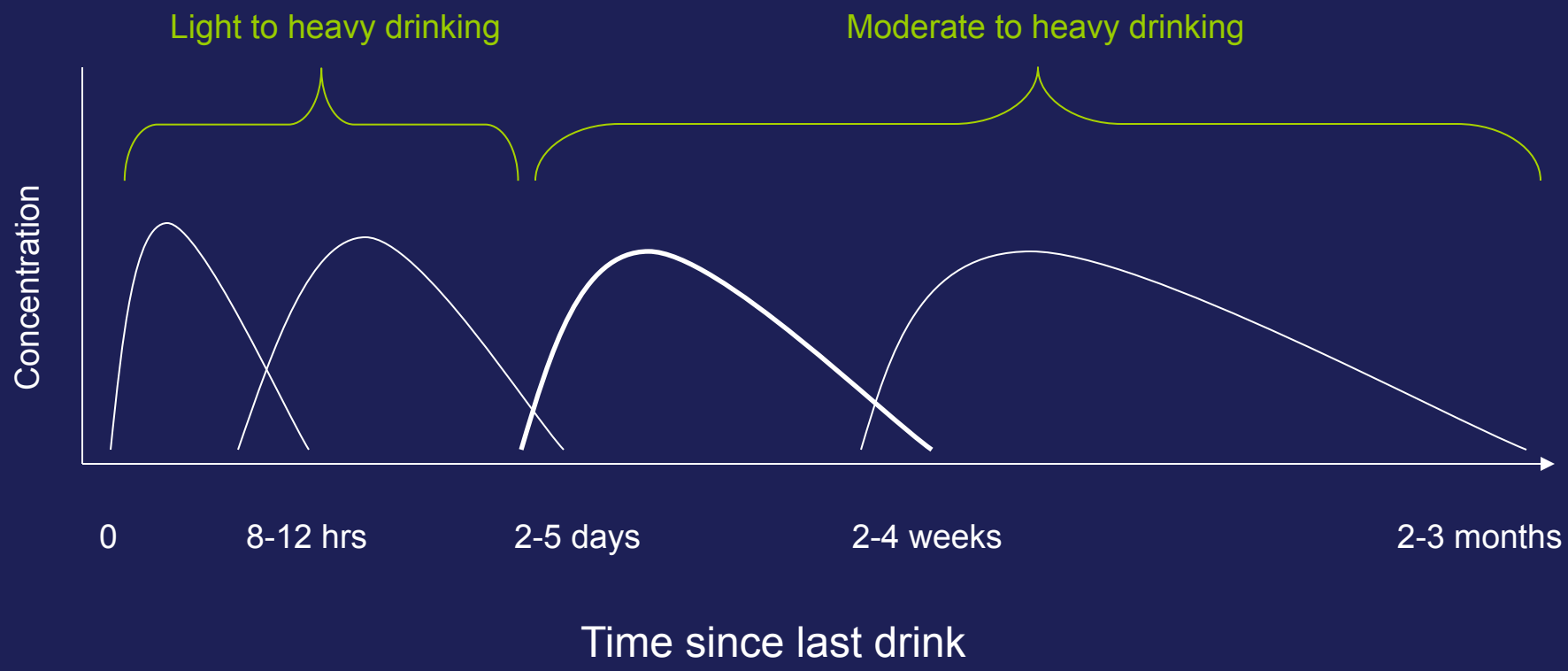
Disclosure Information

Scott H. Stewart
No disclosures

What do we want in a biomarker? Diabetes as a paradigm

- Hemoglobin A1c
  - A summary of glycemic control in months preceding testing
    - Useful for monitoring
    - Determining need to alter therapy or refer
  - Landmark studies show predictive of complications
  - Standardized assays widely available at local level
  - Usually considered a superior marker relative to reported glucose

Biomarkers Can Provide an Alcohol Use "Timeline"



Will focus on detecting regular alcohol use that can harm over time

- Serum carbohydrate-deficient transferrin
  - a “toxic effect” marker
- Blood phosphatidylethanol
  - direct ethanol elimination product

Carbohydrate-Deficient Transferrin (CDT)

What is CDT and how is it formed?

- Transferrin is a liver-synthesized glycoprotein with 2 glycosylation sites
- Glycosylation is a complex process occurring in the endoplasmic reticulum and Golgi body prior to secretion
- Major transferrin glycoform is tetrasialo-transferrin

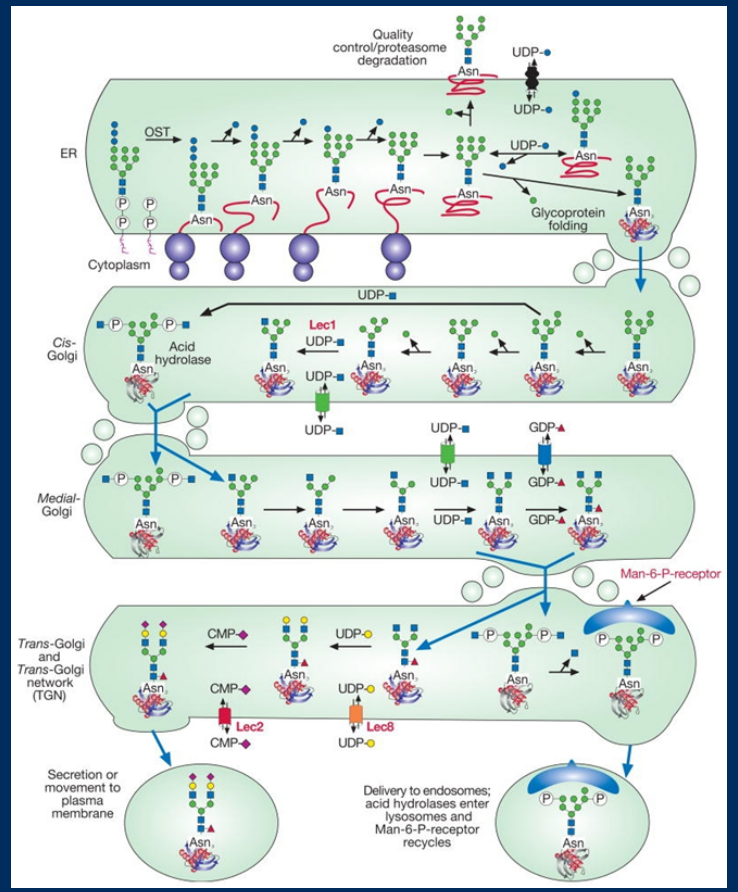
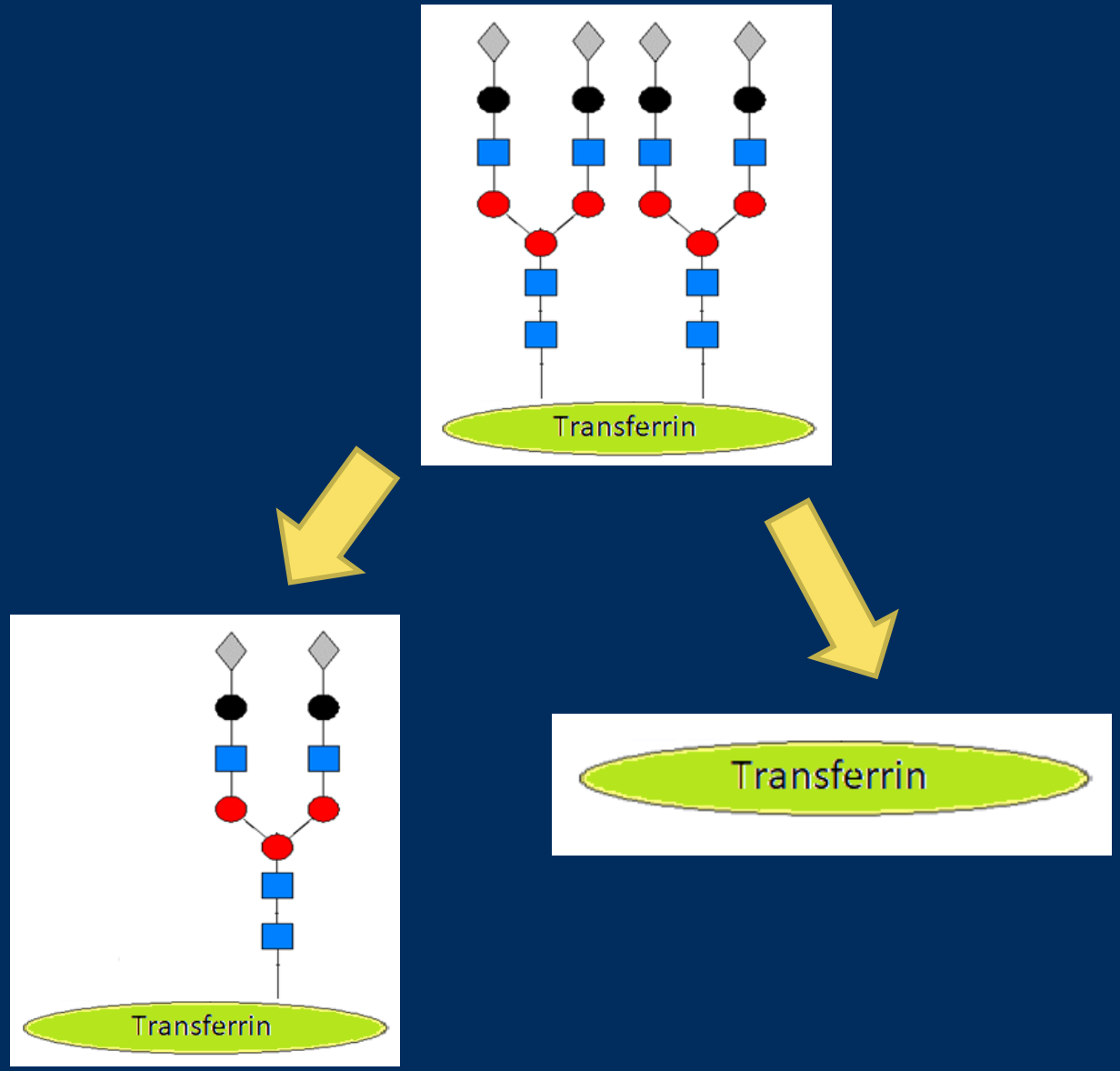


Image from Essentials of Glycobiology (2nd ed). Cold Spring Harbor Laboratory Press, 2009

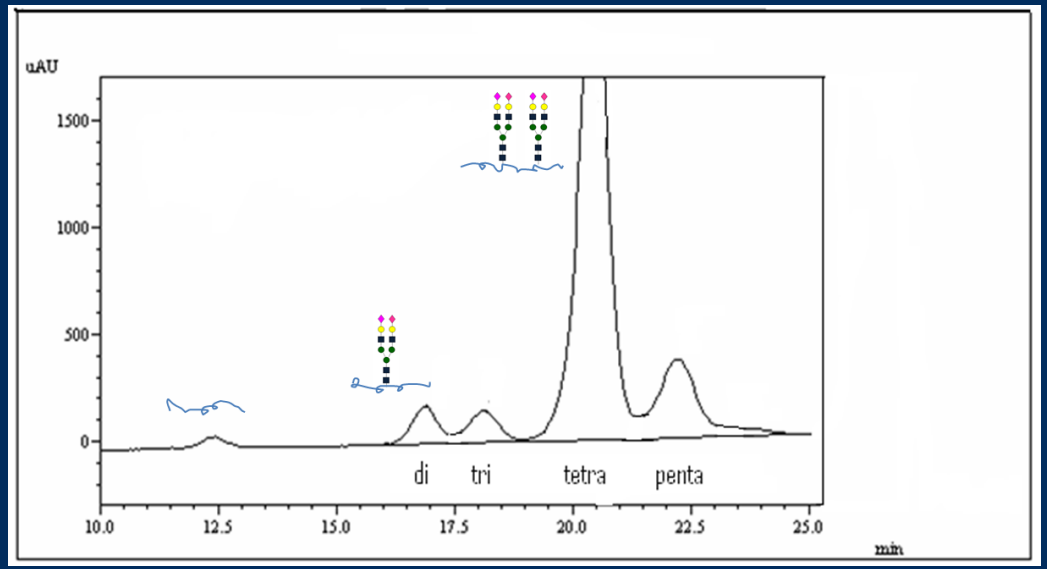
CDT Formation

- Frequent heavy drinking can alter protein glycosylation
- One (or both) transferrin glycans can be absent due to alcohol effects
- This yields disialo-transferrin (as well as asialo-transferrin) as "carbohydrate-deficient transferrin"



CDT Measurement

- Transferrin glycoforms can be separated by various methods
- Relative quantification of disialo +/- asialo fractions constitute %CDT for detecting chronic heavy drinking
  - Roughly 4 or more standard drinks daily or most days



Helander et al, Clinical Chemistry 2003, 49(11): 1881-90

CDT Reference Procedure

Contents lists available at ScienceDirect

Clinica Chimica Acta

journal homepage: www.elsevier.com/locate/clinchim

IFCC approved HPLC reference measurement procedure for the alcohol consumption biomarker carbohydrate-deficient transferrin (CDT): Its validation and use☆

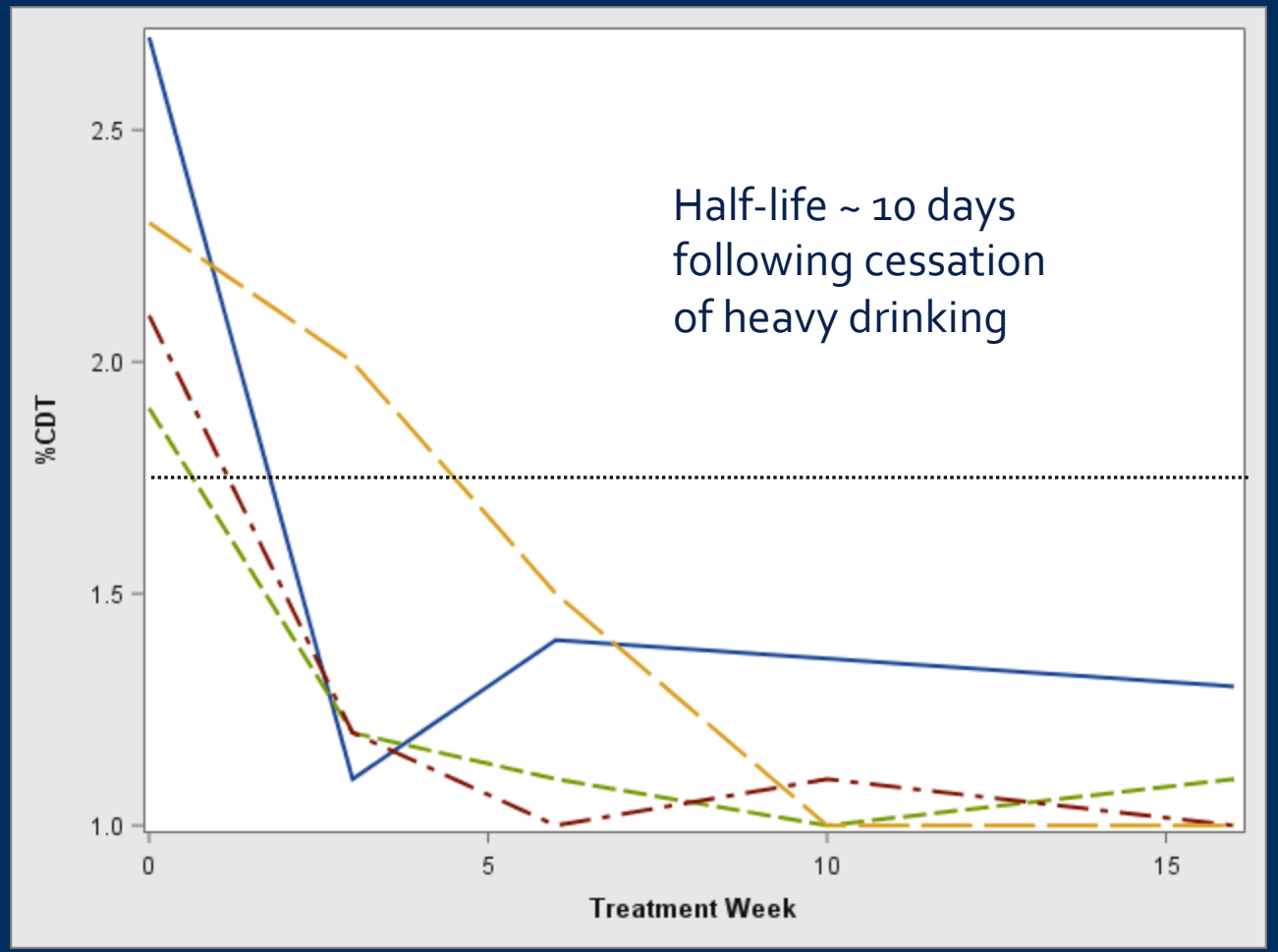
François Schellenberg [a], Jos Wielders [b,*,1], Raymond Anton [c], Vincenza Bianchi [d], Jean Deenmamode [e], Cas Weykamp [f], John Whitfield [g], Jan-Olof Jeppsson [h], Anders Helander [i]

Correlation with IFCC Reference

	IFCC Reference	BioRad/Axis Shield HPLC	Sebia CZE	N-Latex CDT
IFCC Reference	**1**			
Sebia CZE	**0.99**[1]	0.97	1	
N-Latex CDT	**0.98**[2]	0.86	___	1

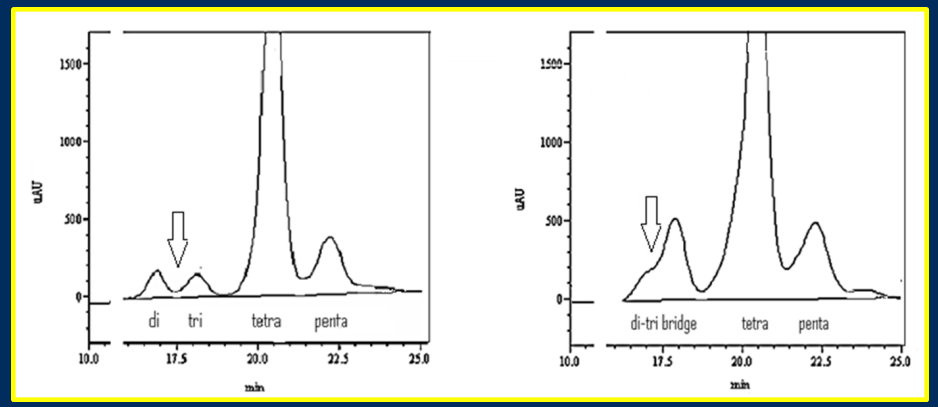
Schellenberg et al, Clin Chim Acta 2010, 411: 1888-93[1] / Delanghe et al, Clin Chem 2007, 53: 1115-21[2]

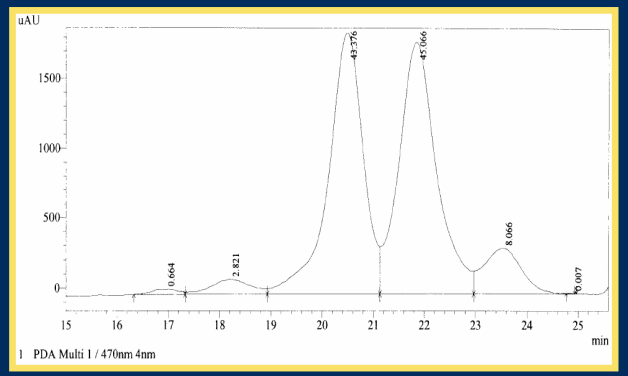
CDT Elimination and Monitoring



Transferrin Variants and CDT

- Chromatographic separation that provides a visual resolution of transferrin glycoforms will not yield falsely positive results in individuals with advanced liver disease, genetic variants, or other disorders of glycosylation





Variants discussed in Schellenberg et al, Clin Chim Acta 2017, 465: 91-100

Specific but Limited Sensitivity for Detection

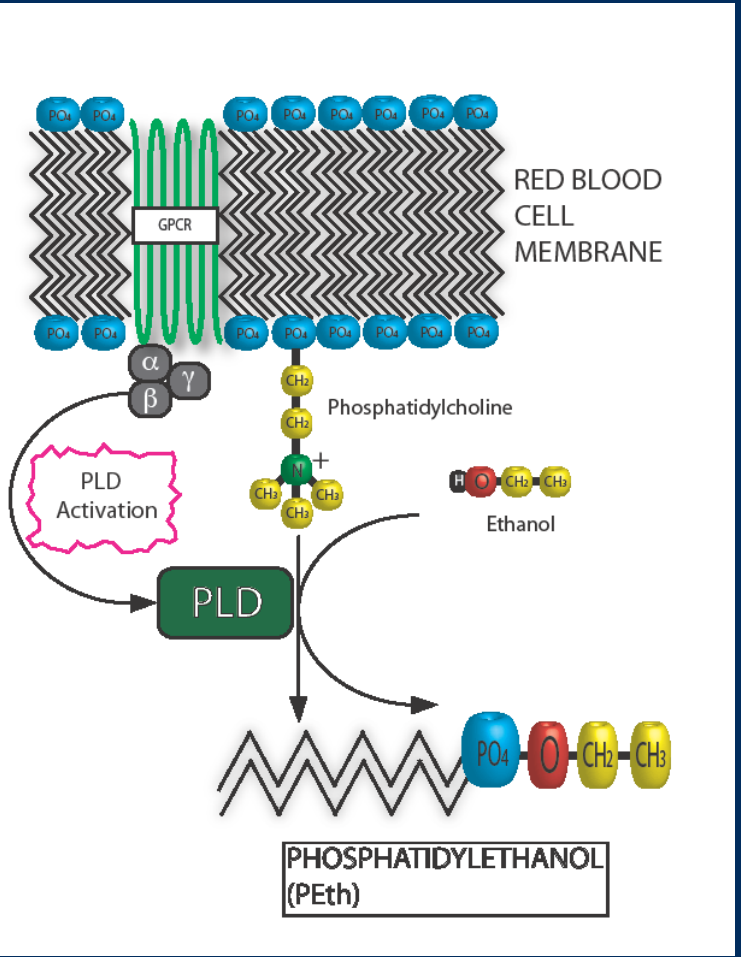
- Hundreds of studies on the relationship of CDT to alcohol use and other biomarkers such as GGT
  - Very difficult to summarize due to differences in study populations, definitions and ascertainment of "heavy drinking", CDT assay methodologies
- A rule of thumb however, for differentiating current heavy drinkers (60 or more grams on most days) vs. social drinkers and abstainers
  - 50-70% sensitivity, ~95% specificity

Clinical Use of CDT

- Good specificity, limited sensitivity
- Advanced liver disease and genetic variants can limit use
- In the absence of heavy drinking, should reach normal levels in 2-4 weeks
- For monitoring "heavy" drinking only
- Assays likely standardized going forward
  - But current cutoffs for a positive result do vary test to test

Phosphatidylethanol

What is it and how is it formed?



- Alcohol enters RBC's where PEth is formed from ethanol and phosphatidylcholine in a PLD-catalyzed reaction
- A "family" of PEth's is synthesized based on structure of fatty acids
- Most prevalent is 16:0/18:1 (about 40% of total PEth)
  - 1-Palmitoyl-2-oleoyl-*sn*-glycerol-3-phosphoethanol

Early PEth studies evaluated extremes with less sensitive assay methods

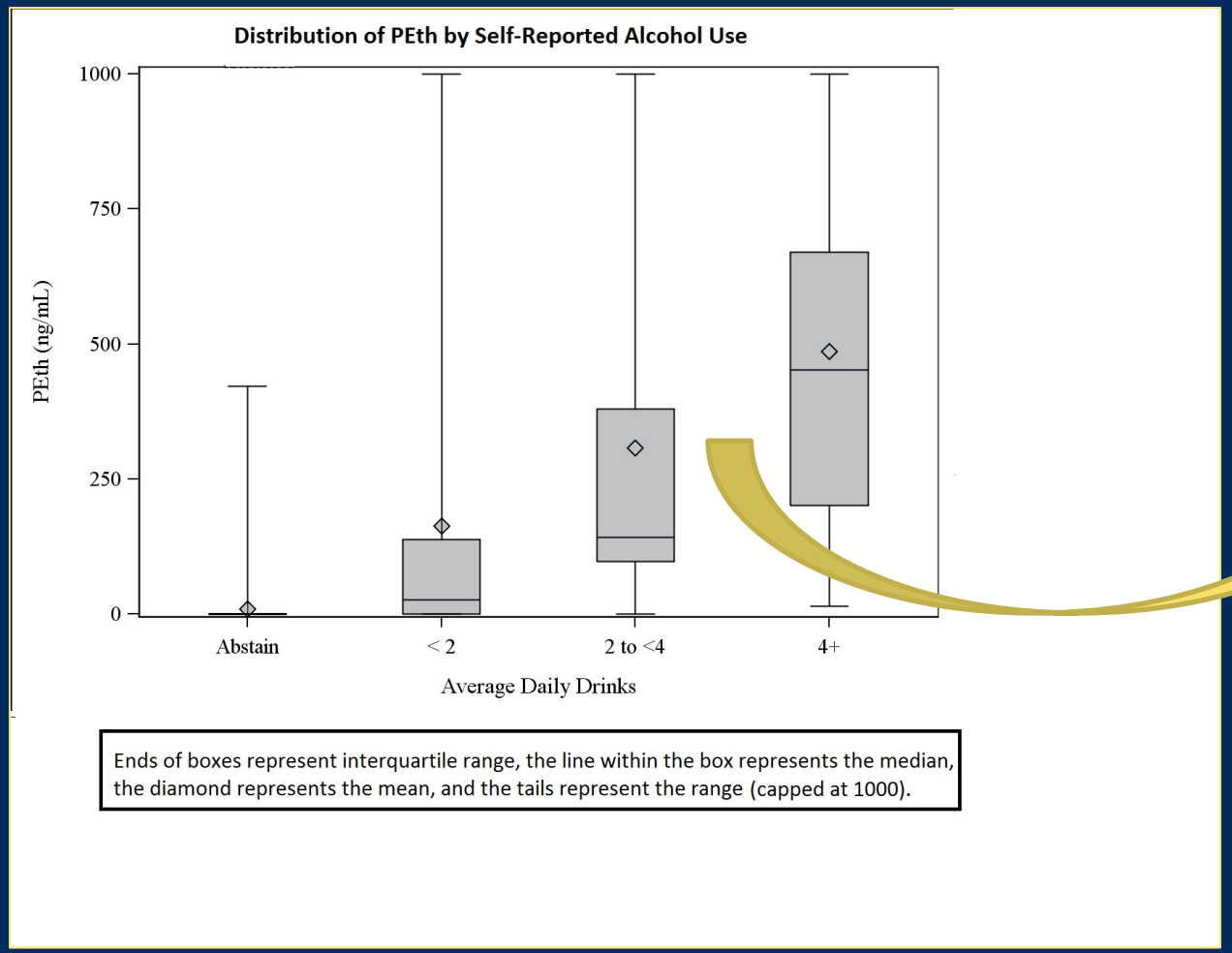
Citation	Detec-tion Method	Cutoff/LOQ	Cases (male)	Definition of 'Case'	Controls (male)	Definition of 'Control'	Sensi-tivity	Speci-ficity	Correlation with EtOH Consumption
Aradottir et al 2006	HPLC w/ ELSD	>0.22 µmol/l	144 (123)	Inpatient and outpatient EtOH dependent patients	N/A	N/A	99	N/A	0.568 ($p<0.001$)
Hansson et al 1997	TLC	>0.1 µmol/l	15 (15)	13 alcoholics admitted for detox, drinking 60-300g EtOH daily for ≥ 1wk prior to admission and 2 hospital admissions drinking 150-300g EtOH daily for ≥ 1wk prior to admission who were followed over time	6 (6)	Non-heavy drinking lab personnel who had abstained for at least 4 days	100	100	Not reported
Hartmann et al 2007	HPLC w/ ELSD	>0.36 µmol/l	56 (not given)	Alcohol dependent detox patients w/ median EtOH consumption of 1400g over past 7 days	35 (not given)	Sober forensic psychiatric inpatients on a closed ward	95	100	0.802 ($p<0.05$)
Wurst et al 2004	HPLC w/ ELSD	0.8 µmol/l	18 (14)	Detoxification patients with an ICD-10 diagnosis of alcohol dependence	N/A	N/A	100	N/A	Not reported

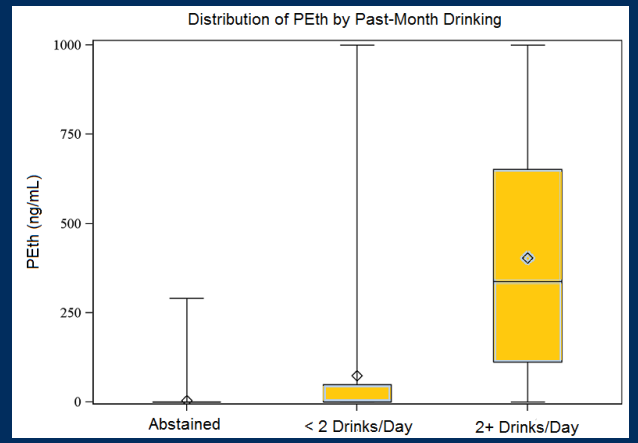
xplanation of Abbreviations:
PLC w/ ELSD - High Pressure Liquid Chromatography with Evaporative Light-Scattering Detector
OQ - Limit of quantitation
LC - Thin Layer Chromatography

Assay LOQ
~ 150 ng/mL

Distribution in Liver Disease Patients

LOQ ~ 8 ng/mL





Stewart et al, Alcohol Clin Exp Res 2014, 38(6): 1706-11

Kechagias et al, Alcohol & Alcoholism 2015, 50(4): 399-406

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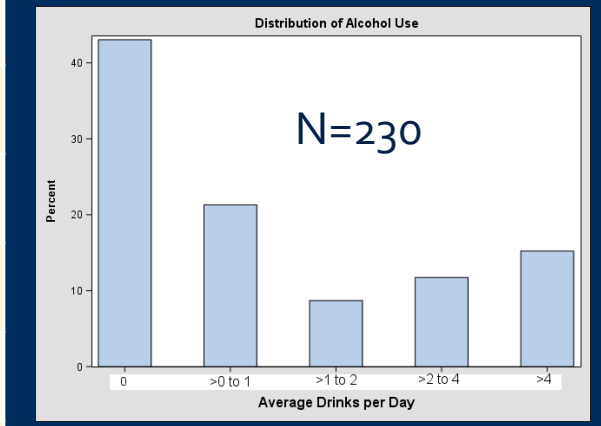
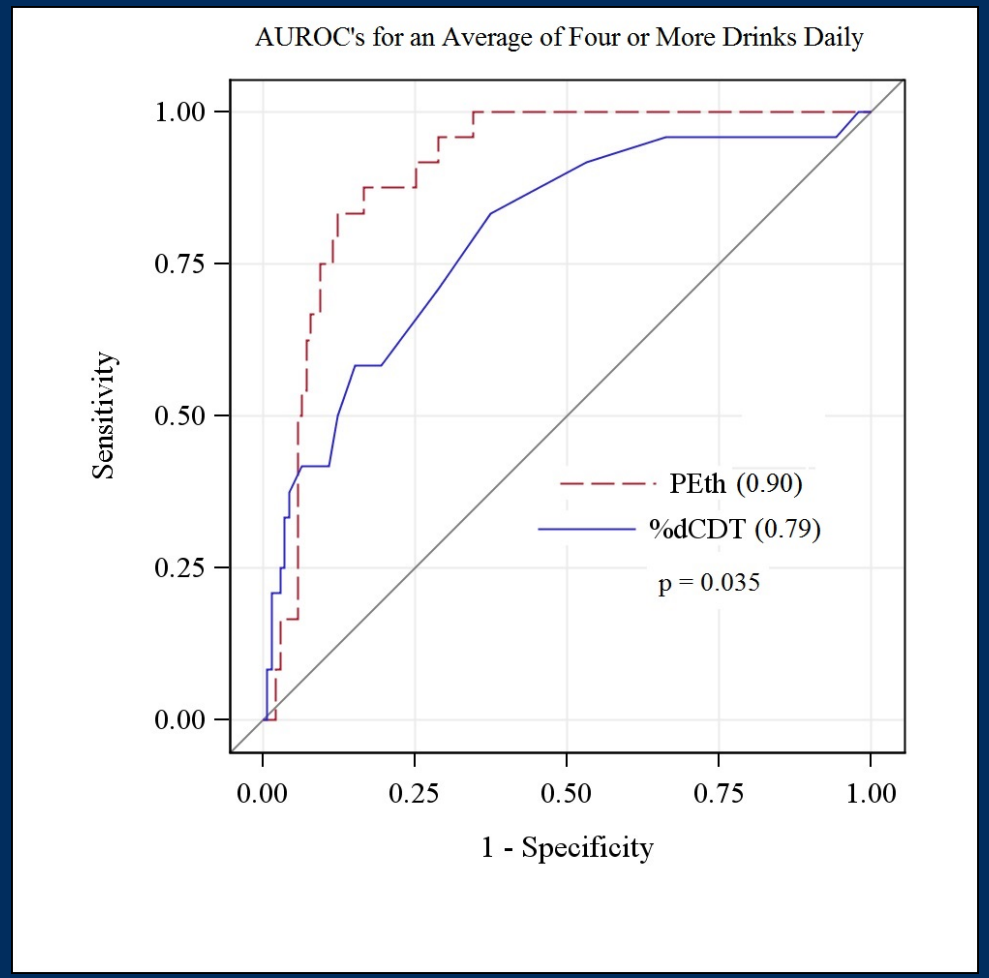
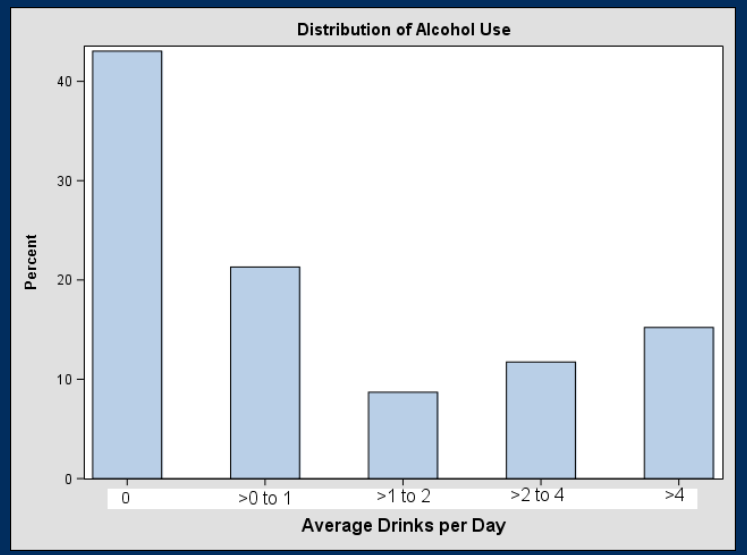
PEth Sensitivity and Specificity for Detection

	Any Drinking	2+ Drinks Daily	4+ Drinks Daily
8 ng/mL cutoff			
Sensitivity	80 (71-89)	100	100
Specificity	96 (90-100)	66 (56-76)	56 (46-65)
100 ng/mL cutoff			
Sensitivity	53 (44-61)	82 (72-91)	89 (78-99)
Specificity	99 (97-100)	90 (85-95)	81 (75-87)
295 ng/mL cutoff			
Sensitivity	35 (26-44)	55 (42-68)	71 (56-86)
Specificity	100	94 (90-98)	90 (86-95)

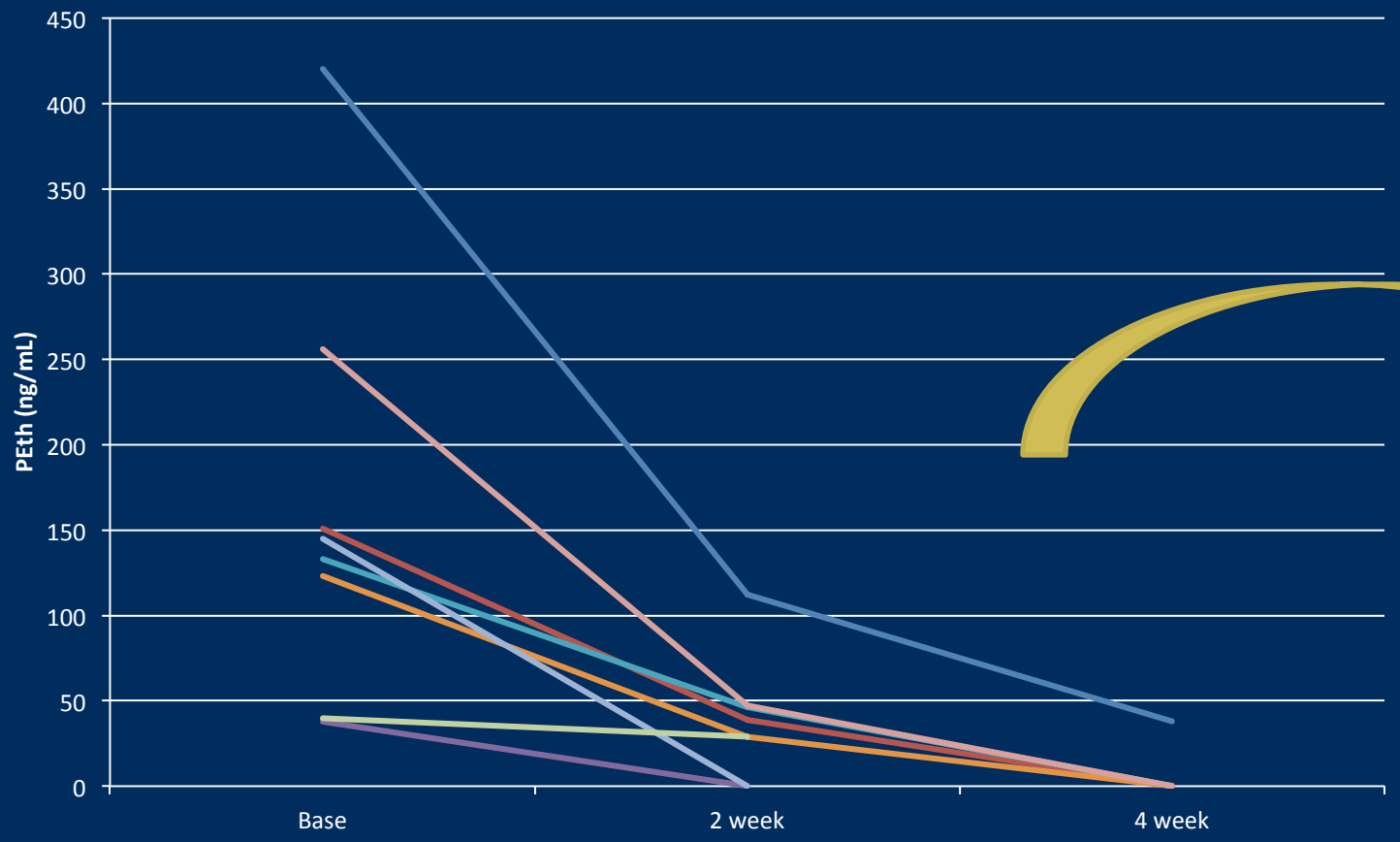


PEth and CDT for Heavier Drinking





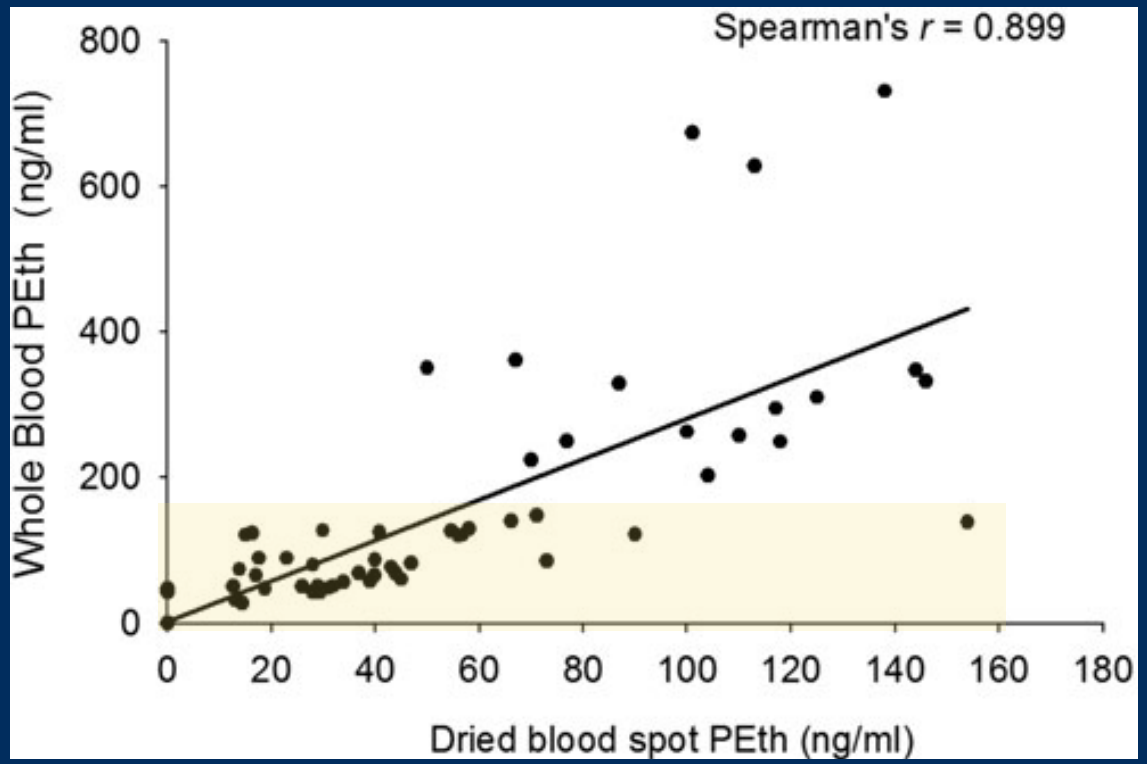
PEth Elimination and Monitoring



Controlled drinking experiment also demonstrated acute elevation and half-life ranging up to 10 or 12 days

Gnann et al, Alcohol Clin Exp Res 2012, 36(9): 1507-11

Sampling Matters, Even if Methods Otherwise Similar



Piano et al, Alcohol and Alcoholism 2015, 50(5): 519-25

Clinical Use of PEth

- Not just for heavy drinking (particularly with MS methods)
- Imperfect cutoffs can be selected but best use is probably to follow changes within an individual (substantial variability between)
  - Ask for specific concentration (not just "positive" or "negative")
  - Be conservative with half-life
  - Drinking in past hours/days strongly influence PEth concentration
- Stick with the same sampling method, assay method, laboratory

Some Final Thoughts

- If you elect to use alcohol consumption biomarkers, use them early in treatment (*avoid the "got ya" test* later in treatment)
  - Seek patient's endorsement of biomarker use up front
- *Test then talk* to minimize resistance and quickly focus in on continued alcohol use during treatment encounters
- Research needed to determine optimal use as a component of a treatment plan

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PEth for the Treatment of People living with co-Occurring HIV/AIDS and AUD

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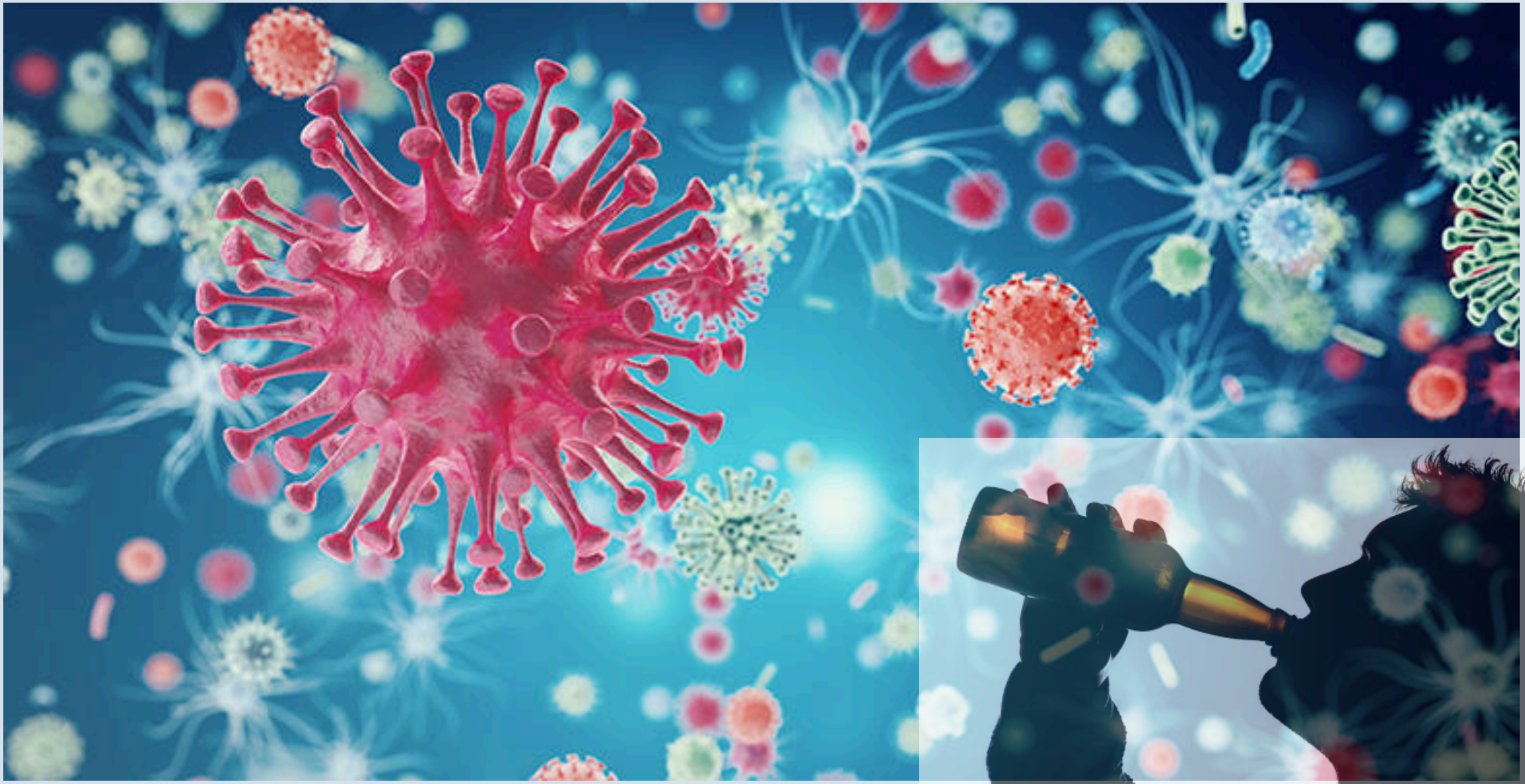
ASAM April 12, 2018

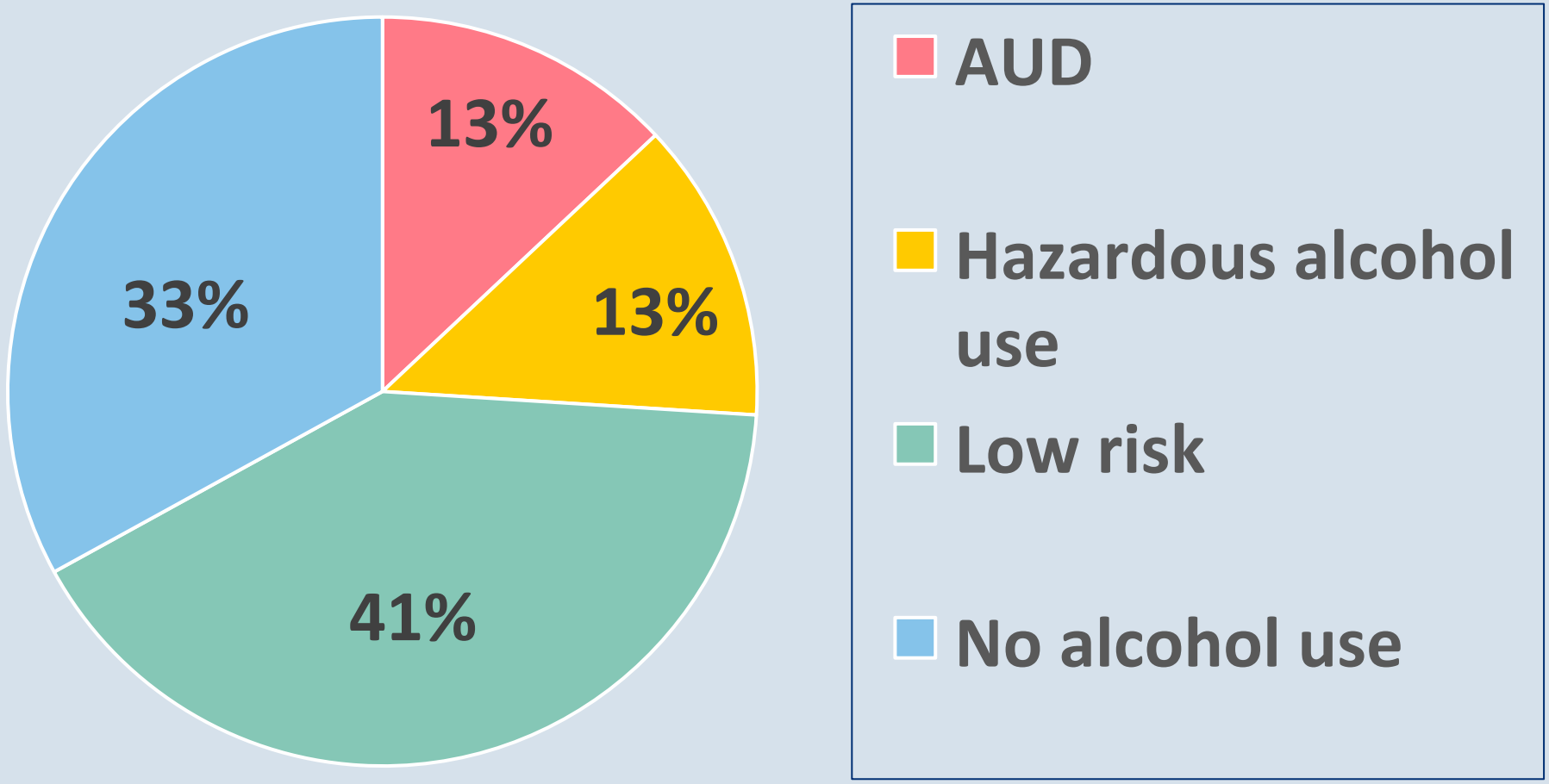


I have nothing to disclose.

Outline

- Alcohol use among persons with HIV and impact on the HIV treatment cascade
- Use of biomarkers in alcohol treatment in persons with HIV
  - Reporting of alcohol use
  - Treatment outcomes
  - CM studies / personalized feedback
  - Strengths and weaknesses

Alcohol use among persons with HIV



Crane HM et al, *AIDS Behav,* 2017
Williams EC et al, *Drug Alc Dep,* 2017

Alcohol use impacts the HIV care continuum

Sexual risk behavior

HIV infection

Diagnosis, entry into care, receipt of antiretrovirals, and retention

ART adherence

HIV viral suppression / other outcomes

Alcohol/medication metabolism

Co-morbidities

Alcohol use as a driver of sexual transmission of HIV infection - behavioral

Meta analyses have shown that

- Any alcohol use
- Alcohol use before sex
- Binge drinking

Double the risk of acquiring HIV infection

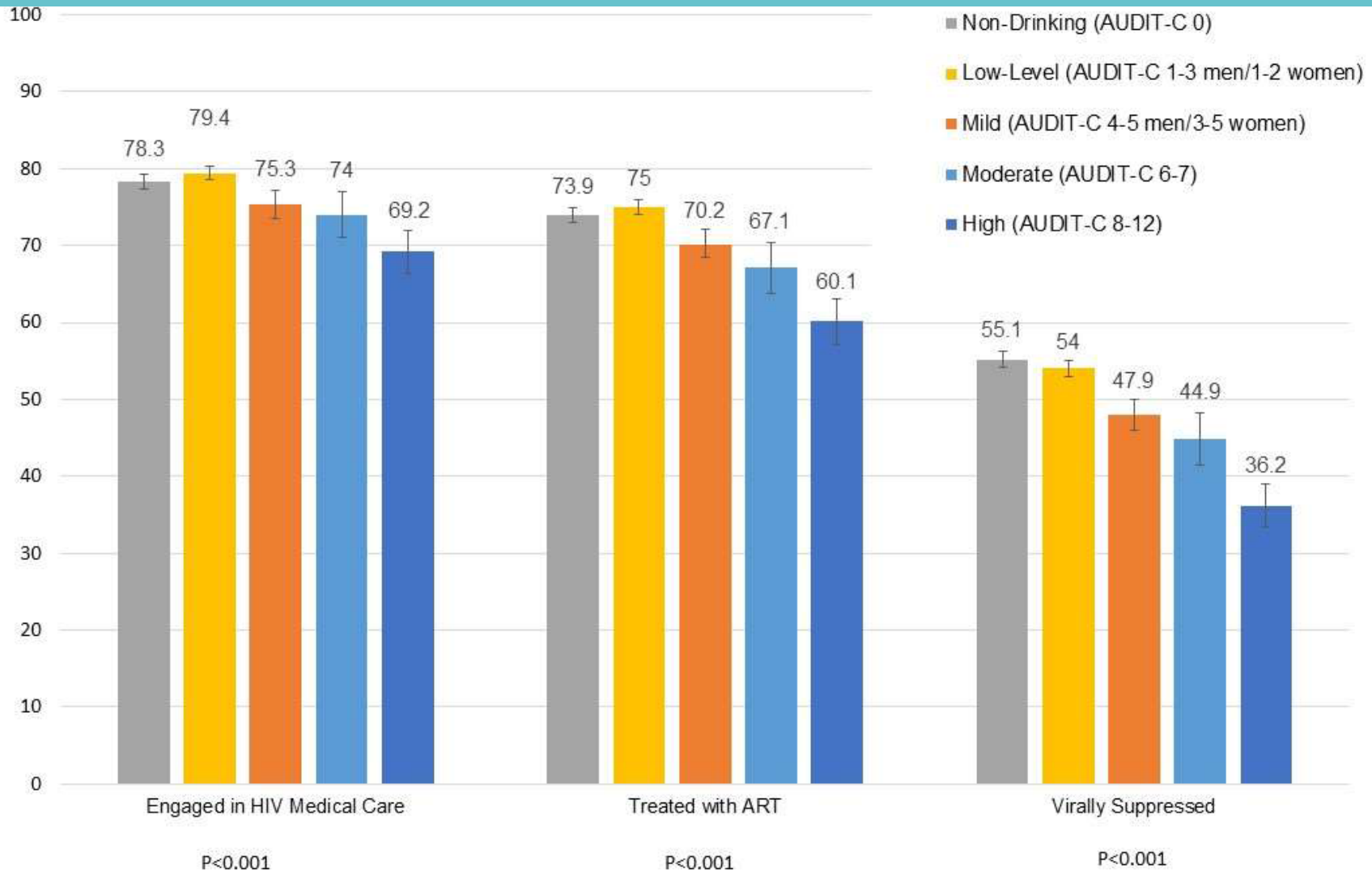
Shuper P et al, *AIDS Behav,* 2009
Baliunas D et al, *Int J Pub Hlth,* 2010

Alcohol use as a driver of sexual transmission of HIV -- biological

- Alcohol can increase susceptibility to HIV infection
  - Rhesus macaques given daily doses of alcohol (versus sucrose) showed higher rates of infection with simian immunodeficiency virus (SIV) after innoculation
- Alcohol can increase transmissibility of HIV
  - Current and heavy alcohol use associated with persistent vaginal HIV shedding in a longitudinal cohort study of women with HIV

Amedee AM et al, *AIDS*, 2014
Bagby GJ et al, *Alcohol Res,* 2015
Homans JD et al, *JAIDS,* 2012

Alcohol use and HIV care engagement, treatment, and viral suppression



Williams, EC. Poster at Addictions Health Services Research Conference. Madison, WI, 2017.

Alcohol use consistently associated with poorer ART adherence

- Meta-analysis of 40 studies (n>25,000) showed associations between poorer adherence and alcohol use
  - Any drinking OR: 0.60 (95% CI: 0.53-0.69)
  - At-risk/more severe drinking OR: 0.47 (95% CI: 0.41-0.55)

Hendershot CS et al, *JAIDS* 2009

Impact of alcohol use on HIV disease progression

- Experimental evidence in macaques
  - Alcohol (versus sucrose) administration was associated with higher levels of HIV viremia and more rapid mortality (Bagby GJ et al, *Alc Res Curr Rev,* 2015)
- Findings from prospective observational studies in humans
  - Associations between alcohol use and HIV progression:
    - Samet JH et al, *JAIDS,* 2007; Baum MK et al, *AIDS,* 2011; Kahler C et al, *AIDS Behav,* 2017.
  - No associations:
    - Several pre-ART era studies (Hahn JA and Samet JH, *Curr HIV/AIDS Rep,* 2010), and Chander G et al, *JAIDS,* 2006; Cook JA et al, *AIDS,* 2008; Ghebramichael M et al, *AIDS Care,* 2009; Kowalski S et al, *JAIDS,* 2013; Conan A et al, *JAIDS* 2013; Cagle A et al, *AIDS Care*, 2017; Wandera B et al, *PLoS One*, 2017, Hahn JA et al, *JAIDS* 2018.

Alcohol and HIV drug metabolism

- Cytochrome P450 (CYP450) is a class of enzymes that regulate metabolism
- Involved in the metabolism of alcohol and of several HIV medications
- Acute drinking
  - Decreases drug metabolism by competing for CYP450, leading to drug toxicity
- Chronic drinking
  - Increases drug metabolism by up-regulating CYP450 (the same pathway that leads to increased alcohol tolerance) , leading to suboptimal drug therapy

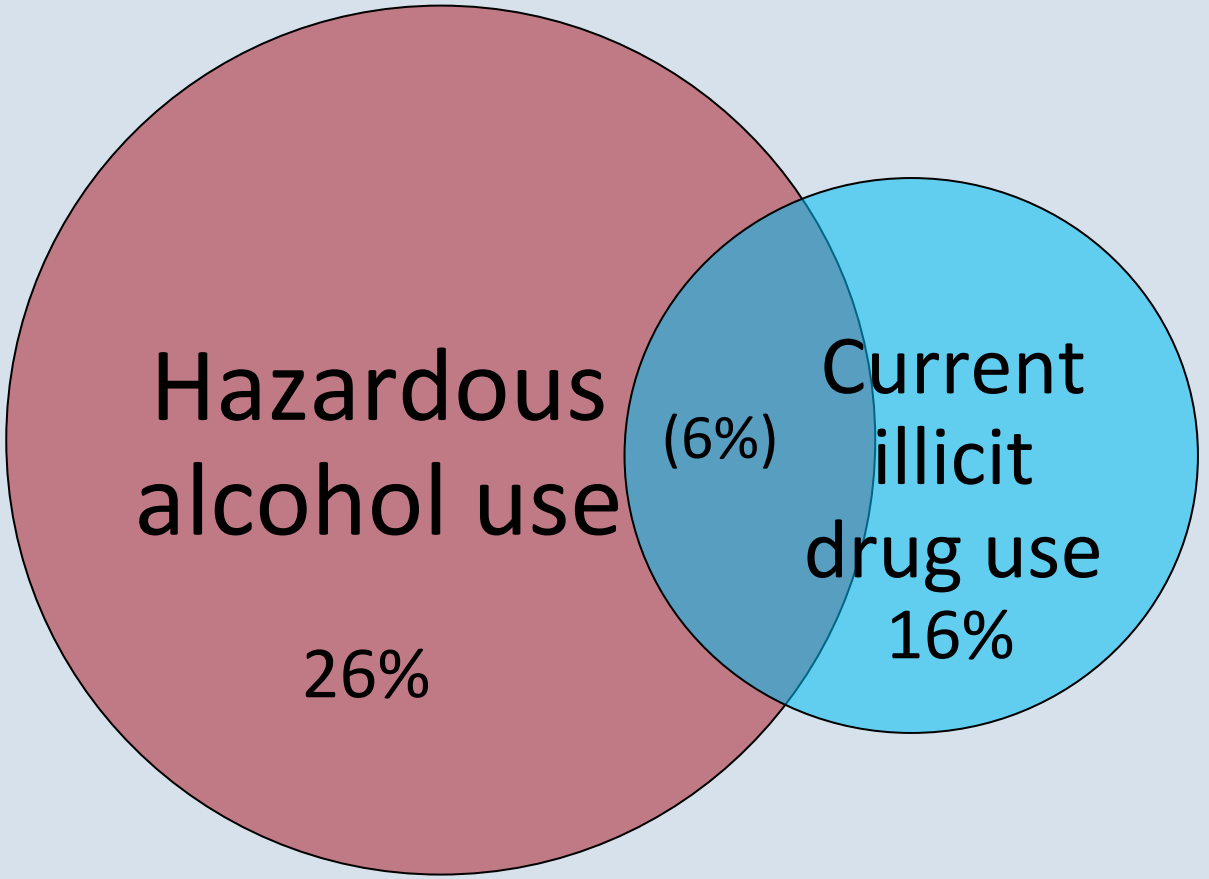
Kumar S, et al. *Expert Opin Drug Metab Toxicol*, 2012
Kumar S, et al. *Expert Opin Drug Metab Toxicol*, 2014

Alcohol / HIV drug metabolism

- Metabolism of alcohol may differ in persons with HIV compared to those without
  - Lower level of drinking may incur higher physiological effects (VACS study, n=2,648)
  - The number of drinks to feel a buzz
    - HIV uninfected participants, mean=3.2 (SD: 1.7)
    - HIV infected participants, viral suppressed mean=2.9 (SD: 1.6)
    - HIV infected participants, not virally suppressed mean=2.8 (SD: 1.6)

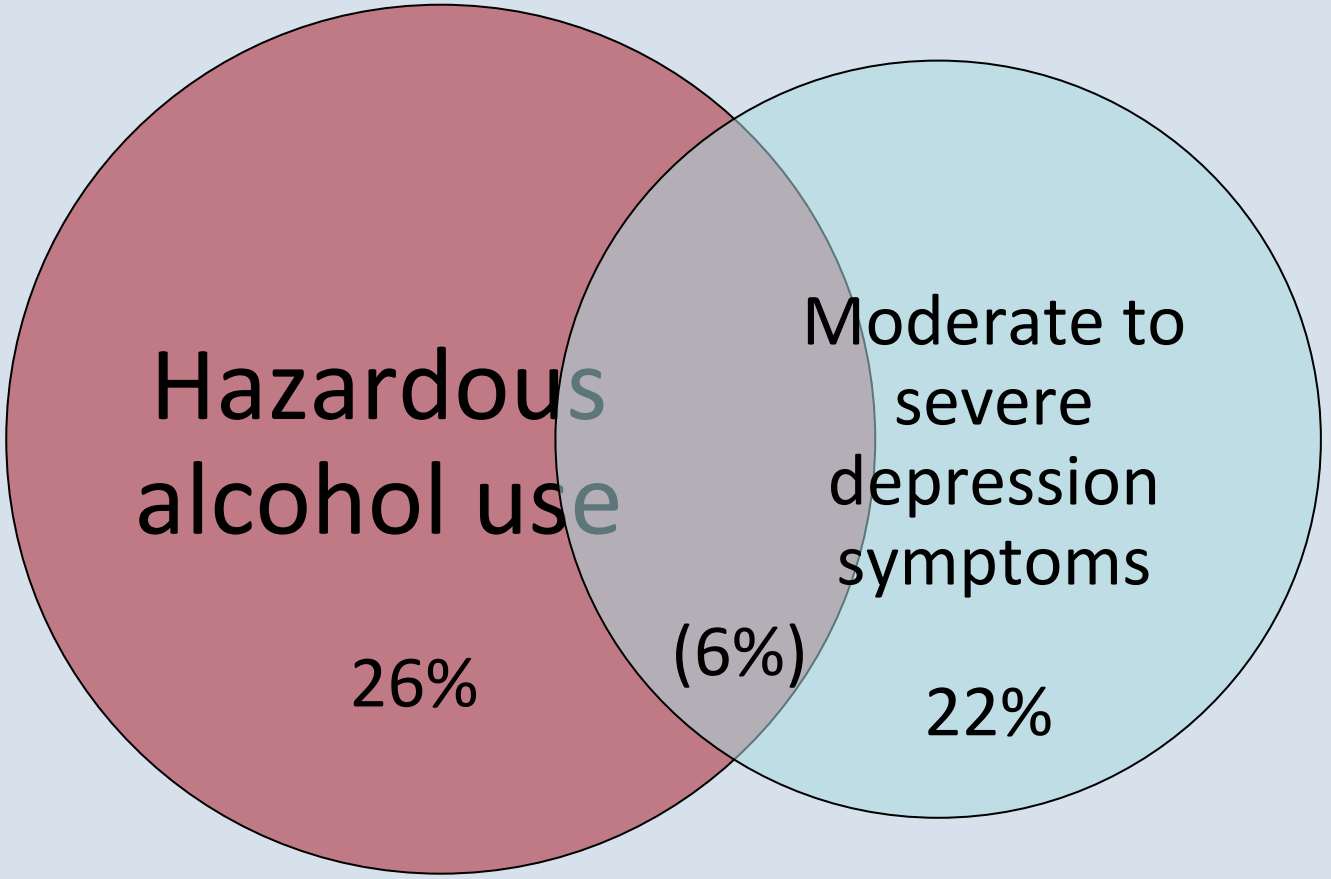
McGinnis KA et al, *AIDS Behav,* 2016

Co-morbidities – substance use



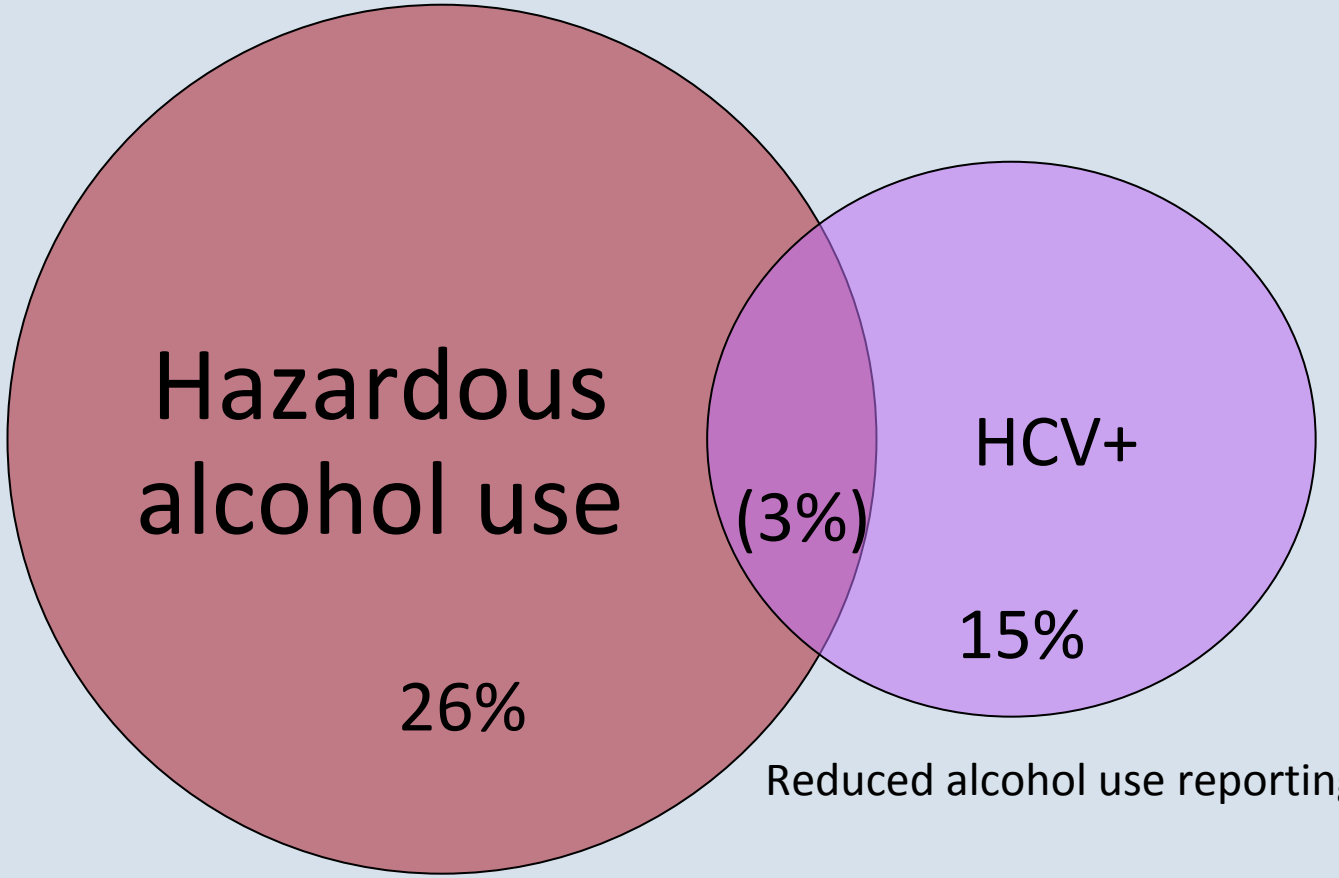
Adapted from Crane, HM *AIDS Behav,* 2017

Co-morbidities - depression



Adapted from Crane, HM *AIDS Behav,* 2017

Co-morbidities – Hepatitis C virus (HCV)



Reduced alcohol use reporting after HCV diagnosis?

Adapted from Crane, HM et al, *AIDS Behav,* 2017
Tsui, JL et al, *Drug Alc Dep,* 2009
Tsui, JL et al, *J Gen Intern Med,* 2007

Other HIV/alcohol co-morbidities

- Gut permeability and inflammation
- Neurocognitive disorders
- Cardiovascular disease
- Tuberculosis
- Cancers
- Falls and injury
- Smoking
- Vulnerable populations

Williams EC et al, *Alc Clin Exp Res,* 2016

Summary of alcohol use/HIV

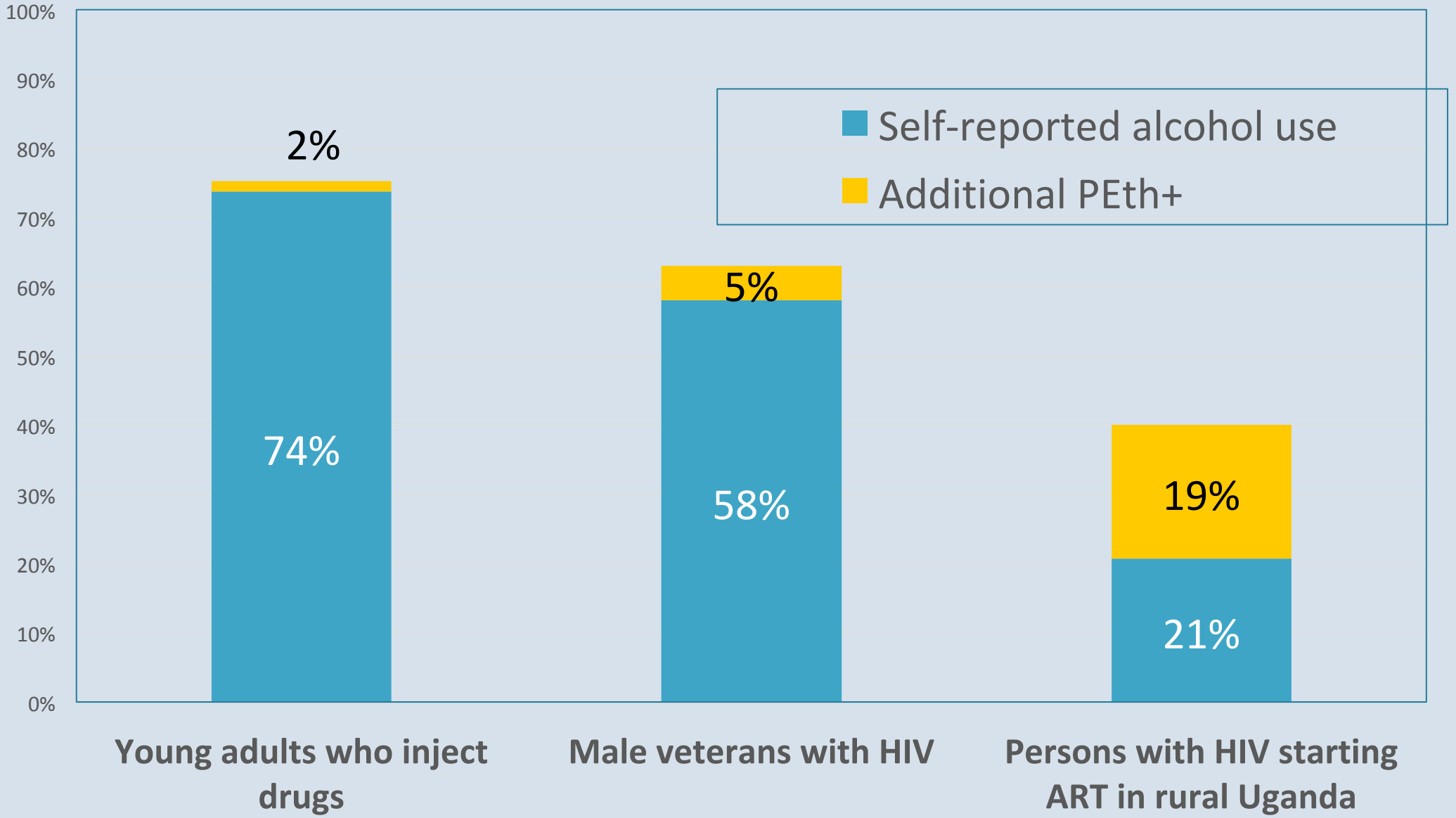
- Alcohol use among persons with HIV has harmful consequences
  - Transmission, medication adherence, drug interactions, co-morbidities
- Treatment for alcohol use disorders (and hazardous drinking) can and should occur in HIV care settings

Potential role of PEth and other alcohol biomarkers for treatment of persons with HIV

- Assessment of validity of self-report
- Assessment of alcohol treatment study outcomes
- Use within treatment
  - Incentive-based treatment
  - Personalized feedback

PEth to detect under-reporting

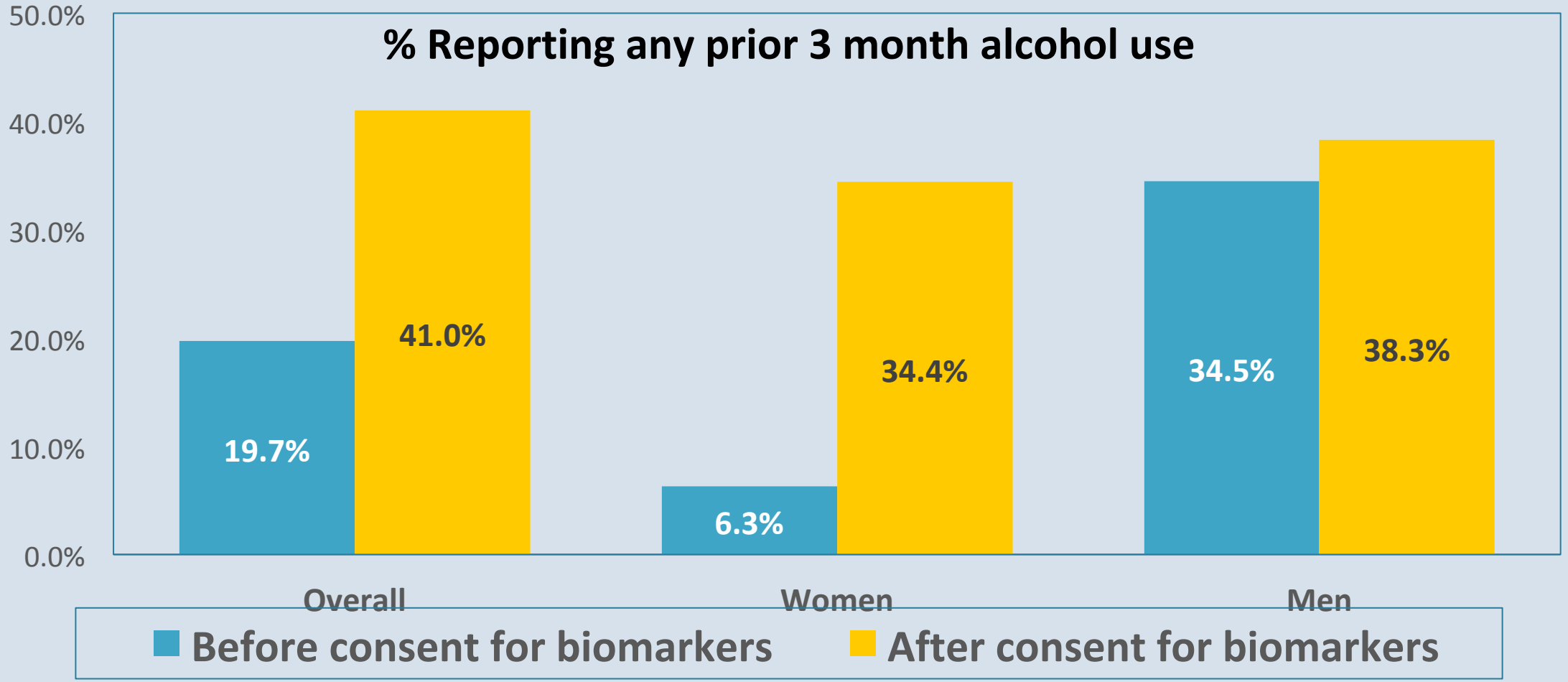
Under-reporting varies by population



Jain J et al, *Alc Alc* 2014
Eyawo O et al, *JIADS,* 2018
Bajunirwe et al, *PLoS One,* 2014

PEth as a bogus pipeline

Persons starting HIV treatment in Uganda



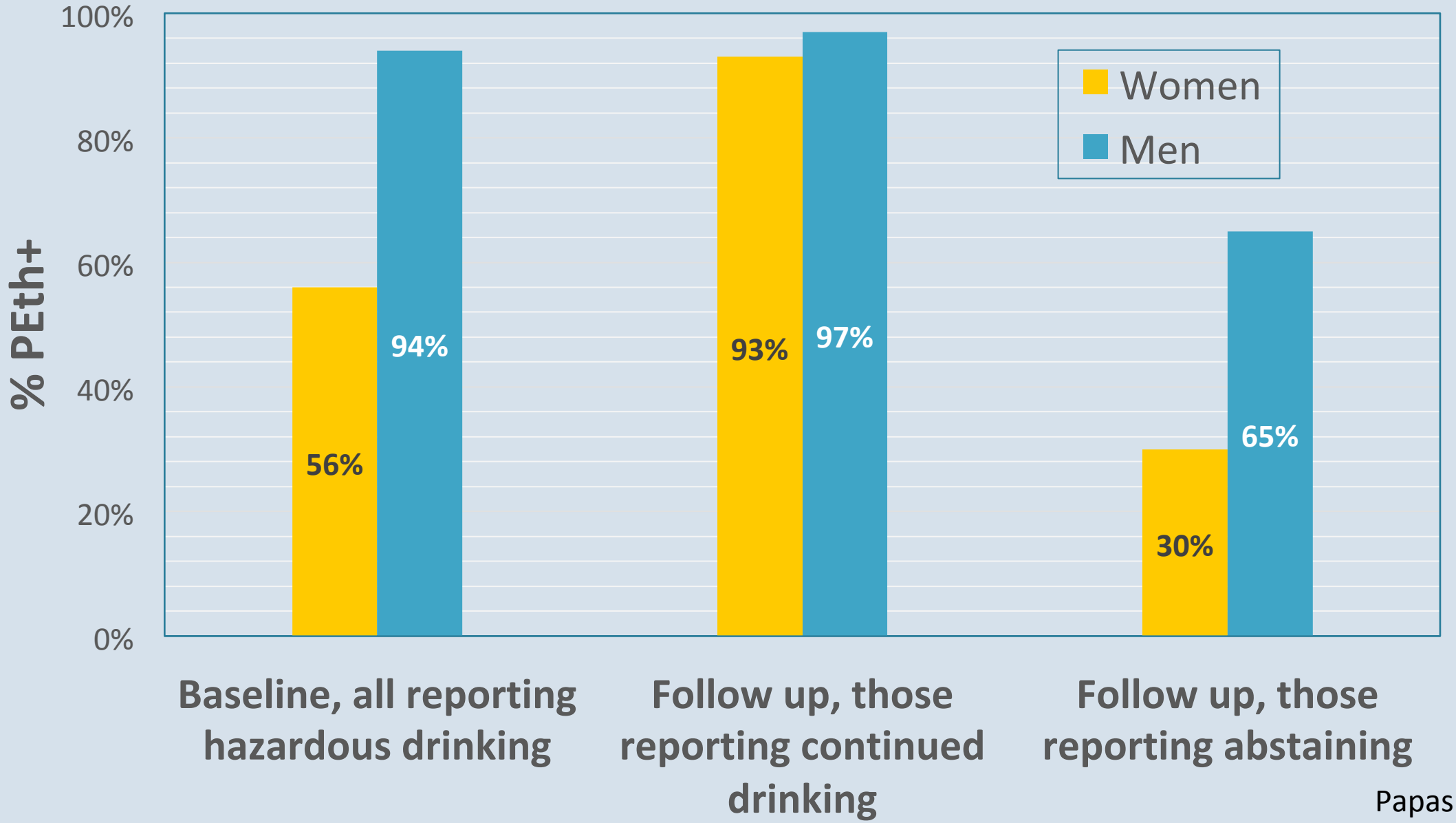
Hahn JA et al, *JAIDS,* 2012

Using PEth as an outcome measure in treatment trials

- Advantages of a biologic measure over self-report
  - PEth results can differ from self-report, even in blinded trials
- Challenges
  - PEth not 100% sensitive
  - Specificity depends on window period – i.e. it can take weeks for PEth to decay, depending on starting level
- Possible solution
  - PEth level used as a study entry requirement
    - PEth >8 ng/ml used for entry into RCT: Ondansetron, Alcohol Use, and Alcohol-Related Symptoms In HIV+ Persons (McCaul et al, Johns Hopkins)

PEth at baseline and follow up

RCT of CBT in persons with HIV in Kenya



Papas RK, *ACER,* 2016

PEth as an outcome measure

RCT of naltrexone in HIV+ women

Mixed effects models of the effect of naltrexone on self-reported drinking (# of drinks in the past week) and PEth, among 194 HIV+ hazardous drinking women.

	Self-reported drinking		PEth (log-transformed)	
	Coefficient *b*	95% CIs	Coefficient *b*	95% CIs
Intercept	3.52**	2.95, 4.09	3.36**	0.85, 5.88
Wave				
Month 2	−0.72**	−0.76, −0.67	0.07**	0.03, 0.12
Month 7	−1.56**	−1.63, −1.49	0.55**	0.51, 0.60
Intervention				
Naltrexone	0.03	−0.26, 0.32	0.25	−0.98, 1.48
Wave × naltrexone				
Month 2	−0.56**	−0.64, −0.48	0.06	−0.00, 0.13
Month 7	−0.60**	−0.72, −0.48	−0.45**	−0.51, −0.38

**p<0.01

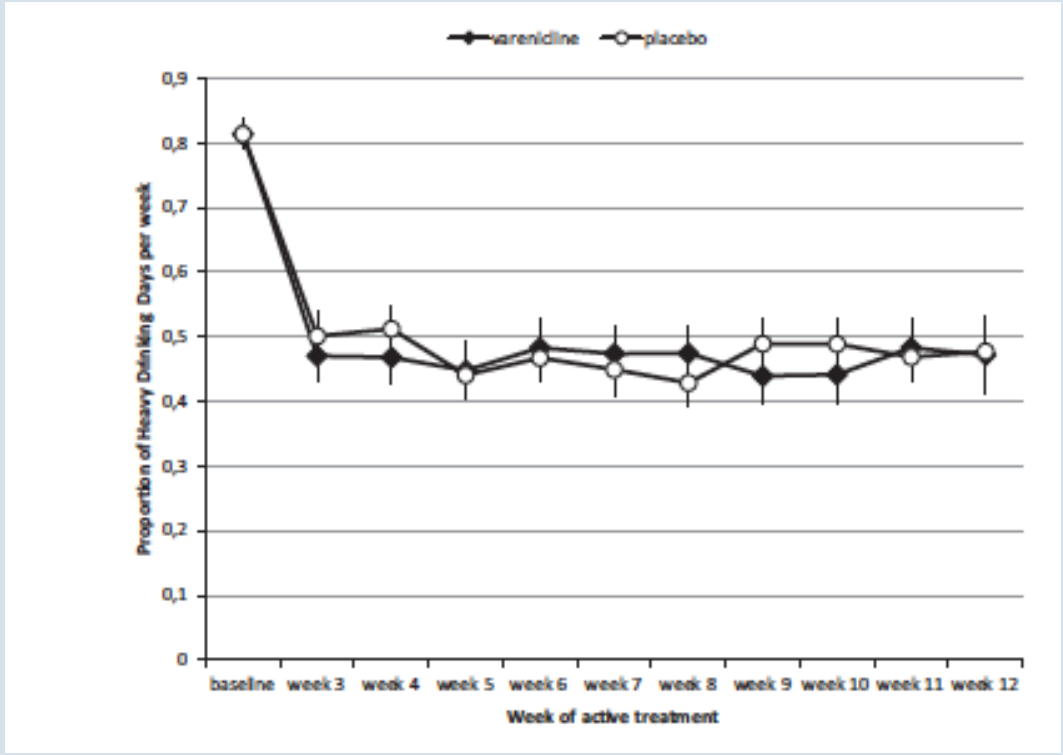
Weak correlations between PEth and total number of drinks: Spearman r= 0.21-0.29 at the 3 study visits

Wang et al, *ACER*, 2018

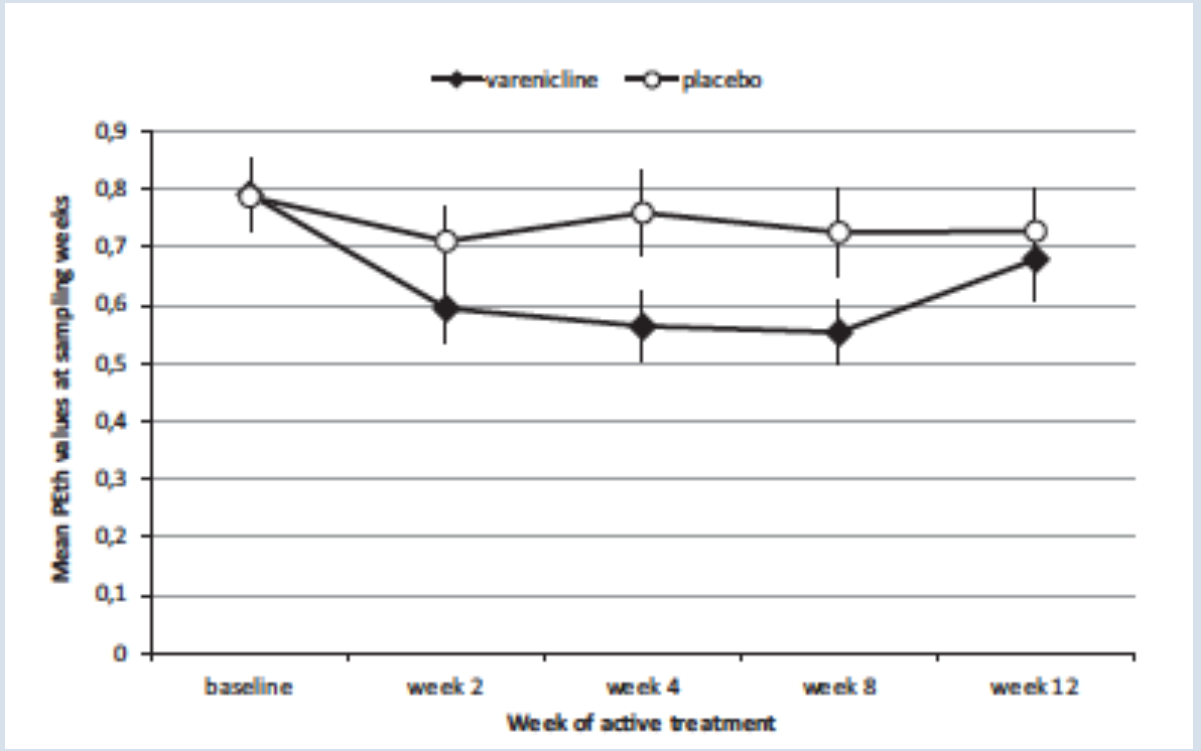
PEth as an outcome measure

RCT of varenicline in persons with AUDs

Proportion of heavy drinking days (self-reported) per week



PEth levels (µmol/l)



Spearman correlations between PEth and grams of alcohol: 0.51-0.68 in varenicline group
0.33-0.52 in placebo group

De Bejczy et al, *ACER*, 2015

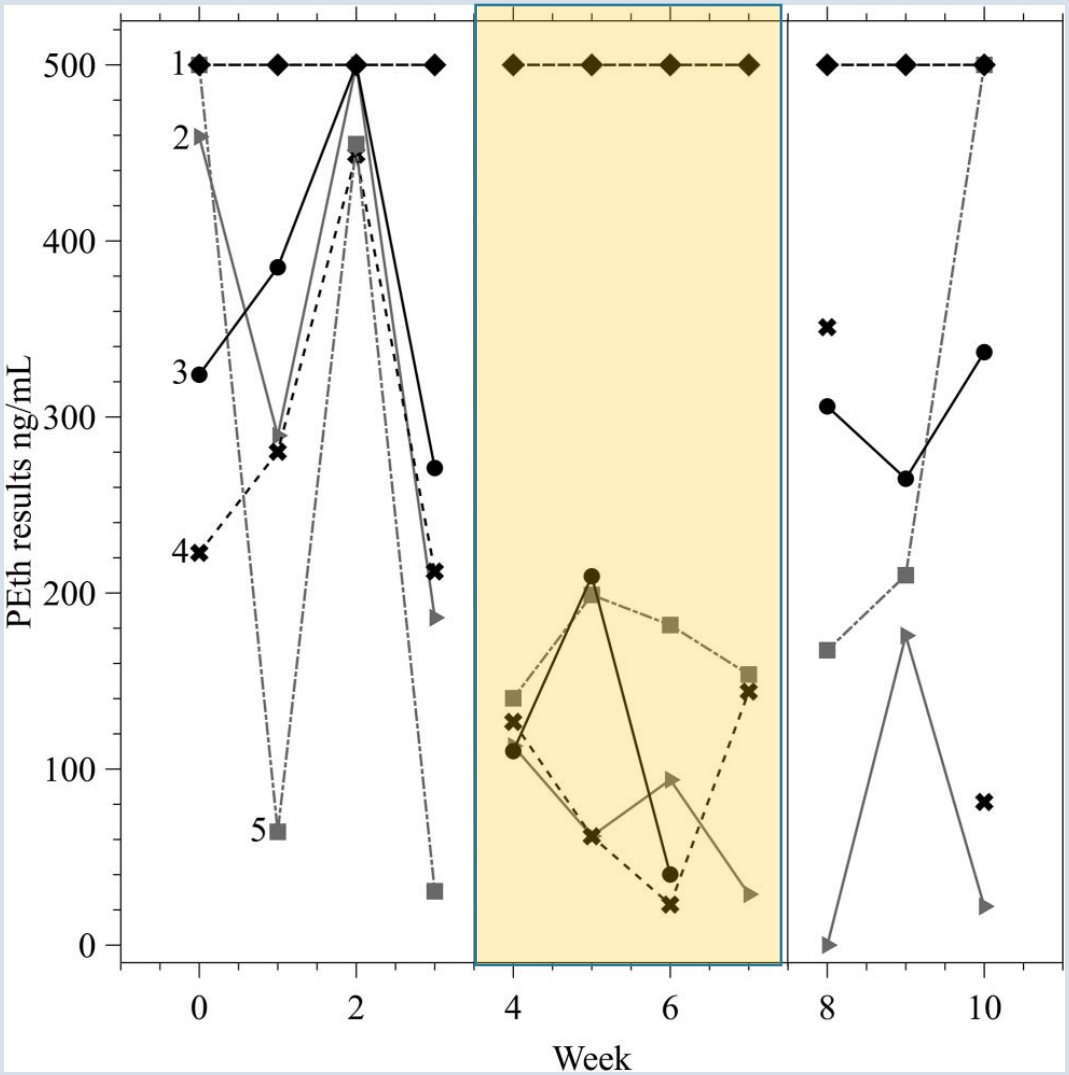
Biomarkers measuring alcohol use during contingency management

- Breathalyzers (Petry N et al, *J Con Clin Psychol,* 2000)
- Video recorded cell-phone based breathalyzers (Alessi SM et al, *Addiction,* 2013)
- Transdermal alcohol monitoring

  (Barnett N et al, *Drug Alc Dep,* 2011; Doherty D et al, *ACER,* 2015, Alessi SM, etc.)
- Urinary ethyl glucuronide (EtG) testing (McDonell M, *Am J Psychol,* 2017)
- Weekly PEth / EtG testing (McDonell M, *Psychol Add Behav,* 2017)
  - 5 patients, Re-inforcers given for negative EtG test *and decreased* PEth levels

Biomarkers in contingency management

Pilot study of using weekly PEth levels



Period in which re-enforcers were given

McDonell M, *Psychol Add Behav,* 2017

NIAAA-funded trials using incentives linked to alcohol biomarkers in persons with HIV

- Financial Incentives, Randomization With Stepped Treatment Trial (Yale, Fiellin)
  - Persons with HIV with at-risk drinking, AUD, or certain medical conditions
  - PEth will be used to measure abstinence during CM and as a study outcome
- Drinkers Intervention to Prevent Tuberculosis (UCSF, Hahn/Chamie)
  - Risky drinkers with HIV/TB co-infection
  - Aim is to reduce alcohol consumption during the 6-months of TB preventative therapy that is potentially hepatotoxic treatment (isoniazid)
  - Incentives given for negative EtG dipstick tests conducted at monthly refill visits
  - PEth will be used to measure overall treatment response

Strengths and challenges in using PEth in alcohol treatment

Challenges

- No point of care or rapid test for PEth
- Cutoffs for risky drinking are not definitive
- High variability between people, so absolute value hard to interpret

Strengths

- PEth is highly specific for *any* alcohol use – a positive PEth reflects either recent or heavy drinking
- Declining PEth strongly suggests declining alcohol use

Using biomarkers as part of personalized feedback

- Personalized feedback considered a key component of behavioral counseling
- Most rely on self-report, collected via various media
- Potential for a biomarker to complement/supplement self-report
  - Urine or blood test in a primary care visit might start the conversation

Summary

- Biomarkers are very important as objective measures for observational research and treatment trials
- Their use in clinical treatment is still in early stages

Thank you!

- NIAAA
- Collaborators and staff at UCSF, Boston University, Mbarara University of Science and Technology, Washington State University

- Contact me with questions! Judy Hahn judy.hahn@ucsf.edu

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A WEARABLE ALCOHOL BIOSENSOR: BENEFITS AND CHALLENGES

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American Society of Addiction Medicine

April 13, 2018

The Use of Biosensor Technology to Guide the Clinical Management of AUD

April 13, 2018

Disclosure Information

M. Katherine Jung, Ph.D.

No Disclosures

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Characteristics of an Ideal Wearable Alcohol Biosensor

- Continuous monitoring of BAC
- Real time detection
- Passive sampling
- Non-invasive
- Wearable, comfortable, affordable, inconspicuous

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Characteristics of an Ideal Wearable Alcohol Biosensor

- Ability to transmit, interpret, and record data.
- Ability to verify standardization and functionality.
- Power source- dependable, rechargeable.
- Microelectronic miniaturization
- Ability to remove for activity (depending on application)
- Subject identification:
  - Biometric, facial, or voice recognition
  - GPS (sometimes)
- Data security

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Areas of Use for Continuous Passive Sensing

- Research- many applications
- Addiction treatment
- Chronic disease care
- Personal health monitoring
- Public safety (doctors, airline pilots)
- Criminal justice, law enforcement

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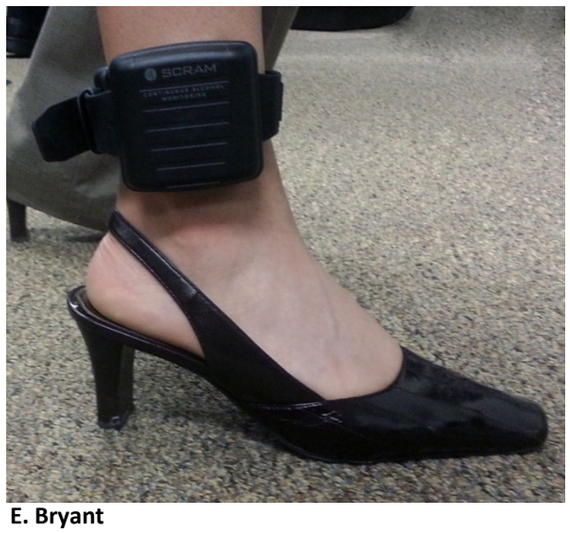
SCRAM

Secure Continuous Remote Alcohol Monitor

- Transdermal alcohol testing
- Tamper-resistant
- Court-mandated



E. Bryant

- Readings every 30 minutes, uploaded daily
- Good success rate at enforcing abstinence

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WrisTAS

Giner, Inc.

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Biosensors and Contingency Management

SCRAM vs Self-report, Gender, BMI

Barnett et al. (2014) Exp. Clin. Psychopharmacol. 22(1): 86–96.

SCRAM with contingency management

Barnett et al. (2011) Drug Alcohol Depend. 118(2-3): 391–399.

Dougherty et al. (2014) Drug Alcohol Depend. 142: 301–6.

Dougherty et al. (2015) Drug Alcohol Depend 148:77–84.

Dougherty et al. (2015) Alcohol Clin Exp Res 39: 743–51.

Alessi et al. (2017) Drug Alcohol Depend. 178: 417-424.

Barnett et al. (2017) Addiction. 112(6): 1025-1035.

WrisTAS vs Self-report

Simons et al. (2015) Addict. Behav. 50: 205–212.

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Biosensor Validation

SCRAM vs BrAC

Dougherty et al (2012) Exp. Clin. Psychopharmacol. 20(5):373–381.

Number of drinks

Dougherty et al. (2015) Addict. Disord. Their Treat. 14(3): 124–130.

Detect low level drinking

Roache et al. (2015) Alcohol Clin. Exp. Res. 39(7): 1120–1127.

Pharmacokinetics of Phosphatidylethanol 16:0/18:1 and 16:0/18:2

Javors et al. (2016) Alcohol Clin. Exp. Res. 40(6): 1228–1234.

Detection delays relative to BrAC

Karns-Wright et al. (2017) Alcohol Alcohol. 52(1): 35–41.

SCRAM vs PEth, EMA

Hahn et al. (2017) Research Society on Alcoholism

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NIAAA Efforts to Stimulate Development

The small business program

RFA-AA-15-007: Alcohol Biosensors (STTR[R41,R42])
RFA-AA-15-008: Alcohol Biosensors (SBIR[R43,R44])
Six funded

PAR-16-410: Wearable Alcohol Biosensors (SBIR[R43/R44]
Six funded

PAR-18-204: Wearable Alcohol Biosensors (SBIR [R43/R44]
Clinical Trial Optional)
Currently open

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NIAAA Efforts to Stimulate Development

A Wearable Alcohol Biosensor Challenge
(A prize competition)

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FIRST PRIZE - $200,000

Awarded May 2016

BACtrack

The solution: BACtrack Skyn

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SECOND PRIZE - $100,000

Awarded May 2016

Milo Sensors, Inc.

The Solution: Milo Alpha

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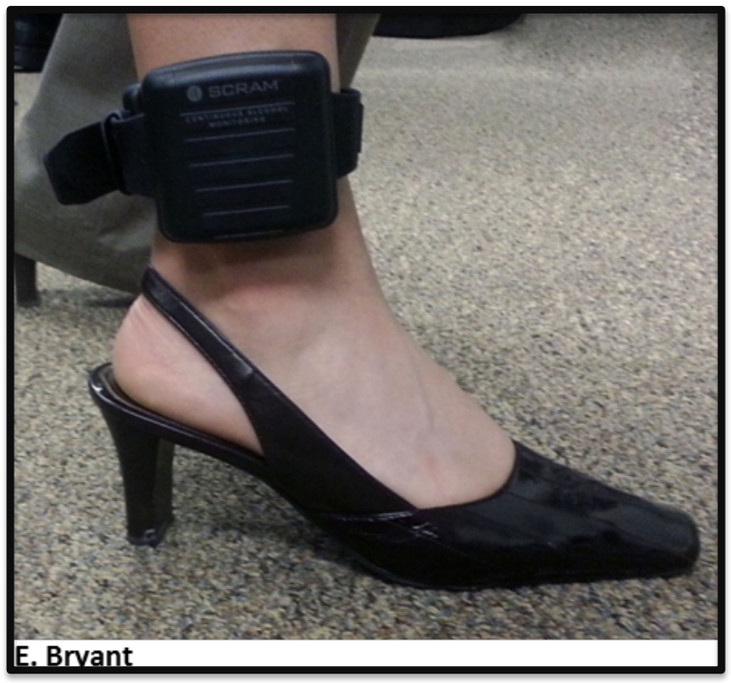
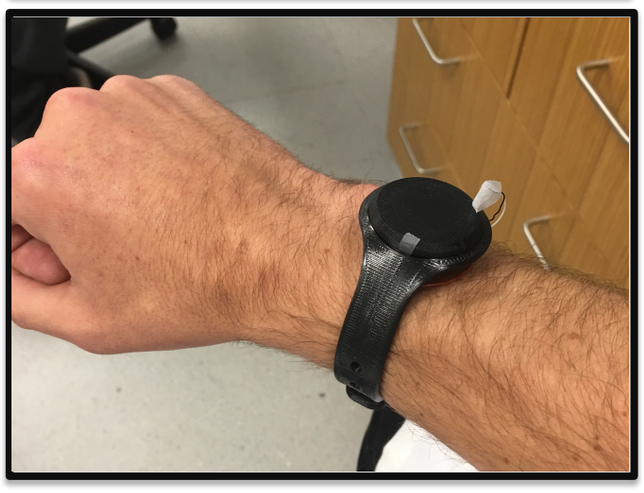
From Stigmatizing to Fashionable



SCRAM

BACtrack



Milo

Technical challenge

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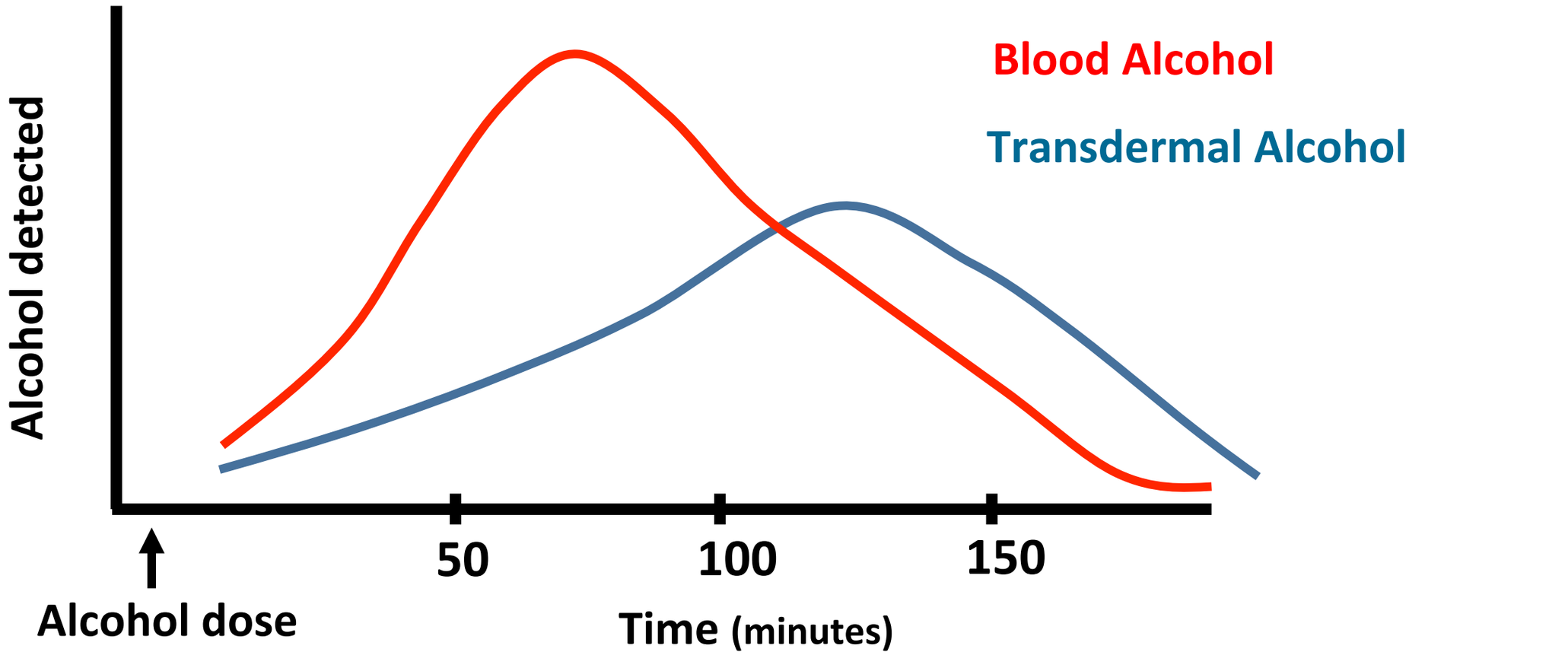
Alcohol Pharmacokinetics



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Benefits to the Wearer

Motivation to “keep a clean record”

Reinforcement of continued successful abstinence

Strengthen or restore relationships

Evidence to a spouse

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Benefits to the Treatment Provider

If the client chooses:

Feedback for treatment professional

Accurate picture of progress being made

Compiled records over time for each appointment

Allow for appropriate treatment plan

Possibility for timely intervention, if in contact with wearer.

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Practical Challenges

For the wearer:

Willingness, cost, consistency, comfort

For the clinician:

Time for interpretation of a large amount of data with respect to case load

Feasibility of real time monitoring and intervention

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My Questions to You

Would a wearable alcohol biosensor be useful for your purposes?

What level of involvement would you take?

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Biosensor and Biomarker Usefulness in Different Settings

	Biomarker	Wearable biosensor
Primary care physicians	✓	☒
Emergency room	✓	☒
Addiction treatment specialists	✓	✓
Chronic disease detection	✓	Less likely
Chronic disease care, incl. HIV	✓	✓
Epidemiology	☒	Possibly
Personal consumer use	☒	✓
Alcohol research	✓	✓

There are still challenges

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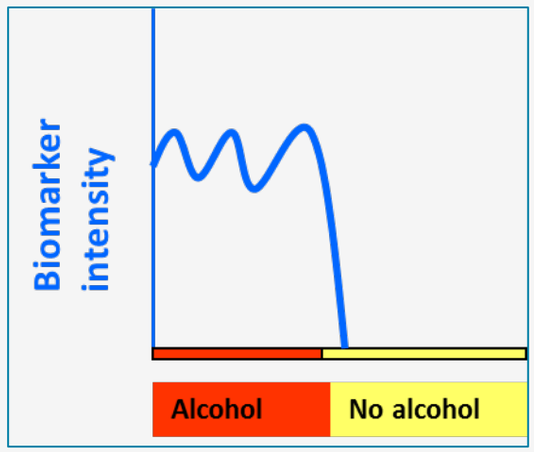
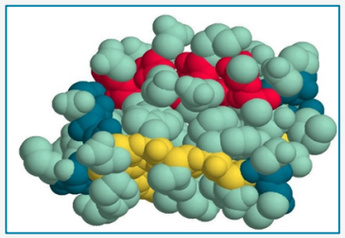
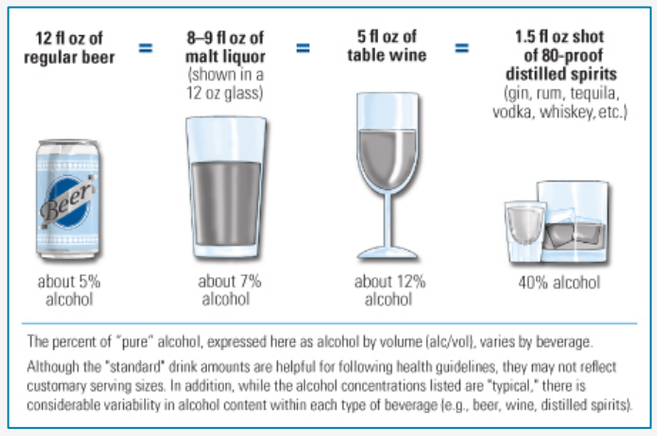
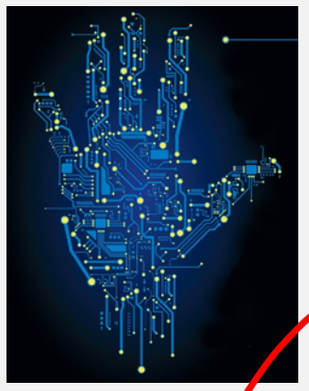
The **Ultimate** Alcohol Biomarker

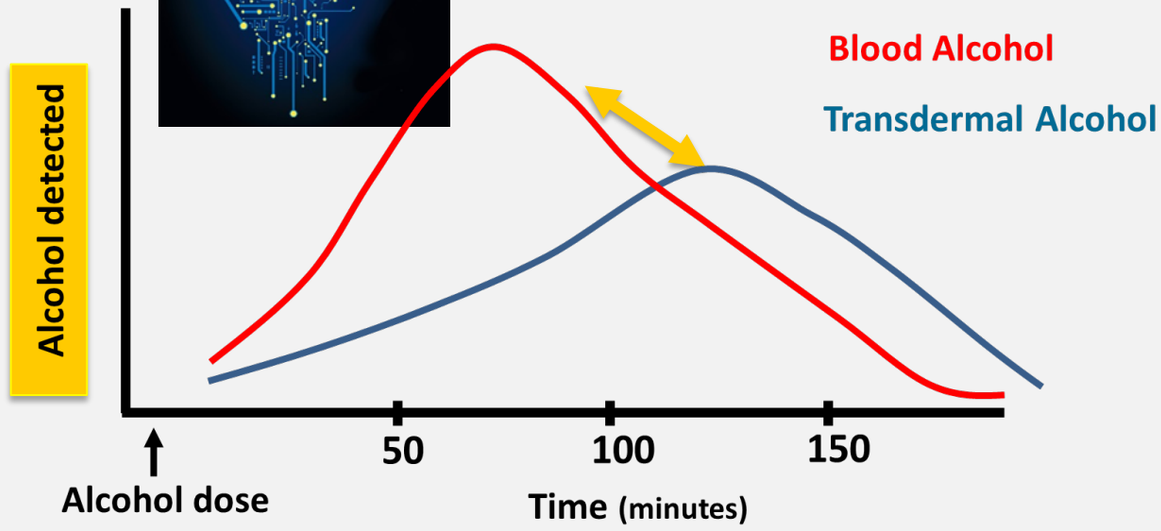
The **Ultimate** Wearable Alcohol Biosensor











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National Institute on Alcohol Abuse and Alcoholism

Using Alcohol Biomarkers to Guide Pharmacotherapy for Alcohol Use Disorder

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National Institute on Alcohol Abuse and Alcoholism

American Society of Addiction Medicine **April 13, 2018**

National Institute on Alcohol Abuse and Alcoholism

Using Alcohol Biomarkers to Guide Pharmacotherapy for Alcohol Use Disorder

April 13, 2018

Disclosure Information

Deidra Roach, MD

No Disclosures

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Using Alcohol Biomarkers to Guide Pharmacotherapy for Alcohol Use Disorder

Session Outline

Biomarkers for Managing Alcohol Use Disorder: Formation, Elimination, and Clinical Considerations

Scott H. Stewart, MD, MS; University at Buffalo

Phosphatidylethanol for the Treatment of People Living With Co-Occurring HIV/AIDS and Alcohol Use Disorder

Judy Hahn, PhD, MA; UCSF

A Wearable Alcohol Biosensor: Benefits and Challenges

Kathy Jung, PhD; NIAAA

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Biomarkers for Managing Alcohol Use Disorders: Formation, Elimination, and Clinical Considerations

- **Characteristics of an ideal biomarker (e.g., standardization; monitoring disease control; guide to modifying tx, etc.)**
  - Current alcohol biomarkers very useful but not ideal
  - **Carbohydrate-deficient transferrin (CDT) and PEth variably useful for detecting moderate to heavy drinking past hours to weeks**
    - Other biomarkers also useful for recent and long-term drinking
  - **CDT best for truly heavy drinking only**
  - **PEth very sensitive for modest to heavy ETOH use**

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Phosphatidylethanol for the Treatment of People Living With Co-Occurring HIV/AIDS and Alcohol Use Disorder

- Alcohol impact at every point in the HIV acquisition, progression and care continuum, from exposure/infection to clinical course; occurrence and course of comorbidities.

- HIV may affect alcohol metabolism such that less alcohol is needed to feel a “buzz”.

- Studies of association of alcohol and HIV disease progression independent of ART adherence: evidence is thin.

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Phosphatidylethanol for the Treatment of People Living With Co-Occurring HIV/AIDS and Alcohol Use Disorder

- **Peth and other biomarkers of alcohol use in setting of HIV infection to:**
  - **Assess under-reporting of drinking**
  - **Assess response to alcohol treatment (e.g., contingency mgt.; pharmacotherapy, etc.)**
  - **Determine eligibility for research study entry**

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A Wearable Alcohol Biosensor: Benefits and Challenges

- Characteristics of an ideal wearable alcohol biosensor (e.g., real time, continuous monitoring; non-invasive, etc.)

- Recent technological advances have moved us closer to the ideal (2015 NIAAA Biosensor Challenge).

- Potential boon to people who are seeking to reduce their drinking, specialty treatment providers, researchers.

- Use of biomarkers and biosensors in combination may be optimal for research.

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Thank You

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