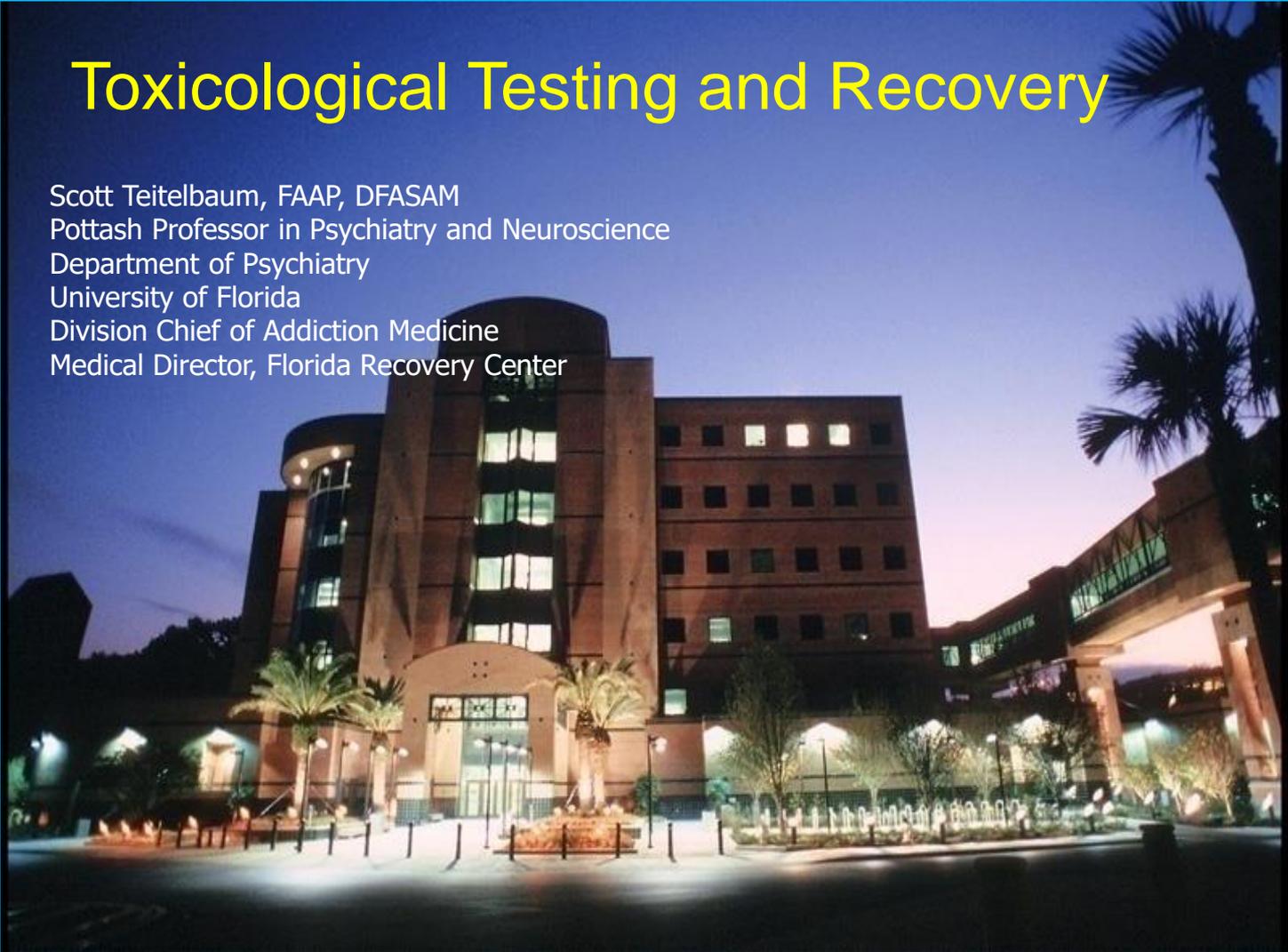


# Toxicological Testing and Recovery

Scott Teitelbaum, FAAP, DFASAM  
Pottash Professor in Psychiatry and Neuroscience  
Department of Psychiatry  
University of Florida  
Division Chief of Addiction Medicine  
Medical Director, Florida Recovery Center



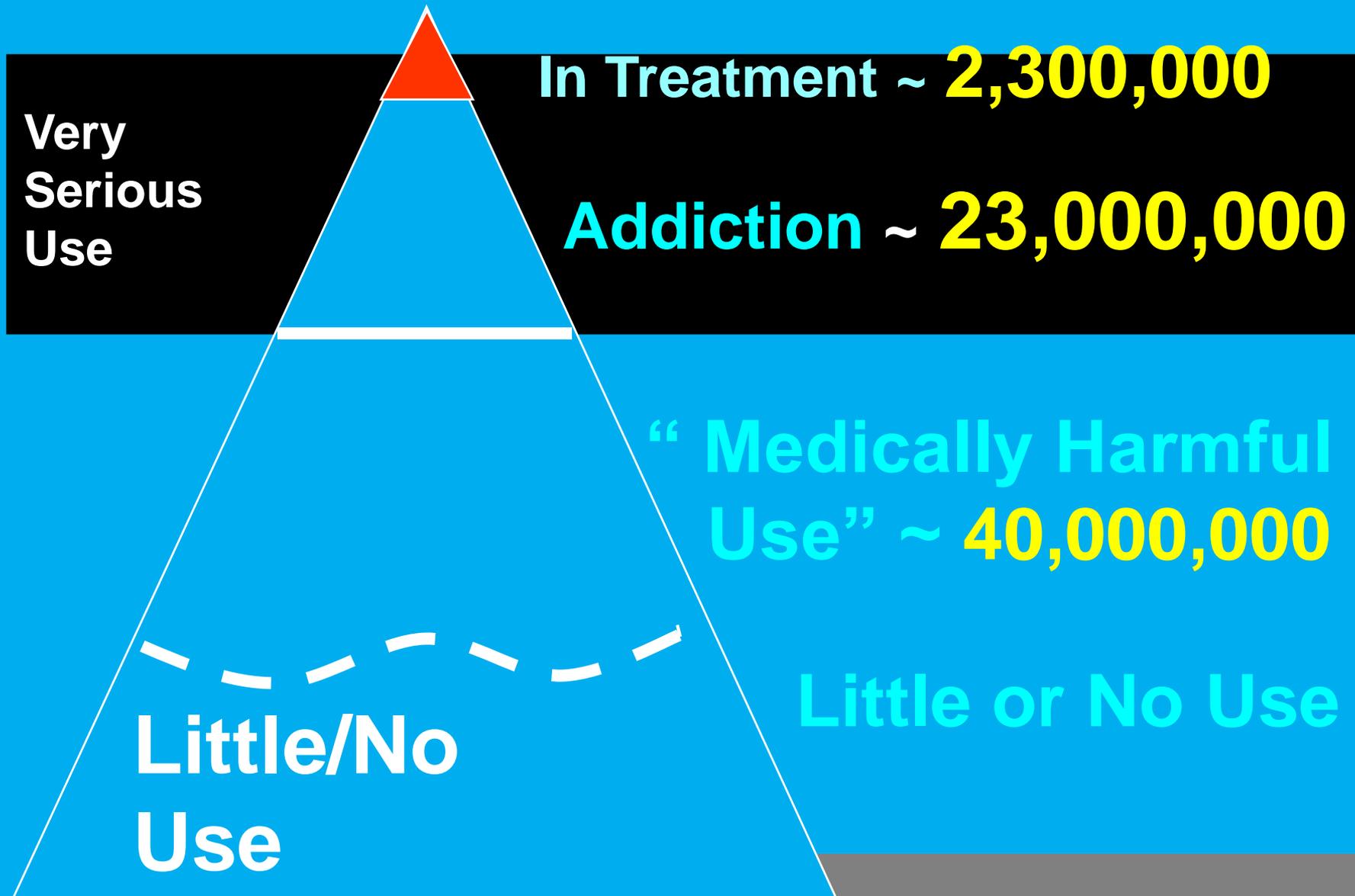
# OBJECTIVES

1. The participant will be able to summarize the evolution of drug testing in monitoring programs
2. The participant will be able to explain the differences between toxicological possibility and a reasonable medical explanation
3. The participant will be able to discuss the principles of recovery as they relate to toxicological testing

# Disclosure



# Population Prevalence



# Suggested Model of Care for Substance Use Disorders

1. Identification and Early Intervention
2. Stabilization – *If Needed*
3. Clinical Management – Setting(s) determined by:
  - a. Severity, duration, complexity of illness
  - b. Availability of social supports
4. Patient Self-Management

# Fragility of Early Recovery

Most individuals leaving addiction treatment are fragilely balanced between recovery and re-addiction in the hours, days, weeks, months, and years following discharge.

Recovery and re-addiction decisions are being made at a time that service professionals have disengaged from their lives, while many sources of recovery sabotage are present.

# Similarities to Other Medical Disorders

Substance addiction comparable to asthma, hypertension and diabetes.

Highest risk of relapse is in first 3- 6 months

Patients respond best to a combination of pharmacological and behavioral interventions.

Treatment of severe cases improves outcomes.

# Circa 1938

An illness of this sort—and we have come to believe it an illness—involves those about us in a way no other human sickness can. If a person has cancer all are sorry for him and no one is angry or hurt. But not so with the alcoholic illness, for with it there goes annihilation of all the things worthwhile in life. It engulfs all whose lives touch the sufferer's. It brings misunderstanding, fierce resentment, financial insecurity, disgusted friends and employers, warped lives of blameless children, sad wives and parents—anyone can increase the list.

-Big Book of Alcoholics Anonymous,  
page 18

There are Differences

## How to Deliver a More Persuasive Message Regarding Addiction as a Medical Disorder

Keith Humphreys, PhD

Many members of our field are frustrated that the public does not see addiction as a legitimate medical disorder which should be compassionately addressed as a health problem rather than a criminal justice problem. Although some attribute the disconnect to the public's lack of scientific knowledge or attachment to outdated moral views regarding substance use, this commentary suggests that the problem may well be our own messaging. We would be more persuasive if we acknowledged that addiction is different from most medical disorders because of its high negative externalities, and that this understandably makes the public more scared of and angry about addiction than they are about conditions like asthma, type II diabetes, and hypertension. Relatedly, because of the amount of violence and other crimes associated with addiction, we should acknowledge that the public's belief that law enforcement has an important role to play in responding to addiction has a rational basis.

**Key Words:** addiction, attitude change, medical disorder, persuasion

*J Addict Med* 2017;11: 174–175)

Many members of our field have tried for some time to persuade the public that addiction is a legitimate medical disorder meriting health-oriented preventive and treatment approaches like any other disorder. Yet, much of the public remains unconvinced and harbors punitive, stigmatizing views of people with addictions (Meurk et al., 2014). Within our field, the public's refusal to embrace the concept of addiction as a medical disorder is typically explained as a result of their being unaware of the relevant scientific evidence, their holding moralistic views of substance use, or both (Volkow et al., 2016). This commentary suggests that the fault lies not in the public, but in ourselves, specifically that how

and what we say about the status of addiction as a health problem turns many people off, because it is incomplete in some respects and perhaps even inappropriately scolding in others. I write as someone who believes that addiction is best understood as a legitimate medical disorder, but who also believes that we need better messaging to persuade people outside of our bubble of wisdom of that view.

The case for seeing addiction as a chronic medical illness is sound in many respects. The most widely cited articulation of this view noted that addiction shares many features with medical disorders such as asthma, type II diabetes, and hypertension (McLellan et al., 2000). All come about in part due to voluntary behavior, but are difficult to manage behaviorally once they are established. All may be caused in part by genetic factors and all respond to treatment that is provided on an ongoing basis. All require at least some people who have them to engage in lifelong management of the condition. Most members of the field, including me, find these parallels compelling and consider them excellent reasons for health insurance plans to cover addiction treatment as they would for other medical disorders.

That said, analogies to medical disorders such as asthma, type II diabetes, and hypertension (and also "brain disease" formulations; Leshner, 1997) leave out something important about addiction. Let me suggest where the blind spot lies by asking my colleagues to consider some questions.

If you had a financial manager who would have access to all your accounts and personal information, would you consider that person developing a heroin addiction of any more consequence than him/her developing type 2 diabetes? If you were enrolling your child in a preschool, would you react in the same way if informed that the teacher was prone to methamphetamine binges as you would to learning that the teacher was prone to asthma attacks? If asked by a nonexpert from outside our field, how would you explain why millions of people have chosen to attend self-help groups and treatment programs focused on recovering from having had an "alcoholic" parent, but there is no demand for recovery programs focused on adult children of hypertensive patients?

Grappling with these questions illuminates the limitation of framing addiction as just another medical disorder. The public will not buy our current message, not because they are ignorant or stubborn, but because they know that people with high blood pressure are not prone to steal money from family and employees, people with asthma do not drive cars in a fashion that kills thousands of people a year, and people with type 2 diabetes do not have high rates of committing assault.

From the Veterans Affairs and Stanford University Medical Centers, Menlo Park, CA.

Received for publication February 6, 2017; accepted February 8, 2017.

Funding: The preparation of this paper was supported by the Stanford Neurosciences Institute and the Veterans Affairs Health Services Research and Development Service.

Conflicts of interest: The opinions expressed here are not necessarily those of any government agency that the author has worked for or advised.

Send correspondence and reprint requests to Keith Humphreys, PhD, Veterans Affairs and Stanford University Medical Centers, 795 Willow Road (152-MPD), Menlo Park, CA. E-mail: kah@stanford.edu

Copyright © 2017 American Society of Addiction Medicine

ISSN: 1932-9832/17/1103-0174

DOI: 10.1097/ADM.0000000000000306

“high  
negative  
externalities”

Idaho Statesman

## Bartender attacked after woman complains drink wasn't strong enough, Kentucky cops say

### Save Rachel's Face



**Mike Stunson**

Tue, May 11, 2021, 12:58 PM

The bartender, identified as Rachel Hendricks, suffered a crushed nose, broken septum, broken orbital wall in four places and four cuts in her face that required 12 stitches, according to police. She needed reconstructive surgery and had four plates put in her face and eye socket.

Reason #3,747

# Reason #1,312

abc NEWS

VIDEO

LIVE

SHOWS



## 12-year-old Boy Scout killed when car plows into group, suspected driver charged with DUI

By KARMA ALLEN, AARON KATERSKY and EMILY SHAPIRO  
Oct 1, 2018, 10:56 AM ET

Share

Tweet



CRIME 08/03/2018 08:02 pm ET

2.6k



1.4k

# Boy Died After Mistaking Dad's Meth For Breakfast Cereal: Police

Indiana police say Curtis Gilbert Collman refused to call 911 when his 8-year-old son overdosed.

By David Moye



A 8-year-old boy in Indiana who died after reportedly mistaking his dad's methamphetamine for breakfast cereal had more than 180 times the lethal amount of the drug, according to a [toxicology report released Thursday](#).

TRENDING



Kris Kobach Could Be The Next Governor Of Kansas



Facebook Removes Alex Jones And InfoWars Pages



Robert Redford Retires From Acting: 'I've Been Doing It Since I Was 21'



John Oliver Exposes The Most 'Galling Lie' In Trump's Defense Of Don Jr.



Sacha Baron Cohen Trolls Joe Arpaio Into Saying

Reason #1306\*



Theodore Gerstle is charged with public intoxication, according to jail records. - WKYT

FAYETTE COUNTY

## Lexington doctor accused of showing up to perform surgery while intoxicated



BY MORGAN EADS  
[meads@herald-leader.com](mailto:meads@herald-leader.com)

\* Why addiction will never be widely viewed as a disease .

# NIDA's 13 Principles of Effective Drug Treatment

1. No single treatment is effective for all individuals
2. Treatment needs to be readily available
3. Effective treatment attends to multiple needs
4. Treatment needs to be flexible
5. Remaining in treatment for an adequate period of time is critical for treatment effectiveness
6. Individual and/or group counseling and other behavioral therapies are critical components of effective treatment for addiction

# NIDA's 13 Principles cont...

7. Medications are an important element of treatment for many patients

8. Addicted or drug-abusing individuals with co-existing mental disorders should have both disorders treated in an integrated way

9. Medical detox is only the first stage of addiction treatment

10. Treatment does not need to be voluntary to be effective

11. Possible drug use during treatment must be monitored continuously

12. Treatment programs should provide assessment for HIV/AIDS, hepatitis B and C, tuberculosis and other infectious diseases

13. Recovery from drug addiction can be a long-term process

# Treatment Today

Only 1 in 10 Americans who need treatment receive it

Of those that need it, approximately 95% don't think they do

Of the 5% who believe they need it, 2/3 made no effort to obtain it

Less than 50% of those admitted to publically funded treatment successfully completed treatment

# New Paradigm

The use of principles of state PHPs (coercion, contingency contracting) and other mandated programs (Hawaii HOPE program, Drug Court, etc...)

Shifts balance of decision making toward lasting recovery

NOT hands off, but engaging

# New Paradigms in Practice

PHPs

HOPE

Drug Court

LAP

HIMS- pilot study

# Voluntary Treatment of Professionals is an Oxymoron



# Components of Monitoring

With Behavioral Monitoring, we follow:

- Time and adherence to daily call in (to determine if screening is requested).
- Support group attendance
- Therapy attendance
- Submission of other self-reports

For chemical monitoring:

- Screen frequently, tailored to past use pattern
- Screen using multiple methodologies (urine, hair, nails, etc.)

What do physicians and other healthcare professionals think about their PHP experiences?



# Attitude of PHP participants

~79% reported satisfaction

~93% would recommend PHP to a friend

~85% continued to attend meetings after contract ended

Most reported strengths of PHP:

Accountability provided by monitoring

Fellowship and social support

Restoring relationships

Building a spiritual foundation

# Views Regarding Helpfulness of Treatment/Monitoring

Treatment Experience	Mod/Extreme Helpful	Slightly Helpful	Not Helpful	Did Not Participate
Detox Facility	28.0%	16.1%	8.6%	47.3%
Residential or PHP Program	★ 62.7%	14.9%	3.2%	19.1%
Intensive Outpatient Program	34.7%	9.8%	8.7%	46.7%
Outpatient Treatment	23.9%	13.0%	9.8%	53.3%
AA/NA Meetings	★ 81.9%	14.9%	2.1%	1.1%
Individual Therapy	52.7%	22.6%	8.6%	16.1%
Couples/Family Therapy	19.3%	14.0%	8.6%	58.1%
Weekly Monitoring Group	★ 75.5%	21.3%	3.2%	--
Random Drug Screening	★ 71.3%	19.1%	6.4%	3.2%
Church-Based Recovery Group	17.3%	6.5%	4.3%	72.0%

# Purposes of Drug Testing

Patients are not always truthful.

Verify adherence to pharmacotherapeutic regimen.

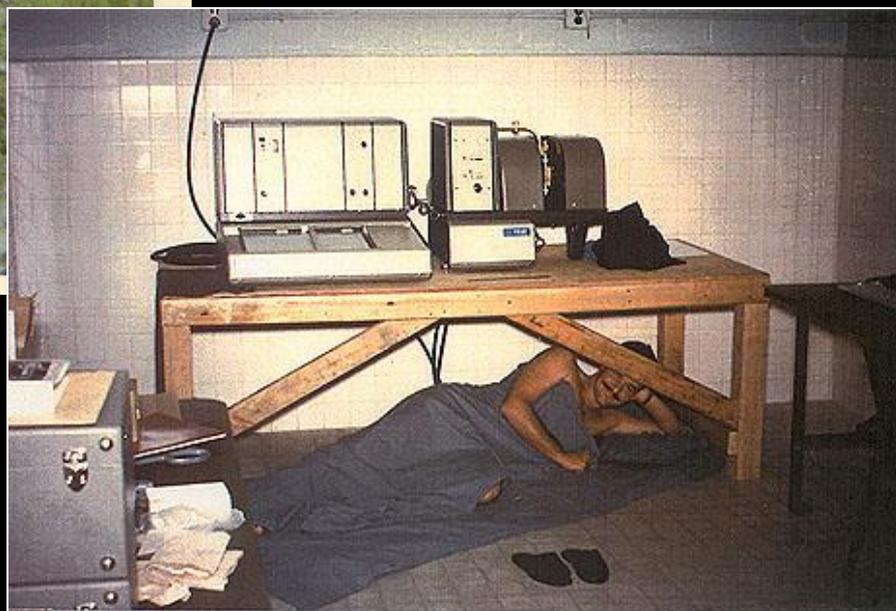
Detect unauthorized use of prescription/illicit drugs.

Deter use.

Protect public.



SEP • 67



7. FRAT guarded 24 hours a day.

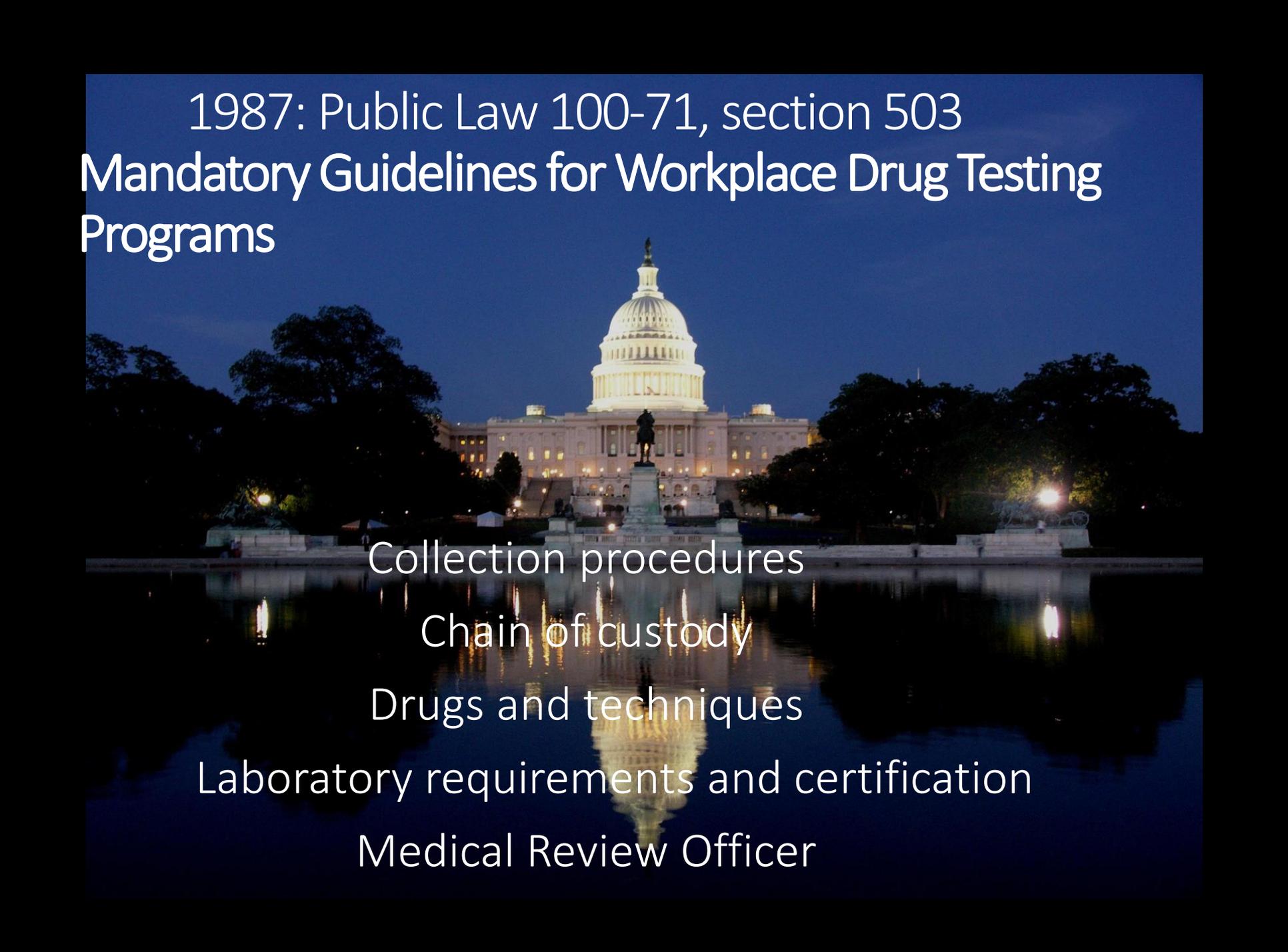


# DRUG FREE FEDERAL WORKPLACE



1981





1987: Public Law 100-71, section 503  
Mandatory Guidelines for Workplace Drug Testing  
Programs

Collection procedures

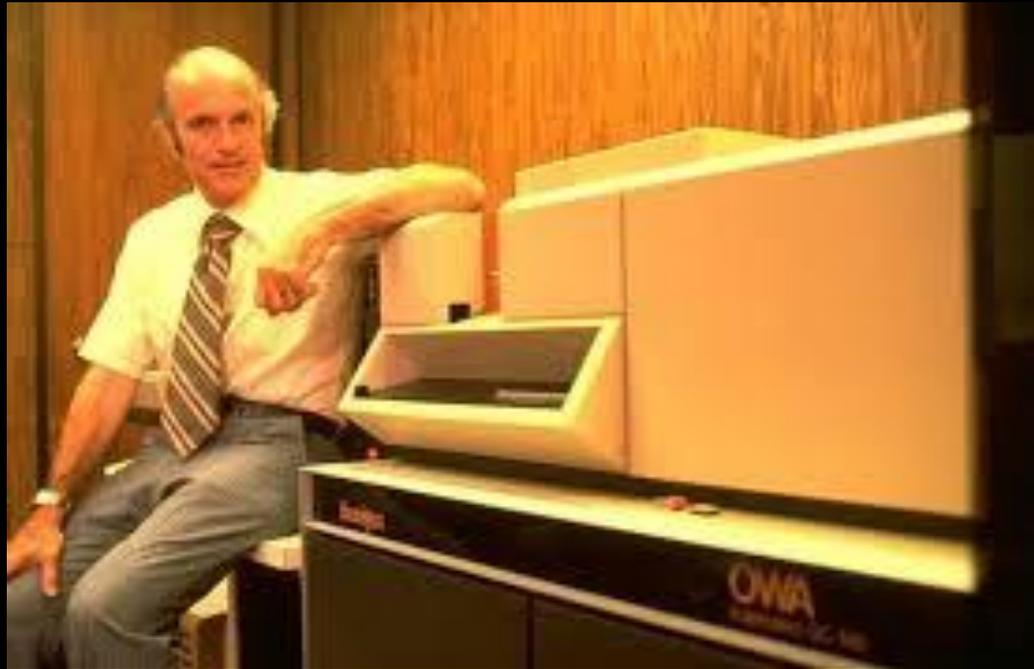
Chain of custody

Drugs and techniques

Laboratory requirements and certification

Medical Review Officer

# Early Technology



# Immunoassays: POC vs. laboratory-based



# Chromatography Column Technology



# Gas Chromatography Mass Spectrometers



# Liquid Chromatography Tandem Mass Spec



# DRUG FREE FEDERAL WORKPLACE

## “NIDA 5”

- **Amphetamine/Methamphetamine**
- **Cocaine**
- **Opiates (codeine, morphine, heroin)**
- **Phencyclidine**
- **Marijuana**



# Changing Drug Use Patterns

## Opiates

Codeine

Morphine

Hydrocodone

Hydromorphone

6-MAM

Oxymorphone

Oxycodone

Buprenorphine

Methadone

Meperidine

Propoxyphene

Tramadol

• Cocaine

• Marijuana

• PCP

• Barbiturates

— Butabital

— Amobarb

— Pentobarbital

— Secobarb

— Phenobarbital

Amphetamines

Amphetamine

Methamphetamine

MDA

MDMA

MDEA

• Benzodiazepines

— Oxazepam

— Nordiazepam

— Temazepam

— Lorazepam

— Flurazepam

— Nitrazepam

— Triazolam

— Alprazolam

— Flunitrazepam

— Midazolam

— Clonazepam

— Syn Canns

• Phentermine

• Propofol

• Ketamine

• Sevoflurane

• Gabapentin

• Fentanyl

• Sufentanil

• Soma

• Zolpidem

• Dextromethorphan

• Methylphenidate

• Ethyl glucuronide

• Bath Salts

Jun

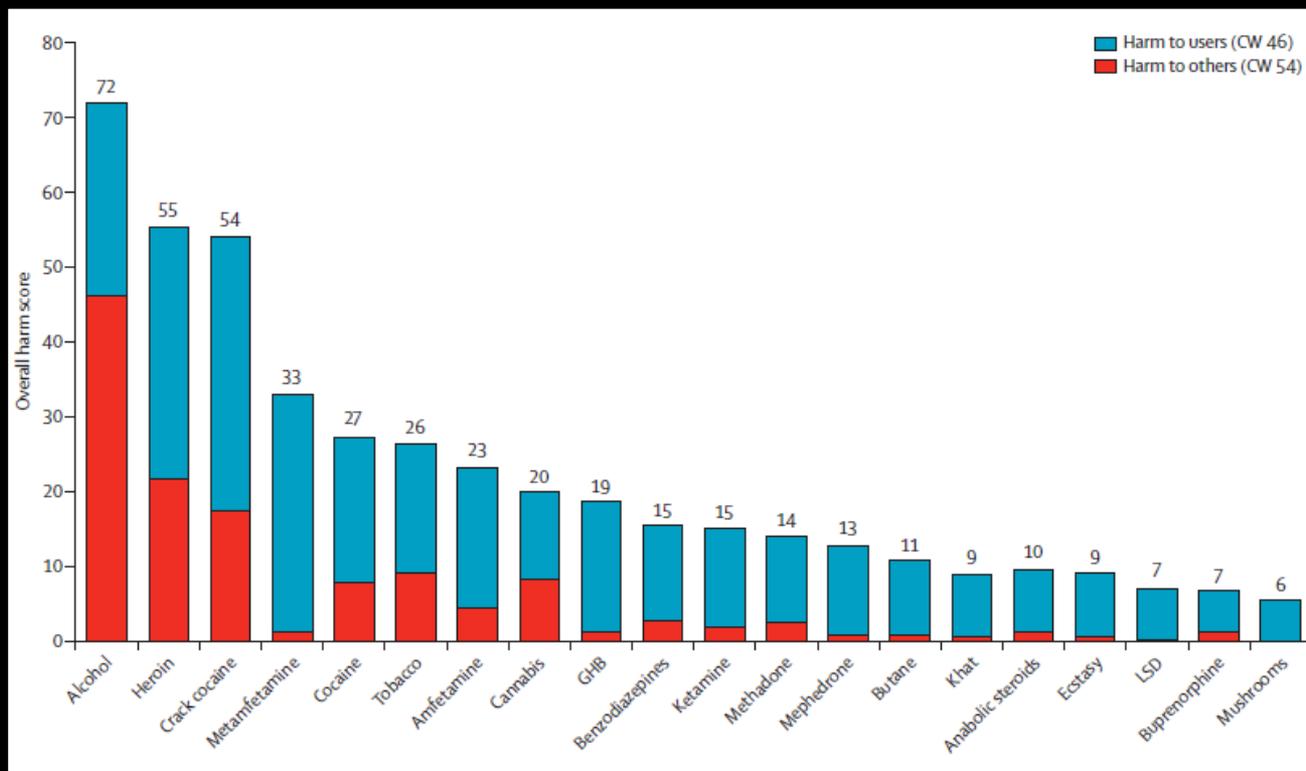


86

September 5, 1989

March 29, 2016

NE  
W



Nutt DJ. *Lancet* 2010;376:1558-1565



## Effects of the COVID-19 pandemic and lockdown on alcohol use disorders and complications

Pratima Murthy<sup>a</sup> and Venkata Lakshmi Narasimha<sup>b</sup>

### Purpose of review

To understand the effect of COVID-19 pandemic and lockdown on persons with alcohol use disorders.

### Recent findings

From a total of 455 titles on COVID-19 and alcohol, 227 abstracts were screened, and 95 articles were reviewed (on November 25<sup>th</sup>, 2020). The immediate effect was an increase in alcohol related emergencies including alcohol withdrawal, related suicides, and methanol toxicity. Although there are mixed findings with respect to changes in the quantity of drinking, there are reports of binge/heavy drinking during the lockdown as well as relapse postlockdown. Psychological, social, biological, economic and policy-related factors appear to influence the changes in drinking. Although preliminary data suggest no change in alcohol use among persons with comorbid mental illness, findings in this population are presently limited. Among patients with alcohol related liver disease, outcomes appear worse and caution is warranted with the use of medications. Alcohol also appears to increase the risk of COVID-19 infection and complicates its course.

Although some nations banned alcohol sales completely during lockdown, others declared it as an essential commodity, resulting in different problems across countries. Alcohol use has added to the burden of the problem particularly among vulnerable groups like the adolescents, elderly, patients with cancer, as well as health professionals. Services for patients with alcohol use disorders have been affected.

### Summary

The COVID-19 pandemic has had considerable impact on alcohol use, with an increase in alcohol related emergencies, changes in alcohol use patterns, increased risk of contracting COVID-19, effect on alcohol policies and sales, and an effect on vulnerable groups. It is essential to understand and respond to the current situation, intervene early, and prevent further repercussions of the pandemic.

# Clinical vs. Forensic Testing

Clinical tests are a part of medical care, whereas forensic tests are considered evidentiary.

Forensic testing requires MRO which is not so in clinical testing.

Forensic testing maximizes sensitivity and specificity (don't want false negative or false positive).

Forensic testing almost exclusively intended to detect illicit drug use whereas clinical testing is for both illicit and legitimate use.

# Ethical Issues

Beneficence

Nonmaleficence

Justice

Autonomy

# Choice of Matrix

Blood

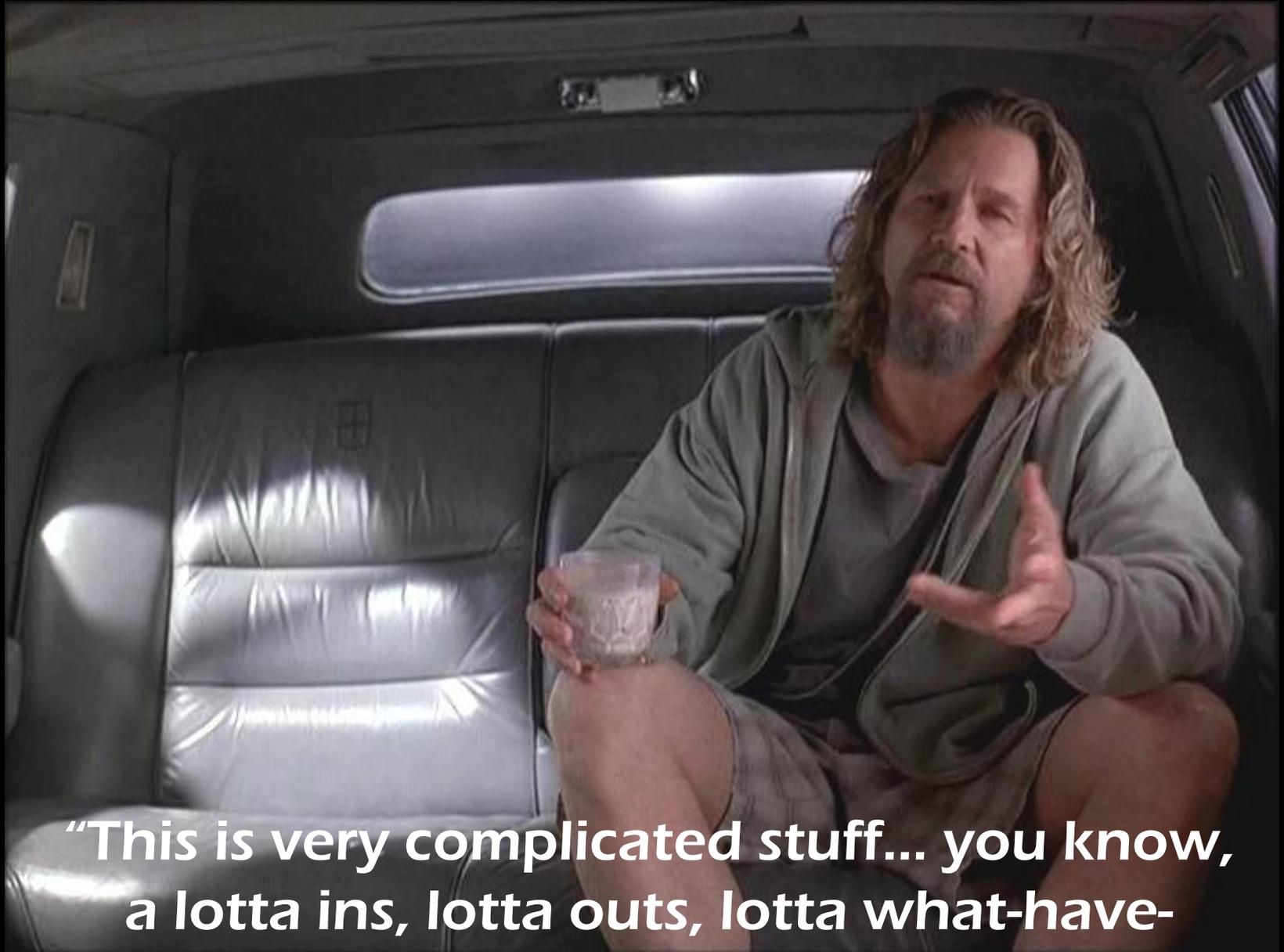
Breath

Urine

Oral Fluid

Sweat

Hair/Nails

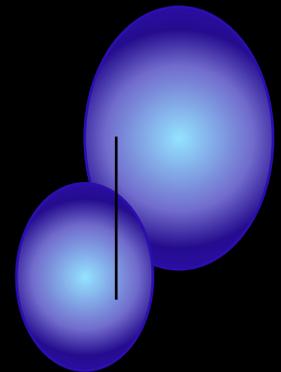
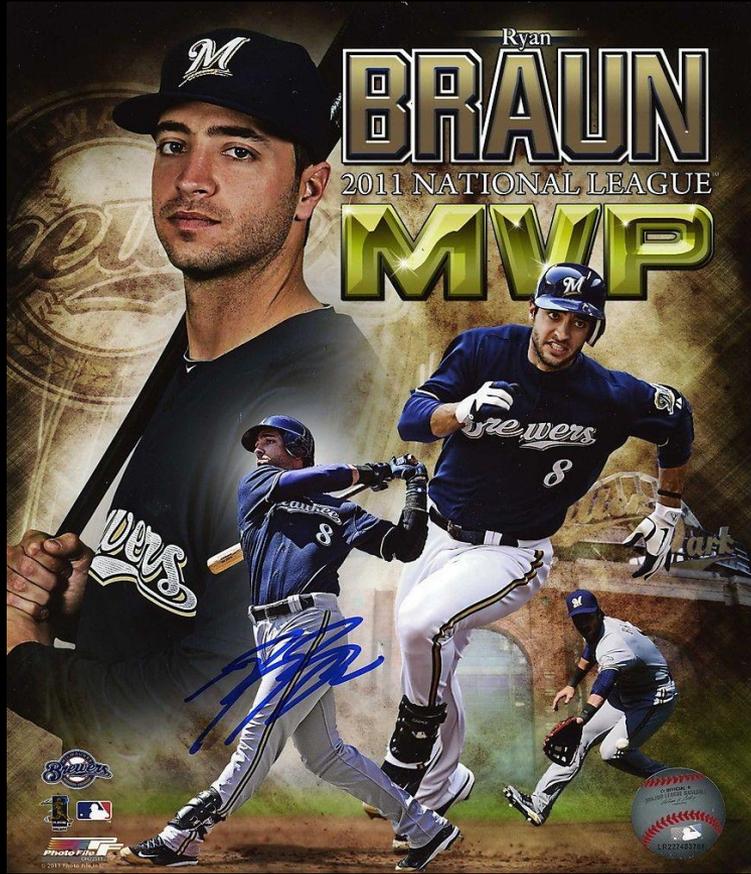


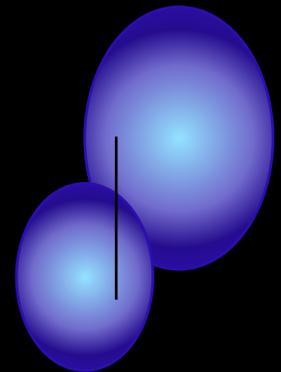
**“This is very complicated stuff... you know,  
a lotta ins, lotta outs, lotta what-have-  
yous.”**

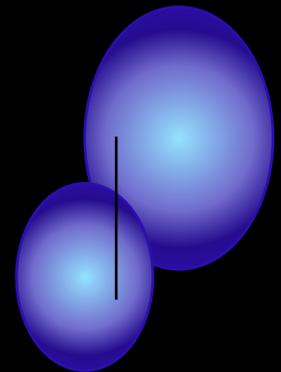
**BELIEVE**

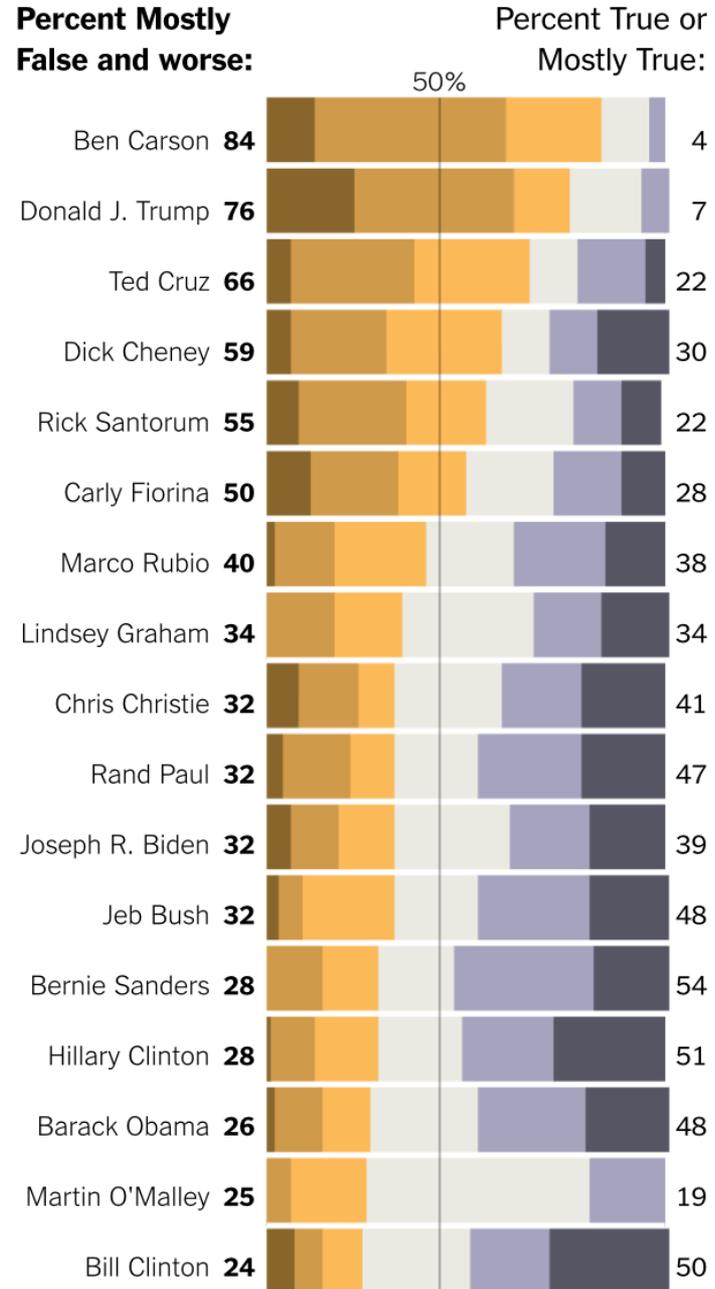
Доверяй, но проверяй





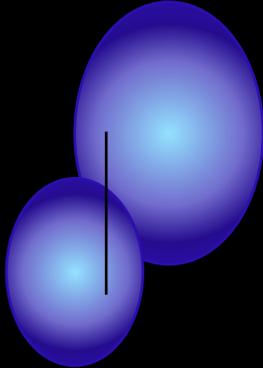
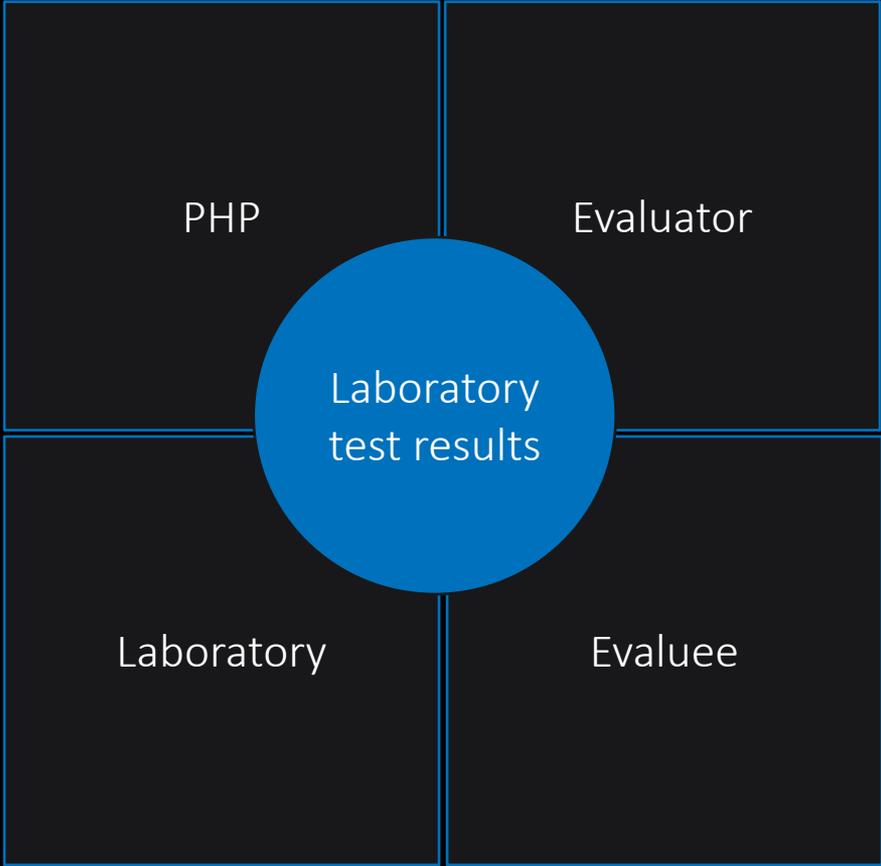






*New York Times*, December 11, 2015





# “Positive or Negative Tests”

Only confirm the presence of a designated substance at a cutoff level.

A positive test is not diagnostic of a substance use disorder.

A negative test does not prove that the drug or substance was not used.

# Differential of negative IA test results

- Drug is absent
- Assay not designed to detect
- Limited test specificity
- Drug is present, but below cutoff
  - Lack of recent use
  - Pharmacologic induction
  - Genetic polymorphisms
- Specimen manipulation
- Laboratory error
  - Preanalytical
  - Analytical: false negative
  - Postanalytical: interpretation error

# Differential of positive IA test results

- Use as prescribed
- Unauthorized (same class) drug administration
- Incidental exposure
- Laboratory error
  - Preanalytical
  - Analytical: cross-reactivity
  - Postanalytical: misinterpretation

Reisfield GM, Goldberger BA, Bertholf RL. “False-positive” and “false-negative” test results in clinical urine drug testing. *Bioanalysis* 2009;1(5):937-952

# Differential of C-MS test results

## Positive

Unauthorized drug administration

Biotransformation

Incidental exposure

Contamination during  
manufacture

Laboratory error

*Preanalytical*

*Analytical: cross-reactivity*

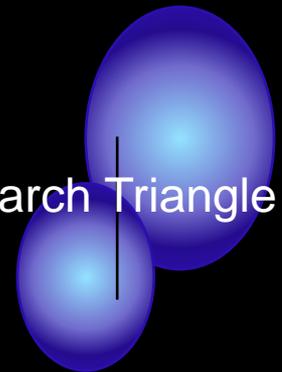
*Postanalytical*

# Alternative medical explanations

The important point here is that to a lay person and often for individuals in a drug testing program, the term “alternative medical explanation” is often misunderstood. It sounds as though it includes anything that is technically possible. It does not. Alternative medical explanations are carefully described in policy. Accidental or unknowing ingestion of a drug is possible, but it is not an acceptable alternative medical explanation.



Shults TF. Medical Review Officer Handbook (10<sup>th</sup> ed). Research Triangle Park, NC



**I had a urine drug test at work today.  
They said they found opiates.  
I told them it was probably from the poppy seeds on my bagel.  
But then they asked about the THC, hallucinogens, cocaine, and methamphetamine.  
I told them it was an everything bagel.**





FSPHP 2021 VIRTUAL EDUCATION CONFERENCE & ANNUAL BUSINESS MEETING  
*World Disrupted: Caring for Caregivers in Uncertain Times*

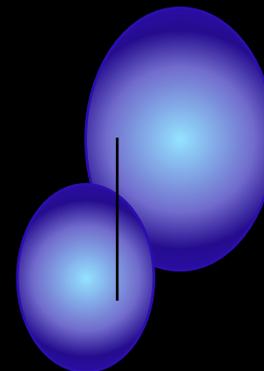
# The nexus between toxicological possibility and alternative medical explanation

Scott Teitelbaum, MD

Gary Reisfield, MD

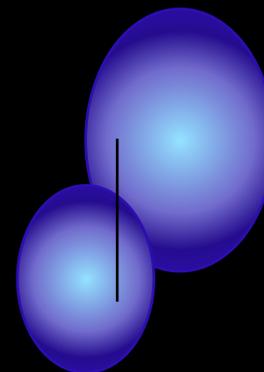
Joseph Jones, PhD

March 31, 2020, 2:30 – 4:30

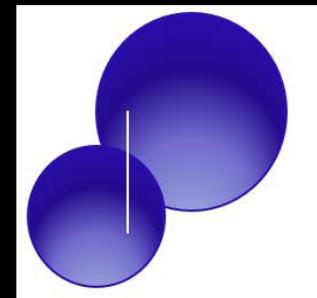
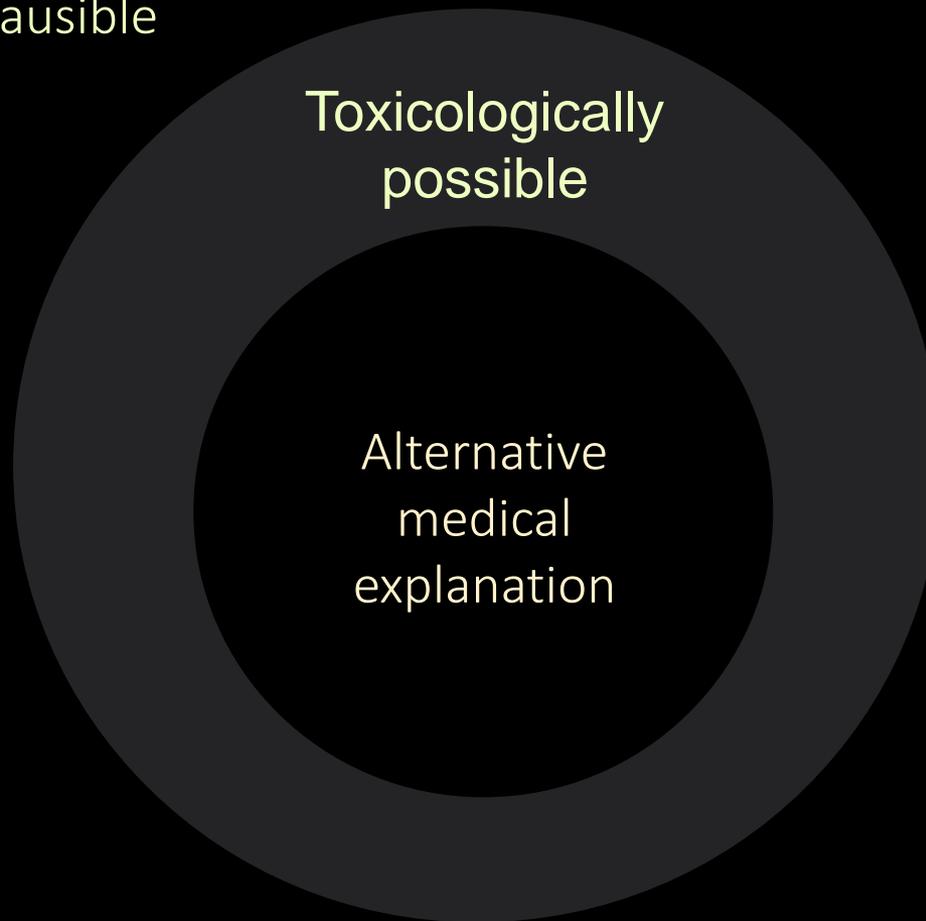


Can any of these cause positive drug screens?



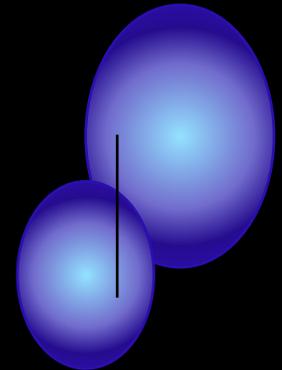


Toxicologically implausible



**ALCOHOL IS  
THE  
ANESTHESIA  
BY WHICH WE  
ENDURE THE  
OPERATION  
OF LIFE.**

**- GEORGE BERNARD SHAW**



# Ethanol biomarkers

## INDIRECT BIOMARKERS

Liver enzymes (GGT; AST; ALT)

Mean corpuscular volume (MCV)

Carbohydrate-deficient transferrin (CDT)

Serum/urine  $\beta$ -hexosaminidase

Total serum/plasma sialic acid

Sialic acid index of apolipoprotein J

5-Hydroxytryptophol

## DIRECT BIOMARKERS

Ethanol: urine; breath; transdermal

Urine/hair ethyl glucuronide (EtG) and/or ethyl sulfate (EtS)

Phosphatidylethanol (PEth)

Fatty acid ethyl esters (FAEE)

# Indirect biomarkers: *specificity* issues

## GGT

False positives with multiple medications, including phenytoin, tricyclic antidepressants, warfarin, and others

May be elevated with cigarette smoking, diabetes, obesity

May be elevated with viral hepatitis, nonalcoholic liver diseases, and ischemic liver injury

Coffee drinking (>4 cups/day) may lower concentrations in heavy drinkers

## MCV

May be elevated in various anemias, including megaloblastic anemia

May be elevated with certain medications, including antibiotics, anti-neoplastics, anticonvulsants, anti-inflammatories, and anti-diabetics

## %CDT

Genetic variants in transferrin may cause false positive %CDT

Factors that increase transferrin levels, including Fe-deficiency anemia, chronic illness, and menopausal status may increase total CDT

Some liver diseases, including biliary cirrhosis and end-stage liver disease may elevate % and absolute CDT

Other chronic diseases, including COPD and rheumatoid arthritis may elevate % and absolute CDT

False negative may be associated with female gender and acute trauma with blood loss

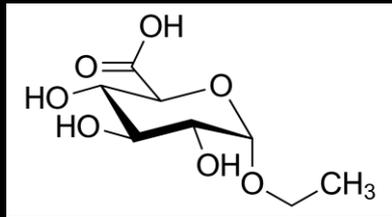
Some drugs may elevate % and absolute CDT, including some anticonvulsants and ACE inhibitors

Some drugs may lower % and absolute CDT, including loop diuretics

## $\beta$ -Hexosaminidase

May be increased by hepatitis, liver metastases, diabetes, rheumatoid arthritis, inflammatory bowel disease, myocardial infarction, cerebral infarction.

May be elevated with oral contraceptives and pregnancy



Ethyl glucuronide  
(EtG)

$\leq 0.1\%$   
glucuronosyltransferase  
(UGT)

$\leq 0.1\%$   
Sulfotransferase

Ethyl sulfate  
(EtS)

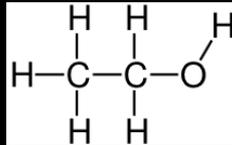
$\geq 95\%$  Alcohol dehydrogenase  
(ADH)

Acetaldehyde

Aldehyde  
dehydrogenase  
(ALDH)  
Acetate

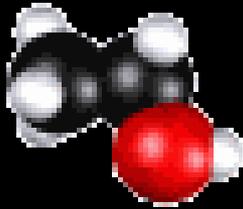
Unchanged in breath, urine, sweat

$\leq 5\%$



Ethanol

# ALCOHOL TESTING



## Standard Technology

- Breath – Hours/Drink
- Saliva - Hours/Drink
- Blood – Hours/Drink
- Urine – Hours/Drink

## Recovery Technology: 3 x 3 x 3

- 1) Urine Ethyl Glucuronide(EtG) - **3 Days binge**
- 2) Phosphatidylethanol(Peth)- **3 weeks binge**
- 3) Hair/Nails EtG – **3 months binge**

# BrAC monitoring



# BrAC and zero order kinetics



# TAC Monitoring



Experimental and Clinical Psychopharmacology  
2014, Vol. 22, No. 1, 86–96

© 2014 American Psychological Association  
1064-1297/14/\$12.00 DOI: 10.1037/a0034821

## Predictors of Detection of Alcohol Use Episodes Using a Transdermal Alcohol Sensor

Nancy P. Barnett  
Brown University

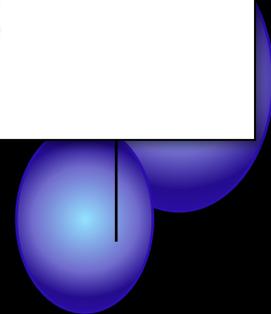
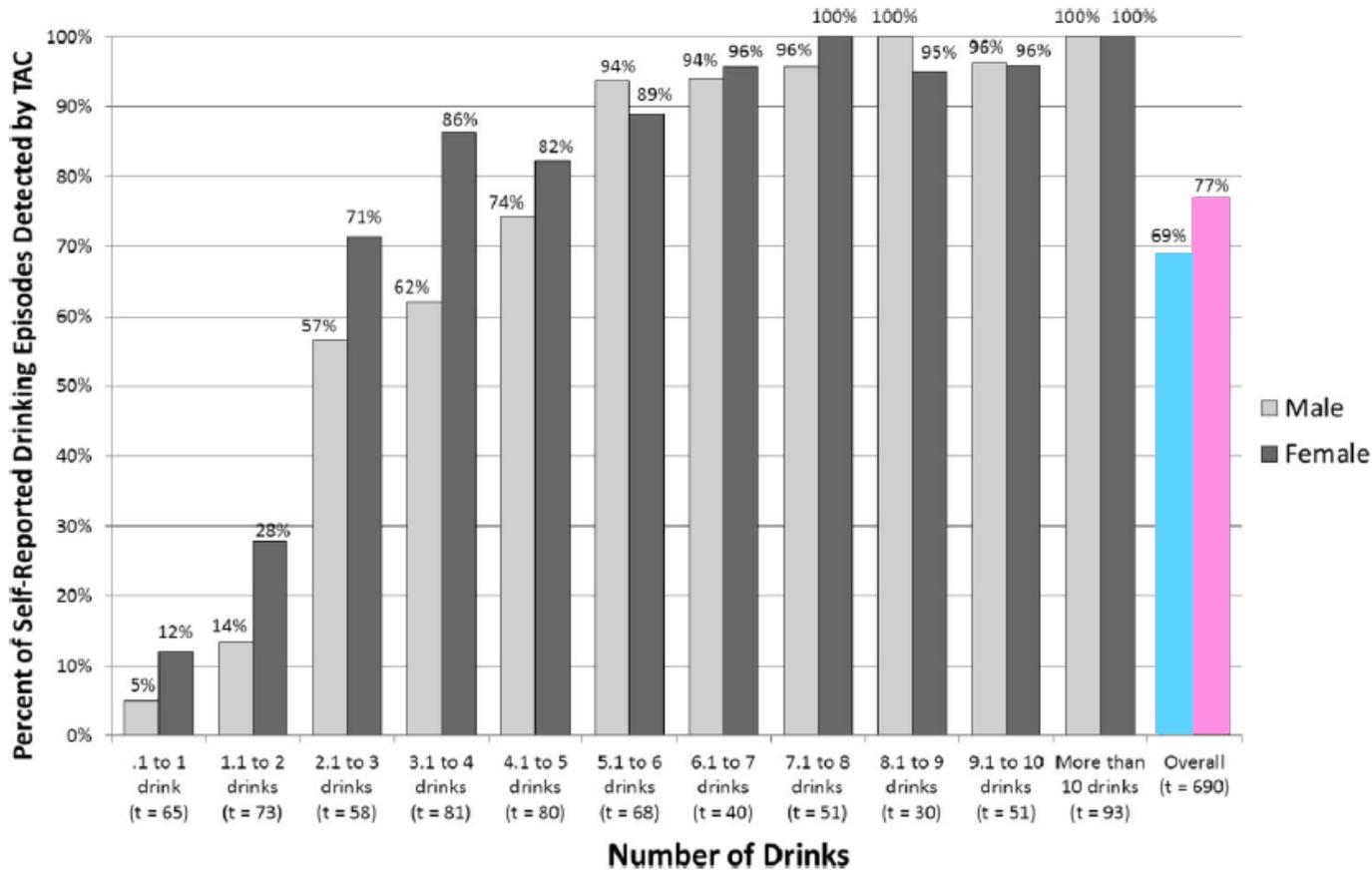
E. B. Meade  
University of Delaware

Tiffany R. Glynn  
Brown University

## Critical Review

# Wearable Transdermal Alcohol Monitors: A Systematic Review of Detection Validity, and Relationship Between Transdermal and Breath Alcohol Concentration and Influencing Factors

**Conclusions:** Transdermal alcohol monitors offer an opportunity to measure alcohol consumption in a valid and continuous way with mathematical models and software estimating BrAC values improving interpretation of TAC data. However, the SCRAM seems unable to detect low-to-moderate drinking levels using the thresholds and criteria set by the manufacturer. Moreover, the WrisTAS and the Skyn prototype show a high failure rate, raising questions about reliability. Future studies will assess the validity of new-generation wristbands, including the next Skyn generations.



# Urinary EtG/EtS limitations: 1

	EtG	EtS
“Clinical false positive”	<ol style="list-style-type: none"><li>1. Incidental exposures</li><li>2. UTI: <i>E. coli</i>*</li></ol>	<ol style="list-style-type: none"><li>1. Incidental exposures</li></ol>
“Clinical false negative”	<ol style="list-style-type: none"><li>1. Dilution</li><li>2. UTI: <i>E. coli</i> (with <math>\beta</math>-glucuronidase) <i>C. sordellii</i> (with <math>\beta</math>-glucuronidase)</li><li>3. <i>UGT 1A1</i> polymorphism (?)</li></ol>	<ol style="list-style-type: none"><li>1. Dilution</li></ol>

\*In presence of alcohol (i.e., alcohol in urine or yeast (e.g., *Candida albicans*) + glucose)

---

# Ethyl Glucuronide, Ethyl Sulfate, and Ethanol in Urine after Intensive Exposure to High Ethanol Content Mouthwash

**Gary M. Reisfield<sup>1,\*</sup>, Bruce A. Goldberger<sup>1,2</sup>, Amadeo J. Pesce<sup>3</sup>, Bridgit O. Crews<sup>3</sup>, George R. Wilson<sup>4</sup>, Scott A. Teitelbaum<sup>1</sup>, and Roger L. Bertholf<sup>5</sup>**

*Departments of <sup>1</sup>Psychiatry and <sup>2</sup>Pathology, Immunology, and Laboratory Medicine, University of Florida College of Medicine, Gainesville, Florida; <sup>3</sup>Millennium Research Institute, San Diego, California; and Departments of <sup>4</sup>Community Health and Family Medicine and <sup>5</sup>Pathology, University of Florida Health Science Center, Jacksonville, Florida*

---

# Ethyl Glucuronide, Ethyl Sulfate, and Ethanol in Urine after Sustained Exposure to an Ethanol-Based Hand Sanitizer

**Gary M. Reisfield<sup>1,\*</sup>, Bruce A. Goldberger<sup>1,2</sup>, Bridgit O. Crews<sup>3</sup>, Amadeo J. Pesce<sup>3</sup>, George R. Wilson<sup>4</sup>, Scott A. Teitelbaum<sup>1</sup>, and Roger L. Bertholf<sup>5</sup>**

*Departments of <sup>1</sup>Psychiatry and <sup>2</sup>Pathology, Immunology, and Laboratory Medicine, University of Florida College of Medicine, Gainesville, Florida; <sup>3</sup>Millennium Research Institute, San Diego, California; and <sup>4</sup>Departments of Community Health & Family Medicine and <sup>5</sup>Pathology, University of Florida Health Science Center, Jacksonville, Florida*

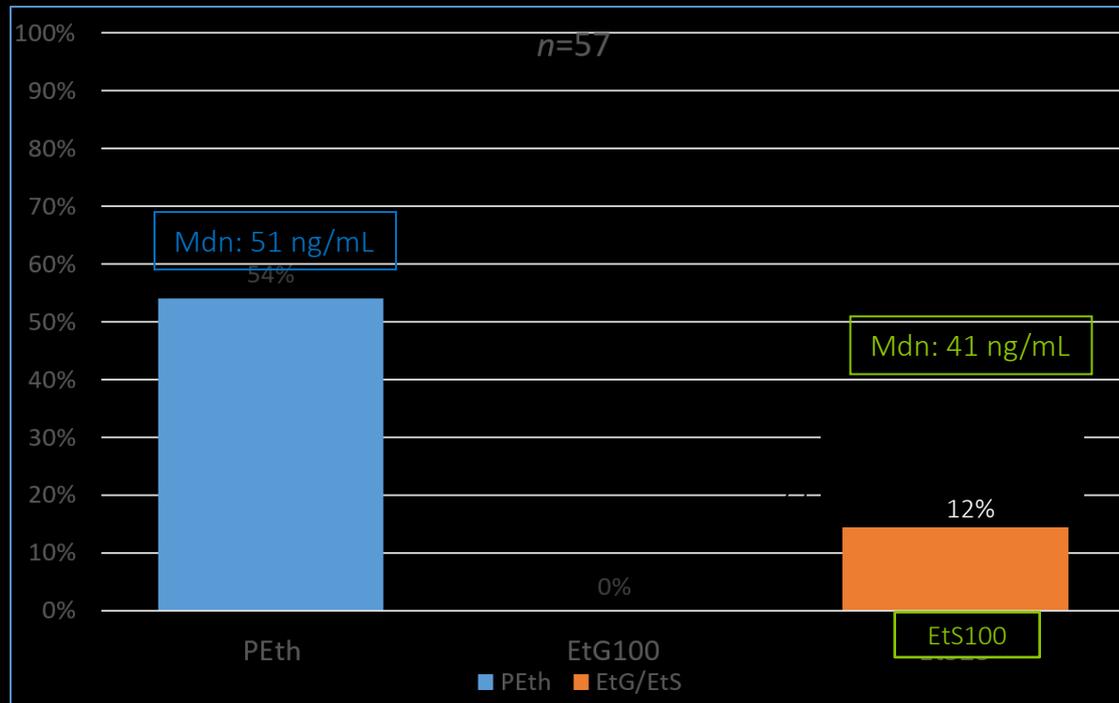
PEth  
and the  
20 ng/mL cutoff

# Three nips of scotch



# Evaluees with a single positive biomarker

On contract



# Integrating alcohol biomarkers

Received: 12 December 2019 | Revised: 16 April 2020 | Accepted: 16 April 2020

DOI: 10.1002/dta.2809

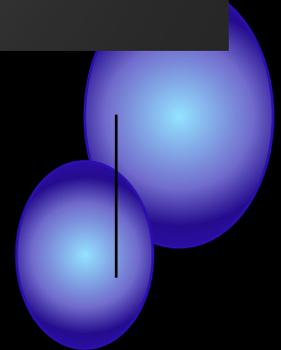
**RESEARCH ARTICLE**

WILEY

**The roles of phosphatidylethanol, ethyl glucuronide, and ethyl sulfate in identifying alcohol consumption among participants in professionals health programs**

Gary M. Reisfield<sup>1</sup>  | Scott A. Teitelbaum<sup>1</sup> | Shannon O. Opie<sup>2</sup> | Joseph Jones<sup>3</sup> |  
Deborah G. Morrison<sup>1</sup> | Ben Lewis<sup>1</sup>

# Blood PEth: 30 ng/mL, 3 ways



# Our conclusions based on extant literature

PEth<sub>20</sub> theoretically offers perfect specificity for alcohol consumption

There are large inter-individual variations in PEth kinetics

PEth<sub>20</sub> can be detected for  $\geq 30$  days after last use in heavy drinkers

One cannot determine time/quantity of last drink from PEth concentration

Negative PEth<sub>20</sub>  $\neq$  proof of alcohol abstinence

Negative PEth<sub>20</sub> is compatible with:

Alcohol abstinence

Daily low-risk (1-2 drinks/day) alcohol consumption

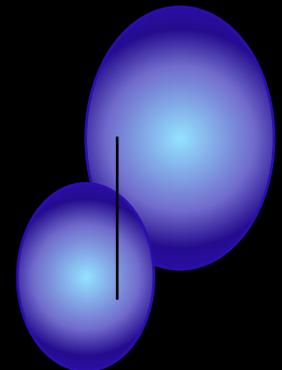
Positive PEth<sub>20</sub> disproves abstinence

Positive PEth  $> \approx 200$  ng/mL indicates heavy alcohol consumption

28-year-old physician with alcohol use disorder was on a 5-year substance use disorder monitoring contract. Prescribed naloxone 50 mg daily and disulfiram 250 mg daily. He missed 8 urine drug tests over a recent 3-month period and experienced several “mechanical issues” with his breathalyzer.

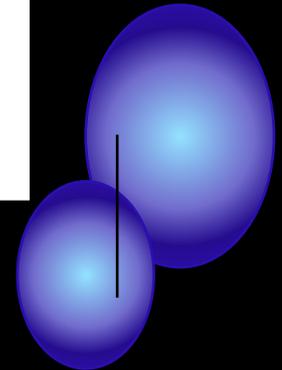
He was required to undergo a I.M.E.  
A blood PEth test was ordered.

Blood: PEth 632 ng/mL



**Table II.** Raw PEth Concentrations by Participant

Participant #	Sex	PEth concentration (ng/mL)		
		Day 0	Day 6 ± 1	Day 12 ± 1
1	M	ND	ND	ND
2	M	4	<LOQ	ND
3	F	5	ND	ND
4	M	ND	ND	ND
5	M	ND	4	<LOQ
6	F	4	4	12
7	F	<LOQ	<LOQ	<LOQ
8	F	4	4	4
9	F	ND	ND	ND
11	M	ND	ND	ND
12	F	ND	ND	ND
13	M	18	13	14
14	M	<LOQ	ND	ND
15	F	ND	ND	ND
16	M	15	9	8



*Journal of Analytical Toxicology*, 2021, **00**, 1–12  
DOI: <https://doi.org/10.1093/jat/bkab115>  
Advance Access Publication Date: 8 November 2021  
Article



---

# Blood Phosphatidylethanol (PEth) Concentrations following Intensive Use of an Alcohol-based Hand Sanitizer

Gary M. Reisfield <sup>1,\*</sup>, Scott A. Teitelbaum<sup>2</sup>, Joseph T. Jones <sup>3</sup>, Dana Mason<sup>2</sup>, Max Bleiweis<sup>2</sup> and Ben Lewis <sup>2</sup>

<sup>1</sup>UF Health Springhill, University of Florida College of Medicine, 4037 NW 86th Terrace, Gainesville, FL 32606, USA

<sup>2</sup>University of Florida College of Medicine, 1600 Sw Archer Road, Gainesville, FL 32610, USA

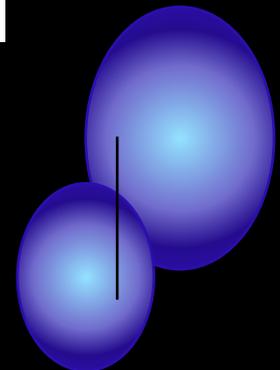
<sup>3</sup>United States Drug Testing Laboratories, Inc., 1700 S Mount Prospect Road, Des Plaines, IL 60018, USA

**Table III.** PEth Concentrations by Participant

Participant #	Day 0	Day 6 $\pm$ 1	Day 12 $\pm$ 1
1	ND	ND	<LOQ
2	<LOQ	5	6
3	ND	ND	ND
4	5	ND	13
5	ND	ND	5
6	9	6	4
7	ND	ND	ND
8	5	5	ND
9	ND	<LOQ	ND
10	ND	6	6
11	4	6	6
12	10	6	11
13	ND	<LOQ	ND
14	6	ND	7
15	<LOQ	<LOQ	4

# The New York Times

In the last two and a half years, six of the 21 kombucha samples the New York State Department of Agriculture and Markets examined were above the 0.5 percent alcohol by volume threshold, according to the department. Three were above 1 percent A.B.V.; two of those hit 7 percent. (On average, the A.B.V. for beer is 4.5 percent.) Similarly, the United States Department of the Treasury's Alcohol and Tobacco Tax and Trade Bureau, which oversees the beverage alcohol industry, found nine out of 13 kombucha producers whose products it examined in 2015 to be noncompliant; and in 2010, that number was 20 out of 24. "Some of them didn't just drift," said Thomas Hogue, a tax and trade bureau spokesman, of past test results. "Some of them got really close to some of the beer ranges."





**POWERFUL**  
Nighttime  
**RELIEF**



**NyQuil™**

**COLD & FLU**

Nighttime Relief

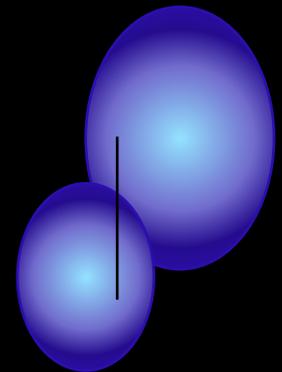
Acetaminophen, Doxylamine succinate, Dextromethorphan HBr

- ♥ Headache, Fever, Sore Throat, Minor Aches & Pains
- ♥ Sneezing, Runny Nose
- ♥ Cough

Alcohol 10%

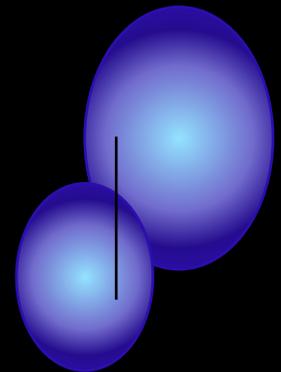
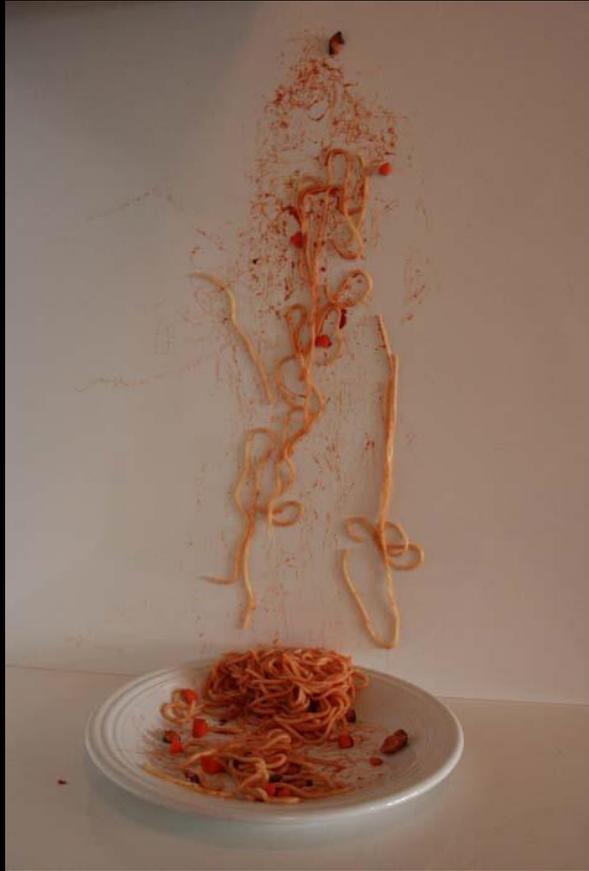
12 FL OZ (354 mL)

55-year-old surgeon on a monitoring contract for alcohol use disorder, severe, was referred for an evaluation consequent to a bloodspot PEth result of 56 ng/mL. He initially denied consuming alcohol, but later recalled that he recently consumed Nyquil for an upper respiratory tract infection.



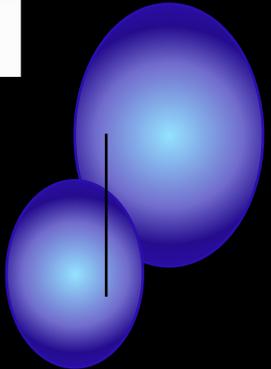


READ MORE  
**ABOUT NYQUIL™**



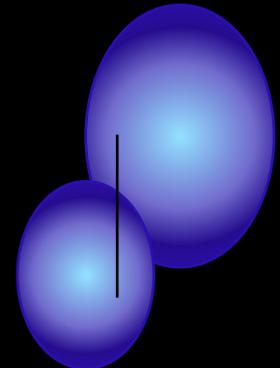
# Conclusions

1. There is no single ideal biomarker for measuring alcohol abstinence
2. For detecting any recent alcohol use, PEth was the single most important biomarker, but...
3. For detecting any recent alcohol use, PEth combined with EtG/EtS had the greatest yield.
4. Regarding urinary biomarkers, traditional EtG<sub>500</sub>-only screening would have left most very recent alcohol consumption undetected. The greatest yield necessitates EtS testing.
5. Based on very limited evidence, hair EtG<sub>20</sub> offered the lowest yield for detecting alcohol consumption.
6. Best use of biomarkers requires history (days), history (weeks), history (months)!



It is important for all employers and safety-sensitive employees to know:

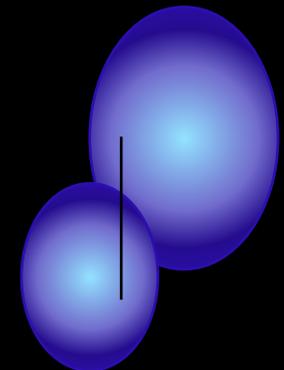
1. The Department of Transportation requires testing for marijuana and not CBD.
2. The labeling of many CBD products may be misleading because the products could contain higher levels of THC than what the product label states. The Food and Drug Administration (FDA) does not currently certify the levels of THC in CBD products, so there is no Federal oversight to ensure that the labels are accurate. The FDA has cautioned the public that: “Consumers should beware purchasing and using any [CBD] products.” The FDA has stated: “It is currently illegal to market CBD by adding it to a food or labeling it as a dietary supplement.” Also, the FDA has issued several warning letters to companies because their products contained more CBD than indicated on the product label.”
3. The Department of Transportation’s Drug and Alcohol Testing Regulation, Part 40, does not authorize use of Schedule I drugs, including marijuana, for any reason. Furthermore, CBD use is not a legitimate medical explanation for a laboratory-confirmed marijuana positive result. Therefore, Medical Review Officers will verify a drug test confirmed at the appropriate cutoffs as positive, even if an employee claims they only used a CBD product.



**Table 2. Observed Cannabinoid Concentration of 84 Tested Extract Products Sold Online**

Cannabinoid	Average Observed Concentration Across Tests, mg/mL	
	Mean (SD)	Median (Range)
Cannabidiol <sup>a</sup>	30.96 (80.86)	9.45 (0.10-655.27)
Cannabidiolic acid	1.35 (6.74)	0 (0-55.73)
Cannabigerol	0.08 (0.55)	0 (0-4.67)
Cannabinol	0	0
<b>Δ-9-Tetrahydrocannabinol</b>	<b>0.45 (1.18)</b>	<b>0 (0-6.43)</b>
Δ-9-Tetrahydrocannabibolic acid	0	0

**JAMA** November 7, 2017 Volume 318, Number 17

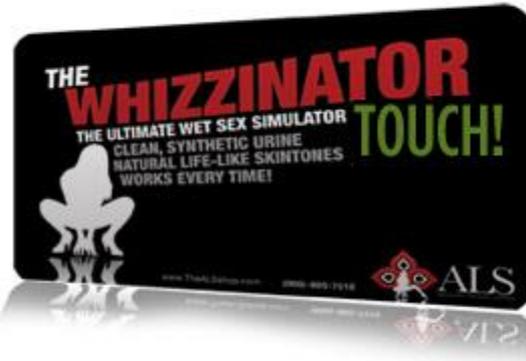


**ANYTIME, ANYWHERE... LET IT FLOW!**

PUCK TECHNOLOGY  
PRESENTS

**NEW and  
IMPROVED!**

Publicité parue dans High Times (entre autres 02/04)



# THE WHIZZ+KIT



No Credit? Ask about Western Union!

**100% SATISFACTION GUARANTEED!  
OVERNIGHT DELIVERY AVAILABLE!**

The Whizzinator is to be used in accordance with all Federal, State and local laws. The Whizzinator is not a medical device.



PLANET IS GRAPHICS (2004) 0404  
Web site: planetis.com

## Cops: Man used 'Whizzinator' strap-on device to pass drug test

Email Facebook 0 Twitter 23 +1 1

Christal Hayes, Orlando Sentinel

3:46 pm, August 10, 2015

An Orlando man was arrested after Lake County deputies said he used the "Whizzinator" device in a failed attempt to pass a drug test Saturday morning in Tavares.

A judge had sentenced William Bradham Dixon to 48 months probation after he was convicted of grand theft and criminal mischief in Osceola County. One of the conditions of probation was that Dixon submit to drug tests.

When he took a urine test at the probation office on County Road 561, a deputy noticed something strapped on to the 32-year-old Orlando resident.

The deputy found Dixon had strapped on a Whizzinator, whose purpose is to defeat drug tests.

Dixon told deputies he had dipped a tea bag in water and filled the device with it.

He was charged with violating probation and employing fraudulent practices during a urine test.

[Chayes@orlandosentinel.com](mailto:Chayes@orlandosentinel.com) or 352-742-5936

LEGAL

New Lower Rates just for Florida

Around \$30 a month

Allstate BOAT

FIND AN AGENT

ADVERTISEMENT

### Related Content

Live map: Active Orlando Police Department calls

2015 Central Florida homicides map

Orange County Jail mug shots - updated daily

Pictures: A sampling of Florida's death row





You can beat the system but you can't beat the disease.



## *After False Drug Test, He Was in Solitary Confinement for 120 Days*

Hundreds of New York State prisoners were locked in cells, denied release or removed from programs when tests erroneously showed they had used narcotics, according to a lawsuit.



November 20, 2019

# Perspectives

Toxicology testing is a way of following a chronic illness like HgbA1C in Diabetes or BP in Hypertension

Powerful relapse prevention tool

Deter more than detect

Accountability

Balance protecting public and supporting healthcare professional

Pro-recovery/ Positive reinforcement

# Negative Aspects

Can't drink or use

Cost

Hassle

Stigma

Reliability

Not real time

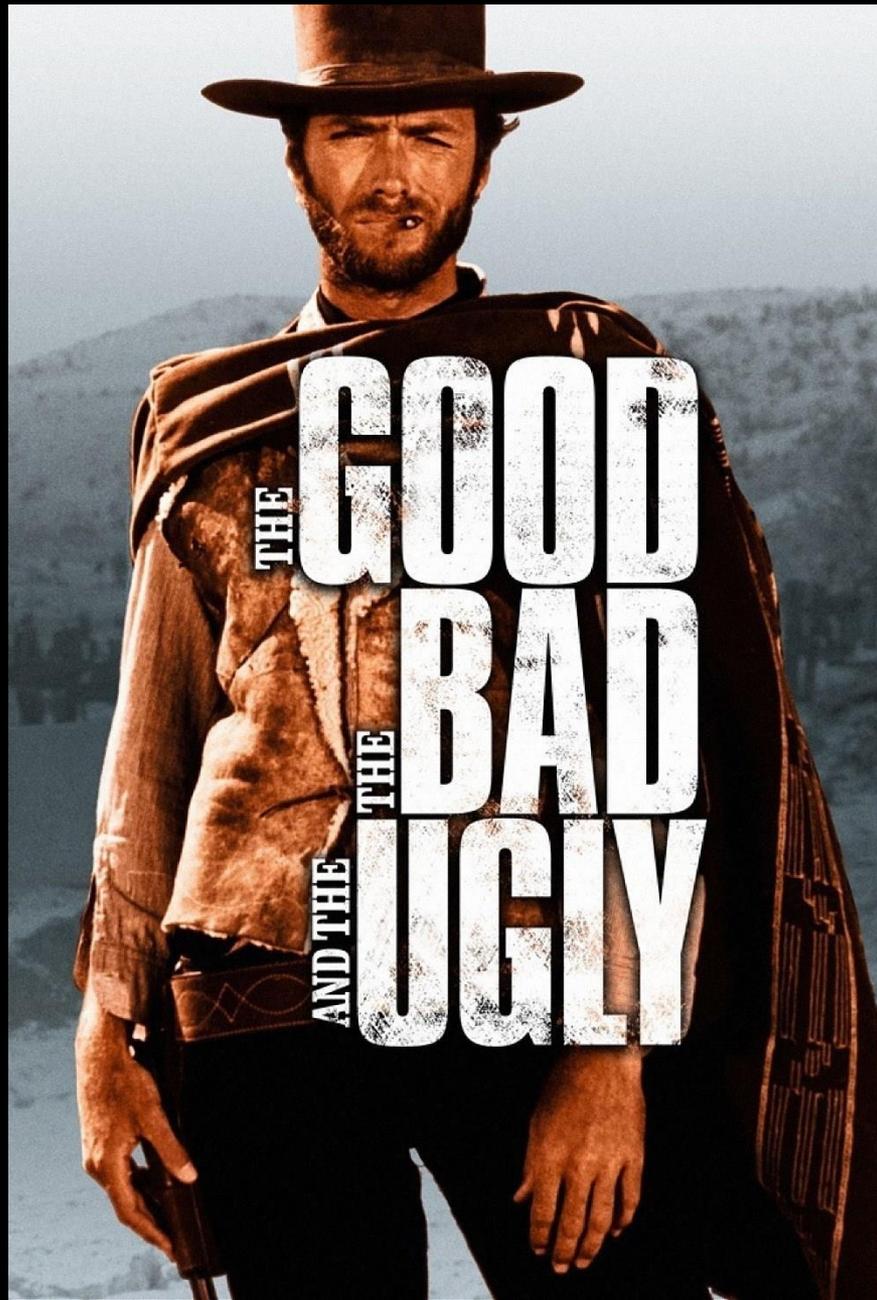
# Cost

Testing can include urine, PETH, hair, portable breathalyzer

Usually years 1-2 are most expensive (\$3k +)

Years 2-5: \$2000-\$2500

List of drugs expanding i.e. Kratom, Tianeptine, etc



THE GOOD  
AND THE BAD  
THE UGLY

# Character Defects

“The chief activator of our character defects have been self-centered fear, primarily fear we would lose something we already possess or fail to get something we demanded.” – step 7

# Twelve and Twelve pg 31, step 2

“As Psychiatrists have often observed, defiance is the outstanding characteristic of many an alcoholic.”

Character Defect	Recovery Response
Defiance/ Oppositional	Obedience, Willingness, Respect, Acceptance
Pride	Humility
Mistrust/ Skeptical	Faith, Trust
Arrogance	Teachable
Victim role/ Blaming	Resiliency, Responsibility, Gratitude
Dishonesty	Honesty, Accountability

# Humility

Humility, as a word and as an ideal, has had a very bad time in our world. Not only is the idea misunderstood; the word itself is often intensely disliked. – step 7

“To those who have made progress in AA, it amounts to a clear recognition of what and who we really are, followed by a sincere attempt to become what we could be.” – step 5

“Participants’ attitude about testing is a great indicator of where they are in recovery.”

- Dr. Scott Hambleton

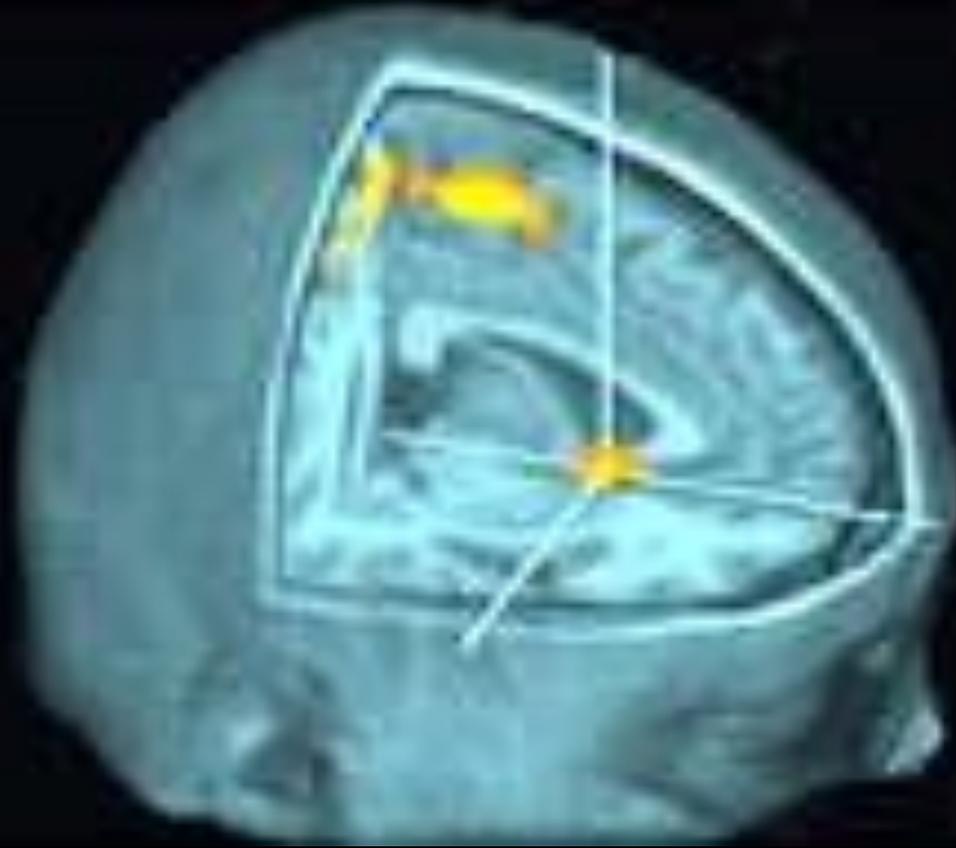
“The two things that kept me sober early on were a picture of my kids on my desk and an empty urine cup.”

- Dr. Penny Ziegler

# Spiritual Experience

“We find that no one need have difficulty with the spirituality of the program. Willingness, honesty and open-mindedness are the essentials of recovery. But these are indispensable.”

- Alcoholics Anonymous, Appendix 2



The Target is Always  
*The Brain, however...*

The nucleus accumbens lighting up

*While science has taught us that  
addiction is a hijacking of the  
brain, recovery must involve  
healing of the heart and the soul.*

