



The Case for Impairment Testing and the Science behind the Druid App

**Presentation to ASSP Niagara Frontier
April 11, 2022**

Agenda

Presentation to ASSP Niagara Frontier
December 17, 2021

Welcome and Introduction
The Case for Impairment Testing
& The Druid App

- The Science Behind Druid
- Druid Enterprise & Pilot Program
- Q&A

Thomas Weisbeck
Chris Bensley

Dr. Mike Milburn
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AMERICAN SOCIETY OF
SAFETY PROFESSIONALS

Niagara Frontier Chapter

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Workplace Safety Challenges

The Construction Industry has a high propensity for workplace accidents:

- One in every 10 construction workers is injured annually. [OSHA]
- Construction sees non-fatal injury rates that are 71% higher than any other industry. [Accident Analysis & Prevention]
- The construction industry sees a 71 percent higher spend on workers' compensation than all goods-producing industries combined. [CPWR]
- Construction workers are prone to alcohol and drug abuse as shown in a study by the Substance Abuse and Mental Health Services Administration (SAMSA):
 - Heavy alcohol use: 1) mining (17.5%); 2) construction (16.5%)
 - Substance abuse: 1) accommodations (16.0%); 2) construction (14.3%)

Impairment is a concern across all safety sensitive jobs:

- Increased stress from COVID-19, continuing high levels of substance abuse, and legalization of marijuana require a new solution to traditional drug & alcohol testing.

Problem with Current Testing

There is **no generally accepted objective test for performance impairment**, much less one that is quick, accurate, inexpensive, mobile, and that covers all causes.

- Proxy testing with blood, urine, breath, saliva, or hair is expensive, time-consuming, invasive, and narrowly focused
- Proxy testing for certain drugs, like cannabis, is ineffective because bodily presence of drug do not reliably correlate with impairment
- Proxy tests cannot test for fatigue, illness, chronic condition, or injury such as concussion
- Standard Field Sobriety Tests are imprecise and subjective
- Most digital tests make claims unsupported by scientific validation
- Increasing decriminalization and legalization of cannabis for medical and recreational use increases risk and hazard

Problem with Cannabis Testing

Rapidly changing legal landscape increases need for impairment testing, not drug testing.

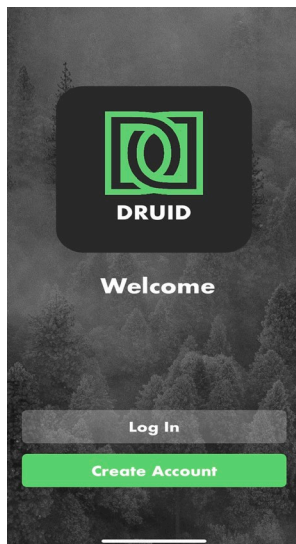
- **Medical** Cannabis Use – Now legal in 36 states and 4 territories
- **Recreational** Cannabis Use – Now legal in Canada and 15 US states and 3 territories. Six more states likely to put legalization on the ballot in 2022
- **THC's brief impairment** (several hours) but lingering bodily presence (several weeks) means proxy tests for cannabis use are generally not valid
- **Drug tests are expensive:**
 - Urine tests: \$50 - \$80 for a single 5-panel lab
 - Blood tests: \$85 for one substance, \$280 for a single 10-panel test
 - Sweat tests: \$300 - \$450 monthly

Conclusion:

- Employers should test employees for *fitness for duty*, not drug use

Solution

Druid, an app for all iOS and Android smartphones and tablets, represents a paradigm shift in impairment testing.



- Tests for the condition of cognitive and physical impairment *itself*, not for the use of drugs or alcohol
- Tests for impairment due to *any* cause
- Test is quick (3 minutes), easy to take, portable, non-invasive, and inexpensive
- Accurate - Results published in 3 peer-reviewed, scientific research studies
- Objective - Based solely on quantitative measurement, not subjective assessment

Druid Tasks

Screen Shots



[PLAY VIDEO](#)



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Welcome and Introduction

Joe Xavier

▪ The Case for Impairment Testing
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Chris Bensley

▪ The Science Behind Druid

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▪ Druid Enterprise & Pilot Program

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Q&A

All

How Druid Works

- Each Druid test takes several hundred measurements of **key neurophysiological indicators**:
 - Reaction time
 - Hand-eye coordination
 - Decision-making
 - Time estimation
 - Balance
- Other than the balance task, all tasks are **divided-attention** tasks, meaning users are required to do two things simultaneously.
- Data is statistically integrated to calculate an impairment score that measures impairment in two ways:
 - **Personal Standard** - Comparing it to the user's baseline score
 - **Objective Standard** - Interpreting it as a blood alcohol concentration (BAC) equivalent

Test Results

Objective and Personal Standards

YOUR REPORT

41.9

Current Score

42.3

Baseline

Druid assesses your score two ways:

1. Objective Standard

PERFORMANCE: **GOOD**

Your score is 10.6% better than the average score of males your age.

[Learn More](#)

2. Personal Standard

INTERPRETATION: **NORMAL OR BETTER**

Your Current Score is 0.4 points lower than your Baseline.

[Learn More](#)

[DRUID for the Workplace](#)

[Learn More](#)

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View Graph

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Objective Standard

41.9

Current Score

PERFORMANCE: **GOOD**

As a reference point, we have compared your current score to the DRUID score that typically results from a Blood Alcohol Concentration (BAC) of 0.05%. At that BAC, DRUID scores range between 49.0 and 51.9. Research has shown that a BAC of 0.05% increases a person's risk of making errors and causing injury.

Current score	Performance
38.9 or less	EXCELLENT
39 - 43.9	GOOD
44 - 48.9	FAIR
49 - 52.9	DEFICIENT
53.0 - 57.9	POOR
58.0 - 62.9	VERY POOR
63.0 or more	EXTREMELY POOR

Whatever your current score, if you think you might be impaired, you should not drive or

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Personal Standard

41.9

Current score

51.2

Baseline score

INTERPRETATION: **NORMAL OR BETTER**

We have compared your Current Score to your Baseline Score, which is the average of your most recent scores. Your Current Score is 9.3 points below your Baseline.

Compare your Current Score to your Baseline Score

Difference	Interpretation
Equal to or less than	NORMAL OR BETTER
3 pts higher or less	NEAR NORMAL
More than 3 pts higher	WORSE THAN NORMAL

If your Personal Standard score is "Normal or better" but your Objective Standard score indicates any level of impairment, you should consider yourself impaired.

Whatever your current score, if you think you might be impaired, you should not drive or perform any other task that may result in injury

Druid Timeline



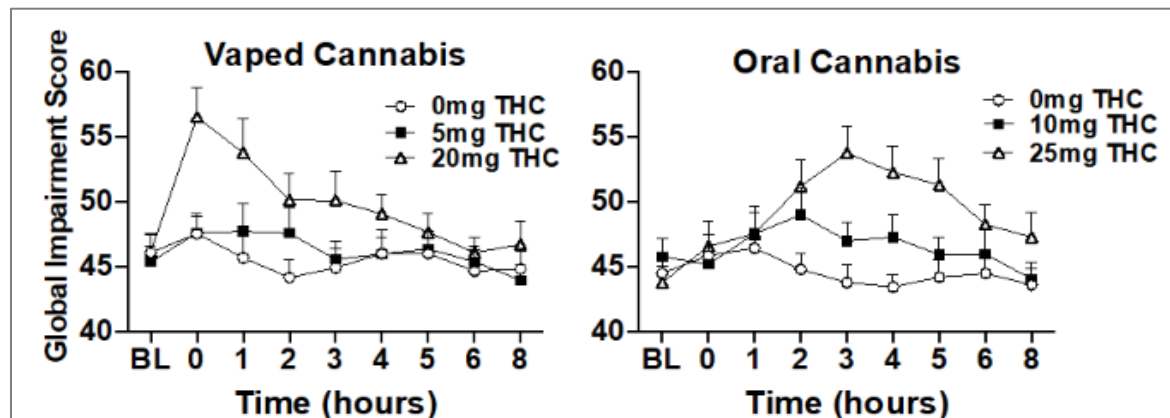
- 2016 - Dr. Michael Milburn conceives Druid to address lack of testing for cannabis impairment.
- 2018 - Using cognitive neuroscience research and statistical modeling, Dr. Milburn develops and launches the Druid app.
- 2019 – Receives SBIR grant from the National Institutes of Health (NIH) to undertake research in conjunction with The Johns Hopkins School of Medicine to detect impairment from cannabis.
- 2019 - Research study with two Massachusetts Police Academies demonstrates Druid's equal ability to detect impairment due to alcohol.
- 2020 – New leadership team established and strategy to make Druid available to detect impairment generally.
- 2021 – 3 Peer-reviewed paper published adding scientific validity.
- 2021 – Company launches Druid Enterprise system for companies and organizations to improve workplace safety.

Cannabis Impairment

Scientifically validated as the most sensitive measure of impairment

- Three published, peer-reviewed scientific papers
- DRUID increasingly used for research in the academic scientific community
- Research sponsored in part by U.S. National Institute of Health (NIH) at Johns Hopkins University School of Medicine concluded:

*“A novel mobile device application, DRUID, was **the most sensitive measure of impairment** when compared to the other cognitive performance tasks administered (i.e., the DSST, DAT, and PASAT) as well as several common field sobriety tests (i.e., the WT, OLS and MRB).”*



Alcohol Impairment

Scientifically validated against BAC at Mass Police Academy

Baseline (no alcohol)

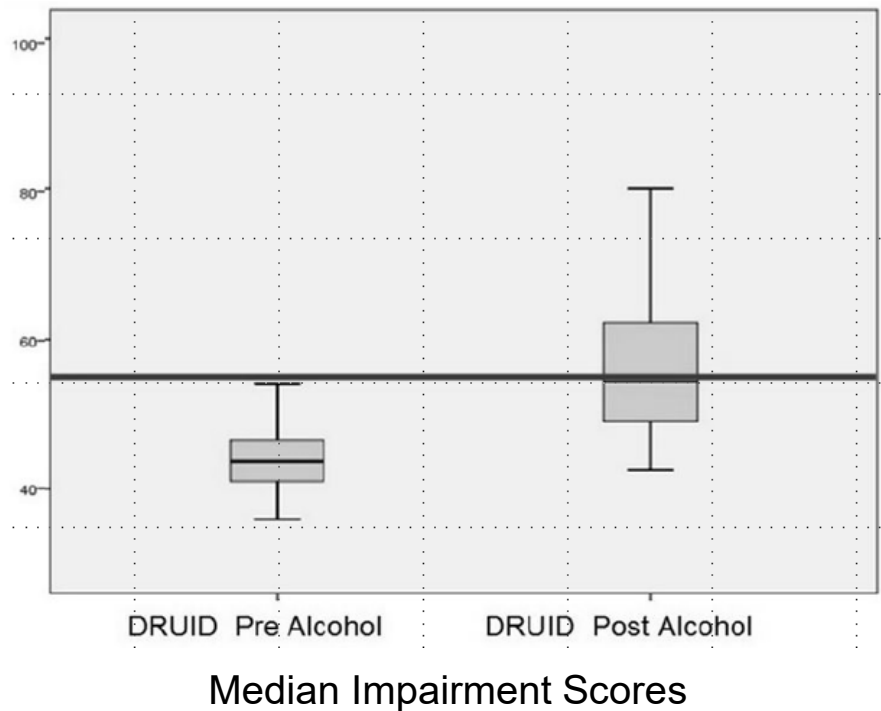
- Mean impairment score = 44.3

Post-test (BAC > 0.08%)

- Mean impairment score = 57.1

Paired-sample t -test: $t_{(47)} = 8.7, p = 0.001$

Richman, J. E., & May, S. (2019). An investigation of the Druid® smartphone/tablet app as a rapid screening assessment for cognitive and psychomotor impairment associated with alcohol intoxication. *Vision Development Rehabilitation*, 5, 31-42.



Academic Researchers Using Druid

Colorado State University

- Dr. Hollis Karoly

Johns Hopkins University School of Medicine

- Dr. Ryan Vandrey
- Dr. Tory Spindle
- Dr. Elise Weerts

University of California Los Angeles

- Dr. Ziva Cooper

University of Colorado

- Dr. Cinnamon Bidwell

University of Kentucky

- Dr. Shanna Babalonis

Washington State University

- Dr. Stephen James
- Dr. Nick Lovrich

Yale University

- Dr. Godfrey Pearlson

Tested Sources of Impairment

Alcohol

Cannabis

Opioids

Polydrug Use

Fatigue



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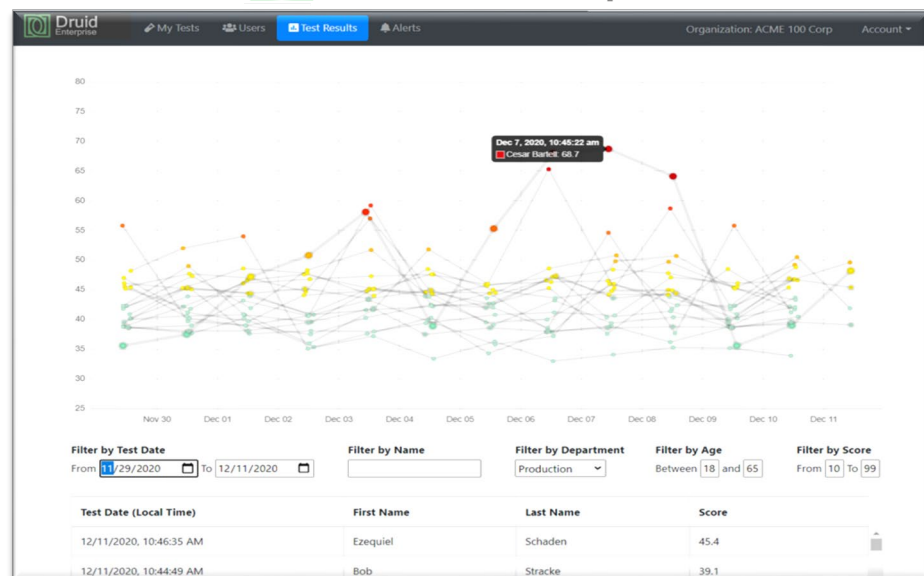
Druid Enterprise Management System

A sophisticated portal and dashboard for corporations and organizations to monitor Druid scores.

Capabilities include:

- View all scores of over any period of time
- Notify management of irregular scores
- Schedule tests
- Analyze scores by date, age, department, or custom filter
- Conduct Multivariate Data Analysis

Druid Enterprise



PLAY VIDEO



How to Act on Druid Scores

Druid is a monitoring system. Not a legal tool. Safety professionals should incorporate it into existing protocols.

- Poor results are escalated to various courses of action.

Druid score increase over baseline of	Indicates minimum BAC of	Effects
2.2 points	0.02%	At this BAC level, some people will begin to experience reduced coordination and judgment. To prevent alcohol-impaired driving, many countries have made it illegal to drive a vehicle with a BAC of 0.02% or higher (e.g., Brazil, China, Norway, Sweden).
4.5 points	0.04%	Drivers with a BAC of 0.04% or higher who operate a commercial vehicle stand in violation of regulations issued by Federal Motor Carrier Safety Administration, U.S. Department of Transportation. The Federal Aviation Administration has the same rule for airline pilot crews, while also prohibiting the ingestion of any alcohol within eight hours of flying.
5.6 points	0.05%	At a BAC of 0.05%, side effects may include impaired balance, speech, and vision, slower reaction times, and impaired judgment and memory. For this reason, most countries have made it illegal to drive a vehicle with a BAC of 0.05% or higher (e.g., Argentina, Canada, Germany, Egypt, South Africa, South Korea).
9.0 points	0.08%	Most U.S. states have made it illegal to drive a vehicle with a BAC of 0.08% or higher. The exception is Utah, which defines alcohol-impaired driving as 0.05% or higher. The National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health defines binge drinking as alcohol consumption that results in a BAC of 0.08% or higher.
12.5 points	0.11%	At a BAC of 0.11% or higher, people are severely impaired and will exhibit confusion, dizziness, slurred speech, along with extremely poor balance and much slower reaction times. Vomiting, sleepiness, and blackouts may occur. Some people who reach this BAC level or higher may require medical attention.

Druid Enterprise Pilot Program

Pilot Goal: Give employers and safety managers a free, hands-on trial of Druid Enterprise by deploying testing across a small sample of workers

- Duration – 30 day
- Number of employees – 15 to 20
- Admin training
- Employee (user) onboarding
- Weekly review
- Post-pilot debrief and assessment
- Determine if move forward

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Q & A



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