

New Year. Renewed Threats.
2022 will challenge those who don't prepare.



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What's Inside

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Section 1 delivers a good foundation of information on the current state of the drugs of abuse market. We talk about the most current CDC data that shows skyrocketing overdose deaths, but more importantly have analyzed data going back to 2000 and find that those deaths have significantly accelerated in the past few years. There is also information about cartel shifts to new tactics, the flood of counterfeit pills and the threat they bring and questions you should ask yourself about your testing program.

2

In **Section 2**, we discuss why “**Value**” should be a core theme in evaluating drug testing solutions. In this section we review how value investors make more informed decisions in financial markets and how those same methods can apply when quantifying the value of your drug testing program. We provide insights on the relationship between **PRICE** and **VALUE**, and suggest tools that can help make those comparisons when evaluating drug testing methods.

3

Section 3 details how, as a contributor to any Value assessment, **COST** must be defined. Not as simple as using the price paid for a test, this section details why understanding the real cost of identifying a single drug user is the foundation to achieving highest value for a drug testing investment. We provide the formula for **Cost-Per-Positive** (users identified) and deliver three use cases comparing Urine and Hair Testing from that perspective.

4

In **Section 4** we take a deep dive into why safety-sensitive industries are adding hair testing to their programs. Case study data detailing positive rates and windows of detection for both test methods is provided. More importantly, and certainly a factor as more companies evaluate whether marijuana should factor into employment decisions, we show the breakdown by drug class that each testing method delivers and how that affects Cost-Per-Positive. And finally, we provide data courtesy of J.B. Hunt and KLLM Transportation services that show the deterrence impacts of a Psychomedics hair test.

1

Why Risk Missing An Avoidable Workplace Threat?

Why did you start drug testing in the first place?

A habitual drug user brings risks to work every day. Most Psychemedics clients view drug testing as a defense against business risk, and identifying high-risk individuals likely is your key concern in considering or already testing for substances of abuse. The risks—higher accident rates, workplace theft, prohibitive medical costs, increased absenteeism—have tangible and well-known impacts. Given your interest in this booklet, you already recognize drug testing as an effective tactic to reduce substance-related risks, and the best tool to use in pursuit of a drug-free enterprise.

Urgency has dramatically increased in the past three years.

The substance abuse epidemic is not new. In fact it is a timeworn topic that gets plenty of attention when other buzzworthy topics are sparse, and sadly seems largely accepted as a societal inevitability. But the pandemic has it back in the news.

The isolation and uncertainties during COVID brought with them an expected, but very unwelcome, fellow traveler. Substance abuse and overdose deaths spiked—something we projected and against which we cautioned in April 2020 in a Psychemedics 3-part series *“Rebuilding A Workplace After COVID-19”*. The pandemic only worsened the threat, and multiple government agencies, rehabilitation centers and professional organizations have come to the same conclusion; substance use has increased, driven largely by the isolation and disrupted daily routines of the past two years.

March 2020 to April 2021, there were 100,000 drug deaths for the first time in any 12 month period.

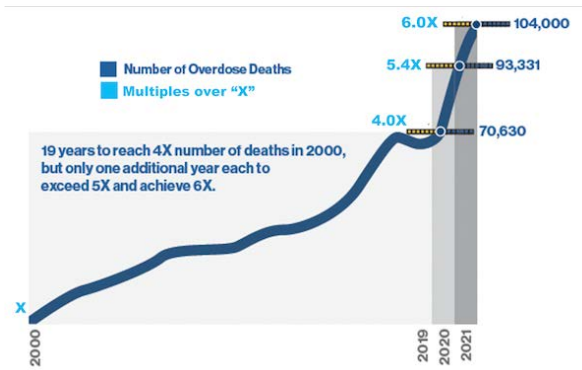
- 38% higher rate of overdose deaths in 2020 compared to 2019. (CDC)
- 35% of drug users report increased usage. (survey by Recovery Village)
- “We consider addiction to be a disease of isolation.” (Betty Ford Center)

Rising drug overdose deaths are a proxy for rising use of the most dangerous drugs; *substances don’t kill until they are used*. With that in mind, consider this. At the beginning of the new millennium, the year 2000, there were 17,415 drug overdose deaths recorded. By 2020, overdose deaths had reached nearly 5X those 2000 levels. And the trend continues.

Overdoses are skyrocketing.

When it completes its tally, CDC could report 105,000 people or more lost their lives to drugs in 2021. Simply stated—the epidemic has frighteningly accelerated. It took nineteen years to quadruple the 17,415 deaths reported in 2000, but only one additional year to more than quintuple them and just one more to be at 6X those turn-of-the-millennium levels.

Drug Abuse Epidemic is Accelerating



The big drug testing challenge for 2022? Change.

The drugs-of-abuse landscape has once again evolved and not in a good way. Certainly, the pandemic pressed more people to self-medicate, but increasing usage is not the whole story. On the heels of a 44% reduction in the number of opioids prescriptions written, other drugs have filled the void. While a changing legal landscape and employers' needs to get back to full staffing have many turning a blind eye to marijuana use, other drugs that present an intensifying workplace threat can't be ignored.

Methamphetamines, benzodiazepines and synthetic opioids have seen explosive gains in market penetration, with fentanyl the dominant threat for 2022. It was responsible for 62% of all 2020 overdose deaths, will again dominate when final 2021 results are released and has been on a steady rise through the past five years.

Traffickers have recovered from lockdowns with volume at pre-pandemic levels. Online sales, and major drug markets on the dark web are now worth \$315 million annually, with contactless drug transactions through the mail on the rise.



UNODC

United Nations Office on Drugs and Crime



Digital marketing of counterfeit pills hits the mainstream.

At the same time the drug mix is evolving, a troubling side-effect of our increasingly digital culture is that sophisticated distributors have shifted to online order and ship-to-anywhere services. But infinitely more troubling is that the drugs ordered online may be that drug in name only. The Drug Enforcement Administration reports that drug cartels are now flooding U.S. markets with counterfeit versions of popular pills for drug abusers. These pills are pressed and labeled to resemble Oxycontin®, Percocet®, Vicodin®, Xanax®, and Adderall®. Often, the active ingredient in these fake pills is methamphetamine or fentanyl and the outcomes can be devastating as manufacturing controls are non-existent. In fact, the DEA reports that **40%** of seized shipments in 2019 contained a potentially deadly dose of fentanyl.

The two questions to ask yourself.

In the face of a changing drugs-of-abuse landscape, a well-designed and implemented drug testing program is an effective tactic to minimize the risks to your workplace that substance abuse represents. Especially today, when the most threatening drugs are plentiful and easily accessible, and with all the data telling us that consumption is up, assessing your ability identify users early is just good business. And on the business side of drug testing, assessing whether your program is saving you money or costing you money.

There are two questions you can ask yourself today to help assess whether you are effectively positioned for the challenges ahead.

What drug test is best for me to detect
the **rapidly emerging threats** to my workplace?

Am I getting the **best value** for my drug testing investment?

In this booklet, we answer both those questions to help you assess where you are and help get you to where you want to be.

In the chapter **“CAN YOU QUANTIFY THE VALUE OF YOUR TEST?”**, we review how some of the same methods that businesses use in valuations of other potential investments can be applied to drug testing solutions.

In the **“COST-PER-POSITIVE: THE METRIC THAT MATTERS MOST.”** chapter, we explain the concept, how it is calculated, and detail how those costs are driven lower to impact Value for the drug testing investment.

And finally, in our review of **“BY THE NUMBERS: HAIR VS. URINE.”** we’ll consider why each of those methods is so different in detecting the drugs that are trending upwards today and how their value-for-the-dollar is determined by what and how much is detected.

2

Can You Quantify The Value Of Your Test?

Leveraging a proven financial practice.

For financial professionals, "value investing" is the practice of determining a price-per-share reflecting the value of underlying assets for a business, service, or product and then buying in at a price below that level. Ben Graham, Warren Buffet and other value investors understand the difference between **PRICE** and **VALUE**. And they rarely pay a price that is not exceeded by the value returned.

*"Price is what you pay;
value is what you get."*

Ben Graham
Father of Value Investing

Applying these same valuation principles to drug testing solutions is a logical first step in evaluating alternatives to ensure the best return on a drug testing investment. They help ensure that the most value is returned for the drug testing dollar spent—a hallmark of value investing.

Objective and measurement based.

In a world that tends to promote services with subjective hyperbole, the more tangible impacts of substance use enable a more objective assessment of a drug testing solution. For many businesses, the objectives for drug testing are fewer accidents, lower employee costs, and reduced financial risks. Drug testing helps deliver on all three by identifying individuals that history shows can significantly increase those risks.

Nearly 75% of illegal drug users are employed; their potential workplace impacts are documented, well known and include:

- **Safety.** 65% of workplace accidents result from substance use (Dept of Labor)
- **Restaffing costs.** More than 2X as likely to have more than one job/year (NSC)
- **Absenteeism/lost productivity.** Substance users miss nearly 65% more work (NSC)

Aligning these risks with their potential cost drives an economic assessment of a solution's value based on how cost effectively it identifies the people who potentially elevate those risks—and costs—for an organization.

For a value investor, $\text{VALUE} = \text{BENEFIT} - \text{COST}$

Why would a drug testing investment be any different?

Positive rates are the value generator.

The goal for most testing programs is achieving and sustaining a drug-free workplace. Identifying high risk applicants or employees who hamper achieving that goal is the tactic. The more effective and cost-effective a testing solution is at identifying individuals, the more value it delivers.

For a drug program administrator, determining how many high-risk applicants or employees threaten the workplace is not just an objective; it is a function of a test's detection rate and a baseline for assessing value of one testing investment versus another.

The impact of detection rate on the value that a testing solution delivers is significant; logically, a higher number of threats eliminated delivers correspondingly avoided costs and raises the return on the dollars invested; value is increased. The numbers tell the story.

A 2% positive rate identifies 70 users (threats) in 3,500 people tested.

A 9% positive rate identifies 315 users (threats) in 3,500 people tested.

Quantifying a higher number of potential bad hires or high-risk employees is certainly a valuable outcome of a higher detection rate. It literally forms the foundation on which the value of a testing solution can be assessed versus alternatives. But it is half the story.

The other half is determining the economic benefits, and those are dramatically influenced by the number of users who are identified.

"Benefits minus Cost" quantifies a drug test's value.

An effective drug testing solution reduces risk and associated cost. For a high-value solution, those costs avoided far exceed the cost of a test. According to drug testing industry experts at Current Consulting Group and DISA Global Solutions, each drug user brings \$7,000-\$35,000 additional cost to an organization depending on industry. Those are driven in part by higher insurance premiums, medical costs, accidents, and increased turnover expense. Safety sensitive industries—manufacturers, refiners or fabricators as examples—can expect even higher costs given the impacts of lost-time accidents.

Benefits. If the economic benefits of a drug test are directly related to the costs they help manage or eliminate, a test with a high detection rate yields significant economic benefit. Imagine a situation in which each drug user brings additional costs of \$8,000/yr to an organization of 3,500 workers. The detection rate of a testing solution can have a marginal or dramatic potential economic impact, with those impacts driven entirely by how many users are identified.

2% detection rate identifies 70 users X \$8,000 = \$560,000/yr.

9% detection rate identifies 315 users X \$8,000 = \$2,520,000/yr.

Can You Quantify The Value Of Your Test?

Costs. The price of a drug test, and the cost to identify a single drug user are not the same (see the section on Cost-Per-Positive for information). But just as Buffet and other value investors assess share price as their "cost", the total testing price does provide one of the variables to quantify the value delivered by a testing solution.

Urine Test



Detection Rate	2%	12%
Number of Tests	3,500	3,500
Users Identified	70	420
Added Cost/User ⁽¹⁾	\$8,000	\$8,000
Total Added Cost ⁽²⁾	\$560,000	\$3.36M
Total Testing Cost ⁽³⁾	\$87,500	\$140,000
Value Returned ⁽⁴⁾	6:1	24:1

- 1) Additional cost that is incurred for each drug user
- 2) Additional cost/user multiplied by number of users identified
- 3) Assumes \$25 per urine test and \$40 per hair test
- 4) Total Added Cost divided by Total Testing Cost

The simplest formula for an assessment is to divide the total potential costs avoided by the total cost of testing. Although prices for testing may vary, hair testing can be 1.5-2X the cost of a urine test. But that price difference is eclipsed by the disparity in the potential economic returns a Psychemedics test delivers. In our 3,500 person organization, urine testing and hair testing detection rates deliver vastly different returns on the drug testing investment. (see chart above)

Cost vs. Cost-Per-User Identified (or "cost-per-positive") Contrasting the true costs with the economic benefits delivered enables the drug program administrator to confidently assess the value of a testing solution.

On the one hand, economic benefits of a drug test that substance users bring to the workplace can be captured as the incremental costs detailed in the section above. On the other, if the objective of a drug testing program is to identify high-risk applicants or employees, the true cost of a drug test is the cost to identify each user. That "unit cost" is foundational to any value assessment. With that in mind, **"Cost-Per User-Identified"** is the most objective measure of drug test cost-effectiveness against the objective of achieving a drug-free enterprise.

In the next section, we detail what Cost-Per-User Identified is, how you can calculate it, and why it is so critically important as the foundation for assessing the value returned—or R.O.I.—for each drug testing dollar invested.



3

Cost Per Positive: The Metric That Matters Most.

PRICE *noun* | the amount of money given or set as consideration for the sale of a specified thing.

COST *noun* | the outlay or expenditure made to achieve an object (or objective)

Know your objectives to calculate your costs.

Especially through the past two years the need to protect a business from substance abuse has been amplified. In the midst of a pandemic, an epidemic has raged—and largely remained a second-page news item. Since 2018, overdose rates—an indicator of increased usage—have exploded nearly 40%. And the mix of drugs within that frightening rate has shifted dramatically toward synthetic opioids (see chart) that traditional testing methods and programs

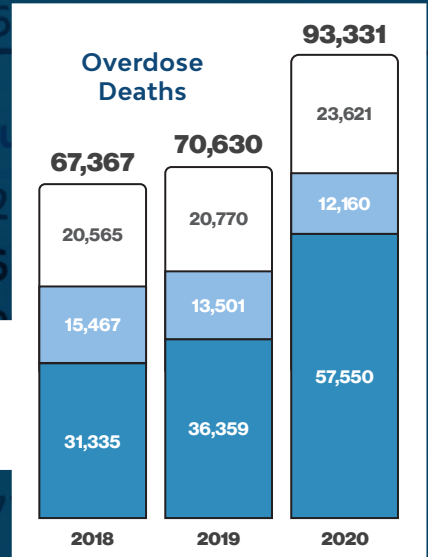
are likely not catching. These statistics are too daunting to ignore, prompting many companies to reassess their programs and determine if their drug testing investments are delivering their objective of a drug-free enterprise.

Most Psychmedics clients view drug testing as a defense against business risk. Their objective is to identify high-risk individuals. The risks—higher accident rates, workplace theft, prohibitive medical costs, increased absenteeism—have tangible impacts. You likely recognize substance abuse as a business risk, and substance abusers as high-risk employees. Drug testing is an effective tactic to use in managing those risks.

But are you considering and calculating your true cost?

Price vs. Cost. Not even close to the same thing.

Our tendency is often to assume “price” and “cost” are two sides of the same coin. They are not. While price is an exchange of funds for goods, cost is an exchange of funds to achieve an objective. “Cost” is more tied to a tangible result rather than a simple transaction to buy something. While drug testing is an investment that many companies make, some will likely make it without really knowing whether their objectives are being met at the lowest cost.



Cost-Per-Positive is an Objective-Based Measurement of Value.

Despite changing usage patterns and trending drugs, one constant measurement of the return on a drug testing investment is the cost to identify a drug user and that is reflected by the cost for each positive result achieved. Both price and the detection rate for the test administered impact Cost-Per-Positive, with the detection rate (positive rate) being the key influencer. Generally speaking, a test that detects more drugs will also deliver the lowest cost for each drug user identified.

Total Testing Cost

divided by

Total Positives

Cost-Per-Positive

total testing cost = price per test x number tested

Simple and Accurate Calculation.

The Cost-Per-Positive calculation is simple, but delivers an accurate measurement of the true cost and value delivered by a drug test. It factors in whether or not the objective—identifying a drug user—is achieved and at what cost for each user identified.

Numbers Never Lie.

As Detection rates increase, the cost to identify a user is lowered. In the chart below, example pricing for urine and hair tests illustrate the huge impact that the Detection Rate has on true cost. The higher the rate, the lower the Cost-Per-Positive at every price point. Generally, urine testing yields positive rates between 1-2% depending on the drugs detected. A urine test is not effective for those drugs that are quickly metabolized; opioids, cocaine, amphetamines/methamphetamines, etc), resulting in a lower overall positive rate, and a significantly higher Cost-Per-Positive.

Urine Testing

Test Cost	Total Tested	Total Cost	POS Rate	Number Identified	Cost Per Positive
\$30	3,500	\$105,000	2%	70	\$1,500
\$25	3,500	\$97,000	2%	70	\$1,386
\$20	3,500	\$70,000	2%	70	\$1,000



Test Cost	Total Tested	Total Cost	POS Rate	Number Identified	Cost Per Positive
\$40	3,500	\$140,000	12%	420	\$333
\$37	3,500	\$129,500	12%	420	\$308
\$35	3,500	\$122,500	12%	420	\$292

Psychemedics delivers a Positive Rate that is up to **10X higher** than urine testing, and a Cost-Per-Positive that is **3X-5X lower**.

4

By the Numbers: Hair vs. Urine.

Few industries are as safety-sensitive as Trucking. In 2005, leading trucking firm J.B. Hunt Transportation extended their DOT-mandated urine testing program to include a Psychomedics hair test. Their logic was simple.

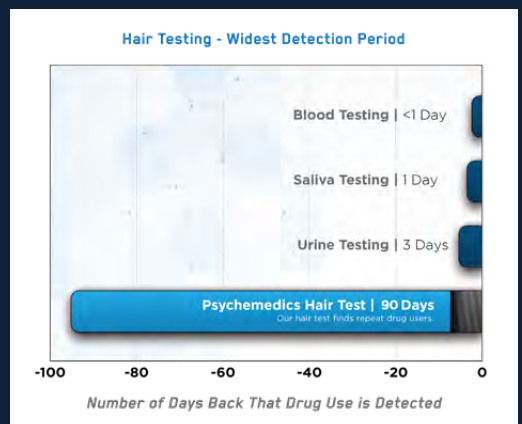


Hunt felt a urine test was too easy to cheat and they needed to tighten their process to ensure the applicants who used drugs didn't get into their fleet. Today, with litigation a continuing threat, trucking firms and other safety-sensitive organizations are focused on sustaining drug-free enterprises. And although urine testing is still widely used, its detection shortcomings are well known within management circles. Like J.B. Hunt, other trucking firms are turning to Psychomedics to identify high risk drivers before an accident happens. In fact, **7 of 10** board member companies for the Trucking Alliance—an industry organization dedicated to driver and roadway safety—have added Psychomedics to urine testing. And like the trucking industry, other safety-sensitive organizations or those seeking to minimize the financial risks that come with a drug user are adding Psychomedics to their testing programs.

Four Reasons Leaders Across Industries Adopt Psychomedics

1) Nearly Impossible To Evade.

Drug user tricks-of-the-trade to avoid a positive result on a urine test are no secret. And it is no secret to drug program administrators that drug users use them all. Evasion tactics rely on an unsupervised sample collection, or the very short window of detection urine provides. With Psychomedics, the person being tested is never out of sight of the collector and drugs used in the previous 90 days are detected. Evading the test with sample substitution, chemical doctoring, short term abstinence or other methods is not possible.



2) Highest Detection Rate.

Psychemedics is proven in side-by-side tests conducted on over 150,000 truck drivers to identify 10 drug users for every one that is detected by a urine test. That **10X detection rate** advantage lowers hiring risks.

KLLM Transport began using Psychemedics for applicant screening in 2018. By mid-2020, Psychemedics had identified **900 drug users** that had passed the urine drug screen and would have moved forward in the hiring process. Those same outcomes are typical in every industry that tests with Psychemedics and are validated in independent studies of drug testing data.

3) Significantly Better Detection of the Most Dangerous Drugs.

The data tells the story; Psychemedics delivers **6X-10X** more positives than urine testing and identifies significantly more users of the most dangerous workplace drugs. An analysis of industry drug testing data shows that a urine test primarily detects marijuana usage. (Chart To Right) The data underscores that not only does Psychemedics identify more marijuana users, it excels at detecting the opioids, benzodiazepines, cocaine and other drugs that pose the greatest threat and are mostly missed by urine.

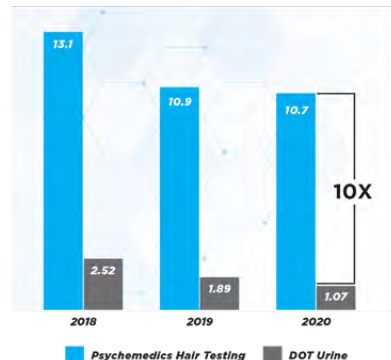
4) The Deterrent Impact.

As Detection becomes a Certainty, drug users tend to change behaviors or move to companies that only test with urine. Great news for those firms that test with Psychemedics as they avoid costly hiring mistakes. Not great for companies that rely only on urine testing.

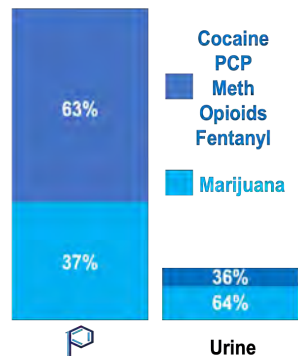
But the biggest benefit may be the Psychemedics halo effect on other testing methods. As J.B. Hunt Transportation found, DOT random and post-accident positive rates dropped rapidly and significantly-and stayed low-after implementing Psychemedics. The deterrent impact was the driving force and a reduction in on-the-road risks was the outcome.

Leading truckers, over **4,000 firms** in the oil/gas/ petrochemical industry, the most recognized names in industry, a host of educators and others rely on the deterrence impact Psychemedics delivers to ensure their safety-sensitive operations stay drug free.

POSITIVE RATES
Same Subject / Side-by-Side Test

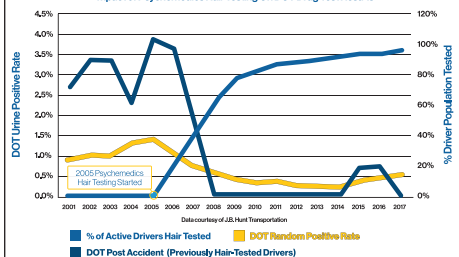


Drug Classes as a Percent of the Total Positive Rate



Urine

Impact of Psychemedics Hair Testing On DOT Drug Test Results



Both the Trucking Alliance and American Trucking Associations have called for DOT approval of hair testing for its mandated screens.

5

Summary

Changes to drug laws, an evolving drugs-of-abuse landscape, and increased usage in the wake of the pandemic challenge drug testing programs to keep pace. And the challenge to keep pace is coupled with a challenge to justify the dollars invested in a program.

*Most users. Most drugs. The most dangerous drugs.
At the lowest cost.*

Identifies significantly more drug users.

The Psychomedics drug tests are proven to identify **510X** more drug users than body fluids tests and **2X** more than other hair tests. Patented science, a 90-day window of detection, and resistance to evasion tactics are the keys.

Detects significantly more of the most dangerous drugs.

Over 60% of what urine testing detects is marijuana meaning the most dangerous drugs mostly slip by. Over 60% of what we detect are those drugs. Our higher positive rate finds more of everything---and significantly more of the most dangerous drugs.

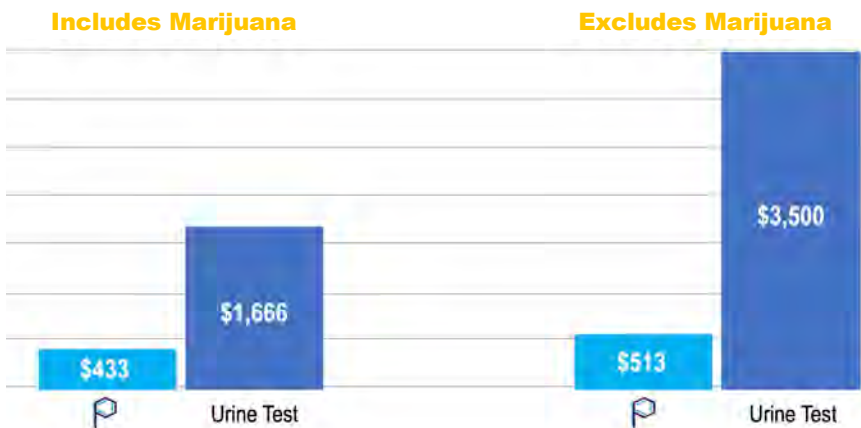
Delivers the lowest cost-per-user identified. Period.

These charts assume a tested population of 3,500. Industry average pricing and positive rates are used in the calculation. Excluding marijuana significantly increases the gap between urine and hair Cost-per-Positive as urine positive tests are dominated by marijuana detections.

This chart shows the Cost-Per-Positive (Users Identified) for each testing method when a full 5-panel drug test is administered; cocaine, opioids, PCP, amphetamines and marijuana.

This chart reflects the lower positive rates when marijuana is excluded. Urine's dependence on marijuana for the bulk of its positives increases its cost-per-user identified significantly.

Cost-per-User Identified





Psychemedics Corporation is the world's leading hair drug testing company. Psychemedics' patented hair analysis technology is trusted by Fortune 500 companies, police forces, courts, schools, and parents all over the world.

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