

Oral Fluid vs. Urine

The Data Is Clear—So Why Hasn't the Industry Moved?

Real-world workforce data challenge **long-standing assumptions** that urine testing effectively identifies **illicit drug use**

Revealing a potential **blind spot** that may be slowing industry progress

Non-DOT workforce analysis | Controlled DOT paired comparison | National DTI analysis



About the presenter

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- *Founded The Compliance Resource Group (CRG) in 2001*
- *Director, CRG Laboratories*
- *CRG provides full-service employment screening, laboratory drug testing, and TPA services*
- *Located in Oklahoma City*

Oral Fluid Testing

What We Can Agree On...

- Sample Collection Benefits:

- No restroom required, Less invasive
- Efficiency gains with fewer variables
- Eliminates shy bladder and specimen validity issues
- Observed collection; **Consistently obtain a sample from the intended donor**

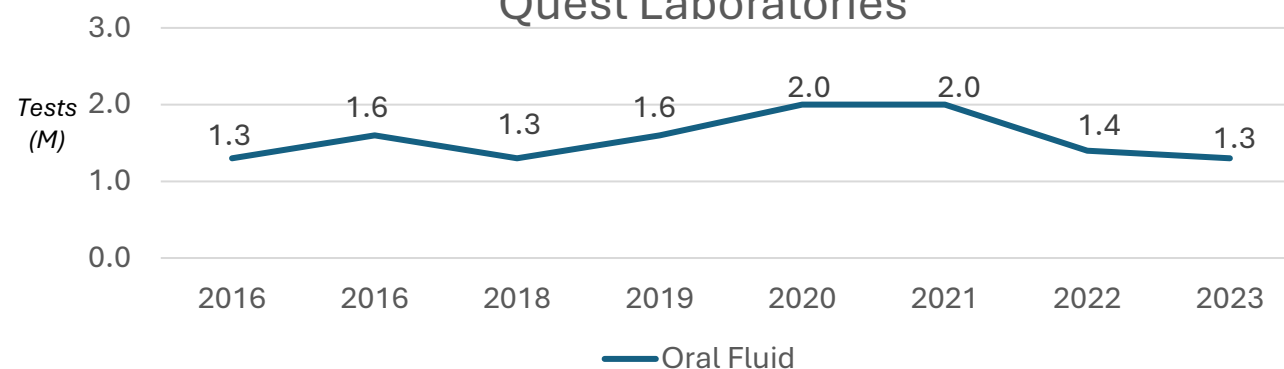
- Analytical Profile:

- Shorter detection window (24-48 hrs.)
- Identifies parent drug (not metabolite)
- Closer temporal alignment with recent use
- Better correlation with potential impairment window

Despite Clear Operational Benefits and a Distinct Analytical Profile – Adoption Has Stalled

- Lab based Oral Fluid testing volumes have remained flat for nearly a decade

~ Oral Fluid Tests/Yr 2016 – 2023
Quest Laboratories



A Question the Industry May Not Be Asking...

Urine has long been the dominant specimen in workplace drug testing

- Built on an **assumption** that urine testing is performing adequately
- Performance discussions often emphasize analytical metrics, **not system outcomes**
- **Regulatory, financial, and operational structures** reinforced its dominance
- Familiarity and historical momentum has **limited re-examination**

Should we be asking:

***How well does our testing system perform where it matters most
- in the real world?***

Analytical Sensitivity $\neq$ System Sensitivity

System sensitivity reflects how effectively a **drug-testing system** detects true drug use under real-world conditions — considering donor behavior, specimen collection, and sample integrity **in addition to analytical performance**

- ***Analytical sensitivity***

- Cutoff levels
- Assay performance
- Instrumentation
- Confirmation chemistry

*Drug **present in sample** = (+) Test*

- ***System sensitivity***

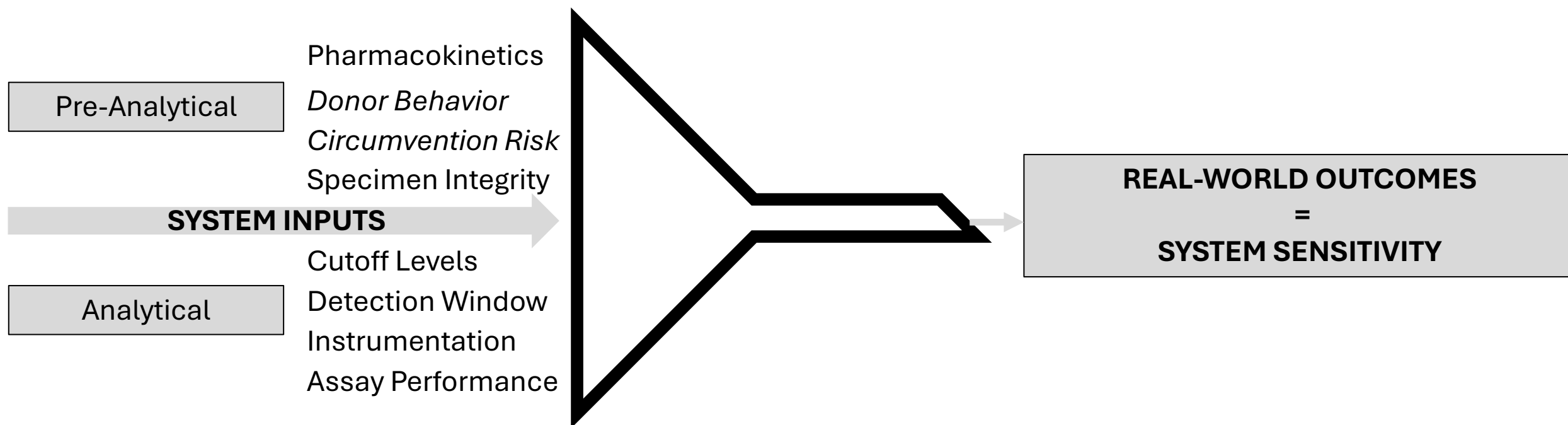
- Detection window
- Donor behavior
- Risk of circumvention efforts
 - e.g. Substitution/Adulteration
- Specimen integrity

*Drug **use occurred** = (+) Test*

*Two tests with identical analytical performance characteristics can perform very differently **at the system level**.*

The Performance Funnel:

Capturing all factors that influence real-world outcomes



*When populations are comparable, **system sensitivity reflects the combined impact** of all upstream factors influencing real-world outcomes*

How We Approached the Analysis

Primary observation, controlled comparison, and secondary analysis

- Analyzed two primary non-DOT observational datasets from CRG Laboratories
- Evaluated a contemporaneous paired Transportation dataset (same donors, same time) comparing DOT urine vs. non-DOT oral fluid
- Conducted secondary analysis of aggregated non-DOT data from the 2025 Quest Drug Testing Index (DTI; reporting period 2020-2024)

All reported positive results reflect laboratory-confirmed findings, including confirmatory testing in accordance with standard workplace drug-testing protocols.

No definitive biological gold standard exists for comparative evaluation of “true” system performance.

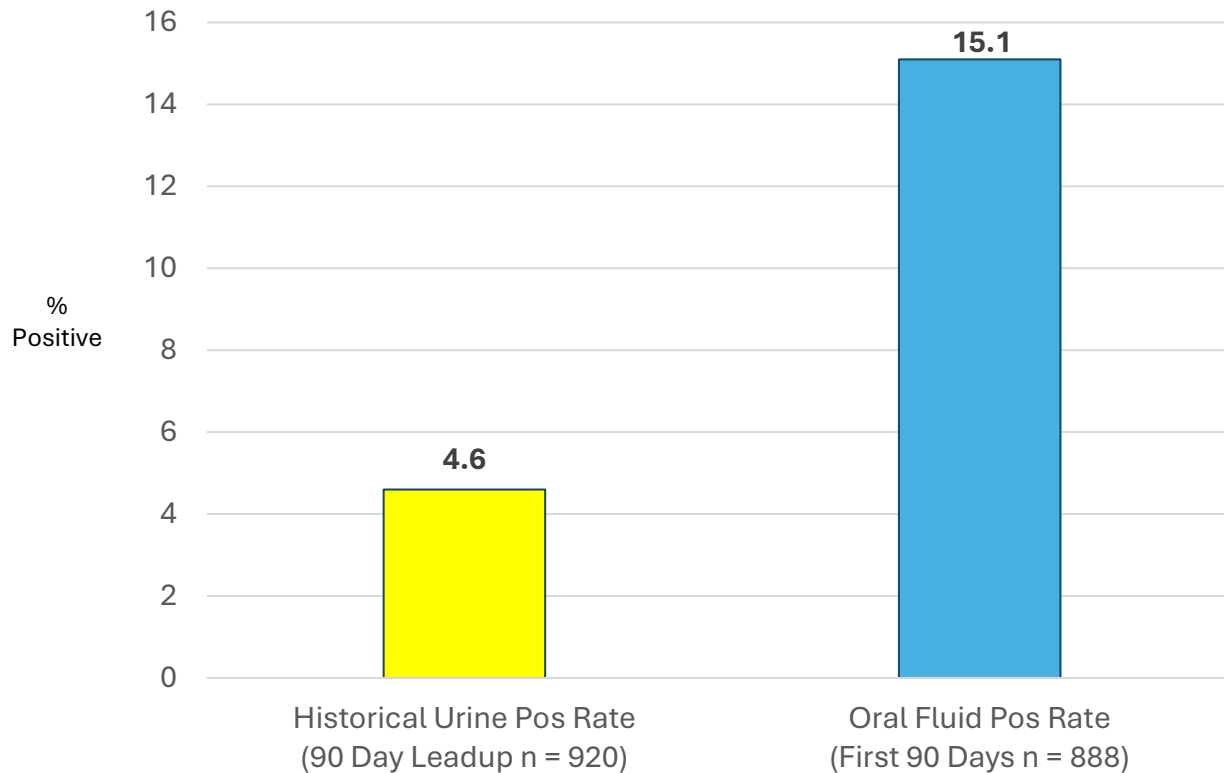
CRG Case Studies...



- Pre-employment testing data across **3 unique industries**
- **Two non-DOT program transitions:** urine → oral fluid
- **One DOT transportation dataset:** contemporaneous paired collections
- Observed under **routine operational conditions**

Warehouse Case Study

Pre-Employment Positivity Rate Post Confirmation and MRO Review

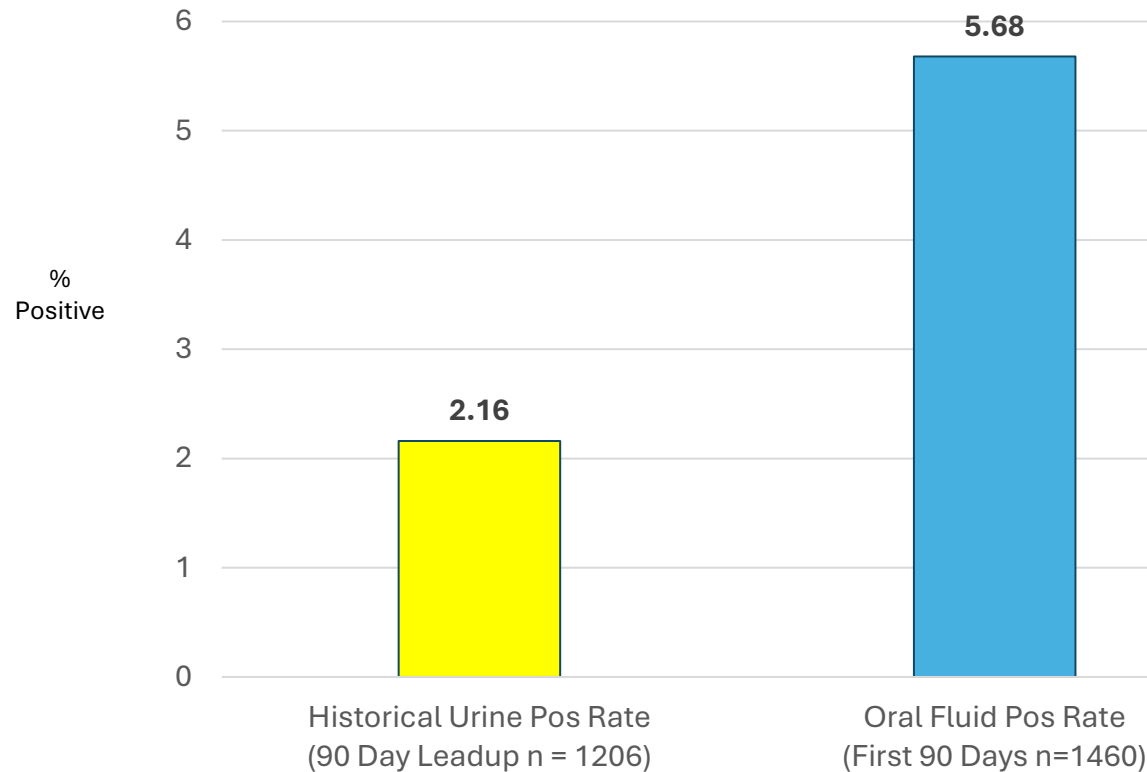


What the data show

- Initial 90-day oral fluid positivity rate was **~3.3× higher** than last 90 days of urine testing
- Identified **>10 additional drug-using applicants per 100 pre-employment screens** compared with urine
- Pattern consistent with **closure of urine sample circumvention pathways** rather than population drift
- 90-day average **may underestimate true impact**; effect was most pronounced immediately after conversion
 - *Day 1–15:* 21.4% positive
 - *Day 16–30:* 15.2% positive
 - *Month 2–3:* 13.5% positive

Hospital Case Study

Pre-Employment Positivity Rate Post Confirmation and MRO Review



What the data show

- Initial 90-day Oral fluid positivity rate was **~2.6× higher** than last 90 days of urine testing
- Identified **~3.5 additional drug-using applicants per 100 pre-employment screens** compared with urine
- **Increase observed** despite substantially lower baseline prevalence
- Suggests **system sensitivity effects persist** even in lower-prevalence workforces
- Reinforces that observed **effects are not industry-specific**

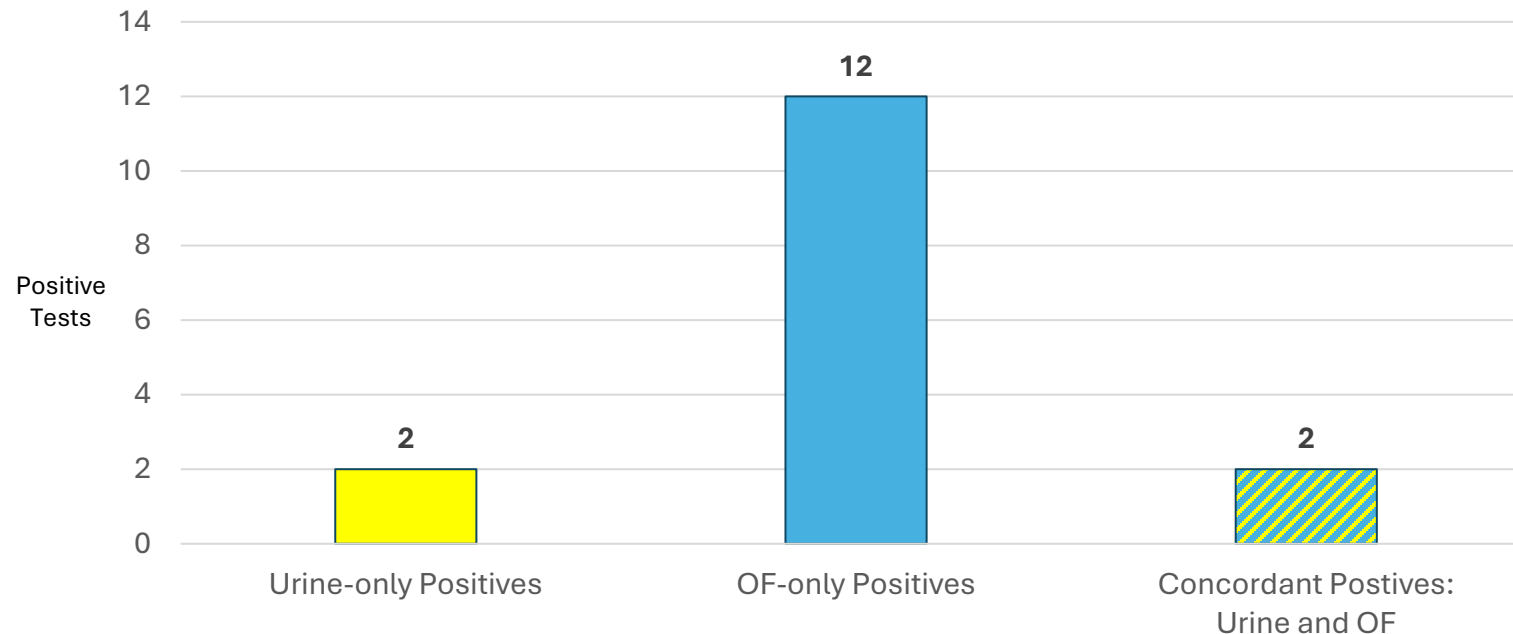
Across two distinct non-DOT industries, oral fluid adoption revealed substantial increases in detected drug use that were immediate, consistent, and operationally meaningful. Does this effect exist in DOT settings?

DOT Transportation Paired Case Study:

Same donors • Same time • Different outcomes...

- **196 Paired collections:** DOT urine and employer-mandated non-DOT oral fluid pre-employment tests collected **contemporaneously**
- Eliminates population, timing, and prevalence confounders

Positive Result Patterns
Contemporaneous Paired Collections (n=196)
(Mos 1-2 post-oral fluid adoption)



UNDER SAME-DONOR, SAME-TIME CONDITIONS

Oral Fluid Identified:

- **3.5× more total positives** (14 vs 4)
- **6× more specimen-discordant positives** (12 vs 2)

Interpreting the DOT Paired Collection Results

A consistent signal...



What the paired DOT data show

- All oral fluid positives fell within **DOT panel drug classes** and were subject to MRO review
- Specimen discordance **overwhelmingly favored oral fluid**
- Discordance **cannot be explained by population or timing** bias

What this means

- When donor population and timing are controlled, **specimen-driven system differences persist**
- Direction and magnitude are **consistent with non-DOT CRG findings**
- In **high-consequence DOT settings**, lower positivity may reflect avoidance behavior – not lower drug use

When the same donors are tested at the same time, **differences in outcomes reflect behavioral responses to testing conditions** — not population or timing.

Quest DTI: Relative System Sensitivity Analysis



The Quest Diagnostics Drug Testing Index (DTI) is a periodic national surveillance report summarizing aggregate workplace drug testing results across millions of U.S. tests by DOT classification, specimen type, drug class, and year

Estimated dataset size (2020–2024):

~25-30 million urine tests | ~6-8 million oral fluid tests

- Restricted analysis to **non-DOT populations** (General U.S. Workforce) for comparability with oral fluid testing
- Assumed comparable **General U.S. Workforce populations** across specimen types within DTI reporting
- Evaluated aggregated **positive rates by specimen type and drug class** (2020–2024 reporting period)
- Limited analysis to the **five drug classes** included in Federal workplace drug-testing programs
- Framed comparisons using **Relative System Sensitivity** establishing urine (legacy matrix) as proxy benchmark

Calculated as:

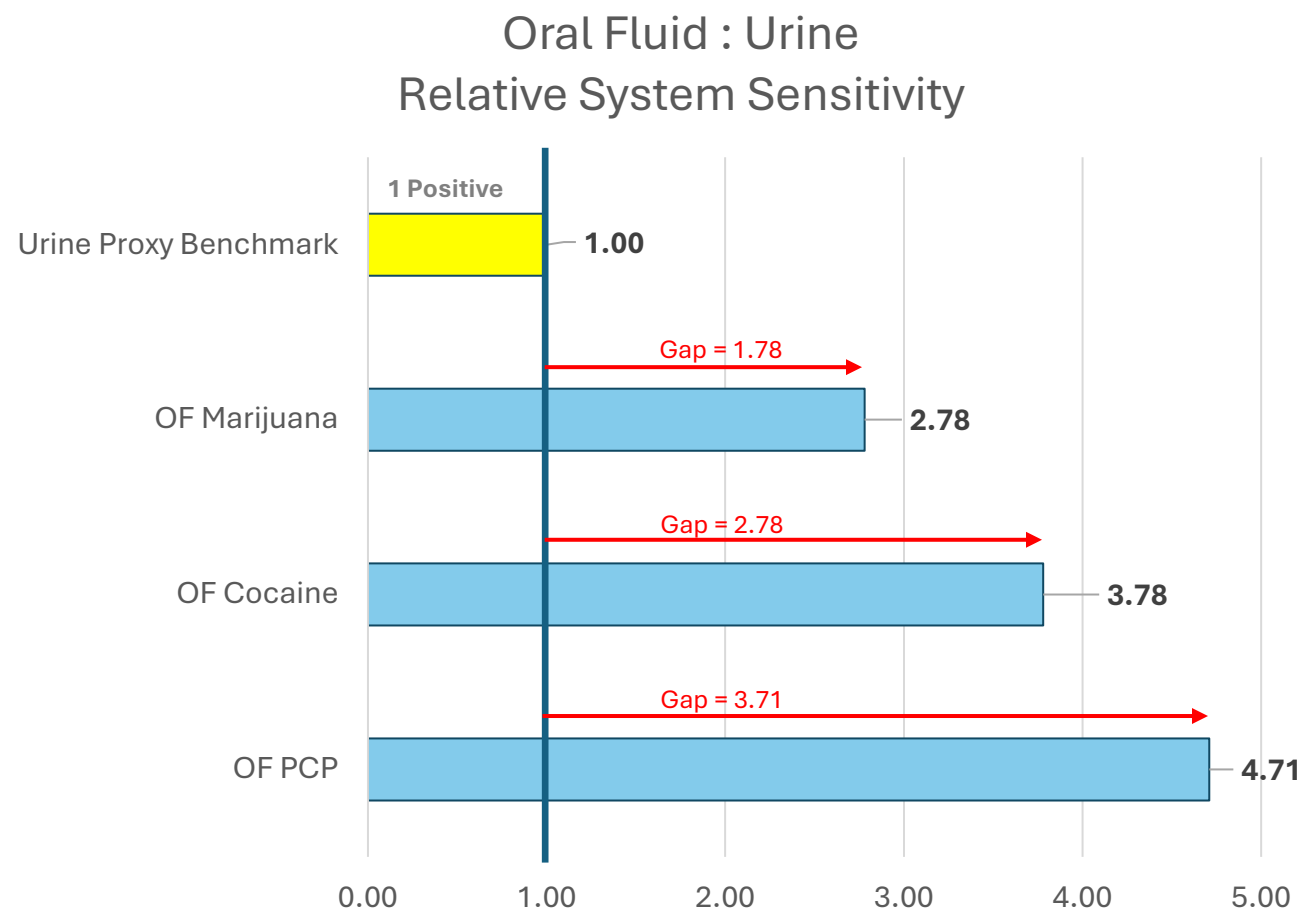
Relative System Sensitivity = Oral Fluid Positive Rate ÷ Urine Positive Rate

*Values greater than **1.0** indicate higher oral fluid system sensitivity relative to urine testing,
values less than **1.0** indicate lower oral fluid system sensitivity relative to urine*

- Focused on **directional consistency and magnitude**, not absolute prevalence or analytical performance

PCP, Cocaine, Marijuana:

The Illicit Drug Detection Problem



What the data show

- Significant urine system sensitivity deficits appear in **illicit-only drug classes**
- Data suggest urine testing may be **missing far more illicit use than it is capturing**
- Effect appears **despite a narrower window** of detection in oral fluid

Why do we see this and what does it mean

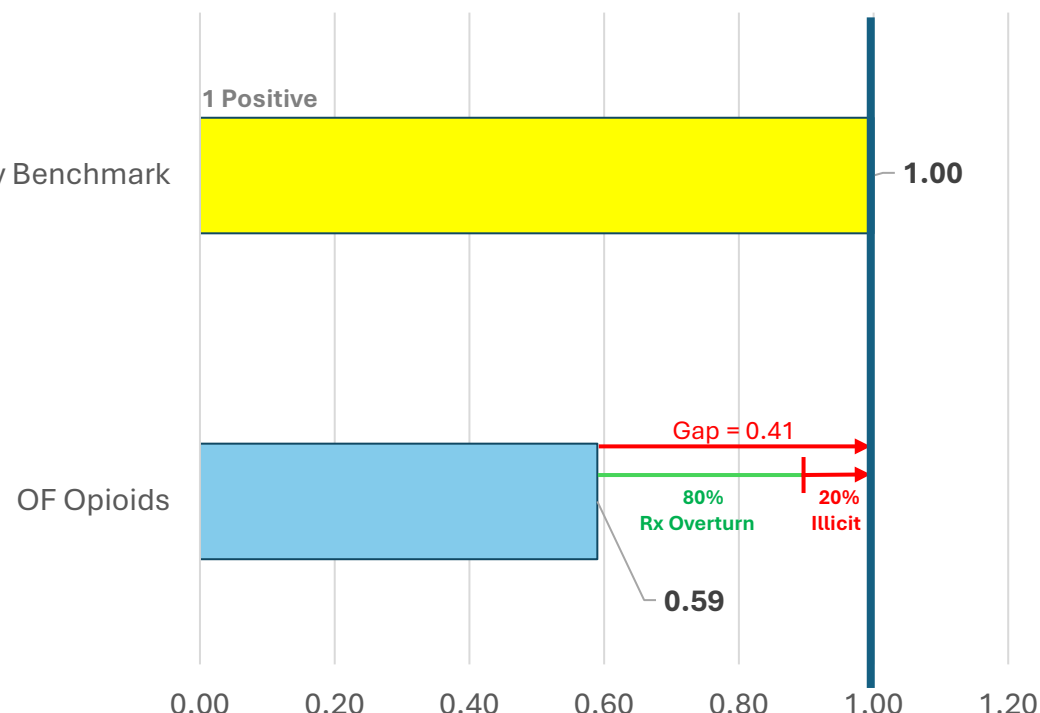
- No legitimate **medical explanation**
- **Illicit use** carries full consequence of policy violation
- High avoidance incentives = **frequent circumvention**
- **Illicit Gap: All observed misses are illicit**; High Risk Profile

*Where detection carries full consequence,
incentives for urine circumvention are highest*

Opioids:

Behavior changes when a valid explanation exists...

Oral Fluid : Urine
Relative System Sensitivity



Prescription-tolerant drugs

- ~ **80%*** **overturned** during MRO review = **Reduced avoidance incentive**
- Lower behavioral distortion
- **When a valid specimen is obtained**, longer detection windows associated with urine may produce equal or higher positivity rates
- Employer risk is concentrated in the ~ **20% of illicit positives** post-MRO review

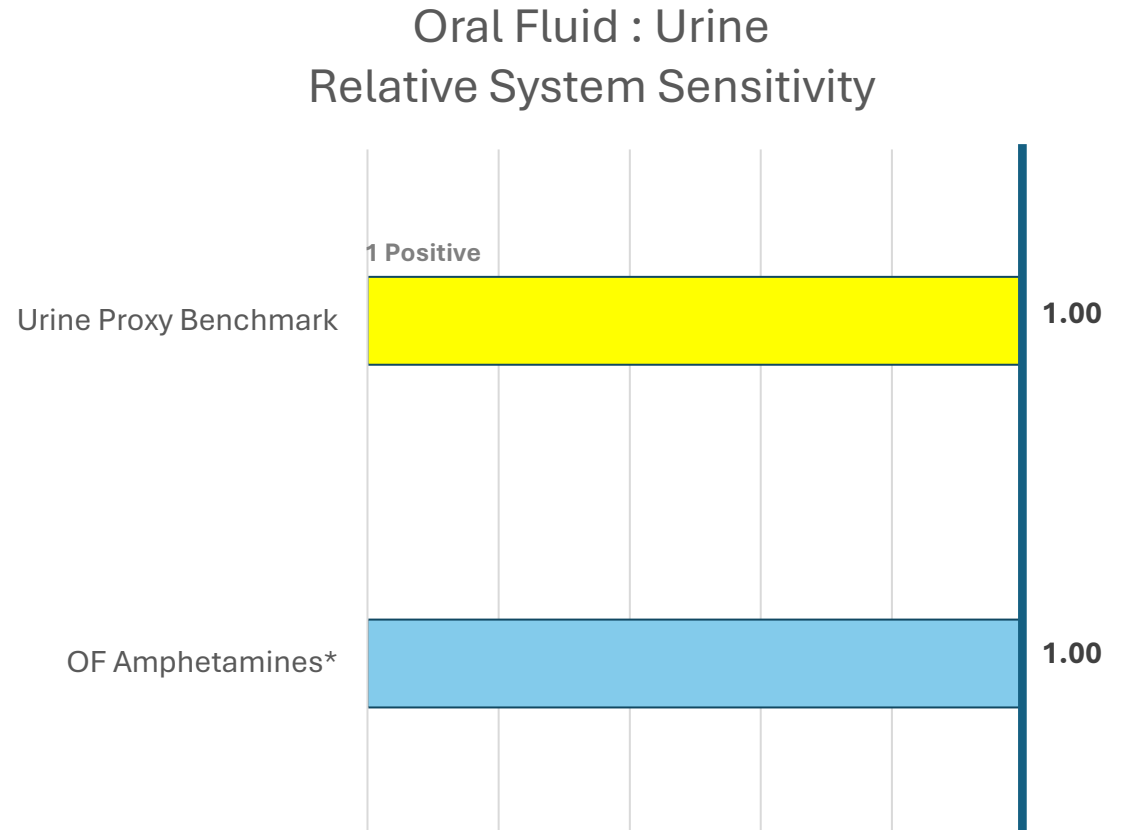
Opioids sensitivity reflects combined Quest DTI categories for codeine/morphine, hydrocodone/hydromorphone, oxycodone/oxymorphone, and 6-acetylmorphine. Fentanyl is not included in DTI oral fluid reporting and is therefore excluded from this analysis for both specimen types.

*CRG non-DOT MRO Review data - 2025

*When consequence is mitigated,
avoidance pressure declines*

Amphetamines:

The Hybrid Category



What the data suggest

Blends two distinct behavioral incentive patterns

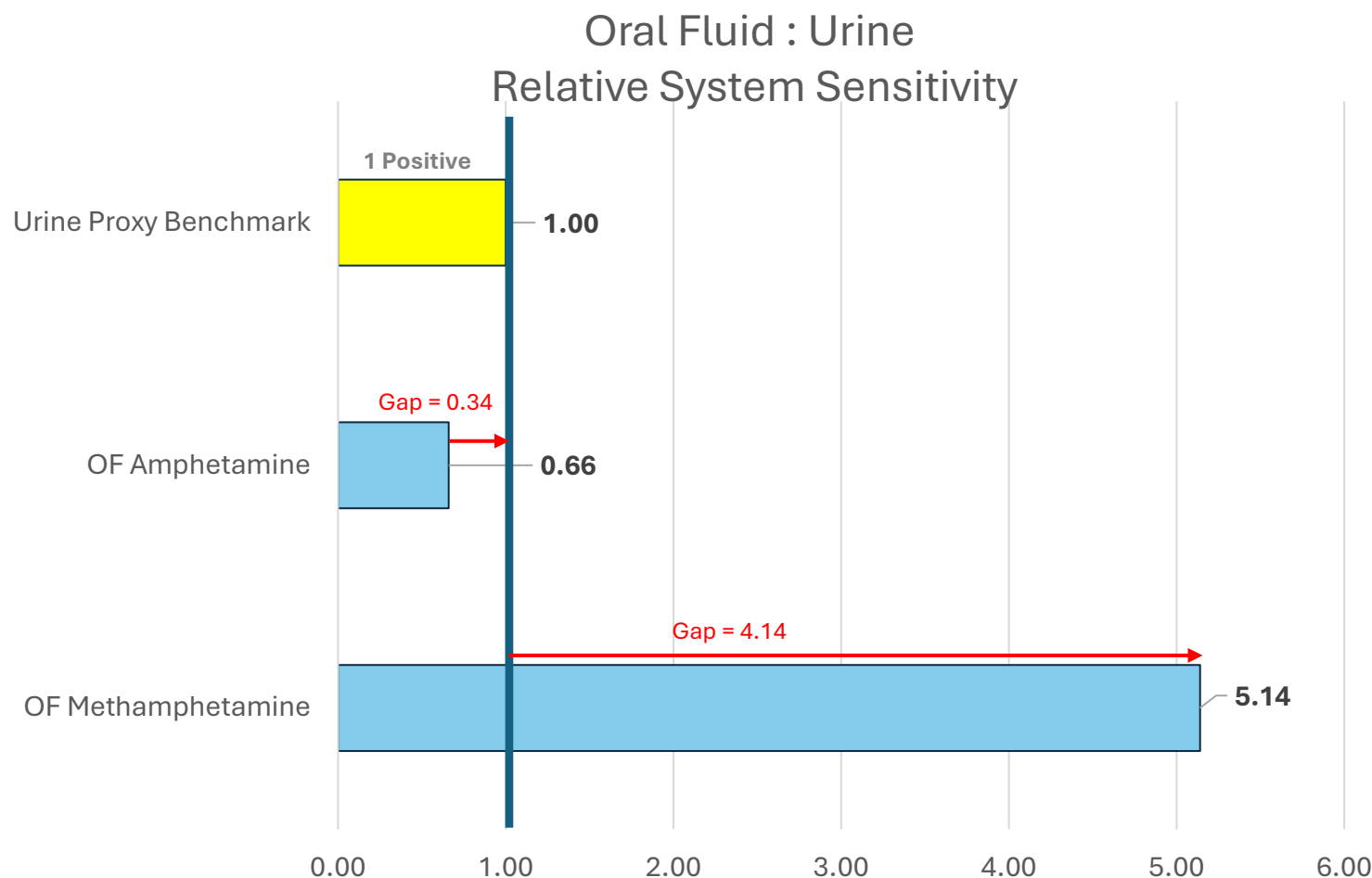
- DTI Annual Summary data show identical positivity rates in urine and oral fluid at the category level
- Suspect **opposing directional system sensitivity effects** within the aggregated amphetamines category
- **Prescription amphetamine** may push urine detection rates **↑**
- Urine sample **circumvention** associated with **illicit methamphetamine** may pull urine detection rates **↓**
- Result: **blended midpoint produces a 1:1 ratio**

**Oral Fluid Amphetamines category includes both Amphetamine and Methamphetamine positive results to allow for comparison with aggregate Urine Amphetamines category in DTI Annual Summary*

*Category level reporting limitations may mask
true system-level differences*

Amphetamine vs Methamphetamine:

Industry Insights: *Behavioral Incentives Within the Same Drug Class*



Sub-Category Isolation

•Amphetamine:

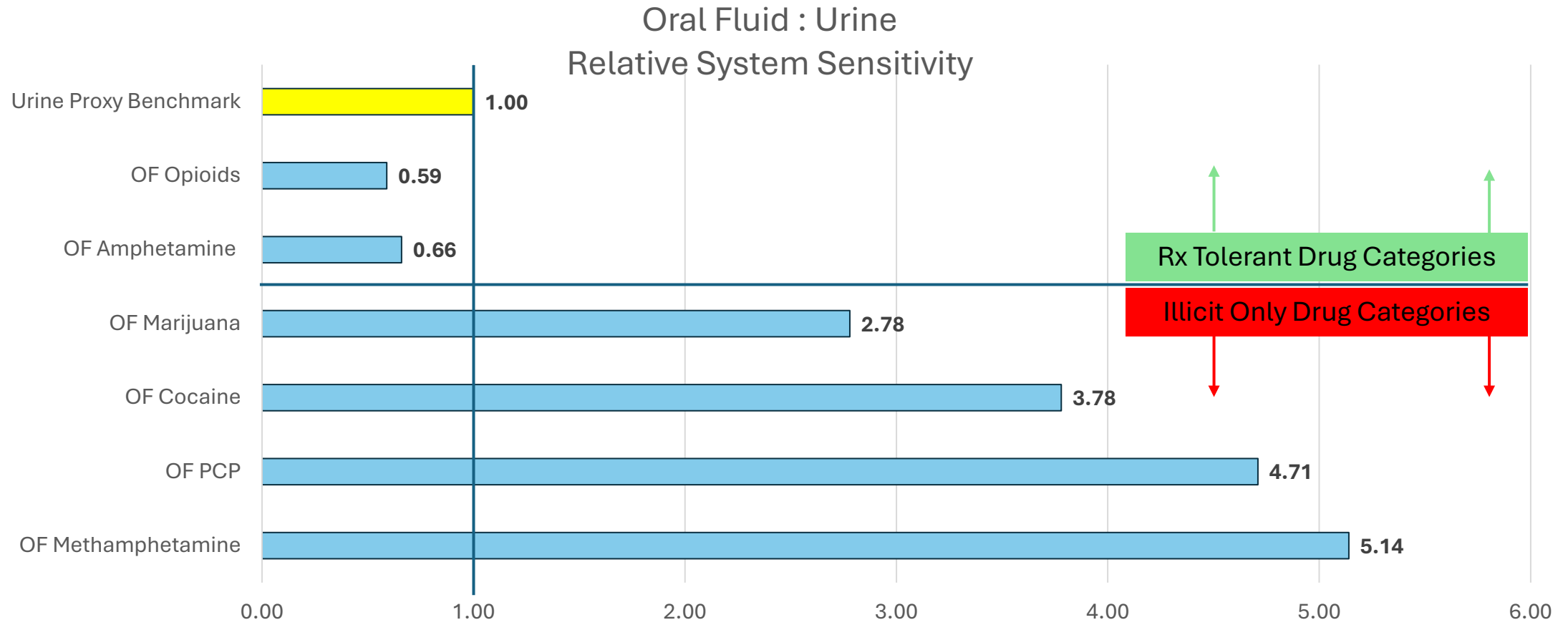
- Mimics relative system sensitivity observed in the Opioids category
- Rx overturn influences donor behavior, **minimal circumvention incentive**

•Methamphetamine:

- Oral fluid detects **>5× more positives**
- Suggests for every 1 Methamphetamine positive urine sample, **>4 may be missed**
- Mimics illicit-only drug categories when **circumvention is not an option**

A Consistent System Sensitivity Pattern Emerges

Relative Oral Fluid Detection vs Urine (DTI 2020–2024)



Interpreting the Pattern: Why System Sensitivity Varies by Drug Class

Behavioral incentives, not analytical performance, drive observed differences

- **Persistent rate differences suggest behavioral adaptation — not analytical limitations**
- **When detection pathways can be manipulated, donor behavior adapts**
- **Oral fluid constrains circumvention pathways**

When observational case studies, controlled same-donor comparisons, and national data all point in the same direction, the signal is unlikely to be accidental.

Specimen type matters.

IF THE BENEFITS ARE CLEAR....

Why Hasn't the Industry Moved?



Specimen Collection Is Not the Barrier

- Simpler, less invasive, and operationally more efficient than urine

Regulation Alone Is Not the Barrier

- ~23-25M lab based non-DOT tests performed annually in US, **only ~3-4M utilize oral fluid**

Science Is Not the Barrier

- Directional patterns are **reproducible across independent data sources**

Demand Has Not Caught Up with the Data

- **Meaningful** system-level performance **differences exist**
- **Limited recognition and understanding** of these differences constrain market response

*If the data exists and the benefits are real,
perhaps the problem isn't evidence — **it could be perspective***

Does our industry have a **blind spot**?

The assumption that urine testing performs adequately could be limiting progress...

Lack consistent framework for evaluating system-level detection effectiveness



Performance differences remain invisible



Limited urgency to challenge structural or economic friction



Stakeholders default to the most familiar and lower-cost option



Legacy inertia persists — not necessarily because it is optimal, but because it is *rarely examined*

*When **performance differences remain invisible**,
structural and economic barriers remain unchallenged*

Where Adoption Breaks Down in Practice

Structural and Economic Barriers to Oral Fluid Adoption

Structural Friction (Collection Device Reality)

- Oral fluid requires pre-purchased collection devices
- Inventory must be stocked, tracked, and managed with expiration risk
- Financial accountability shifts to collection sites holding unused devices
- Limited lifecycle visibility once devices leave distribution

Economic Misalignment (Who Bears the Risk)

- Unlike urine testing, labs cannot absorb collection device cost **without assurance of a billable test**
- Device cost is incurred **before** any billable test event
- Oral fluid **reagent and processing costs are higher** than urine
- Result is a **higher end user test price**: lab \$ + device \$
- Employers see higher per-test pricing **without visibility** into downstream value or risk reduction

*These barriers are **not inherent to oral fluid testing** —
they arise from how devices, costs, and accountability are structured across the system*

From Evidence to **Action...**



The next step is not more data — it is better system design

Make Detection Effectiveness Visible

- **Demonstrate system-level performance** differences to employers
- Translate data into **decision-relevant risk insight**

Modernize Device Logistics

- Match supply management to **real-world utilization**
- **Improve visibility** across the distribution chain

Align Incentives Across Stakeholders

- Reduce inventory risk **without limiting availability**
- **Align** cost, accountability, and downstream value

*The path forward is not about choosing sides —
it is about **redesigning systems**, so performance, logistics, and incentives work together*

The Responsibility Ahead...

If workplace safety matters, we have an obligation to ensure our testing systems reflect **real-world performance—not legacy assumptions**

When better approaches emerge, our responsibility is not to resist them—but to **remove the barriers that prevent their adoption**

THE GAP IS NOT INNOVATION, IT IS COORDINATION

The data are public. The implications are structural. Progress requires collaboration.

Continue the Conversation:

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Continue the Work:

**Evaluating Workplace Drug Testing Effectiveness:
A System Sensitivity Framework for Urine and Oral Fluid Testing**

Scan to access full white paper

