Unlocking the Potential of High-Resolution Toxicology Data to Transform Behavioral Health

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Abstract

Most substance use research and policy decisions rely on data that is self-reported, infrequently collected, or delayed by weeks to months. Ammon Labs offers a rare, underutilized asset: high-frequency, toxicology-confirmed real-world data (RWD) from patients in addiction treatment. This white paper lays out the shortcomings of traditional data sources and highlights how Ammon's high-resolution data opens new possibilities for public health, payers, pharmaceutical developers, law enforcement, and researchers. To operationalize these insights at scale, Ammon has partnered with LabTrax—a new AI-driven analytics startup that will convert Ammon's raw clinical data into actionable behavioral health intelligence products. The message is simple: Behavioral health and drug surveillance need better data. LabTrax—with exclusive access to Ammon's dataset—is how we get it.

A New Lens on a National Crisis

Substance use disorders (SUDs) and overdoses are among the most pressing public health crises in the United States. Over 80,000 Americans die from drug overdoses each year (CDC, 2025). Even among those who receive addiction treatment, relapse rates remain alarmingly high — with 40–60% returning to use within just one month (Family Addiction Specialists, 2024). In response, U.S. government agencies requested $46.1 billion in 2024 alone for alone for SUD prevention, treatment, harm reduction, and recovery (ONDCP, 2023). Yet, despite these investments, our systems remain largely blind to what substances people are actually using, when they're using them, and how that's changing in real time.

Behind the scenes, however, a hidden stream of data exists — one that could fill these gaps. Toxicology labs like Ammon perform weekly biochemical testing on patients in addiction treatment. These include full drug panels, fentanyl analog identification, tampering detection, synthetic urine flags, and even blood biomarkers like liver function panels and CBCs. But this information is rarely aggregated, analyzed, or even shared beyond treatment facilities.

LabTrax, Inc. was created to solve this problem. As a behavioral health analytics startup built in partnership with Ammon Labs, LabTrax has exclusive access to Ammon's dataset and is developing scalable, AI-powered platforms to turn this unique data into real-time insight. This white paper introduces the LabTrax-Ammon model as a new path forward.

Ammon Labs' high-frequency, real-world testing data—collected weekly across the patient treatment journey—represents a critical new resource. We can now map substance trends with unprecedented granularity, detect analogs within days, and measure patient outcomes biochemically. LabTrax is productizing

these capabilities for use by payers, pharma, treatment providers, and others—creating tools that offer visibility, predictive power, and strategy support. For behavioral health sectors ranging from government agencies to treatment providers, this changes everything. No more guesswork. No more months-long delays. No more blind spots.

Flying Blind: The Data We Use Now (and Why It's Not Enough)

Every stakeholder in the substance use ecosystem makes critical decisions based on data that is outdated, incomplete, or unfit for real-time or predictive use. These blind spots have real costs: missed intervention windows, ineffective treatments, and preventable harms. Here's where the gaps lie for various behavioral healthcare sectors.
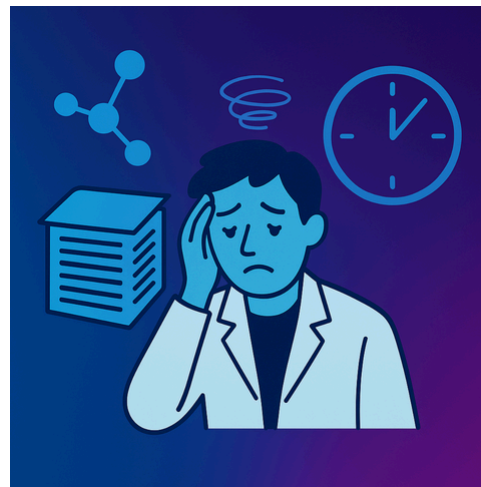
Public Health: Too Little, Too Late

Surveillance systems rely heavily on postmortem toxicology, emergency department visits, and syndromic indicators like overdose clusters. These are not only delayed by weeks or months but also skewed toward the most extreme outcomes. By the time action is taken, it's often reactive. Emerging drugs—like novel fentanyl analogs or xylazine—aren't captured early enough to prevent outbreaks. What's needed is real-time, biochemical insight into what people are actually using in the community.

Payers: Limited Visibility into Risk

Payers typically rely on claims data, discharge summaries, and self-reports to inform coverage decisions, network design, and fraud detection. Increasingly, they are using electronic health records (EHRs) but claims and the other data sources above still predominate. Claims don't reveal non-disclosure of substance use, urine substitution, or patterns of emerging drug use. Nor do they provide biochemical context for clinical status (e.g., liver function or STI co-infection). The result: under- or over-authorized treatment, missed relapse risks, and limited tools for evaluating provider performance.

Researchers: Incomplete or Retrospective Data

Epidemiologists, health economists, and behavioral scientists are often limited to cross-sectional survey data; longitudinal but self-reported substance use at intake, follow-up, and discharge or drop-out; or sparse EHR snapshots—far from the continuous, granular measurement needed to understand the real trajectory of recovery. Week-to-week variation, intermediate relapses, and objectively measured treatment adherence go unseen. Most toxicological studies capture only one or two timepoints, if any. This obscures patterns and leads to interventions based on static, outdated assumptions.

Law Enforcement: Scattered, Slow, and Indirect

Drug market intelligence typically comes from drug seizures and arrest data—which are highly scattered and not necessarily representative of what people are actually using. There's no standardization, no real-time sharing, and no direct linkage to community-level use patterns. That makes it nearly impossible to detect geographic surges in novel synthetics or coordinate effective interdiction and harm reduction strategies. Law enforcement is fighting a constantly evolving threat with an extremely low-resolution map.

Pharma & Biotech: Misfiring with Incomplete Behavioral Health Data

Even in an era of advanced clinical trial design and real-world evidence (RWE), pharma and biotech companies face enormous blind spots in behavioral health drug development. Data sources typically include:

• Self-reported or ICD-code-based diagnoses (often outdated or inaccurate)

• Sparse lab results (e.g., a tox screen at intake, nothing longitudinal)

• Aggregated claims that don't reflect moment-to-momentclinical reality.

Moreover, even when they use higher quality data, it often comes from randomized controlled trials (RCTs), which do not capture polydrug mixtures and other aspects of messy, real-world substance use.

These issues make it difficult to:

• Identify subpopulations at risk of relapse or dropout

• Detect potential drug interactions (e.g., with unprescribed opioids or synthetics)

• Assess medication effectiveness in the presence of polydrug use.

This limits R&D, pharmacovigilance, and market access strategies—at a time when new medication-assisted treatments (MATs) and behavioral therapies are urgently needed.

These data systems are like weather reports based on where lightning struck weeks ago. What's missing is a real- time, forward-looking radar. Ammon's data is different: objective, fine-grained, real-time, and collected longitudinally from the same individuals. It represents a paradigm shift in how we can understand, predict, and respond to behavioral health and substance use trends.

LabTrax transforms Ammon's data into AI-powered analytics tools for users across the spectrum of data-science savviness, as well as actionable dashboards, real-time alerts, and predictive tools designed for stakeholders across the behavioral health ecosystem.

A New Kind of Data for a New Kind of Challenge

What if we didn't have to guess anymore?

Ammon Labs has built a toxicological and clinical dataset that breaks out of the static, low-resolution mold of traditional systems. Unlike surveys,

discharge summaries, or death records, this dataset provides:

- **Objective data:** On the level of individual patients, weekly lab-confirmed toxicology results across a wide range of drugs—including opioid, benzodiazepine, and stimulant analogs; xylazine; synthetic and emerging or novel psychoactive substances; and more.

- **Longitudinal structure:** Tracking the same patients weekly through their treatment journeys—from admission to discharge/drop-out.

- **Daily drug use data:** While each patient is tested weekly, across patients, testing occurs each day of the week—allowing real-time insights.

- **Rapid turnaround:** Presumptive results returned in an average of 5 hours and four minutes; most confirmatory results returned within a day of sample collection—again allowing real-time insights, not quarterly backlogs.

- **Comprehensive health data:** In addition to urine testing, blood testing at intake. Together, their toxicology and blood biomarker results provide information on substance use and its potential impact on liver and kidney function, STIs and hepatitis B, other infections, and anemia. Furthermore, this data indicates pregnancy status and evidence of sample tampering or urine substitution.

- **Emerging threat detection:** Lab methods capable of detecting new substances within 1.5 weeks of their entry into the US drug market.

This is toxicology **reimagined**—not as a compliance afterthought, but as a real-time intelligence layer for behavioral health, public safety, payer strategy, and R&D. And LabTrax will allow users from all behavioral health sectors to derive deep, new, and more accurate insights from it—regardless of their analytics knowledge.
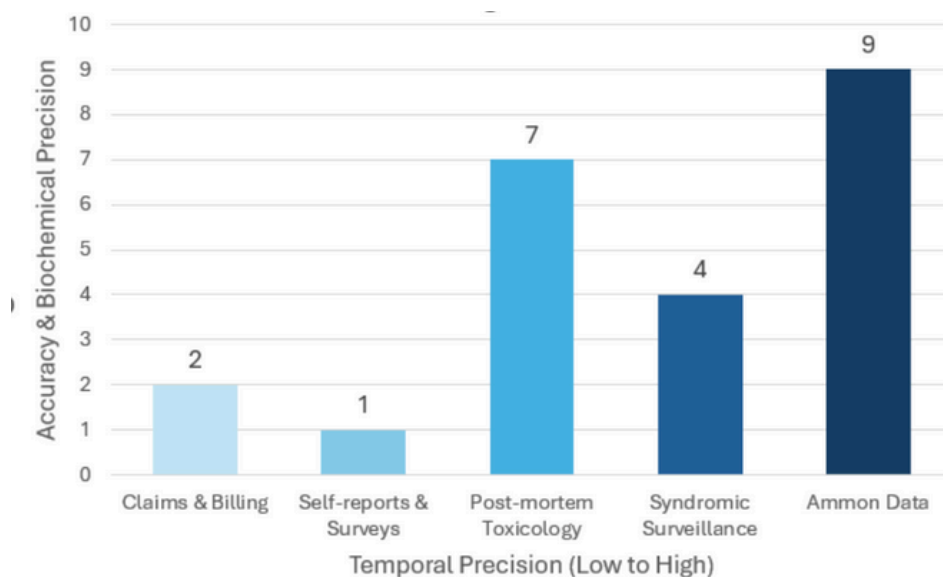

Figure 1. Temporal precision versus accuracy and granularity of data sources used by various behavioral health sectors.

A Glimpse of the Future: How Ammon's Data Can Be Used Today

Now imagine putting that dataset to work. Here's what's already possible, and what could be scaled with the right partners:

Treatment System Visibility
Treatment programs and oversight agencies often lack clarity into what's working—and what's not. With Ammon's data:

- **Clinical programs** can track substance use patterns, tapering success, and programs' own effectiveness in near real-time.

- **State oversight bodies** can compare program outcomes based on actual biochemical data, not just intake and discharge paperwork. Funders and regulators can monitor treatment performance across populations, identify sites with high synthetic urine rates, and flag providers consistently missing red flags.

Example: A state could rank programs based on rates of confirmed relapse in weeks 3–6 of treatment, adjusting funding or technical assistance accordingly.

Risk Adjustment & Smarter Coverage
Using Ammon's data, payers can improve risk assessment, treatment authorization, network decisions, and fraud detection. Biochemical profiles can indicate acuity and guide smarter reimbursement decisions.

Example: A patient with confirmed alcohol and Percoset use, poor liver function, and a positive pregnancy test could be fast-tracked for treatments safe for a liver-damaged mother and her baby—avoiding delays or further liver damage due to ambiguous, incomplete claims data.

This enables not just smarter coverage, but safer and faster clinical decisions.

Real-World Evidence for Pharma & Biotech
Most RWE platforms can't offer week-to-week drug exposure data or confirmation of concurrent illicit use. Ammon's data fills that gap.
- Optimize trial protocols with more accurate behavioral profiles.
- Evaluate effectiveness of a new MAT across subpopulations, settings, and real-world drug mixtures.
- Track co-use and drug-drug interactions in the real world— critical for post-market safety and effectiveness studies, and new drug development.

Use case: A pharma sponsor studying a new MAT for methamphetamine could use Ammon data to define inclusion criteria based on confirmed stimulant use and dropout risk.

Early-Warning Systems for Surveillance & Safety

Public health and law enforcement agencies are often months behind emerging drug threats. Ammon data can help them move from hindsight to foresight.

- Detect geographic spikes in new analogs or drug combinations.
- Map substance trends weekly across facilities and geographic locales ranging from counties to the entire U.S.

Example: A sudden rise in xylazine plus fentanyl co-positivity in two counties could trigger rapid alerts, resourcing, and public messaging before overdose fatalities climb.

Objective Data for the Criminal Justice System

Decisions about probation, parole, or custody often hinge on unreliable or sparse data. Ammon provides clearer answers:

- Confirmed use of treatment drugs (e.g., buprenorphine) vs. illicit or unprescribed opioids.
- Evidence of urine sample substitution or tampering.
- Temporal patterns of use or abstinence aligned with treatment plans.

Use case: A judge assessing custody for an individual in recovery can now distinguish between a confirmed treatment regimen and undisclosed relapse—based on biochemical evidence, not guesswork.

Sector	Typical Data Used	Key Limitations
Public Health	Syndromic surveillance, post-mortem toxicology, self-reported use	Delayed; lacks granularity; may be inaccurate; cannot detect emerging analogs
Law Enforcement	Drug seizures, arrest logs	Partial view; inadequate insight into usage trends or spread
Insurance/Payers	Claims, self-reports, EHRs	Often inaccurate, non-specific, and time-delayed; unlikely to confirm relapse
Pharma/Biotech	RCTs, market surveys, limited RWD	Excludes most poly-drug users; mostly lacks real-world drug combinations, analogs, and other novel psychoactive substances
Treatment Providers	Intake forms, self-reports	No tox-confirmed outcomes (use self-reports); inaccurate polydrug information may cause erroneous effectiveness results
Researchers	NSDUH, NHANES, and other surveys; RWD studies	Cross-sectional (NSDUH); infrequent biochemical confirmation and small sample (NHANES); inaccurate RWD on polydrug, analog, and novel synthetic drug use

Table 1. Current data sources and key limitations.

Partner With Us

We are now actively seeking partners who can benefit from and shape the next generation of behavioral health intelligence.

We invite interest from:

- **Payers** looking to improve risk scoring, treatment authorization, network decisions, and fraud detection.
- **Biotech and pharma** teams wanting to design smarter trials and real-world safety surveillance.
- **Government agencies** building early-warning systems, overdose dashboards, cross-sector response efforts, or improved interdiction.
- **Treatment networks** interested in benchmarking outcomes and reducing relapses.
- **Academic researchers** seeking high-resolution, longitudinal toxicological data for novel analyses.

- **Criminal justice and child welfare systems** ready to incorporate more accurate behavioral health data into life-altering decisions.

Let's build a better future for behavioral health—rooted in reality and powered by objective, near real-time data and AI.

For partnering inquiries or any other information, please contact:
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