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Why MOUDs Matter & What the Laboratory Should Know

By Robert Cole Pueringer, MD, and Melanie Ripley, DO

Introduction

Since 1999, more than 1 000 000 people have died from drug overdoses. In the most recent data from 2021, these numbers remain high, and overdose deaths are now the leading cause of death in the United States (US) for people ages 20–45. At least 75% of overdose deaths involve opioids, predominantly fentanyl, and the risk of overdose separates opioids from other drugs of abuse (1). Unfortunately, psychosocial and behavioral treatments, effective in managing many substance use disorders (SUDs), are significantly less effective in treating Opioid Use Disorder (OUD). Pharmacotherapies, or medications for opioid use (MOUDs), form the bedrock of treatment for those with OUD. Their use increases treatment retention and profoundly decreases illicit opioid use, opioid overdoses, and 1-year all-cause mortality compared to psychosocial and behavioral treatments or withdrawal management alone (2, 3). Currently, there are 3 FDA-approved medications for opioid use: methadone, buprenorphine, and naltrexone. While methadone administration is strictly regulated, buprenorphine and naltrexone are more freely available and prescribed in clinics. Historically, buprenorphine required providers to have a waiver that limited its availability; however, in 2023, section 1262 of the Consolidated Appropriations Act removed a long-standing barrier to buprenorphine access, and now all practitioners with a current Drug Enforcement Agency (DEA) registration with Schedule III authority can prescribe buprenorphine for OUD (4).

The laboratory is critical in managing OUD, specifically in monitoring MOUD compliance and assessing for co-occurring drug use. Each MOUD has unique pharmacology, a particular niche in the treatment of OUD, and special considerations that need to be considered by laboratory personnel. This paper will provide an overview of the opioid epidemic, the critical importance of MOUD among all SUD pharmacotherapies, and a discussion on the laboratory's essential role in managing MOUD for OUD.

The Opioid Epidemic

The opioid epidemic is a complex health crisis characterized by the widespread misuse, addiction, and overdose deaths associated with opioids, including prescription painkillers, heroin, and synthetic opioids like fentanyl.

Three-to-4 waves often characterize the opioid epidemic. The first occurred in the 1990s to early 2000s. Opioids marketed as effective and safe analgesics led to rising prescription rates of opioid pain medications. It led to a surge in prescription rates, OUD, and overdose deaths. The second wave began around 2010 as users transitioned to heroin as a cheaper, more accessible alternative to prescription opioids. The third wave started in 2013 with the introduction of synthetic opioids, mainly illicitly manufactured fentanyl, and is ongoing, with overdose deaths increasing dramatically in 2017 and again in 2019 (5). Fentanyl and other synthetic opioids combined with or used as a cheaper replacement for heroin, counterfeit "pressed" pills, cocaine, and methamphetamine. Fentanyl is a short-acting, highly potent opioid, approximately 100 times more potent than morphine. In much of the US, fentanyl (and fentanyl analogs) are the predominant compounds found in opioids obtained off the street (5).

Opioid overdose deaths continue to rise, claiming thousands of lives annually and devastatingly affecting public health. According to the Centers

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for Disease Control (CDC), drug overdose deaths increased nearly 30% from 2019 to 2020 and have quintupled since 1999. Almost 75% of the 91 799 drug overdose deaths in 2020 involved an opioid. From 2019 to 2020, opioid-involved death rates increased by 38%, and synthetic opioid-involved death rates (excluding methadone) increased by 56%. And lastly, from 2015–2020, drug overdose was the leading cause of death in the US for the ages of 25–44 by a substantial margin (3,5).

Factors contributing to the high overdose rates include the potency of synthetic opioids like fentanyl, polysubstance use, and lack of access to SUD treatment, specifically MOUD, and overdose reversal medications like naloxone. Efforts to blunt the epidemic's effect have involved a combination of prevention, treatment, harm reduction, and policy interventions to reduce the impact of opioid misuse and improve outcomes for affected individuals and communities (3).

Importance of MOUD

When thinking of treatment for SUD, it is easiest to think of 2 therapeutic arms: psychosocial and behavioral therapy on the one hand and pharmacotherapy on the other. The first arm, psychosocial and behavioral treatments, refers to a range of therapeutic approaches that address the psychological, social, and behavioral aspects of a person's well-being and functioning—this can be thought of as the "whole person" approach. The treatments focus on understanding and modifying thoughts, emotions, behaviors, and social interactions to improve mental health and address the myriad of biological, psychological, and environmental factors that characterize the complex brain disease of addiction. Examples of psychosocial and behavioral treatments include cognitive-behavioral therapy (CBT), dialectical behavior therapy (DBT), motivational interviewing (MI), and group therapy, which includes self-help groups and support groups. These are the primary therapies used in residential or outpatient SUD treatment (6).

The effectiveness of each therapeutic arm depends upon which substance is being misused (i.e., alcohol vs. opioids vs. stimulants), and the best outcomes occur when both arms are combined. For example, the "whole-person" approach in treating alcohol use disorder (AUD) leads to the highest treatment retention rates at 1 year when combined with pharmacotherapies, including naltrexone, acamprosate, topiramate, or gabapentin (6).

Compared to other SUDs, the treatment of OUD is unique. Psychosocial and behavioral treatments are significantly less effective in treating OUD. Approximately 9 out of 10 people return to opioid use within 1 year when treated with behavioral therapy alone, an alarming failure rate. Pharmacotherapies, or MOUD, form the bedrock of treatment for those with OUD. Starting a patient with OUD on MOUD is one of the most impactful, evidence-based medical interventions we know of. The therapeutic use of MOUD leads to a threefold decrease in mortality, which equates to a number needed to treat (NNT) of less than 3 (2, 6).

The primary MOUDs include methadone, buprenorphine, and naltrexone. Each MOUD interacts with opioid receptors differently, has unique pharmacokinetics (what the body does to the drug), and has a special niche in treating OUD. Despite their differences, using any MOUD decreases mortality, helps prevent overdose, and increases SUD treatment retention.

Importantly, MOUD should be integrated with comprehensive care and support services, including psychosocial and behavioral therapy, to address the complex needs of those with OUD effectively (3, 6).

Role of the Laboratory In MOUD

The laboratory provides a crucial role in managing OUD, specifically in monitoring MOUD compliance and assessing for co-occurring drug use. First, monitoring for MOUD compliance typically involves regularly testing for the presence of the prescribed medications in the patient's system. Testing is most commonly performed on urine samples and consists of a screening immunoassay with confirmatory gas chromatography-mass spectrometry (GC-MS) or liquid chromatography-tandem mass spectrometry (LC-MS/MS) (6, 7). The presence of buprenorphine or methadone, or metabolites suggests the patient is taking prescribed medications and adhering to the treatment plan. Moreover, the absence of a metabolite, or in some cases, the metabolite concentration or the ratio of metabolite to the parent compound, can suggest intentional alteration of the urine specimen. For example, buprenorphine is metabolized primarily to norbuprenorphine. Within a few hours of ingestion, the ratio of norbuprenorphine to buprenorphine in the urine increases. In a patient purportedly taking buprenorphine daily, the presence of buprenorphine and absence of norbuprenorphine, or a low norbuprenorphine-to-buprenorphine ratio, can suggest urine tampering. Buprenorphine taken regularly leads to higher urine norbuprenorphine levels (3, 6, 8).

Second, monitoring while on MOUD involves intermittently screening for other substances in the urine. Random urine drug screens (UDS) increase treatment retention in patients on MOUD, provide another level of accountability, and help the provider understand the patient's use pattern, evaluate the effectiveness of the current treatment regimen, and identify potential risks or complications associated with co-occurring drug use (8, 9). For example, benzodiazepine use can trigger a positive benzodiazepine urine immunoassay result that raises concern for the use of benzodiazepines, which act

synergistically with opioids, and increase the risk of oversedation and life-threatening respiratory depression. Alternatively, morphine or 6-monoacetyl morphine (heroin metabolite) suggests heroin use and that the patient's current MOUD regimen is insufficient. Potential changes to the therapeutic plan include adjusting the dose of buprenorphine or methadone, changing the support structure or living environment, or increasing accountability (3, 7).

Interpreting UDS results can be complicated and challenging. To ensure specimen validity, providers and laboratory personnel should always look for evidence of substitution, dilution, and adulteration when evaluating a UDS. Substitution is submitting a specimen from another person or even another species. Specimen temperature and specific gravity are helpful measurements in identifying substitution. Dilution can be intentional (drinking large amounts of water before providing a specimen) or the result of physiologic conditions like diabetes. Measures like urine creatinine allow for standardization of levels despite fluctuations in urine concentration. Adulteration is the addition of chemicals to a urine specimen that will mask or destroy drugs or their metabolites. Examples include the addition of nitrates, acids, and oxidizing/reducing agents that can chemically alter the drug or metabolites. In short, an accurate UDS interpretation requires a valid urine specimen (6, 7, 10).

Limitations of Urine Drug Screens

Laboratories should also be aware of the downsides and limitations of the UDS. First, they have a time-limited detection window and only provide information about recent drug use, often a few days to a week. This can lead to false-negative results, which make it challenging to assess the overall pattern of substance use or monitor for long-term abstinence (7, 10, 11). Second, a UDS is vulnerable to manipulation, undermining the test's accuracy and reliability. For example, patients can manipulate the test by diluting their urine, using or adding adulterants like glutaraldehyde or sodium hypochlorite (bleach), altering the urine pH, or providing someone else's urine (7, 10)

Third, a UDS can yield false-positive or false-negative results, particularly screening urine immunoassays. Not all laboratories have confirmatory testing, and those that do may not regularly utilize gas chromatography-mass spectrometry or liquid chromatography-tandem mass spectrometry, which can lead to an overreliance or misinterpretation of immunoassay results. Immunoassays rely on the interaction between antibodies and antigens (often drugs or medications) to produce a detectable signal, typically through a color change or fluorescence. Antibodies have specific binding sites that recognize and bind to specific regions (epitopes) on the target molecule/drug. Thus, if a structurally similar drug possesses epitopes similar to the target analyte, the antibodies may bind to the cross-reacting molecule/drug, leading to a false-positive result. This can have profound real-world consequences for someone who needs objective evidence of sobriety for the court or place of employment (8, 10).

On the other hand, if a drug does not possess a similar epitope to the target molecule/drug, it may not bind or recognize the assay antibody. For example, fentanyl is an opioid agonist, which means that it binds to and activates mu-opioid receptors leading to a downstream biological response. However, fentanyl and its metabolites bear no structural resemblance to morphine or other semisynthetic opioids (morphine analogs), which opiate assay antibodies are designed to detect. As a result, fentanyl and its metabolites do not cross-react with opiate immunoassays; the same is true of methadone or trazodone (10).

The fourth limitation of a UDS is that it does not provide contextual information. A positive UDS confirms exposure to the drug but does not provide knowledge about the individual's overall progress, treatment adherence, or underlying factors contributing to substance use, such as changes in drug cravings, mental health issues, social stressors, or changes in social support systems, all of which are crucial for comprehensive addiction management. Regular or random UDS may also contribute to stigmatization and create suspicion and distrust between patients and providers, resulting in a strained therapeutic relationship, reducing treatment engagement, or leading to outright avoidance of the healthcare system (6, 8).

MOUD and Laboratory Analysis

Methadone

Methadone is a long-acting synthetic opioid used to treat OUD and pain. It is a full agonist opioid, meaning that when it binds to the mu-opioid receptor, it fully activates it, producing a maximal biological response. In the case of opioids, this leads to well-known clinical effects, including analgesia, sedation, euphoria, and at higher doses (toxic doses), sleepiness, coma, and life-threatening respiratory depression.

The history of methadone in treating OUD reflects the evolution of our understanding of addiction as a disease and the subsequent development of evidence-based approaches to support individuals with OUD. Methadone therapy, in its most basic form, is a type of opioid substitution therapy that helps alleviate cravings and withdrawal symptoms while causing minimal euphoric effects. The

mortality benefits and improvement in treatment retention are profound; however, because it is a full agonist opioid, it can be dangerous when combined with other sedative-hypnotics or opioids (2, 6).

Today, methadone treatment is subject to stringent federal and state regulations and oversight to ensure safe and effective use. Federal laws establish the operational framework for opioid treatment programs (OTPs) that provide methadone treatment and regulate opioid treatment program certification and accreditation, patient evaluation and admission, medication dispensing, treatment planning/services, and patient privacy/confidentiality (6).

Methadone is metabolized primarily in the liver and involves various enzymes, mainly cytochrome P450 (CYP450) enzymes, such as CYP3A4, CYP2B6, and CYP2D6. The primary metabolite is 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine (EDDP), which is pharmacologically active but less potent than methadone (6, 10).

The UDS is used to monitor for compliance and assess for co-occurring drug use. Screening immunoassays are usually specific for 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine and sometimes the parent compound or the metabolite 2-ethyl-5-methyl-3,3-diphenyl-1-pyrroline (EMDP). Given the strict federal regulation of opioid treatment program clinics, urine adulteration is rare. Quantification, or measurement of urine methadone or metabolite concentrations, plays a very minimal role in methadone therapy management because levels are affected by multiple often unknown variables, including time since last use, the amount used, individual metabolic capacity (which is variable), hydration status, and drug-drug interactions (3, 6-8).

Buprenorphine

Buprenorphine is a semi-synthetic partial mu-opioid receptor agonist for treating OUD and severe pain. As a partial agonist, it produces a *partial* biological response when it binds to the mu-opioid receptor. Clinically, this leads to opioid effects but with a ceiling effect on respiratory depression and sedation. In those with OUD, buprenorphine tempers opioid cravings and alleviates withdrawal symptoms while causing minimal sedation and euphoria. Like methadone, it results in profound mortality benefits and leads to overdose prevention, decreased illicit opioid use, and improved treatment retention; however, its unique pharmacologic properties make it safer in toxicity and provide some degree of protection against overdose (2, 6).

Buprenorphine toxicity is rarely, if ever, life-threatening in adults unless combined with other sedative-hypnotics. Despite being a partial agonist, buprenorphine is highly lipophilic and tends to distribute to and deposit in the brain. It has an exceptionally high binding affinity for and slow dissociation from the mu-opioid receptor. Ultimately, it outcompetes all other opioids for crucial mu-opioid receptor binding spots and theoretically provides dose-dependent protection against overdose from opioids like fentanyl (6).

Other important differences exist between buprenorphine and methadone. Buprenorphine is not subject to the same strict federal regulations as methadone. It can be prescribed in any clinic and, as of 2023, by any provider (4). Laboratory analysis also plays a more prominent role in managing OUD with buprenorphine.

Buprenorphine is extensively metabolized in the liver to norbuprenorphine by N-dealkylation, primarily through the cytochrome P450 enzyme CYP3A4. Buprenorphine and norbuprenorphine then undergo glucuronidation to produce their major active metabolites, buprenorphine-glucuronide and norbuprenorphine-glucuronide. Urine buprenorphine levels start increasing within hours after buprenorphine intake. The norbuprenorphine level lags but eventually surpasses the buprenorphine level by approximately 7 hr after a single dose of sublingual buprenorphine.

Buprenorphine and norbuprenorphine urine levels, when standardized to creatinine, help providers understand how patients are taking buprenorphine. Fluctuations over time can prompt questions about dosing/compliance and help identify non-prescribed substance use and non-adherence. High levels of buprenorphine with low levels of norbuprenorphine suggest "spiked" urine. A compliant patient will have relatively low levels of urine buprenorphine and higher norbuprenorphine levels, while intermittent buprenorphine use leads to much lower norbuprenorphine levels. When evaluating UDS results, providers often focus on unexpected substances, creatinine levels under 20 mg/dL (that suggests dilution), and buprenorphine-to-creatinine ratios over 50:1 (that suggests spiked urine). Moreover, recent research suggests the urine norbuprenorphine-to-creatinine ratio can indicate the sublingual buprenorphine doses a patient has been taking. For example, norbuprenorphine-to-creatinine ratios less than 0.5×10^{-4} are typical of patients taking 8 mg of buprenorphine daily, and ratios less than 1.5×10^{-4} are typical of patients taking over 12 mg daily (12). It is important to note that concentrations may vary due to individual absorption, metabolism, and excretion differences.

Sublingual buprenorphine is often formulated with naloxone to dissuade injection use of buprenorphine, a pretense likely to be false and that has not stopped the parenteral administration of

buprenorphine. Despite this, the combination buprenorphine-naloxone product persists and remains the preferred buprenorphine formulation of many insurance companies, institutions, and societies (13).

The bioavailability of sublingual and orally administered naloxone is extremely low. Around 30% of sublingually administered buprenorphine is absorbed with buprenorphine-naloxone combination products, while >99% of naloxone passes unchanged through the gastrointestinal tract. The little naloxone absorbed undergoes hepatic conjugation, is not pharmacologically active, and produces no clinical effect; however, naloxone conjugates have a longer half-life than naloxone and accumulate in the body over time. For example, using sublingual buprenorphine-naloxone combination products leads to high urine naloxone-to-buprenorphine ratios and the presence of naloxone-conjugates. A negative naloxone with a positive buprenorphine level suggests the use/misuse of buprenorphine alone. In contrast, a high naloxone-to-buprenorphine level ratio with negative naloxone-conjugates suggests the urine was adulterated or spiked with the combination product. Ultimately, urine naloxone and naloxone-conjugate levels, in conjunction with buprenorphine metabolite profiles, can help evaluate for urine adulteration (when buprenorphine metabolite profiles are insufficient) and help determine the naloxone source and administration route (13).

Naltrexone

Naltrexone is a long-acting opioid antagonist that reversibly blocks rewards associated with opioid use but possesses no opioid-like properties. Naltrexone prevents individuals from experiencing the euphoric effects of opioids, and it comes in an oral and long-acting injectable formulation. The monthly injectable formulation leads to more stable serum naltrexone concentrations and better medication adherence. Naltrexone has indications for use in alcohol use disorder, methamphetamine use disorder, and OUD. Naltrexone is infrequently used to treat OUD, and the mortality and treatment retention benefits are inferior to treatment with methadone and buprenorphine. As such, laboratory monitoring for naltrexone is uncommon and focuses on co-occurring drug use instead of treatment adherence (3, 6).

Conclusion

SUDs, including OUD, affect millions worldwide, but the risk of overdose separates opioids from other drugs of abuse. There are effective treatments for SUDs; however, for OUD, MOUDs are critical, given their profound benefit to mortality and treatment retention. As a result, there are few circumstances, and some would argue none, that warrant discontinuing MOUD. Nonetheless, the laboratory is pivotal in monitoring MOUD adherence and co-occurring substance use, which helps provide more information about a patient's use pattern and better enables collaborative decision-making between the patient and provider. Ultimately, laboratory personnel should be aware of the benefits and limitations inherent in UDS and that they play a unique and vital role in managing OUD with MOUD.

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Robert Cole Pueringer, MD, is a Medical Toxicologist, Addiction Specialist, and Hospitalist at Essentia Health in Duluth, MN, and faculty at the University of Minnesota, Department of Psychiatry and Behavioral Sciences in Minneapolis, MN. Email: cpueringer@gmail.com. Melanie Ripley, DO, is a Hospitalist and Primary Care Provider at Essentia Health in Duluth, MN. Email: melanie.ripley@essentiahealth.org.

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Destigmatizing the Language of Drugs

By Christine L.H. Snozek and Ronald R. Henriquez

A gradual shift in the medical community's perceptions of drug use for nonmedical purposes has occurred in recent years, along with the recognition that historical terminology related to drug use can increase the risk of stigma and negative bias. Medical associations such as the American Society of Addiction Medicine and governmental agencies including the National Institute on Drug Abuse (NIDA) and Health Canada (1-4) note that stigma from drug use can have serious consequences, for example, discouraging individuals from seeking care and damaging their relationships with loved ones, healthcare professionals, and others.

Consequently, these and other organizations have developed resources for words to use when discussing drug use. "Person-first" language is encouraged, to maintain the distinction between the individuals who use drugs and any underlying substance use disorder. Examples of person-first language include replacing terms such as "addict" or "drug abuser" with "person with substance use disorder (SUD)" or simply "patient" (Table 1). Although there is not yet a full consensus on appropriate terminology, for medical professionals in clinical settings these resources provide a toolbox for guiding productive conversations about drug use.

Unfortunately, options for decreasing stigmatizing language related to laboratory orders, testing, and results are less clear-cut. References to lab testing in the NIDA and Health Canada publications are largely limited to replacing such colloquial terms as "clean/dirty" with "testing negative/positive." This gap in existing recommendations leaves the task of deciding best practices for incorporating nonstigmatizing language largely up to individual laboratories. This article will highlight some examples of terminology labs could consider when evaluating their current practices.

The objective and technical nature of lab testing lends well to certain aspects of this discussion. For

Table 1. Example Terminology for Nonstigmatizing Language, Adapted from NIDA and Health Canada.

Instead of:	Use:
Addict User Junkie Drug abuser	A person with substance use disorder (SUD) or opioid use disorder (OUD); a person who uses (or injects) drugs
Former addict Recovering addict	Person in treatment for SUD/OUD; a person who previously used drugs
Habit Abuse Misuse	Drug/substance use; drug/substance dependence; Higher-risk drug/substance use
Illicit drugs Street drugs	Recreational drugs; non-prescribed drugs
Opioid substitution therapy Medication-assisted treatment	Opioid agonist therapy; medication for SUD/OUD
Compliance Adherence	Taking as prescribed
Dirty Failing a drug test	Testing positive
Clean Passing a drug test	Testing negative

Table 2. Possible Terminology for Nonstigmatizing Language Related to Laboratory Testing.

Instead of:	Use:
Drugs of abuse	Recreational drugs; drugs associated with substance use disorder
Drug of abuse testing	Matrix-based: e.g., urine toxicology Purpose-based: e.g., pain management drug screen Compound-based: e.g., prescribed opioid panel Toxidrome-based: e.g., sympathomimetic agents Technology-based: e.g., drug testing by LC-MS/MS
Adulterant testing Adulteration Cheating	Ordering: specimen validity testing Resulting: dilution, presence of [foreign substance], non-physiological pH
Simulated compliance	Addition of [medication] to the sample

example, it's unlikely that many labs will have to update reports to remove "dirty" as an interpretive comment. However, other phrases such as "drug of abuse screen" and "drug of abuse testing" are deeply embedded in lab order sets and published literature. Some of this terminology is not entirely straightforward to replace with nonstigmatizing language. Alternatives for "drugs of abuse" might not translate clearly to ordering providers; for example, would a "recreational drug screen" include prescribed opioids and other high-risk medications, or only drugs obtained from nonmedical sources? Considerations such as character limits for test names could also apply, particularly if additional information such as test algorithms are included: "screen for drugs associated with substance use disorder with reflex to confirmation" is possibly too long for many laboratory information systems and undoubtedly longer than busy providers would be willing to read.

For labs with limited drug test menus, updates to naming may be as simple as removing "abuse" from the order, for example, changing "Drug of abuse screen" to "Drug screen." The situation is more complex for laboratories with a wider range of drug tests and/or configurations. One possible solution is to name drug tests according to the matrix, purpose, methodology, or other relevant factors (Table 2), taking care to distinguish tests focused on recreational drugs from broad-spectrum general toxicology screens.

"Adulteration testing" is another potentially problematic term. The Merriam-Webster.com definition of "adulterate" begins "to corrupt, debase, or make impure...,"(5) a connotation which could be perceived as stigmatizing. Alternative wording could focus on the purpose of testing ("specimen validity") or the specific issue(s) detected during testing ("results suggest sample dilution"). "Simulated compliance" is a related concept; "compliance" has been identified to imply the assignment of blame, that is, "noncompliance" suggests that patients are responsible for their own illness (6). Again, describing the objective findings seems the best solution, for example, "high concentrations of parent drug in the absence of metabolites suggest addition of the medication directly to the urine sample."

As this discussion evolves, some lessons can be learned from forensic toxicology: expert laboratory witnesses have navigated the importance of language in an effort to provide factual and unbiased testimony and yielded similar outcomes as person-first language. For example, an expert would likely testify to the "presence or absence of a substance in a specimen" versus stating "the accused used substance x." The former does not denote any guilt of how a substance may come to be found in an individual's specimen. Since the lab results cannot speak to deliberate use or unwitting consumption, this type of testimony shaping is critical to avoid biasing the perceptions of the person who is tested. Like in the courtroom setting, patient outcomes could be further enhanced by striving for a more neutral and exacting choice of language in communicating test names and results interpretations. However, these changes need to be well messaged to the ordering community to avoid confusion as test names and results language change.

The movement toward nonstigmatizing language when discussing substance use has implications for laboratories performing drug testing. This is particularly important as more patients access their own healthcare information electronically, increasing the likelihood that they will see test results without a medical professional to help guide interpretation. Clear, objective wording is essential in this setting. Unfortunately, the absence of resources focused on the language of testing puts the onus on labs to identify and update potentially concerning order names and resulting practices. This is an evolving discussion with no clear consensus on best practices; labs should consult with their local

clientele to determine the most appropriate language for their needs.

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Christine Snozek, PhD, is the director of point-of-care testing and central processing and codirector of chemistry and support services at Mayo Clinic in Arizona. She was previously associate director of the toxicology and drug monitoring laboratory at Mayo Clinic Rochester. She is a member of the Clinical and Forensic Toxicology News *editorial advisory board. Email: Snozek.Christine@mayo.edu. Ronald R. Henriquez, PhD, is the Chief of Core Laboratory Services for Brooke Army Medical Center Fort Sam Houston, Texas, and a member of the* Clinical and Forensic Toxicology News *Editorial Advisory Board. E-mail: ronald.r.henriquez.mil@health.mil.*

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Toxicology Updates from the 2023 AACC Annual Scientific Meeting

By Sara A. Love, PhD, DABCC

This year's annual scientific meeting (ASM) was held in Anaheim, CA, and celebrated the association's 75th anniversary. This meeting also functioned as the transition point from AACC to our new name and branding as the Association for Diagnostics & Laboratory Medicine (ADLM). The ASM events featured networking opportunities outdoors to enjoy the sun and warm weather expected of a CA-based ASM. This year's program continued to feature a toxicology track for attendees which included a variety of educational opportunities spanning meeting days and session types. The annual division membership meeting and luncheon held on Monday afternoon provided opportunities for toxicology-focused networking and recent division activities with important updates.

A University session started ahead of the ASM formally opening on Sunday, with a half-day course where Drs. Snozek and Colby covered the "need to know" items for attendees interested in improving their understanding of drug use testing. This session was presented through interactive case studies describing common and novel drugs, highlighting common issues with testing and result interpretation, and highlighting new trends and methods. The roundtable sessions on both Tuesday and Wednesday appeared popular with most sessions selling out their seating. These sessions were presented by both trainees and toxicology experts and focused on a range of topics including benzodiazepine analysis by liquid chromatography with tandem mass spectrometry, lead testing in high-risk communities, urine screening by gas chromatography-mass spectrometry, fentanyl testing over the years, and how people attempt to defend positive results.

There was an extremely busy week of offerings where several sessions focused on the evolving needs of toxicology labs and test results beyond our clinical partners. A morning session from Dr. Lynch focused on a multidisciplinary team caring for pediatric patients when considering child maltreatment or neglect assessments at UCSF. Here Dr. Lynch's session highlighted the need for collaboration between medical and legal systems practitioners to provide necessary care to this vulnerable patient population. Dr. Badea's afternoon session highlighted the role of the laboratory as part of a harm-reduction strategy to improve public health. They integrate both clinical and forensic toxicology testing with untargeted liquid chromatography quadrupole time-of-flight mass spectrometry as part of the efforts to find synergies between the results from drug and paraphernalia testing, specimens from clinical patients, and timely communication of these integrated findings directly back to providers and those individuals using their local supply of drugs. A session presented by Dr. Konforte focused on the evolving role of urine drug testing that best supports providers in delivering patient-centered care for those with opioid use disorder. A portion of the session highlighted recent guidance from the National Institute on Drug Abuse on updated terminology to help remove stigmatizing language such as "drugs of abuse." For those interested in learning more about this issue and removing stigmatizing language please see the accompanying article in this issue.

Additional sessions highlighted the contemporary challenges laboratories face such as test selection and utilization as well as challenging and unusual toxic exposures or interpretations. A session by Dr. Badea on laboratory stewardship and therapeutic drug monitoring had panelists compare and contrast their considerations for how to approach testing for antiepileptic drugs within their respective institutions, highlighting that there is not one solution to address the needs of all systems. Rounding out the toxicology track offerings were two sessions highlighting challenging and unusual cases: one by Dr. Jannetto focused on heavy metal and elemental toxicity while the second by Dr. El-Khoury highlighted the challenges of interpretations when working with non-blood matrices.

Beyond the broad scientific offerings at this year's meeting, the annual division awards were announced. This included the young investigator award, which went to Dr. Alec Saitman of Providence Regional Laboratories in Portland, OR. The division's best abstract was awarded to Connor Blair, of Washington University in St. Louis, for his poster entitled "Aberrant lithium results after HDL assay on Roche Cobas c503 instrument." Mark your calendar as next year's meeting will be held in Chicago, IL, from July 28 to August 1, 2024.

Sara A. Love, PhD DABCC is currently a medical officer at Siemens Healthineers and a member of the CFTN Editorial Advisory Board. Email: sara.love@siemens-healthineers.com.

S.A. Love receives a salary from Siemens Healthineers.

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