

# inSIGHTS

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# LETTER FROM THE CHAIR

This issue of COLA Insights is devoted to discussing the increasingly central role of the laboratory in addressing the very serious opioid epidemic that continues to worsen due to the introduction and proliferation of synthetic analogues. More than 130 people per day are dying due to synthetic opioid overdoses, and laboratory testing holds the key to effective identification, treatment, and prevention strategies.

The first article, “Combating the Opioid Epidemic: the Essential Role of the Laboratory” presents an overview: the history, statistics, and context of this epidemic. We discuss key testing strategies, including urine drug screening by immunoassay, and confirmatory identification using mass spectrometry. Both the advantages and the shortcomings of each technology are reviewed. However, experience has shown that it is not enough to just test and report results, if the treating physicians do not understand how to interpret the information provided. Laboratory professionals must proactively partner with other healthcare professionals to ensure that the information provided is utilized most effectively. Laboratory test data is important not only for treatment of individuals caught up in this epidemic, but for use by public health professionals to identify new opioid analogues, and their distribution among the population.

This overview of the epidemic is followed by a more detailed discussion of urine drug screens, which are by far the more commonly used laboratory test for evidence of opioid drug exposure. While mass spectrometry provides more specific and detailed information, and is often the follow up test to drug screens, urine drug screens are commonly performed by physician office laboratories, at point of care testing sites when rapid results are needed. This article, “Urine Drug Screens for Monitoring Opioid Therapy” provides guidance on how long various opioids are detectable in urine and the reasons for false negative and false positive results.

Our final article, “Strategic Laboratory Partnerships: Team Fight Against the Opioid Epidemic” examines the strategic imperative that, in order to effectively address this epidemic, laboratories must be part of the total healthcare team effort. This team approach applies not only to improving individual patient care, treatment and monitoring, but to every area of government, law enforcement, public health, legal and forensic involvement. A number of professional organizations have published recommendations for addressing this public health emergency.

For a change of pace, our Feature article: “Patient Empowerment Through Patient Education” discusses how advancing technology that enables the individualization of patient care (or “personalized medicine”), coupled with direct internet access to healthcare providers, is empowering patients to be proactive in their healthcare. This has manifested itself in the assertion of a patient’s right to self-order their own tests, and receive results directly. The impact on laboratories is discussed, including the need for detailed patient education for correct test ordering, results interpretation, and follow up. Essentially, this will continue to impact not only laboratory testing, but issues of confidentiality, customer service and liabilities.

The opioid epidemic touches all of us, and the clinical laboratory can be a valuable partner in the fight against this crisis.



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# Combating the Opioid Epidemic:

## The Essential Role of the Laboratory



### INTRODUCTION:

#### Understanding the Opioid Epidemic

In 2018, for the first time in over two decades, total drug overdose deaths decreased in the United States, declining 5.1%, from 72,224 in 2017, to an estimated 68,577 in 2018. Particularly noteworthy was the fact that some 59 percent of the decline in overall drug deaths could be attributed exclusively to a reduction in those caused by prescription opioids<sup>1</sup>.

However, deaths from illicitly manufactured opioids, especially fentanyl, continued to soar. In 2017, these synthetic opioids were to blame for 28,869 out of the overall 47,600 opioid overdoses, a 46.4 percent increase over the previous year, when fentanyl became the leading cause of overdose deaths in America for the first time. Fentanyl is 50 times more powerful than heroin. Estimates for the first eight months of 2018, the most recent available, show that an additional 20,537 Americans died — a toll on pace to exceed the previous year's<sup>2</sup>.

This rise in opioid overdose deaths can be outlined in three distinct waves<sup>3</sup>:



- 1 The first wave began with increased prescribing of opioids in the 1990s, with overdose deaths involving prescription opioids (natural and semi-synthetic opioids and methadone) increasing since at least 1999.
- 2 The second wave began in 2010, with rapid increases in overdose deaths involving heroin.
- 3 The third wave began in 2013, with significant increases in overdose deaths involving synthetic opioids, particularly those involving illicitly-manufactured fentanyl (IMF). The IMF market continues to change, and IMF can be found in combination with heroin, counterfeit pills, and cocaine.

The adverse effects on individuals, families, society, and healthcare costs are monumental. This public health crisis is recognized and well-publicized, with Federal and state governments investing billions of dollars in an attempt to end the opioid epidemic.

### THE NEED TO MONITOR OPIOID DRUG THERAPY

In many scenarios, though, opioids are still the most efficacious treatment for severe pain, which leaves clinicians in the difficult position of deciding which patients can safely start or continue opioid therapy. Recent data has shown that greater than 40% of patients receiving opioid therapy may develop “opioid use disorder.”<sup>4</sup> An essential tool toward determining the potential for opioid abuse by patients is drug testing. This testing is used to determine if a patient is taking opioids or other pain medications as prescribed, or to determine if a patient is abusing other substances. This information is utilized by physicians, healthcare providers, and, at times, law enforcement agencies.

### TESTING STRATEGIES

#### Urine Drug Screens: Utilized by Physician Office Laboratories / Point of Care Testing

Since one of the greatest challenges to present day treatment of chronic pain is identifying which patients may be potentially at risk of addiction, either prior to the initiation of opioid therapy, or during such therapy, patients in pain management programs are often formally assessed before treatment, and then monitored while they are receiving treatment.

Urine drug screens (UDS) are often a part of this monitoring strategy. The results of UDS provide evaluation of compliance with the agreed-upon treatment plan. While these tests can rapidly diagnose relapse or drug misuse, the results can also be used to advocate for the patient with third-party interests. The purpose of UDS should be explained to the patient at the initial evaluation. UDS can also enhance the relationship between healthcare professionals and patients by providing documentation of adherence to mutually agreed-upon treatment plans<sup>5</sup>.

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In the pain management setting, the presence of an illicit or unprescribed drug does not necessarily negate the legitimacy of the patient's pain complaints, but it may suggest a concurrent disorder such as drug abuse or addiction. The patient must then be willing to accept assessment and treatment of both disorders to receive adequate outcomes in either. Thus, the diagnosis of a concurrent addictive disorder, when it exists, does nothing to negate a legitimate pain disorder; rather, it complicates it<sup>vi</sup>.

Typically a drug screening program involves a two-step process: the initial screen, performed by immunoassay, usually utilizing urine as the preferred specimen; and then the confirmation can be performed by Mass Spectrometry (MS) testing. These laboratory procedures are the methods most commonly utilized to test for drugs. Using a combination of both allows a high level of sensitivity and specificity, meaning there is an extremely low chance for false positives or false negatives.

The immunoassay is performed first and used as a screening method. If the immunoassay is negative for unexpected drugs, no further action may be required.

If the sample is positive, an additional confirmatory MS analysis may be performed on a separate portion of the urine. The more specific MS is used as a confirmatory test to identify individual drug substances or metabolites and in some cases, quantify the amount of the substance.

False positive samples from the screening test will almost always be negative on the confirmation test. Samples testing positive during both screening and confirmation tests are reported as positive to the entity that ordered the test<sup>vii</sup>.

### Mass spectrometry Testing (MS): Confirmatory Toxicology laboratories

The confirmatory Mass Spectrometry testing is usually conducted in full service toxicology laboratories, distinct from the initial point-of-care urine drug screening that is conducted in non-specialized laboratories such as in a doctor's or healthcare provider's office.

The more comprehensive laboratory data from MS testing is also invaluable for epidemiological studies to target prevention efforts, detect and track emerging synthetic drugs, and direct policy changes. Community-based toxicology laboratories that are in close proximity to the at-risk patient population work in conjunction with healthcare providers to design specific testing schemes that are often geographically focused and based on the observed and reported abuse in that specific region.

However, with the rise of prescribed and illicit synthetic opioids, which typically cannot be detected with routine point-of-care drug screening, the toxicology laboratory's role of detecting opioid misuse, monitoring patients, and providing data on emerging synthetic drugs has become even more critical<sup>viii</sup>.

The American Association for Clinical Chemistry (AACC) has published guidelines detailing how healthcare providers can use laboratory tests to manage treatment of pain and prevent prescription drug overdoses. One of the major recommendations is that laboratory professionals should partner with clinicians and contribute their specialized knowledge to pain management cases. The guideline also emphasizes that targeted, definitive drug tests, such as those based on Mass Spectrometry technology, should be used as frontline drug screens whenever possible. Mass Spectrometry-based tests overcome the limitations of the current frontline screening method, the immunoassay, which is useful but can produce a high rate of incorrect results and sometimes only reveals what general drug class is present in a patient's urine rather than the specific drug<sup>ix</sup>.

### Point-of-care urine drug screening has several advantages<sup>x</sup> ...

- Urine is the preferred specimen for drug abuse testing primarily because it is non-invasive;
- Drug levels in blood only reflect the presence of a drug at a given point in time, and levels may be high enough to be detected only for a relatively short period of time;
- Urine specimens may contain detectable levels of drug over an extended period, often as much as 2-4 days, and at much higher concentrations than in blood;
- Urine may also contain higher levels of drug metabolites than blood, providing further evidence of drug use;

### ...but there are also significant disadvantages to point-of-care urine drug screen testing :

- Reliance on an immunoassay test, which only detects classes of drugs, will limit the number of drugs detected. For example, some opioids, such as fentanyl, buprenorphine, tapentadol, and tramadol, are not routinely detected;
- Does not provide quantitative results;
- Can produce false positive results due to cross-reactivity with structurally related and other compounds from prescriptions, herbal compounds and over-the-counter drugs, or false negative results due to lack of reactivity with newer, emerging novel psychoactive substances, all of which can result in poor patient care and incorrect data that skew national statistics.
- Point-of-care testing does not detect the presence of alcohol or its metabolites in the urine, and since mixing prescribed medications with alcohol is one of the most common causes of unintentional overdose, this information is very important to the prescriber.

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## Alternatively, the more complex MS testing offers the following advantages<sup>ii</sup> :

- Provides qualitative and quantitative results with highly specific and sensitive results for a given patient;
- Produces accurate and high-quality data that can improve treatment and prevention efforts in population health;
- Detects a wide range of drugs and differentiates between classes of drugs, providing specific data to clinicians, public health agencies, and law enforcement;
- Produces data reflecting medication compliance or lack thereof;
- Effectively monitors emerging synthetic drugs, providing information to public health and safety agencies about the factors driving the drug abuse epidemic;
- Accurately identifies potentially dangerous drug interactions, such as benzodiazepines and alcohol, which can lead to an overdose or death, so that healthcare providers can intervene.

## LABORATORY LEADERSHIP: Building Strategic Partnerships

Success in combating the opioid epidemic requires a multifaceted, collaborative approach, of which toxicology test data is a critical component. These include strategic partnerships with federal agencies, state and local health agencies, law enforcement officials, healthcare providers and others to leverage the data collected by clinical laboratories to use for treatment and prevention efforts.

Toxicology laboratories, in particular, have the ability to work in conjunction with healthcare providers and state and local agencies to design specific methods and patterns of testing that are often geographically focused and based on the observed and reported abuse in that specific region.

Additionally, these laboratories have the ability to assist healthcare providers in developing and managing individualized patient risk protocols and implementing testing policies that reduce cost, utilization and frequency while simultaneously improving patient care and outcomes.<sup>iii</sup>

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<sup>iii</sup> Centers for Disease Control and Prevention. CDC-Info. Opioid Overdose. Three Waves of Opioid Overdose Deaths. Dec. 19, 2018 <https://www.cdc.gov/drugoverdose/epidemic/index.html#three-waves>

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Some important initiatives that the laboratory community can take as part of the continuing effort to fight this crisis of opioid addiction and death that is decimating communities nationwide include<sup>xiv</sup>:



**1 Educating policymakers,** public health partners, federal government partners, law enforcement agencies and others about the role of toxicology laboratory testing in curbing the opioid epidemic, including differences in types of tests;



**2 Enabling data sharing:** assemble stakeholders to undertake a formal discovery process to determine core elements of a data sharing strategy to inform public health and surveillance efforts;



**3 Fostering collaboration:** Leverage existing relationships and catalyze new partnerships to collectively address the addiction and opioid epidemic and ensure the inclusion of toxicology laboratory experts.

## CONCLUSION

Opioids are potent pain medications, often used for the treatment of chronic pain in both malignant and non-malignant diseases or conditions. Their strong addictive potential requires close monitoring of patients on opioid therapy for possible non-compliance with prescriptions, for drug diversion, and for proof of avoidance of non-prescribed or illicit opioids. Monitoring can be performed by urine drug screens or qualitative / quantitative drug confirmation assays.

Traditional immunoassays, often used for urine drug screening, react with only a small number of opioids or only with a single medication and they exhibit variable cross reactivity with their metabolites. Additionally the limit of detection of these immunoassays may not be sufficient for medical purposes, therefore clinical interpretation of immunoassay test results can be challenging. As a result, Mass Spectrometry based assays have been adopted by many clinical laboratories. These tests can provide information about the presence of multiple opioids and their metabolites in a single sample at clinically meaningful detection limits, allowing accurate assessment of patient compliance.

Clinical data from laboratory testing provides the information vital to confronting the ongoing public health and public safety crises. When this information is lacking, the result is a continued escalation in the opioid epidemic.<sup>xv</sup>

<sup>viii</sup> Curbing Drug Addiction and the Opioid Crisis. The Role of Toxicology Laboratories in Diagnosis, Treatment, and Prevention. National Independent Laboratory Association (NILA). <https://www.nila-usa.org/images/Opioid%20TF%20White%20Paper%20FINAL2.pdf>

<sup>ix</sup> AACCC Releases Practice Guidelines for Using Laboratory Drug Tests to Combat Opioid Addiction, Overdoses. CISION PR Newswire. January 16, 2018. <https://www.prnewswire.com/news-releases/aacc-releases-practice-guidelines-for-using-laboratory-drug-tests-to-combat-opioid-addiction-overdoses-300583234.html>

<sup>x</sup> Urine Drug Testing: Approaches to Screening and Confirmation Testing. Gifford Lum, MD and Barry Mushlin, MA. Laboratory Medicine. June 2004. No.6 V.35

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<sup>xii</sup> Ibid.

<sup>xiii</sup> Ibid.

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<sup>xv</sup> The Laboratory's Role in Opioid Pain Medication Monitoring. Bodor, G. The Journal of the International Federation of Clinical Chemistry and Laboratory Medicine (JIFCC). July 23, 2012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4975244/>

# Urine Drug Screens:

## Monitoring Opioid Therapy



### INTRODUCTION :

According to an evidence-based assessment by the American Society of Interventional Pain Physicians (ASIPP), approximately one third of chronic pain patients do not use opioids as prescribed or may abuse them. Moreover, studies have found that a substantial proportion of chronic pain patients inaccurately report non-adherence to prescribed medications and use of illicit drugs.

Various strategies are available to monitor pain management, and multicomponent interventions are often used. Many settings require patients to sign a contract before they are given a prescription for opioids. The contracts generally involve obtaining patients' agreement on behaviors they will engage in during the treatment period (e.g., taking medication as prescribed) and not engage in (e.g., selling prescribed medication and/or obtaining additional prescriptions from other physicians).

Confirming whether patients follow these behavioral guidelines can be a challenge. Risk-assessment screening instruments, such as the Screener and Opioid Assessment for Patients with Pain-Revisited (SOAPP-R), and the Opioid Risk Tool (ORT), can aid in the assessment of patients' risk for inappropriate drug use.

Another strategy for monitoring patients is testing for the presence or absence of drugs through urine drug screening (UDS). Advantages of urine sampling is that it is readily available, and standardized techniques for detecting drugs already exist.

There are two primary categories of urine drug testing: Immunoassays for qualitative / screening tests; and Mass Spectrometry, most often paired with Liquid Chromatography (LCMS) for qualitative and quantitative confirmatory testing.

Our discussion here will focus on immunoassay based UDS, the methodology most commonly used in physician office settings, and often the initial step in determining compliance with behavioral agreements and contracts.

If the sample is positive, an additional confirmatory LCMS analysis is performed on a separate portion of the sample. The more specific LCMS is used as a confirmatory test to identify individual drug substances or metabolites and sometimes quantify the amount of the substance. Confirmatory tests, such as LCMS should be utilized prior to reporting positive drug test results. False positive samples from the screening test will almost always be negative on the confirmation test. Samples testing positive during both screening and confirmation tests are reported as positive to the entity that ordered the test. Most laboratories save positive samples for a period of time in the event of a disputed result or lawsuit<sup>ii</sup>.

### Immunoassay Testing Qualitative Screening

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These tests can be performed either in a laboratory or at point of service. Immunoassay tests are based on the principle of competitive binding and use antibodies to detect a particular drug, drug class or drug metabolite in a urine sample. With competitive binding, a fixed amount of a labeled drug is added to the urine sample, and the drug or metabolite in the sample competes with the labeled drug for binding sites on the antibody. The amount of labeled antigen that binds with the antibody is inversely proportional to the amount of the drug, drug class or metabolite in the sample.

Immunoassay tests vary in the type of compounds they can detect. Some detect specific drugs and may fail to recognize similarly structured drugs within the same class. Other immunoassays identify only classes of drugs and thus results cannot be used to determine which drug a patient is taking. For example, a positive result to an opiate immunoassay can be due to morphine or hydromorphone. The degree of cross-reactivity, i.e., an antibody's reactivity with a compound other than the target of the test, varies widely among immunoassays.

Immunoassay findings are generally reported qualitatively as either positive (drug level above a pre-specified threshold) or negative (drug level below a pre-specified threshold).

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Raising or lowering the threshold thus changes the proportion of positive tests. A negative test is interpreted as a level below the threshold and does not necessarily mean that the drug or metabolite is absent. Immunoassays generally have a rapid turnaround time, within minutes for onsite tests and 1 to 4 hours for laboratory-based tests.

There are various approaches to incorporating UDS into pain management and treatment settings. Most commonly, patients undergo UDS before beginning treatment to verify the state of current drug use. Some clinicians believe that UDS should be routinely used to establish baseline information about substance use, but the optimal frequency and interval of testing remains uncertain. A universal approach to screening may uncover more inappropriate use and may reduce patients' sense that testing is being performed due to a lack of trust. An alternative approach is selective testing of patients who are at increased risk for drug misuse.

Full informed consent is a requirement before urine drug testing. Patients should be informed of the specific drug testing protocol before treatment and should provide written agreement with the plan for monitoring. As stated in a joint U.S. Veterans Affairs/Department of Defense guideline, patients' refusal to consent to urine testing should be considered as one factor in the overall assessment of patients' ability to adhere to treatment.

### Urine Drug Screens

Considerations of the length of time opioids may be detected in urine<sup>iv</sup> :

OPIATES	DETECTION
Codeine	48 hours
Heroin (morphine)	2 to 4 days
Hydromorphone	2 to 4 days
Methadone	3 days
Morphine	48 to 72 hours
Oxycodone	2 to 4 days
Propoxyphene	6 to 48 hours



## THE POSSIBILITIES OF FALSE NEGATIVE AND FALSE POSITIVE RESULTS :

### Possible reasons for false negative results:

False negatives are uncommon but can occur as a result of low drug concentrations in the urine, tampering, and in other situations. Possible reasons for false-negative results include:

- Dilute urine (excess fluid intake, diuretic use, pediatric sample)
- Infrequent drug use
- Prolonged time since last use
- Recent ingestion
- Insufficient quantity ingested
- Metabolic factors
- Inappropriate test used
- Elevated urine lactate
- **Tampering:**
  - Tetrahydrozoline (eye drops)
  - Bleach
  - Vinegar
  - Soap
  - Ammonia
  - Lemon juice
  - Drain cleaner
  - Table salt

### Possible reasons for false positive results:

Although immunoassays are very sensitive to the presence of drugs and drug metabolites, specificity and accuracy varies depending on the assay used and the substance for detection. This limitation may result in false-positives from substances cross-reacting with the immunoassay.

Many prescription and nonprescription substances have been reported to cross-react with immunoassays and cause false-positives. Most have only been documented in case reports. The frequency of false-positives varies, depending on the specificity of immunoassay used and the substance detected.

### Reporting the Test Result<sup>vi</sup>

A positive initial drug screening means that the person tested has a substance in his or her body that falls into one of the drug classes and is above the established cutoff level. If confirmatory testing provides a positive result, it means that the person has indeed taken this drug. In some cases, this result indicates a window of time in which the person took the substance and its approximate quantity, but in most circumstances, that information is not necessary. Interpretation of when and how much drug was consumed can be challenging because the concentration of many drugs varies, as do people's rates of metabolism.

If testing reveals no drugs, or drugs in amounts below the established cutoffs, then the results are usually reported as "not detected" or "none detected." A negative result does not necessarily mean that the person did not take a drug at some point. The drug may be present but below the established cutoff, the drug may have been already metabolized and eliminated from the body, or the test method does not detect the particular drug present in the sample.

In short, the importance and impact of urine drug screen results on the life of the individual tested requires a heightened awareness of both the strengths and limitations of the methodologies used.

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## Advantages of Urine Drug Screens<sup>SM</sup>

- Non-invasive
- Ample volume
- Drugs and drug metabolites found in urine are usually stable
- Drugs and their metabolites are often present in higher concentrations in urine than in other biological materials
- Detectable in urine for relatively long period of time
- Presence of metabolites (in addition to parent drug) provides further evidence of drug use
- Readily preserved by refrigeration or freezing
- Analysis relatively simple because of absence of proteins and cellular material in urine
- Wide availability of commercial reagents and analytical systems

## Disadvantages of Urine Drug Screens<sup>SM</sup>

- Drug levels in urine do not correlate well with levels in other body fluids
- Drug levels may vary widely depending on fluid intake, voiding pattern, and time elapsed since drug intake
- Urine drug excretion continues after physiologic effect of the drug ceases, resulting in lack of correlation of drug level with intoxication
- May be difficult to obtain specimen if test subject cannot void
- Urine specimens are easily substituted, diluted, or adulterated
- Direct observation of urine collection may be an invasion of privacy
- Urine may be unstable if not properly handled and stored

## DEALING WITH UNEXPECTED URINE TOXICOLOGY RESULTS<sup>SM</sup>

UDS in clinical practice must be used to monitor and improve patient care. Unfortunately, these test results may come back unexpectedly negative for a prescribed drug or positive for an unprescribed one. The first step in interpreting these results is to contact the lab to ensure that no clerical errors have been made. If unexpected results are confirmed, there must be a process in place that should include discussing the unexpected result with the patient.

Unexpected Result	Possible Explanation	Possible Actions for the Physician
<p><b>Test is negative for prescribed opioid</b></p>	<ul style="list-style-type: none"> <li>● False negative</li> <li>● Non-compliance</li> <li>● Diversion</li> <li>● Misidentification of the patient or specimen</li> </ul>	<ul style="list-style-type: none"> <li>● Repeat Urine Drug Testing regularly;</li> <li>● Conduct confirmatory testing specifying the drug of interest (e.g., Oxycodone often missed by immunoassay);</li> <li>● Take a detailed history of the patient's medication use for the preceding 7 days (e.g., could learn that the patient ran out several days prior to the test);</li> <li>● Ask patient if they have given the drug to others;</li> <li>● Monitor compliance with pill counts</li> </ul>
<p><b>Test is positive for non prescribed opioid or benzodiazepines</b></p>	<ul style="list-style-type: none"> <li>● False positive</li> <li>● Patient acquired opioids from other sources such as from another physician or from an illicit source</li> <li>● Misidentification of the patient or specimen</li> </ul>	<ul style="list-style-type: none"> <li>● Repeat Urine Drug Testing regularly;</li> <li>● Ask patients if they accessed Opioids from other sources;</li> <li>● Assess for Opioid misuse / addiction;</li> <li>● Review / Revise Treatment Agreement</li> </ul>
<p><b>UDS positive for illicit drugs (e.g., cocaine)</b></p>	<ul style="list-style-type: none"> <li>● False positive</li> <li>● Patient is occasional user or addicted to the illicit drug</li> <li>● Cannabis is positive for patients taking certain medications (e.g., dronabinol)</li> <li>● Misidentification of the patient or specimen</li> </ul>	<ul style="list-style-type: none"> <li>● Repeat Urine Drug Testing regularly;</li> <li>● Assess for abuse / addiction and refer for addiction treatment as appropriate</li> </ul>

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## CONCLUSION

UDS is an effective tool in the assessment and ongoing management of patients who will be, or are being, treated for chronic pain with opioid therapy. Most importantly, a healthcare professional should have a relationship of mutual honesty and trust with the patient when using UDS in the clinical practice, and should maintain open communication with the testing laboratory. A quality UDS program is intended to improve patient health and safety, and to assist healthcare professionals as they advocate on behalf of their patients<sup>5</sup>.



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<sup>ii</sup> Drugs.com. Drug testing FAQs. <http://www.drugs.com/article/drug-testing.html>

<sup>iii</sup> Ibid.

<sup>iv</sup> Philosophy of Urine Drug Testing in Pain Management. Heit, H. and Gourlay D. Prescribe Responsibly. July 2, 2015 <https://www.medicaldisposables.us/Philosophy-of-Urine-Drug-Testing-in-Pain-Management-Clinics-s/1837.htm>

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# Strategic Laboratory Partnerships:

## Team Fight Against the Opioid Epidemic

Strategic Partnerships Between **Laboratories and Healthcare Providers, Public Health Agencies, and Law Enforcement** are Vital in the Fight Against the Synthetic Opioid Epidemic

### INTRODUCTION:

Deaths linked to opioids continue to increase, and the majority of deaths caused by opioid overdose now point to illicitly manufactured drugs, such as fentanyl and its derivatives, and extremely potent synthetic substances, such as carfentanil and U-47700. The adverse effects of these abused drugs on individuals, families, society, and health care costs are monumental. This public health crisis is recognized and well-publicized, with Federal and state governments investing billions of dollars in an attempt to end the opioid epidemic.

In 2017, 28,869 people died from synthetic opioid related overdoses, a 46 percent increase from the year before. Laboratories are often the first to identify synthetic drugs circulating on the streets and can provide insight into their variety and the frequency of their use in local communities. Leveraging the expertise of clinical laboratory professionals to identify the use of synthetic opioids helps clinicians and first responders make informed treatment decisions and helps public health and safety officials identify the cause of overdose outbreaks and coordinate a response<sup>1</sup>. Laboratories generate data that can support the timely assessment of drug trends and facilitate a faster response to overdose outbreaks.

### LABORATORY TEST DATA HELPS CLINICIANS PROVIDE EFFECTIVE PATIENT OPIOID TREATMENT<sup>2</sup>

Most prescription painkillers are prescribed by primary care and internal medicine doctors and dentists. “I see this in my own practice, where it’s mostly the primary care physicians who have difficulty managing patients on chronic opioid therapy and are coming to the laboratory for help in managing those patients”, according to Barbarajean Magnani, PhD, MD, professor, chair, and pathologist-in-chief, Tufts Medical Center, Tufts University School of Medicine, Boston. She sees a crisis today in managing patients who are taking opioids for chronic, non-cancer pain—and the laboratory, she says, has a major role in supporting clinical services.

What do clinicians need from the laboratory? Dr. Magnani points to what are known as aberrant drug behaviors: not using prescribed medications, not using prescribed medications as prescribed, using non-prescribed medications, using illicit drugs, and diverting prescribed medications. “These are the questions that our clinical colleagues ask us when we run a urine drug test and want to know if their patient is compliant.”

However, while urine drug testing can help clinicians with this question, it isn’t perfect. It can’t determine if a patient is adhering to exact dosing intervals, for example. “This is a problem for us when we do our consultations,” according to Dr. Magnani. “All I can really say is if the drug and its metabolites have shown up in the urine, then it’s most likely they’ve taken that drug prior to the urine collection. I don’t know exactly how much and whether they’re taking it every day. I can’t determine whether they’re taking more or less of that prescribed dose.” As to whether they’re taking a nonprescribed medication, it depends on what the assay targets, though most labs can detect use of illicit drugs.

An equally important issue for urine drug testing is clinicians’ interpretive skills. Dr. Magnani cites a seven-question, multiple-choice survey that assessed the skills of 150 physicians at an opioid education meeting. Among this group, 68 percent used drug testing, and 76 percent prescribed opioids; 19 percent were board-certified in pain management and six percent in addiction medicine or psychiatry. Of those who ordered drug tests, says Dr. Magnani, none answered all seven questions correctly, and only 30 percent scored more than half correctly. The implications are clear to Dr. Magnani: Clinicians need help with interpretation of drug testing results from the laboratory.

In another study, less than one quarter of the clinicians correctly answered questions about urine drug tests related to drug metabolism, the effects of passive inhalation of marijuana, or whether morphine or codeine are present in poppy seeds<sup>3</sup>.

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# THE IMPACT OF SYNTHETIC OPIOIDS

Local markets for synthetic opioids are diverse and continually changing. Highly potent opioids such as fentanyl are easily trafficked. Slight modifications to their chemical structure can produce a variety of derivatives, also known as analogs, which produce similar effects with substantial differences in potency and toxicity. Cheaper and more powerful than their traditional counterparts, synthetic opioids have exploded in prevalence and are commonly mixed with heroin or cocaine or pressed into counterfeit pills and sold as prescription pain medication<sup>iv</sup>.

The rise of synthetic opioids is increasing the rate of overdose deaths because users are often unaware of the true composition of the drugs they have taken. Clinicians and first-responders frequently encounter patients who require multiple doses of the opioid antidote naloxone to reverse an overdose caused by exposure to highly potent synthetic opioids. The effects of these opioids can be long-lasting, and patients who initially respond well to naloxone may need additional doses after the initial reversal to prevent overdose symptoms from returning. High doses of potent synthetic opioids have been known to overwhelm the effects of opioid antidotes to the point that patients require a ventilator to breathe. Detecting when these drugs first begin to circulate in a community is critical to prevent a potential overdose outbreak and save lives .

Laboratory professionals such as toxicologists are experienced with identifying chemicals, drugs, and other substances. Their expertise can support the identification of synthetic opioids and enable a timely public health response.

## LABORATORY TESTING FOR SYNTHETIC OPIOIDS<sup>v</sup>

### The Limitations of Immunoassay Drug Screens

Sophisticated test procedures are required to detect synthetic opioids. Commonly used tests, known as immunoassays, can identify a limited range of synthetic opioid analogs that may vary depending on the manufacturer. These tests can be performed quickly but are often of limited utility when evaluating an overdose due to a lack of sensitivity and specificity. A positive result would not necessarily specify the drug to which a patient was exposed, and a negative result may not indicate a lack of exposure since a compound could be present but undetected. Close collaboration is required between laboratories and the physicians ordering tests, especially when the results have implications for critical treatment decisions. Clinical laboratorians who are familiar with the limitations of certain screening methods, such as board-certified toxicologists or clinical chemists with a focus in toxicology and therapeutic drug monitoring, should be included on clinical care teams to help clinicians order and interpret tests, and to help educate patients and the public about the danger of local synthetic opioid varieties.

### Mass Spectrometry and Laboratory Developed Testing

Direct testing by Mass Spectrometry (MS) is an alternative strategy. One advantage of this approach, according to Tai C. Kwong, PhD, a professor of pathology and laboratory medicine and director of the hematology/chemistry laboratory, University of Rochester (NY) School of Medicine and Dentistry; is that immunoassays are class assays, whereas MS assays are analyte specific. "For example, an immunoassay positive tells you that there are benzodiazepines present, assuming it is a true positive. But the Mass Spectrometry will tell you which benzodiazepine is present."<sup>vii</sup>

MS assays are also analytically more sensitive and have lower cutoffs. For example, the opiate immunoassay cutoff is 300 ng/mL, but MS assays can easily detect down to 50 ng/mL or lower.

Finally, immunoassays are qualitative, while MS assays can give quantitative measurements of drug concentrations. But MS assays have the disadvantage of slow throughput, he notes. Most assays require sample preparation and extraction steps, which are labor-intensive and time-consuming. And "if you want to analyze for 10 or more different opiates, you will have to separate these opiates chromatographically," which makes for a long run time<sup>viii</sup>. Laboratories that use these sensitive analytical technologies are always working on new protocols to detect and confirm synthetic opioids and designer drugs. The rapid pace at which the synthetic opioid landscape evolves makes new testing panels obsolete by the time they receive FDA approval. In order to stay ahead, clinical laboratories develop specialized Mass Spectrometry assays. These laboratory developed tests can accurately identify novel synthetic drugs at extremely low concentrations<sup>ix</sup>.

## PUBLIC HEALTH AND SAFETY PARTNERSHIPS

### Opioid Surveillance for Monitoring Patterns of Use and Prevalence

Overdose outbreaks involving novel synthetic opioids are unpredictable and often deadly. Improving the timeliness and scope of opioid surveillance is crucial since local patterns of usage can change significantly in a short period of time. Expanding laboratory capacity to conduct comprehensive testing for synthetic opioids in both fatal and non-fatal cases helps public health and safety officials rapidly identify changes in the local supply of synthetic opioids and coordinate targeted prevention measures<sup>x</sup>.

### Increased Collaboration<sup>xi</sup>

Greater partnership between laboratories, public health and law enforcement agencies could facilitate a more effective response to the synthetic opioid crisis. Laboratories that detect new compounds could report them to a public health surveillance system focused on tracking opioid usage. The information could then be disseminated to the relevant parties. If a particularly deadly opioid such as carfentanil is reported, clinicians, public health officials, and law enforcement could be notified to take precautions or mobilize a response.

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The Drug Enforcement Administration monitors geographic trends in the illicit opioid supply and collects drug chemistry data from a network of laboratories through its National Forensic Laboratory Information System. Ideally, this information would then be made available to assist laboratories with chemical characterization of novel synthetic opioids and to augment public health surveillance data.

The Opioid Crisis is so dire, that key laboratory professional associations are speaking up with action proposals and programs of their own to address this emergency:

### Recommendations by the American Association for Clinical Chemistry (AACC)<sup>ii</sup>

The AACC, in support of efforts to address the opioid crisis through greater collaboration between laboratories, healthcare personnel, public health and safety agencies, and other stakeholders, has published a set of recommendations.

In particular, the Association recommends the following actions.

#### Laboratories and the Healthcare Community

- Laboratory experts should be included on clinical care teams to assist with test ordering and interpretation.
- Laboratory directors should provide detailed interpretive comments and consultative services for sophisticated tests as warranted.
- Clinicians should consult with experts in their laboratories to ensure patients in pain treatment and opioid dependency programs are effectively monitored for synthetic opioid usage.
- Overdose patients should be educated about precautions to take with synthetic opioids and provided access to medication-assisted treatment.

#### Congress & Federal Agencies

- Congress should provide funding to scale-up the number of hospitals, and clinical and public health laboratories that can identify novel synthetic drugs at the state and local level.
- Congress should provide funding to develop stakeholder partnership networks that facilitate rapid information sharing to target synthetic opioid response and prevention resources.
- Congress should provide funding to expand opioid surveillance programs for synthetic drugs, such as DAWN, to leverage timely de-identified data from a greater number of clinical and public health laboratories.
- The Drug Enforcement Administration should provide access to analysis of seized materials to clinical and public health laboratories to assist with the timely identification of novel synthetic opioids.
- The Food and Drug Administration should expedite the regulatory approval of testing panels developed for the rapid detection of synthetic opioids.

#### CONCLUSION

The opioid epidemic shows no sign of abating soon, and laboratory professionals will continue to play a key role in providing vital data for discovering new opioid analogues, and tracking their distribution and use. By supplying healthcare teams with essential information identifying opioid use, and monitoring of opioid treatment, laboratories help ensure that patients are offered prompt and effective care and given the support they need to avoid future problems.

The clinical laboratories must be more proactive providing information to the clinicians about the specificity, sensitivity and interferences of the laboratory's opioid assays.



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- <sup>iii</sup> Close Up on the Opioid Crisis. Moya del Pino B. Labs have a key role in advising physicians, providing optimal testing. AACC Clinical Laboratory News. May 1, 2017. <https://www.aacc.org/publications/cln/articles/2017/may/close-up-on-the-opioid-crisis-labs-have-a-key-role-in-advising-physicians-providing-optimal-testing>
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- <sup>v</sup> Ibid. <sup>v</sup> Ibid.

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# Patient Empowerment

## Through Patient Education



### INTRODUCTION:

As the healthcare industry continues to re-engineer the delivery of healthcare services in response to rapid technological change, new government regulations, and new reimbursement models, providers are recognizing the need for new approaches to healthcare management, and the need for increasing patients' engagement in their own care. The laboratory profession, reflecting these changes, has become a central point of patient data generation, organization, and communication, assuming an increasingly important role in healthcare delivery.

An estimated 7-10 billion laboratory tests are performed each year in the United States, and laboratory test results influence medical decisions<sup>1</sup>. This rapidly increasing cache of information not only enables physicians and patients to identify disease and begin treatment earlier than ever before, but also achieves the following:



**Individualize care to meet the unique needs of each patient;**



**Monitor patient progress and adjust treatments accordingly;**



**Foster cost-savings and greater productivity in health delivery.**

### IMPACT OF PERSONALIZED MEDICINE

Personalized medicine, defined as the tailoring of medical treatment to the individual characteristics of each patient, is profoundly impacting all aspects of patient care, including prevention, diagnosis, treatment, and follow up. This approach relies on understanding how a person's unique molecular and genetic profile makes them susceptible to certain diseases.

Consequently, this has allowed medical providers to :

- Shift the emphasis in medicine to prevention and prediction of disease rather than reaction to it;
- Focus on susceptibility to disease, improve disease detection, preempt disease progression;

- Make more informed medical decisions; earlier disease interventions;
- Customize disease-prevention strategies;
- Prescribe more effective drugs and avoid prescribing drugs with predictable side effects; and
- Have a higher probability of desired outcomes due to better targeted therapies.

Thus, if a person's genomic information indicates a higher-than-average risk of developing diabetes or a particular form of cancer, that person may adopt a lifestyle, or sometimes be prescribed medications, to better regulate the aspects of health and wellness over which he or she has control. Successful patient management of these potential health issues requires buy-in by the patient to the necessary regimens, including appropriate laboratory testing. Educating the patient on how these tests work, what the results mean in terms of potential for developing these diseases, and the ramifications that can follow are vital.

### PATIENT-CENTERED HEALTHCARE REQUIRES PATIENT ENGAGEMENT THROUGH PATIENT EMPOWERMENT

#### An empowered, activated patient<sup>®</sup> :

- understands their health condition and its effect on their body
- feels able to participate in decision-making with their health care professionals
- feels able to make informed choices about treatment
- understands the need to make necessary changes to their lifestyle for managing their condition
- is able to challenge and ask questions of the health care professionals providing their care
- takes responsibility for their health and actively seeks care only when necessary and
- actively seeks out, evaluates and makes use of information.

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Educating patients about the meaning of their laboratory tests promotes these goals. When the patient understands the reasons specific tests are ordered, what the results mean, and how they are utilized in the diagnosis, treatment, and monitoring of their conditions, it is more likely that the patient will do what is needed to attain and maintain a healthier state.

### Patient education regarding lab testing can be provided in many ways, including through:

- The physician directly
- Laboratory staff and other ancillary healthcare providers who have the education to provide this information, such as nurses, and pharmacists
- Reference laboratories, where patients can visit directly or receive information via mail or online
- Government information sites such as the FDA, and the CDC
- Laboratory information sites, such as Lab Tests Online<sup>iv</sup>; or Health Network Laboratories<sup>v</sup>;
- Laboratory testing information provided online by major medical clinics and hospitals
- Health insurance companies
- Laboratory profession sites such as the American Association for Clinical Chemistry (AACC); the American Society for Microbiology(ASM), and the American Society for Clinical Pathology(ASCP) and
- Laboratory Accreditation organizations, such as COLA, Inc., the College of American Pathologists and The Joint Commission.

## PATIENT-CENTERED HEALTHCARE REQUIRES PATIENT ENGAGEMENT THROUGH PATIENT EMPOWERMENT

### Direct Access aka Direct-To-Consumer Testing (DTC)

Direct Access or Direct to Consumer (DTC) testing permits consumers to order laboratory tests directly from a laboratory without necessarily having to work with a healthcare provider. These test results may be used to monitor an existing health condition, identify a previously unknown medical disorder, or provide data regarding personal health characteristics. DTC laboratory testing is a key element of ongoing efforts to increase individuals' engagement in managing their healthcare, and it is critical that DTC test results are accurate and well understood. While Direct Access and DTC are terms that are sometimes used interchangeably, DTC is also used to describe the marketing of laboratory tests directly to the consumer. For purposes of this article, we will use the term DTC.

### References

<sup>i</sup> Navigate Your Lab Test. ClinLabNavigator.2019. <http://www.clinlabnavigator.com/clinical-laboratory-v15-774.html>

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<sup>iii</sup> Patients Want to Make Their Own Informed Choices. We Need to Let Them. Al-Agba, Niran S. Medpagetoday's KevinMD.com. Sept. 30, 2016. <http://www.kevinmd.com/blog/2016/09/patients-want-make-informed-choices-need-let.html>

<sup>iv</sup> Lab Tests Online. 2015 American Association for Clinical Chemistry. <http://labtestsonline.org>

Currently almost 40 states and the District of Columbia permit consumers to order some or all of their laboratory tests directly without the involvement of a physician. Similarly, the federal government joined this trend by issuing a regulation directing clinical laboratories to provide individuals with access to their test data upon request. With these new policies in place, consumers are increasingly involved in guiding the health decisions that affect their lives.

The global direct to consumer (DTC) laboratory testing market totaled \$208 million in 2018, according to Kalorama Information's new report, **The Direct-To-Consumer Testing Market**.<sup>vi</sup> The clinical diagnostics market research firm said double-digit growth can be expected. Strong growth is expected throughout the forecast period due to easing of the regulatory processes for DTC laboratory tests and increasing consumer demand for both direct-to-consumer routine clinical laboratory tests and genetic tests.

Regardless of the method by which patients order their own tests, they must have the correct and complete information to understand what the results mean; when it is necessary to follow up with physician visits; and when to seek immediate help.

### Patient's Preferences for Receiving Laboratory Test Results

An important consideration when setting up a system for educating patients about their lab test results is an awareness of preferences for receipt of these results. In a study conducted to identify these preferences, all 200 patients in this study preferred online delivery.<sup>vii</sup>

Also, 82.5% (n = 165) preferred to receive both normal and abnormal test results this way. The main reason for receiving results online was time savings, which was reported by 77% of participants, followed by lowering the chance of missing the results (31%). About 40% of participants thought e-mail notification was more secure than accessing the results through a facility website. Findings showed that although patients wanted to benefit from online services for receiving their test results, they were concerned about confidentiality and security. Before using online technologies, security measures necessary to protect patient privacy and to gain the trust of patients should be implemented.

## CONCLUSION

Education is the modern response to enabling patient empowerment in the face of a rapidly changing healthcare environment, driven by the rapid pace of technological change. Patient education is vital for providing the best value-based healthcare, and to promote long-term partnerships between physicians and their patients. A key component of patient empowerment is ensuring that patients have access to the most complete education possible about their laboratory tests to both understand and be partners in the own health care.

<sup>v</sup> Health Network Laboratories. 2015. <http://www.healthnetworklabs.com/Pages/patienteducation.aspx>.

<sup>vi</sup> Direct-To-Consumer Laboratory Testing. AACC Position Statement. July 2015. <https://www.aacc.org/health-and-science-policy/advocacy/position-statements/2015/direct-to-consumer-laboratory-testing>

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<sup>viii</sup> Patient's Preferences for Receiving Laboratory Test Results. Sabahi, A., Ahmadian, L., Mirzaee, M., and Khajouei, R. The American Journal of Managed care. April 19, 2017. <http://www.ajmc.com/journals/issue/2017/2017-vol23-n4/patients-preferences-for-receiving-laboratory-test-results>

# Laboratory Developed Tests and FDA Regulation

By Brian Reuwer – COLA's Senior Healthcare Policy Analyst

Many laboratories have developed custom diagnostic tests, known as laboratory developed tests (LDTs). An LDT, according to the Food and Drug Administration (FDA), is a type of in vitro diagnostic testing that is designed, manufactured and used within a single laboratory. In the past, the FDA has taken a “hands-off” approach in regulating LDTs. However, because LDTs have grown more sophisticated, there has been more interest by the FDA to ensure public safety through increased oversight, via a premarket approval process. As the FDA increases their attempts at LDT oversight, Congress is considering placing additional oversight tools at the FDA's disposal. If this happens, this will mean laboratories may have to change their approach to LDTs and prepare for a regulatory regime outside of Clinical Laboratory Improvement Act (CLIA).

## Current Regulatory Oversight of LDTs

Laboratories are highly familiar with the CLIA regulations: all clinical laboratories must demonstrate compliance with CLIA either through regular inspections by a state surveying agency on behalf of the Centers for Medicare and Medicaid Services (CMS) or by enrolling in a CMS-approved Accreditation Organization, such as COLA.

However, other federal Agencies also have a role in laboratory regulations, specifically the FDA. The FDA, through the Medical Device Amendments (MDA) of 1976 has oversight of in vitro diagnostic (IVD) products that are “introduced into interstate commerce for commercial distribution.” The MDA and CLIA established a multi-agency regulatory structure for laboratory testing oversight with explicit spheres of regulation under the FDA, CMS and the Centers for Disease Control (CDC).

The FDA's role is to determine clinical efficacy of an IVD before it enters the market, CMS' role is ensuring quality and safety in laboratory operations throughout all phases of the testing process and the CDC plays an advisory role and provides best practices for laboratories. The FDA has cleared most assays and analyzers utilized in a clinical laboratory. If there is a novel technology introduced by a manufacturer, that technology will receive a more rigorous review by the FDA through a de novo review. Historically, the FDA has not required LDTs to go through this process. There are a variety of reasons for the FDA's actions including: uncertain FDA authorization under the MDA to regulate LDTs; the assumption that the underlying technology used in an LDT has been deemed safe; and, until recently, a lack of focus by the FDA and/or industry on LDT oversight.

Today, as LDTs have become more complex, the FDA has turned its attention to increasing their oversight including releasing a 2016 whitepaper outlining a proposed new regulatory scheme and asking for a clearer legislative mandate from Congress. The FDA has also looked into using its existing authority to stop unverified LDTs from being used on patients.<sup>1</sup>

## Recent Changes in Congress

In late 2018, Congress released a legislative proposal incorporating aspects of both the 2018 Diagnostic Accuracy and Innovation Act (DAIA) and the FDA's proposal.

This proposal, which is sponsored by Reps. Larry Bucshon, MD, (R-IN) and Diana DeGette, (D-CO) in the House of Representatives and Senator Michael Bennet (D-CO) and Senator Richard Burr (R-NC) in the Senate, is currently called the Verifying Accurate, Leading-edge IVCT Development (VALID) Act. This has since become the leading proposal on legislating oversight of Laboratory Developed Tests (LDTs).

The draft bill defines in vitro clinical tests (IVCTs) very broadly to include any test that is intended for “identifying, diagnosing, screening, measuring, detecting, predicting, prognosing, analyzing, or monitoring a disease or condition, including by making a determination of an individual's state of health; or selecting, monitoring, or informing therapy or treatment for a disease or condition.” IVCTs also include all parts and components of such tests, with certain limited exclusions (e.g., general laboratory equipment). The regulated components and parts will include test protocols, test platforms, collection devices, sample preparation devices, and software. Thus, the IVCT definition encompasses both LDTs and traditional in vitro diagnostic devices (IVDs) regulated by the FDA.

The proposal would make significant changes to how laboratory tests are approved by the FDA for use in the US. Currently, new IVDs are placed into one of three categories by perceived risk to the public (low, medium and high). This proposal would create only two categories, low and high. This is not to be confused with the CLIA test complexity categorization, which is a separate process under the law and would not change. Low-risk IVCTs are those that would likely cause minimal or no harm from inaccurate results. High-risk IVCTs are those that would likely cause serious harm or death from an inaccurate result. IVCTs would require premarket review by FDA, unless an exemption applies. Notable exemptions include: “grandfathered tests,” IVCTs that are currently 510(k)-exempt, low-risk IVCTs, tests for rare diseases (note: this is for tests with fewer than 8,000 individuals tested per year, among other limitations), pre-certified tests and modifications to tests so long as the modifications do not make it a new IVCT. There will be other requirements to align the IVCT process to the device manufacturing process but the draft still leaves a lot of this undefined for now.

## What Does this Mean for Laboratories?

Currently, the VALID Act is just a draft and has not been introduced; but due to the strong interest by the medical device industry, who are developing LDTs, and the FDA, a version of this bill is likely to become law. Many in the laboratory community prefer that LDT regulation be confined to the CLIA Program. However, CMS has signaled that they support the FDA's increased role in LDT oversight. This is because CMS believes that CLIA is not designed to regulate LDT clinical validity. This makes the laboratory community's efforts to put LDT oversight into CLIA all the more difficult. The bottom line is that if a laboratory is thinking about developing or has developed an LDT, then they should pay close attention to updates about the VALID Act.

<sup>1</sup> <https://www.genomeweb.com/regulatory-news-fda-approvals/fda-stepping-actions-against-pgx-testing-forcing-some-labs-stop>

# LAB TESTS ONLINE

*Your Trusted Guide*

Understand your tests. Empower your health.

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- > What preventive screenings are right for you?

Find the answers to these and other questions at **Lab Tests Online**—a single resource where you can find up-to-date, easy-to-understand lab testing information.

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Lab Tests Online is an award-winning health information website designed to help patients and caregivers understand the many lab tests that are a vital part of medical care. The site is produced by AACC, a scientific and medical professional organization. All scientific content on the site is reviewed by experts.

At [LabTestsOnline.org](http://LabTestsOnline.org), you will find the following information:

- Detailed test descriptions
- Descriptions of test procedures, cross-referencing related test kits
- Supporting articles explaining interpretation of testing, utilization
- News articles on topics of relevance to patients and healthcare professionals
- In-depth feature articles such as the meaning of common lab test and how to read your results

Get the card over and mark your calendar. Like, follow or pin [LabTestsOnline.org](http://LabTestsOnline.org) and on Twitter (please) to link to your healthcare practitioner about them.

Understand your tests.  
Empower your health.



# Education for Your Patients

## About Their Laboratory Tests

LabTestsOnline.org, produced by the American Association for Clinical Chemistry (AACC), is an award-winning health information web resource for patients and caregivers to learn more about the what, why and how of laboratory testing. The site is organized so that a patient can search for a test, and/or search a disease or condition to see the tests that are helpful for diagnosis and treatment. Each month, there are 4.4 million visitors from around the world to Lab Tests Online.

"Lab Tests Online is very easy to navigate and highly informative" shared Ms. Kathy Nucifora, COLA's Chief Operating Officer. "The web resource is available in 14 countries and 12 languages which illustrates the importance of patient education worldwide around their laboratory tests," she added. Ms. Kathy Nucifora, serves on the Editorial Review Board of Lab Tests Online.

Through licensing agreements, Lab Tests Online content is integrated into medical resource sites as well as patient health management and portal platforms, and serves as an integrated patient education resource for several large laboratory providers. Lab Tests Online resource information can also help providers with electronic medical records (EMRs) to achieve the Centers for Medicare and Medicaid Services' meaningful use requirements.

To build awareness about this vital patient resource, AACC provides care settings with a free 11"x14" tabletop displays (shown here). These are perfect for patient waiting rooms and blood draw stations. Each display includes a pocket that holds up to 100 4"x9" take-home insert cards with information on Lab Tests Online.

To order, please email [2labtestsonline@aacc.org](mailto:2labtestsonline@aacc.org). Be sure to include your name, shipping address, phone number, and the number of displays desired. Complimentary shipping is only within the continental USA and while supplies last.