

# Updates for Recommendations for Drug Testing in DUID & Traffic Fatality Investigations

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# 2024

Toxicology  
Laboratory  
Survey

The Center for Forensic Science Research & Education at the Fredric Rieders Family Foundation  
206 Welsh Road, Horsham, PA 19044



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Science Research & Education



## Toxicology Laboratories: Final Data Report

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## **Introduction**

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**Introduction:**

Previous scope and cutoff recommendations for laboratories performing toxicology testing in driving under the influence of drugs (DUID) and motor vehicle fatality cases were published in 2007 by Farrell, et al., and have been subsequently updated in 2013, 2017, and most recently in 2021. The aim of this survey is to critically review and provide information to update the 2021 recommendations for the toxicology community. An online survey was sent to toxicology laboratories performing impaired driving and motor vehicle fatality casework. Laboratories were selected from the Society of Forensic Toxicologists (SOFT), National Highway Traffic Safety Administration Regional Toxicology Liaison (NHTSA RTL) and Drug Recognition Expert Coordinator lists, and prior survey respondents. The purpose of the survey was to gather more information regarding the current practices, needs and capabilities of forensic toxicology laboratories. More specifically, the objective was to focus on assessing Tier I and Tier II scope of testing and cutoffs for screening and confirmation, matrices tested, compliance with the 2021 recommendations, and patterns and trends in drug impaired driving in the United States.

Members of the National Safety Council Alcohol, Drugs and Impairment Division (NSC ADID) expanded upon and updated the previous survey's questions to increase the scope of the survey and add clarity. Toxicology laboratory directors or employees were contacted via email to solicit their participation in the survey, verify that they perform testing in DUID and motor vehicle fatality cases, and confirm their contact information. The survey was sent to laboratories who responded via SurveyMonkey®, an online web survey instrument.

Two hundred and twenty-nine toxicology laboratory directors or employees throughout the United States and Canada were initially contacted to inquire about participation. These individuals were contacted via email and asked to participate in the survey if their laboratory performed DUID casework (antemortem and/or postmortem). One hundred and two laboratories agreed to participate in the survey. They were sent an email explaining the survey in more detail with an attached PDF version of the survey to aid in data gathering and timely completion, as well as the link to the survey. Follow-up emails were sent to those who did not respond to the initial email. A total of eighty laboratories completed the survey.

Each question is listed as presented in the survey to the laboratory at the time of survey completion. Question 1 asked for laboratory contact information, which will not be disclosed in this data report.

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## **Executive Summary**

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**Summary:**

It is important to note that the same laboratories are not participating in each survey. After comparing laboratory participation, 75% of laboratories that responded to the 2024 survey had previously participated in either the 2016 and/or 2020 survey. While there appears to be an increase in caseload reported per laboratory for both drug and alcohol cases in both the 2020 and 2024 surveys, diversity of laboratory participation accounts for this variability. Therefore, assessing trends in caseload across surveys is limited. In 2020, the mean caseload for alcohol cases was 2,762 (median = 1,250) and 2,220 for drug cases (median = 820); however, in 2024, the mean caseload for alcohol cases was 3,018 (median = 1,500) and 2,455 for drug cases (median = 1,250). There was no trend that could be determined when caseload was plotted against analyst full time equivalents (Figure 1). When assessing alcohol caseload per analyst full time equivalents, the range was 2-1500 cases per analyst (mean = 349, median = 250), compared to drug caseload per analyst full time equivalents, the range was 1-1750 cases per analyst (mean = 285, median = 210).

Between the 2016 and 2020 surveys, there was shift in laboratory methods from gas chromatography to liquid chromatography technology for both blood and urine samples. In the 2024 survey, this trend continued (Tables 1 and 2). In regard to stop limit testing, a practice where laboratories make an administrative decision to stop testing when a certain BAC result is met or exceeded, the trend remained steady between the three survey years: 49% in 2016, 45% in 2020, and 51% in 2024. In 2016, the top 3 priorities for additional resources were additional staffing, additional instruments for screening, and additional training; in 2020, laboratories reported the need for additional staffing, additional instruments for confirmation, and additional training and upgraded/new facility; in 2024, laboratories indicated the need for additional staffing and upgraded/new facility, additional training, and additional instruments for confirmation. Laboratories are consistently reporting the need for additional resources with some being repeated requests between survey years; however, these needs are consistently not being met.

Laboratories reporting unconfirmed screening results remained consistent between years (34% in 2016, 35% in 2020, and 39% in 2024). In 2024, approximately 2/3 of the laboratories reporting unconfirmed screening results indicate on the report that additional testing must be requested; however, 1/3 of laboratories report these results without additional information provided to the client. In the 2021 recommendation, the authors reiterated that reporting unconfirmed screening results is a practice that should be abolished, referencing the NSC position/policy statement written in 2008.<sup>1</sup> In addition, the American Academy of Forensic Sciences Academy Standards Board (AAFS ASB) published ANSI/ASB Standard 053 Standard for Report Content in Forensic Toxicology which states that “It is sometimes necessary to report

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<sup>1</sup> [https://www.nsc.org/getmedia/a4a5325e-8aed-4d01-bf93-a22acf04b0fa/nscdrug\\_confirm\\_policy.pdf](https://www.nsc.org/getmedia/a4a5325e-8aed-4d01-bf93-a22acf04b0fa/nscdrug_confirm_policy.pdf)

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preliminary analytical results. In these instances, it shall be clearly noted in the report that confirmatory testing is pending or will be performed upon request.”<sup>2</sup>

With respect to matrices test between 2016 and 2024, consistency was observed with laboratories who reported testing blood and urine (89-96% and 63-68%, respectively). In the 2016 survey, two laboratories (2.9%) reported testing urine only as a matrix, and in both the 2020 and 2024 surveys, three laboratories (4.6% and 3.8% of laboratories, respectively) reported testing urine only. An increase was observed in the number of laboratories testing oral fluid, which was only 1% (1 laboratory) in 2016 and increased to 5% (4 laboratories) in 2024.

When assessing percent compliance by drug for screening and confirmation in blood and urine samples (Tables 3 and 4), those cutoffs that did not change between the 2017 and 2021 recommendations saw an increase in compliance or remained about the same. Those cutoffs that were newly established in the 2021 recommendations saw 75-97% compliance. Compliance for blood cutoffs ranged 40-97% and for urine 65-98%. In the 2020 survey, more laboratories reported testing Tier II compounds (91% in 2020 compared to 81% in 2016). Similarly, in 2024, the percentage of laboratories testing Tier II compounds increased to 96%, showing that laboratories recognize that potentially impairing compounds might not always be covered by testing only the Tier I scope.

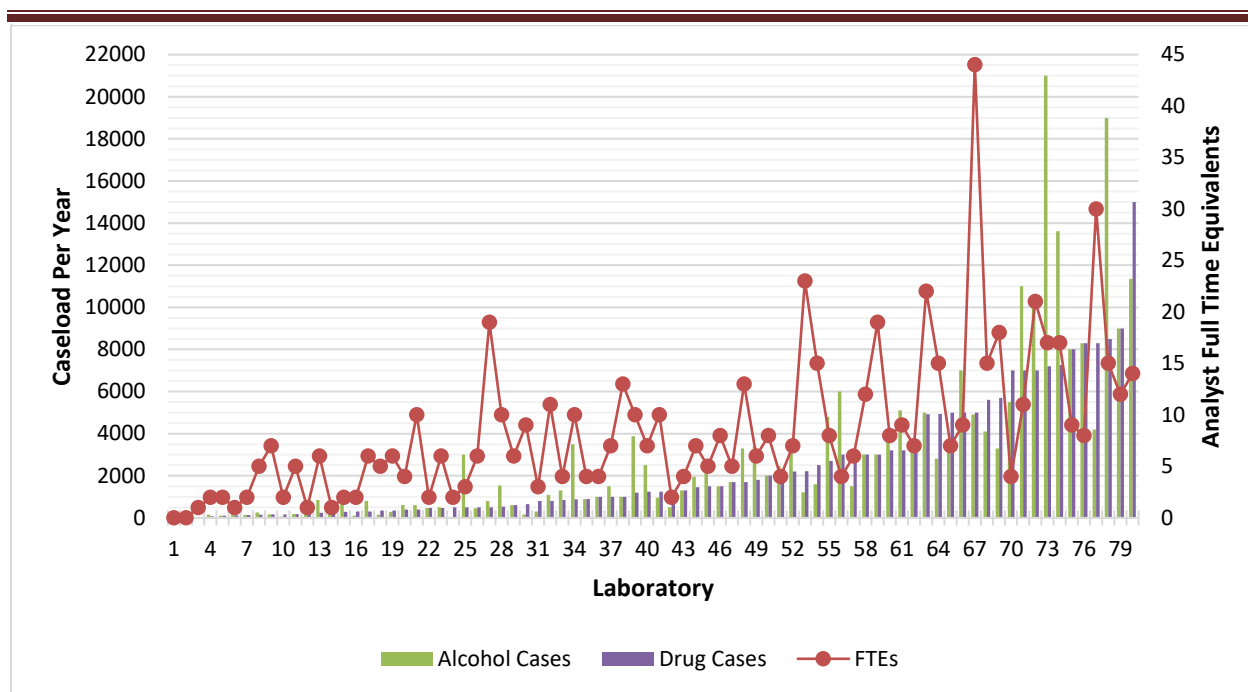
Between the three survey years, there was a shift among the top drugs present in DUID casework<sup>3</sup>. Although THC and metabolites continues to be the top drug, stimulants shifted higher in the 2020 list and remain near the top in 2024. Fentanyl’s prevalence in DUID casework continues to rise throughout the years: present in 26% of laboratory’s top drugs in 2016, 70% in 2020, and 89% in 2024. Diphenhydramine, methadone and metabolite, and novel benzodiazepines were new compounds listed in 2024.

Overall, laboratories are continuing to move towards compliance with the recommendations; however, laboratory space constraints, instrument capacity, instrument technology, staffing, training, money, and time prove to be repeated challenges listed for these laboratories to revalidate methods to comply with all of the recommendations.

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<sup>2</sup> [https://www.aafs.org/sites/default/files/media/documents/053\\_Std\\_e1.pdf](https://www.aafs.org/sites/default/files/media/documents/053_Std_e1.pdf)

<sup>3</sup> In 2016, only the top 10 was requested by laboratories; however, in 2020 and 2024 the top 15 was requested.



**Figure 1.** Caseload per year and analyst full time equivalents for each laboratory (n = 80).

Blood Samples					
Top 3 Screening Methods			Top 3 Confirmation Methods		
2016	2020	2024	2016	2020	2024
ELISA - 74%	ELISA - 51%	ELISA - 46%	GC-MS - 87%	LC-MS - 88%	LC-MS - 91%
GC-MS - 50%	GC-MS - 35%	LC-MS - 41%	LC-MS - 81%	GC-MS - 71%	GC-MS - 69%
LC-MS - 39%	LC-MS - 31%	LC-HRMS - 33%	LC-TOF - 4%	LC-HRMS - 12%	GC-FID, LC-HRMS - 15%

**Table 1.** Changes in screening and confirmation methods between 2016, 2020, and 2024 for blood samples.

Urine Samples					
Top 3 Screening Methods			Top 3 Confirmation Methods		
2016	2020	2024	2016	2020	2024
ELISA - 49%	GC-MS - 34%	ELISA - 33%	GC-MS - 77%	GC-MS - 62%	LC-MS - 65%
GC-MS - 37%	ELISA - 28%	LC-MS - 28%	LC-MS - 54%	LC-MS - 51%	GC-MS - 61%
LC-MS - 29%	EMIT, LC-HRMS - 23%	GC-MS - 25%	LC-TOF - 3%	LC-HRMS - 11%	LC-HRMS - 13%

**Table 2.** Changes in screening and confirmation methods between 2016, 2020, and 2024 for urine samples.



Compliance – Screening	2013 Recommendations		2017 Recommendations		2021 Recommendations	
	Blood	Urine	Blood	Urine	Blood	Urine
Met or exceeded recommendations	-	-	18%	10%	29%	24%
Did not agree with some recommendations	-	-	11%	24%	5%	13%
In process of making changes to meet recommendations	-	-	37%	20%	34%	19%
Close to meeting recommendations but not priority	-	-	51%	51%	49%	41%

**Table 3.** Compliance with the screening cutoffs.

Compliance – Confirmation	2013 Recommendations		2017 Recommendations		2021 Recommendations	
	Blood	Urine	Blood	Urine	Blood	Urine
Met or exceeded recommendations	17%	18%	12%	10%	16%	19%
Did not agree with some recommendations	20%	32%	19%	22%	9%	9%
In process of making changes to meet recommendations	52%	36%	40%	29%	47%	20%
Close to meeting recommendations but not priority	-	-	44%	45%	49%	43%

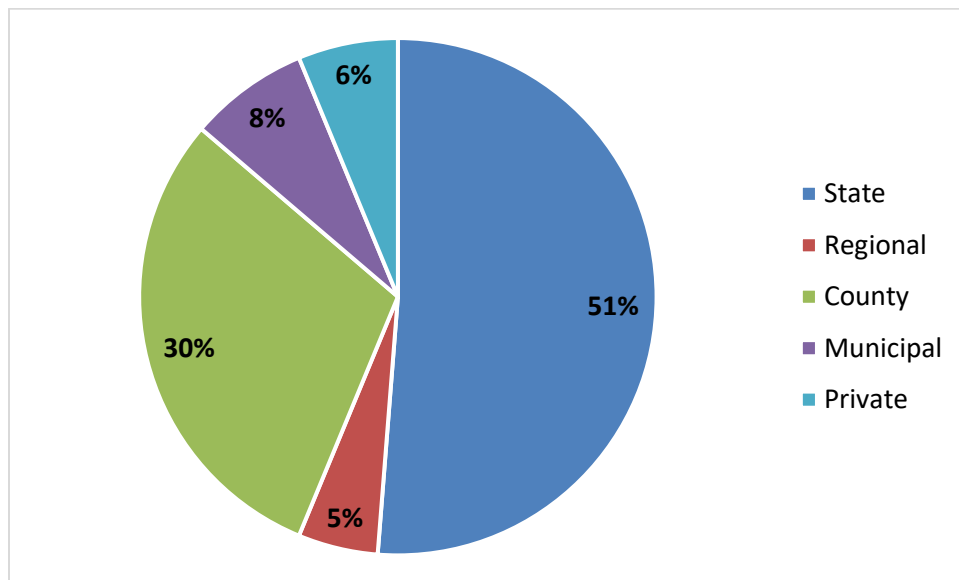
**Table 4.** Compliance with the confirmation cutoffs.

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## **Basic Information**

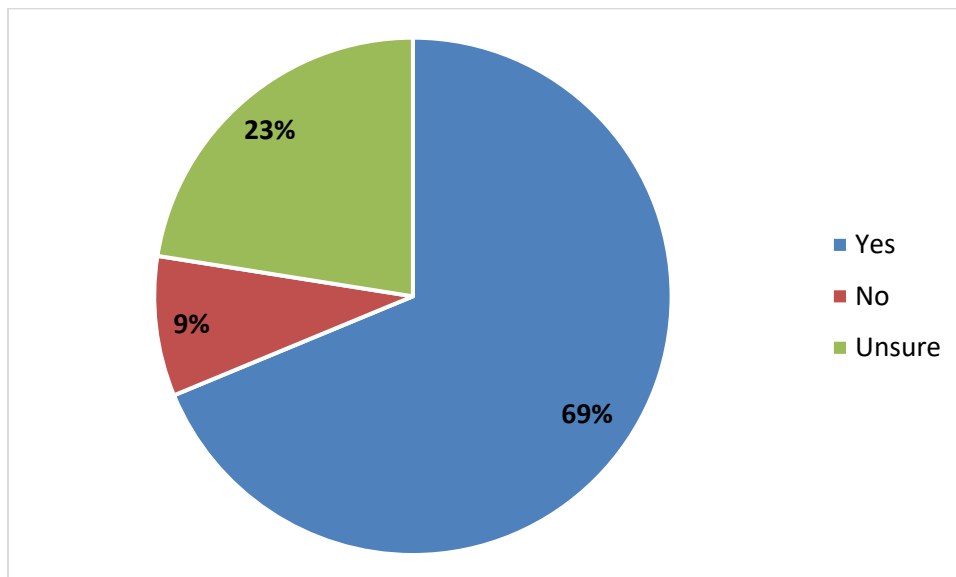
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**Question 2:** What status best describes your laboratory?



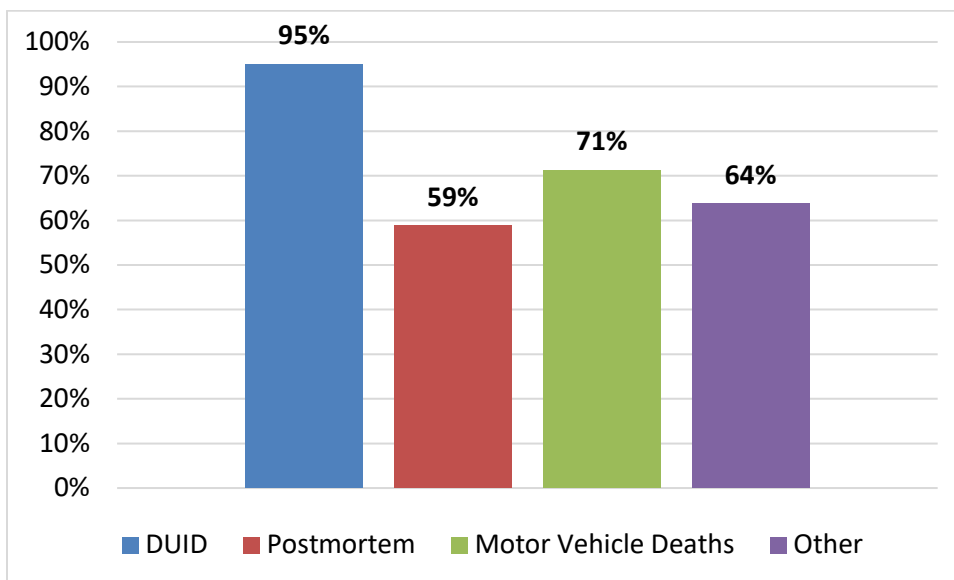
**Figure 2.** Categories of laboratories providing DUID survey data (n = 80).

**Question 3:** Has your laboratory participated in this survey in the past?



**Figure 3.** Laboratory participation in the past with this survey (n = 80).

**Question 4:** What type of testing does your laboratory do? Please check all options that apply.

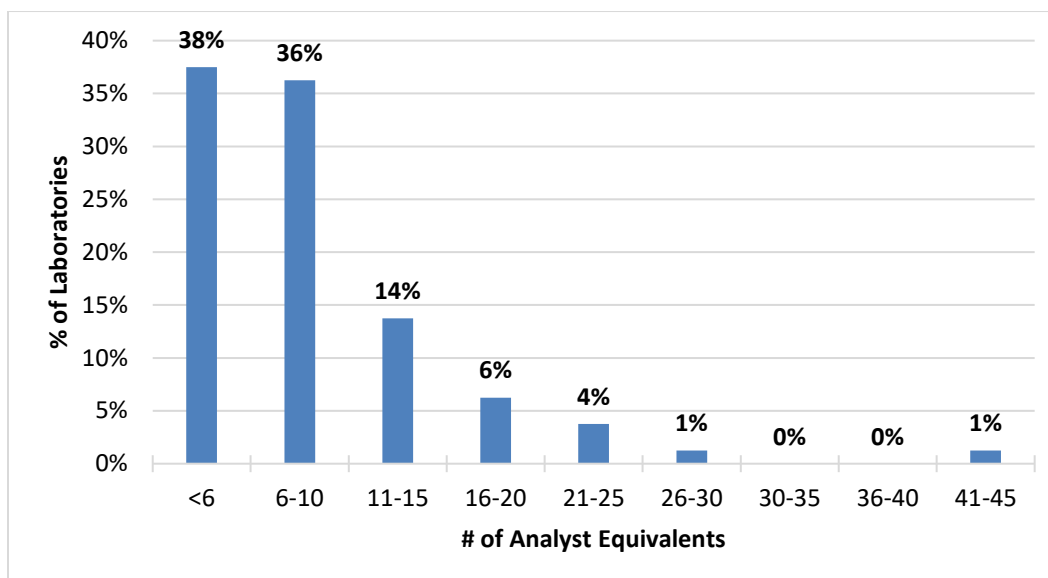


**Figure 4.** Types of testing performed by the laboratory (n = 80).

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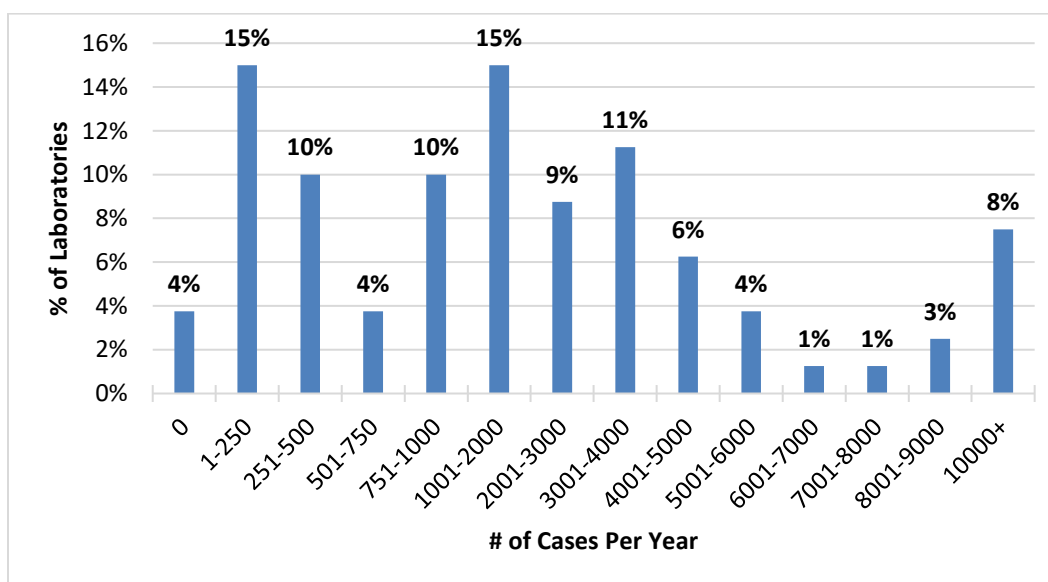
## Toxicology Laboratory Statistics

**Question 5:** Approximately how many analyst equivalents (full time) are doing impaired driving testing?



**Figure 5.** Full time analyst equivalents performing impaired driving testing by laboratory (n = 80).

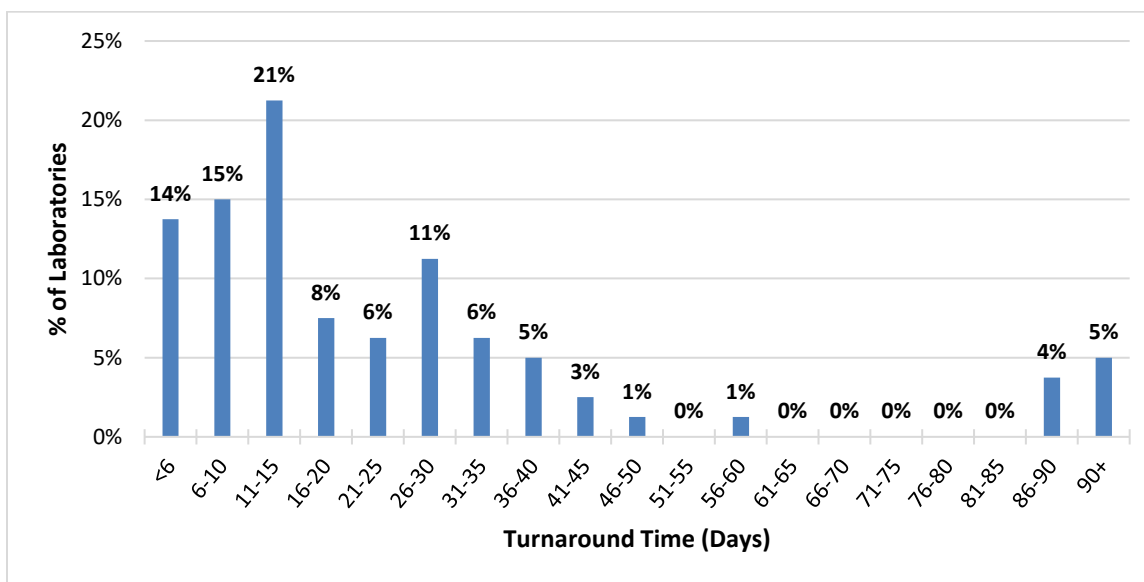
**Question 6:** Approximately how many impaired driving cases are tested for ALCOHOL each year?



**Figure 6.** Number of impaired driving ALCOHOL cases per year performed by the laboratory (n = 80).

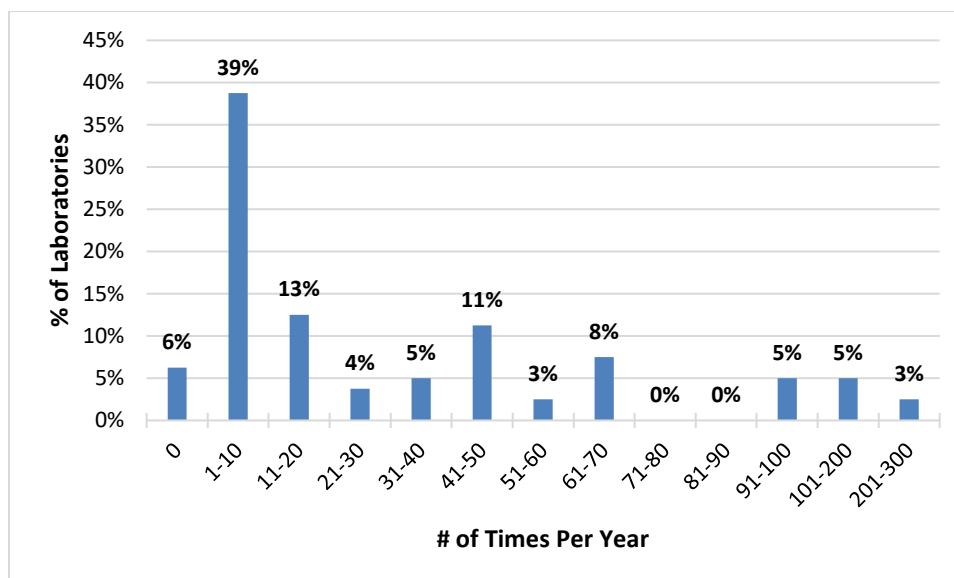


**Question 7:** What is the approximate turnaround time of your laboratory in regards to ALCOHOL analysis? Please fill in only one field with numerical values only.



**Figure 7.** Approximate turnaround times for alcohol analysis by laboratory (n = 80).

**Question 8:** Approximately how many times each year does your laboratory supply toxicology testimony in impaired driving ALCOHOL cases?



**Figure 8.** Alcohol testimony requests per year by laboratory (n = 80).

The number cases analyzed for alcohol in impaired driving cases ranged from 0 to 21,000 each year per laboratory, with a mean of 3,018 and a median of 1,500 (Figure 6). The approximate turnaround times for alcohol testing ranged from 0 to 140 days, with a mean of 27 and a median of 16 (Figure 7). Seventy-five percent of laboratories had a turnaround of time of less than or equal to 30 days. The distribution for alcohol testimony ranged from 1 to 300 times per year, with a mean of 41 and median of 18 (Figure 8). Five laboratories (6%) indicated they did not provide any alcohol testimony or do not track that information.

**Question 9:** What is your laboratory's reporting limit for alcohol in human performance impaired driving cases? Please provide a numerical value with units.

Reporting Limit (g/dL)	# of Laboratories with this Reporting Limit	% of Laboratories with this Reporting Limit
0.005	1	1%
0.010	53	68%
0.011	1	1%
0.020	20	26%
0.025	1	1%
0.400 <sup>4</sup>	1	1%
1.00 <sup>4</sup>	1	1%

**Table 5.** Reporting limit for alcohol concentration in human performance impaired driving cases by laboratory (n = 78)<sup>5</sup>.

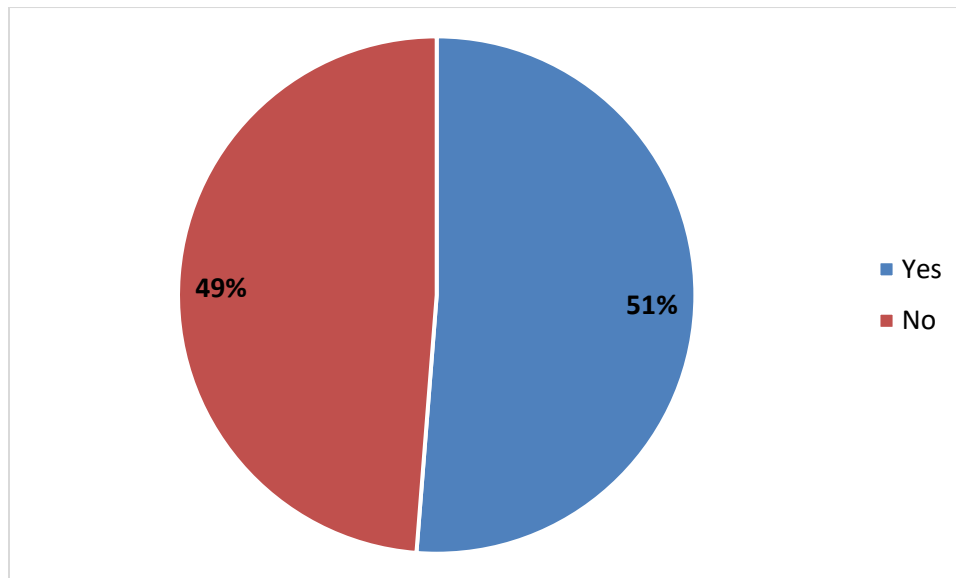
One laboratory further commented that their qualitative alcohol reporting limit is 0.005 g/dL compared to 0.025 g/dL as a quantitative reporting limit.

Two laboratories do not perform alcohol testing.

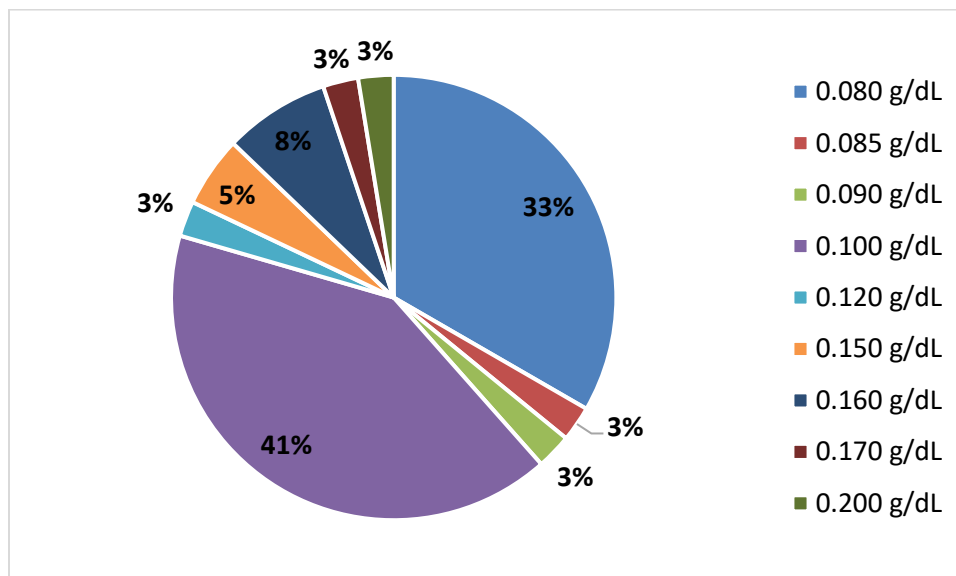
<sup>4</sup> It is believed that this reporting limit was a typographical error by the submitting laboratory.

<sup>5</sup> Reporting limits were submitted by laboratories in a variety of units. All reporting limits were converted to g/dL for uniformity.

**Question 10:** Does your laboratory make an administrative decision to stop testing if a BAC result is at or above a certain concentration?



**Figure 9.** Is there an administrative decision to stop testing if a BAC result is at or above a certain concentration (n = 80)?

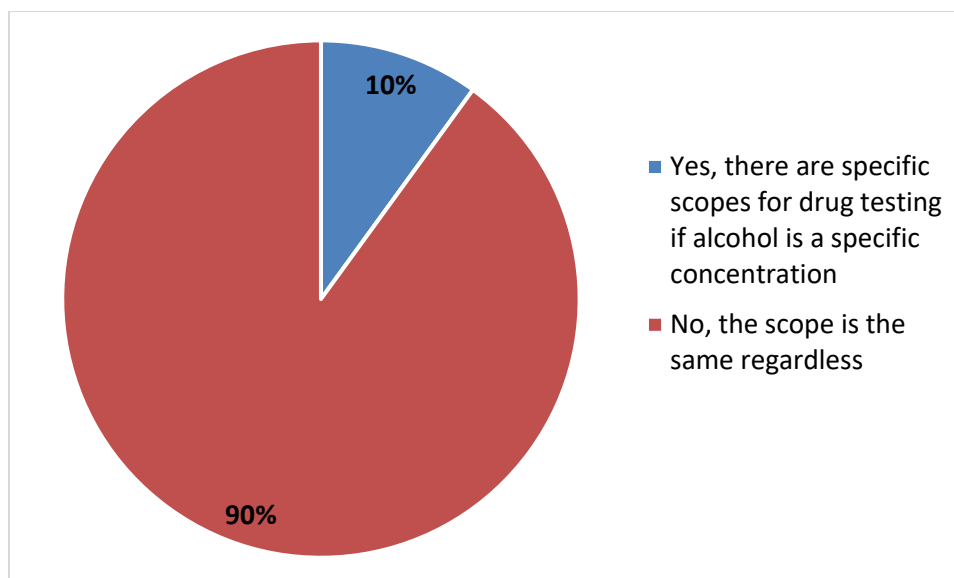


**Figure 10.** Is there a BAC concentration where there is an administrative decision to stop testing (n = 39)?

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Reasons given for laboratories stopping testing if a BAC result is at or above a certain concentration included case type where no fatalities were involved, case type where no sexual assaults were involved, cannabinoids were the only other drug that screened positive, 0.080 g/dL for driving under the influence cases, but 0.150 g/dL used for felony cases, cases where no potentially impairing drugs are suspected, and when the submitting agency requests the laboratory stops testing.

**Question 11:** Is there a specific scope for drug testing if the alcohol concentration is below a specific level?



**Figure 11.** Is there a specific scope for drug testing if the alcohol result is below a specific level (n = 80)?

All eight laboratories who responded with “yes”, plus one laboratory who responded with “no” commented further on their laboratory’s specific scope for drug testing if alcohol is below a certain limit.

One laboratory stated that samples will be tested for methamphetamine, amphetamine, cocaine, opioids, oxycodone, fentanyl, benzodiazepines, zolpidem, and cannabinoids, but are tested for carisoprodol, tramadol, and buprenorphine only upon request.

One laboratory stated there is a specific scope if the case involves a homicide by motor vehicle. If fatal, then there is a specific scope if alcohol is below 0.080 g/dL, and then above 0.080 g/dL if drugs are requested.

One laboratory stated that samples at or above 0.100 g/dL will only be screened for cannabinoids. For samples with a blood alcohol concentration less than 0.100 g/dL, the samples will be screened via ELISA for amphetamine, barbiturates, benzodiazepines, buprenorphine, carisoprodol, cocaine metabolite, fentanyl, methadone, methamphetamine, opiates, oxycodone, PCP, THC metabolite, zolpidem, dextromethorphan, diphenhydramine, tramadol, and tricyclic antidepressants.



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One laboratory stated that samples will be screened via ELISA. Any positive ELISA results are confirmed with GC-MS or LC-MS/MS quantitation/confirmation method. If there is no restricted controlled substance detected, then the laboratory would perform a complete Acid/Basic/Neutral drug analysis and provide quantitation, if applicable.

One laboratory stated that currently the scope includes cannabinoids, opiates, benzodiazepines, cocaine, methamphetamine and related compounds, PCP, and fentanyl. For felony cases, only 265 drugs are included, meeting the NSC Recommendations for Tier I and Tier II. As of August 2024, the scope will include over 125 impairing substances, meeting the NSC Recommendations for Tier I and most of Tier II.

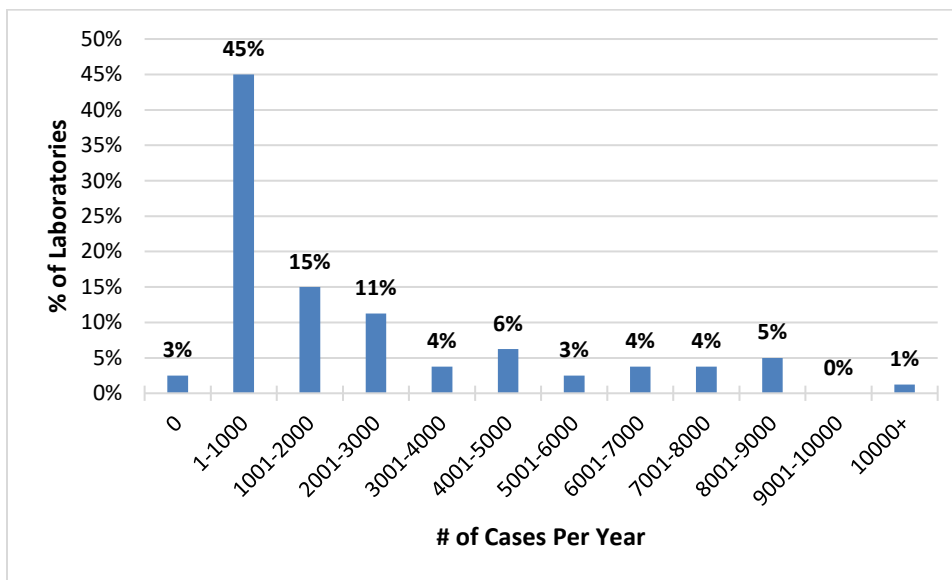
One laboratory stated that if the blood alcohol concentration is at or below 0.089 g/dL, then a 13-panel drug test including all Tier I drugs will be performed; however, this only applies to certain agencies.

One laboratory stated that only urine specimens are tested for drugs. Blood alcohol testing is done by a different state laboratory within state.

One laboratory stated that all cases are tested for drugs if the blood alcohol concentration is less than 0.085 g/dL.

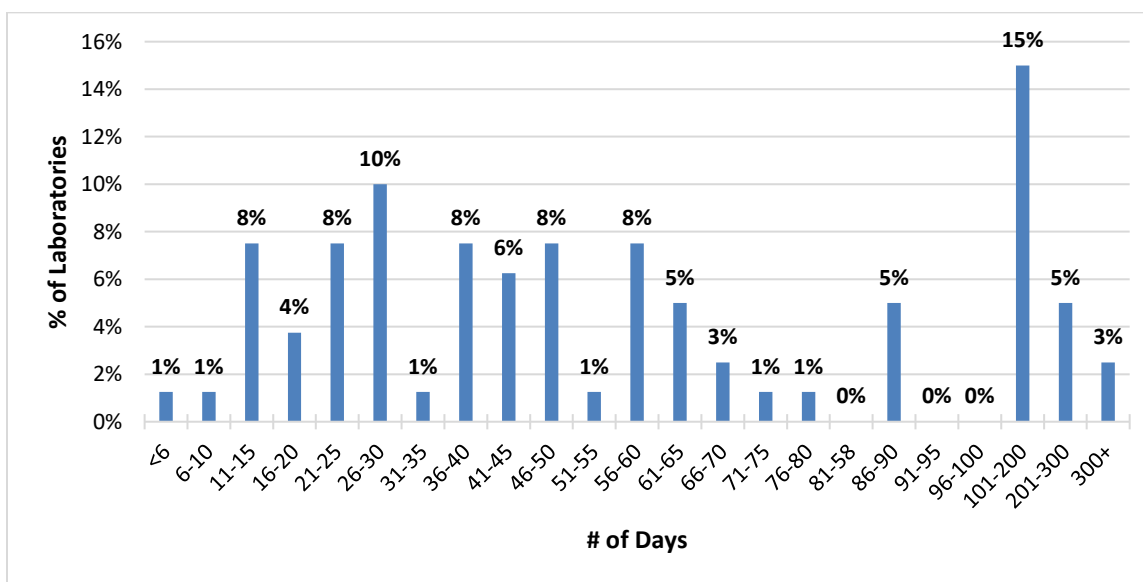
One laboratory stated that all felony cases are screened for drugs regardless of the alcohol concentration. All urine cases are screened for drugs regardless of alcohol concentration. Cases with an alcohol concentration greater than 0.080 g/dL are screened for drugs only if the submitting agency requests and then request is justified.

**Question 12:** Approximately how many impaired driving cases are tested for DRUGS OTHER THAN ALCOHOL each year?



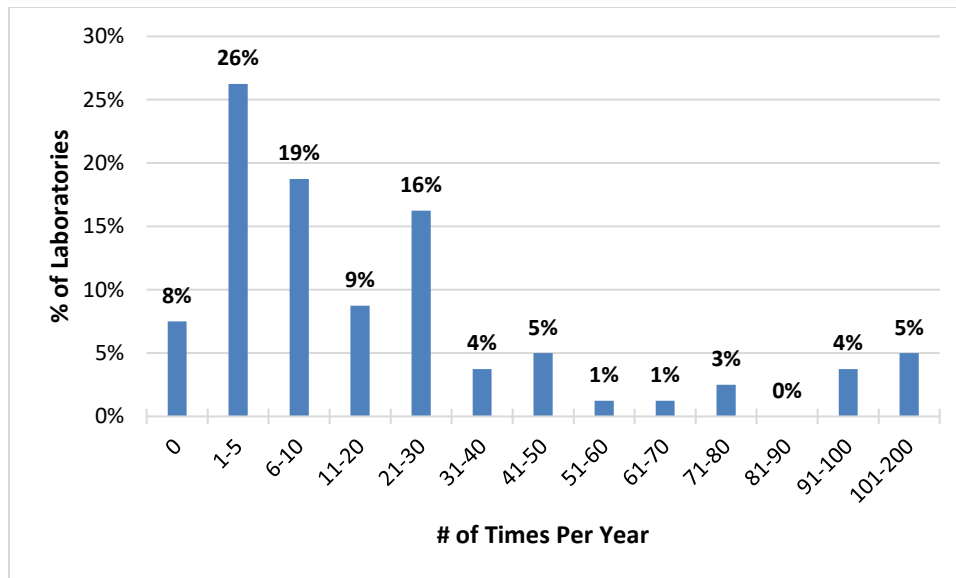
**Figure 12.** Number of impaired driving cases involving DRUGS each year by laboratory (n = 80).

**Question 13:** What is the approximate turnaround time of your laboratory in regards to DRUG (other than alcohol) analysis? Please fill in only one field with numerical values only.



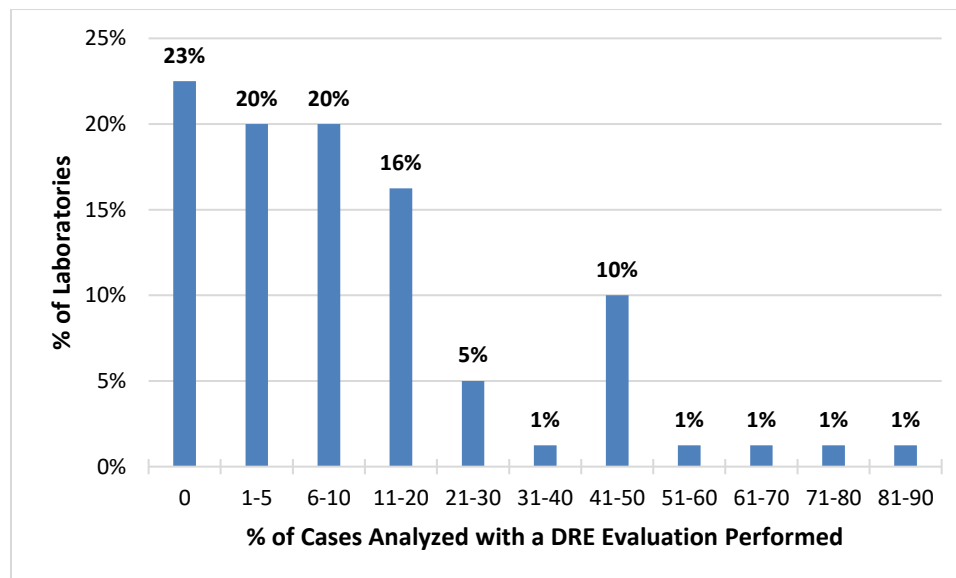
**Figure 13.** Approximate turnaround times for other drug analysis by laboratory (n = 80).

**Question 14:** Approximately how many times each year does your laboratory supply toxicology testimony in impaired driving DRUG (other than alcohol) cases?



**Figure 14.** Drug impaired driving testimony requests per year by laboratory (n = 80).

**Question 15:** Approximately what percentage of all drug-impaired driving cases analyzed by your laboratory have a DRE evaluation performed?

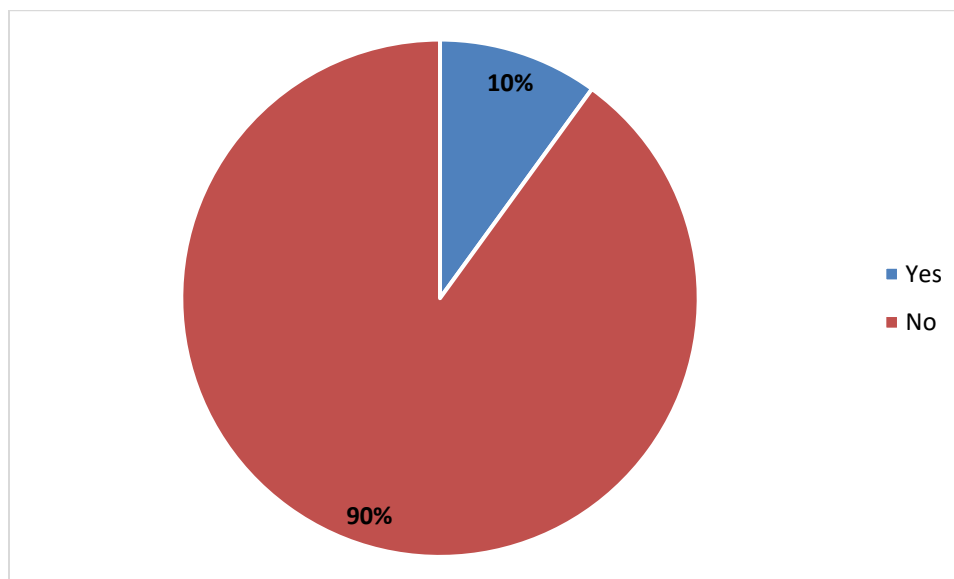


**Figure 15.** What percentage of all drug-impaired driving cases analyzed by your laboratory have a DRE evaluation performed (n = 80).

The number of cases analyzed for drugs in impaired driving cases ranged from 0 to 15,000 per year, with a mean of 2,455 and a median of 1,250 (Figure 12). The approximate turnaround times for drug testing ranged from 0 to 720 days, with a mean of 83 and a median of 49 (Figure 13). Sixty-two percent of laboratories had a turnaround of time of less than or equal to 60 days. The distribution for DUID testimony ranged from 0 to 200 times per year, with a mean of 27 and a median of 10 (Figure 14). Six laboratories (8%) indicated they did not provide any DUID testimony. Two laboratories do not perform drug testing. The percentage of those cases that involved a DRE evaluation ranged from 0 to 90 percent, with a mean of 16% and a median of 10% (Figure 15).

Based on the 77 laboratories that track this information, an average of 14% of the 181,632 total impaired driving cases reported involving DRUGS indicated that a DRE evaluation was performed. This average was obtained by multiplying the total number of impaired driving DRUG cases analyzed each year by each laboratory by the percentage indicated by the laboratory that have a DRE evaluation performed, adding these, then dividing the sum total by the sum total of DUID cases reported by laboratories (n = 77). No data were available regarding the impact of DRE involvement on the need for toxicology testimony.

**Question 16:** Does your laboratory make an administrative decision to stop testing if a specific drug is detected at or above a certain concentration (e.g., THC at per se level)? This is sometimes called “stop limit testing”.



**Figure 16.** Is there an administrative decision to stop testing if a specific drug is detected at or above a certain concentration (n = 80)?

Seven laboratories commented further on their laboratory’s administrative decision to stop testing if a specific drug is detected at or above a certain concentration.

One laboratory stated that this applies to driving while intoxicated cases only where testing may be stopped after any amount of a Schedule I or Schedule II is confirmed; however, this is not done for other case types such as CVOs, CVHs, fatality studies, etc.

Two laboratories stated that if a drug is confirmed and the concentration is above the method’s upper limit of quantitation, the laboratory will usually stop analysis without reanalyzing on dilution and issue a report indicating that the quantitation value exceeded the method’s upper limit of quantitation. Author note: while these laboratories consider this stop testing, this is not stop limit testing, but rather a decision to not dilute a sample further to achieve a concentration within the analytical measurement range.

One laboratory stated that Schedule I substances and their metabolites are a per se substance in their state.

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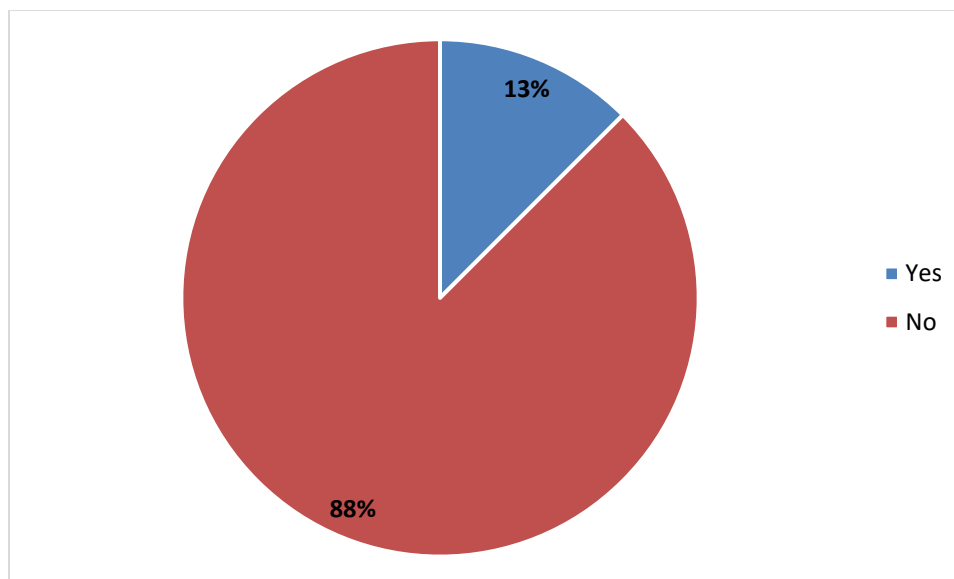
One laboratory stated that if a restricted controlled substance is found (ex. THC greater than or equal to 1 ng/mL, or a detectable level of 6-MAM, methamphetamine, cocaine or metabolite, or any Schedule I drug), they will cancel the ABN general quantitative analysis.

One laboratory stated that if a restricted controlled substance (Schedule I drug) is detected, regardless of concentration, other drug testing will be stopped.

One laboratory stated that testing stops if requested by the submitting agency if the value exceeds per se value.



**Question 17:** Does your laboratory employ a practice of only confirming one drug, or a limited number of the drugs that screened positive in drug-positive cases?



**Figure 17.** Does your laboratory employ a practice of only confirming one drug, or a limited number of the drugs that screened positive in drug-positive cases (n = 80).

Laboratories were asked to provide a list of the top priority drugs that are commonly quantified and reported, or how it is decided which drugs to confirm and report versus not. Twelve laboratories provided further comments.

One laboratory stated that drugs are confirmed based on customer request and their priority.

One laboratory stated that this applies to driving while intoxicated cases only where testing may be stopped after any amount of a Schedule I or Schedule II is confirmed; however, this is not done for other case types such as CVOs, CVHs, fatality studies, etc.

One laboratory stated they are considering implementing such a policy.

One laboratory stated that this only occurs in limited volume samples where full testing cannot be done.

One laboratory stated they follow the ASB tiered recommendations to limit scope of testing to relevant drugs, disregarding antibiotics.

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One laboratory stated that they will perform a comprehensive drug screen/confirmation and stop testing if the cause of death can be concluded from the results.

One laboratory stated that this occurs when at least one motor skill impairing drug is detected with a priority of narcotic analgesics.

One laboratory stated that they will do all of the requested testing unless the submitting agency cancels the remaining testing if a per se value for a substance exceeds the limit.

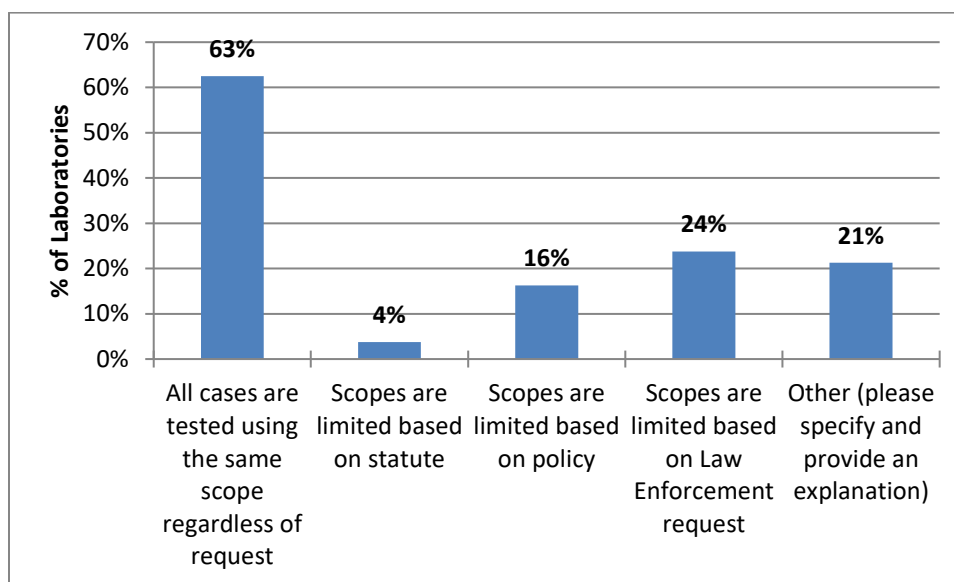
One laboratory stated that they only confirm drugs listed on their state's controlled substance list.

One laboratory stated that for DRE cases, they will confirm all drugs/metabolites belonging to the category of impairment. For DRE cases with suspected CNS Depressants and Narcotic Analgesics, they will perform immunoassay screening and a general screen via GC/MS. Tier I drugs and metabolites would be searched for via extracting ions from the full scan TIC. For fatalities, regardless of whether a DRE evaluation was done, screening is performed by immunoassay and GC/MS, and all drugs would be confirmed. Again, Tier I drugs and metabolites would be searched for via extracting ions from the full scan TIC. For all other cases (ex. child abuse, sexual assault), they will follow the same procedure as applied to fatality cases.

One laboratory stated that if hardcore drugs like cocaine, methamphetamine, fentanyl, and heroin are detected, then no further testing is completed unless a DRE evaluation was completed. Full testing is done on DRE cases and felony cases.

One laboratory stated they have a set 72-drug LC-MS panel with common drugs of abuse.

**Question 18:** Please indicate which describe your laboratory's scope of impaired driving testing.



**Figure 18.** Laboratory's scope of impaired driving testing (n = 80).

Laboratories also had the ability to comment on other reasons for their laboratory's scope of impaired driving testing (17 responses; 21% of the laboratories). Of these 17 responses, two laboratories reiterated their answer choices as noted in the graph above.

Five laboratories stated that all drug toxicology cases are tested using the same scope; however, additional testing can be performed in some circumstances including test request of drug outside of typical scope, specialized testing requested by client or included in case history provided, or if the sample is negative for alcohol when alcohol-only testing is requested.

One laboratory stated that samples are tested for methamphetamine, amphetamine, cocaine, opioids, oxycodone, fentanyl, benzodiazepines, zolpidem, and cannabinoids. Samples are only tested for carisoprodol, tramadol, and buprenorphine upon request. Crashes involving injuries or fatalities will also undergo a comprehensive GC-MS analysis.

One laboratory stated that all cases will be tested using the same scope regardless of request as of August 2024.

Two laboratories stated that they are limited based on policy. However, for one laboratory there is stop limit testing in place for misdemeanor cases, and the other laboratory will perform comprehensive testing if the blood alcohol concentration is less than 0.100 g/dL.

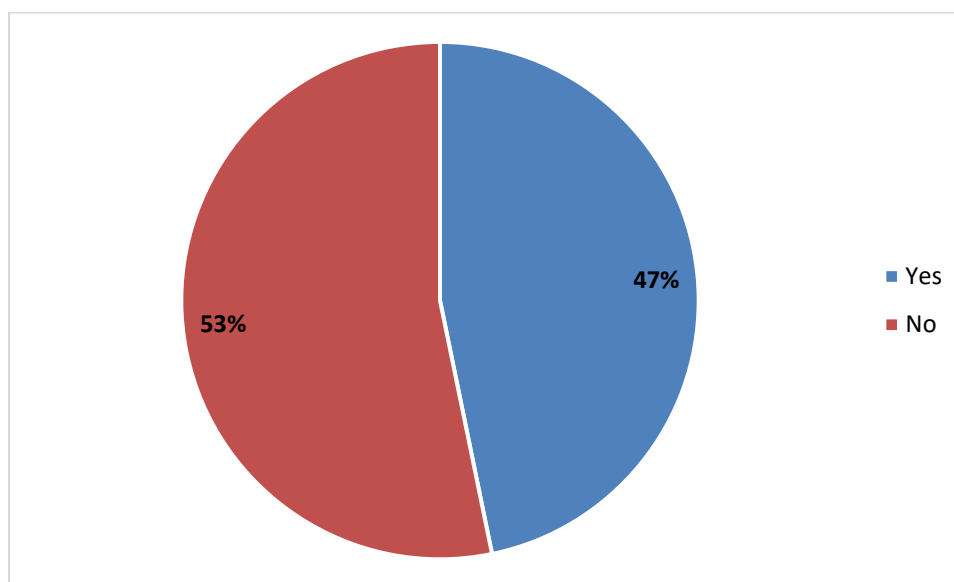
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Two laboratories stated scope is limited based on availability of samples and sample volume.

One laboratory specified that they perform postmortem testing for deceased drivers.

Three laboratories stated testing depends on case type (ex. accidents, homicides, fatalities) or offense types.

**Question 19:** Are cases involving deceased drivers handled differently than living drivers?



**Figure 19.** Do laboratories handle impaired driving cases on deceased drivers differently than living drivers (n = 62)?

Laboratories had the ability to comment on how and/or why cases involving deceased drivers are handled differently compared to cases involving living drivers (29 responses; 47% of the laboratories). One laboratory stated that urine samples are tested for living drivers while blood is tested for deceased drivers. This policy will be changing to test blood samples for all situations later in 2024. One laboratory stated that deceased drivers get both alcohol and drug testing performed; however, living drivers may only have alcohol or drug testing performed. Four laboratories stated that there are different panels for deceased drivers versus living drivers. Two laboratories stated that scope is based on client request. One laboratory stated that cases involving a fatality are run with a rushed status. Nineteen laboratories stated that cases involving deceased drivers get full comprehensive testing with no stop-limit testing. One laboratory further specified that this would occur even if a controlled substance is confirmed.

**Question 20:** Please indicate the percentage of specimen(s) tested for each of the following case types.

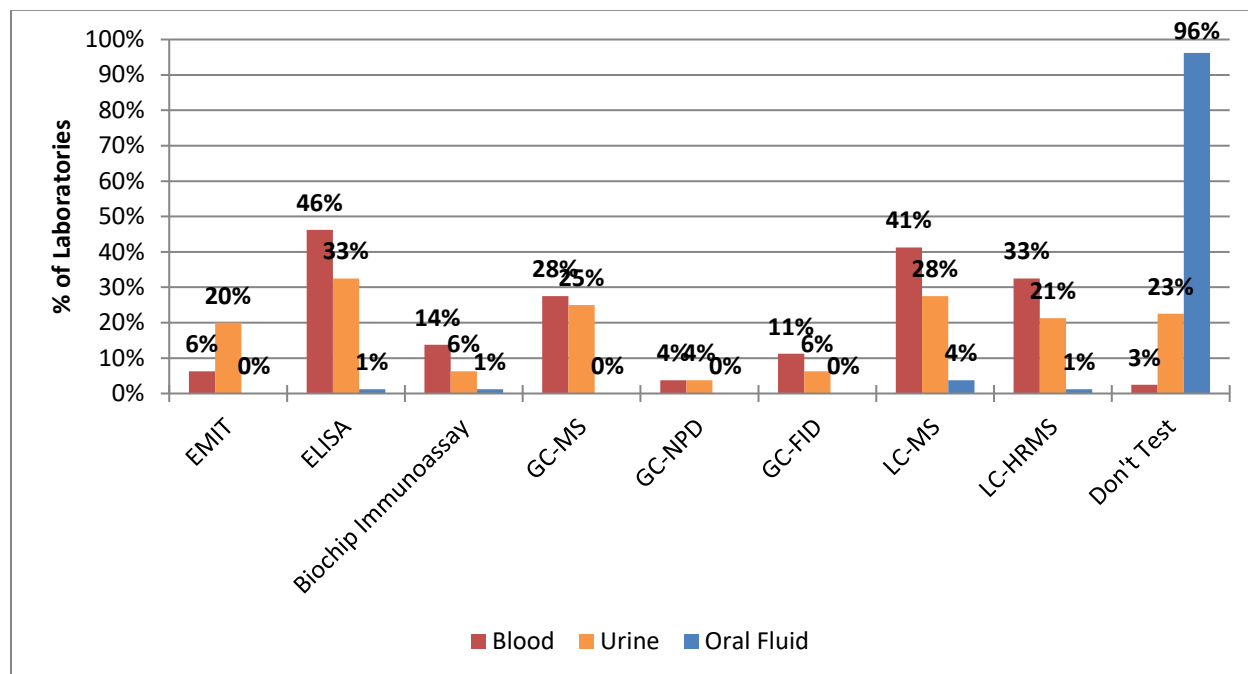
Percentage of Specimens	Impaired driving cases			Impaired driving cases involving death or serious injuries to others			Impaired driving cases involving deceased drivers		
	Blood	Urine	Oral Fluid	Blood	Urine	Oral Fluid	Blood	Urine	Oral Fluid
1-10%	1%	33%	-	14%	30%	-	11%	21%	-
11-20%	3%	3%	-	8%	3%	-	3%	1%	-
21-30%	-	3%	-	1%	3%	-	-	3%	-
31-40%	-	3%	-	-	3%	-	-	1%	-
41-50%	10%	9%	-	1%	1%	-	-	-	-
51-60%	3%	4%	-	3%	1%	-	-	1%	-
61-70%	6%	-	-	-	-	-	-	-	-
71-80%	3%	3%	-	1%	-	-	-	-	-
81-90%	9%	3%	-	4%	-	-	1%	-	-
91-100%	55%	4%	1%	48%	5%	1%	44%	6%	-
Unsure	4%	8%	1%	14%	18%	1%	14%	19%	-
N/A	8%	31%	98%	8%	38%	98%	28%	48%	100%

**Table 6.** Biological specimen(s) tested for different case types (n = 80).

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## **Laboratory Methods**

**Question 21:** Please indicate what methods are routinely used for drug Screening in DUID/traffic fatality testing:



**Figure 20.** Analytical methods routinely used for drug screening in DUID/traffic fatality testing (n = 80)<sup>6</sup>.

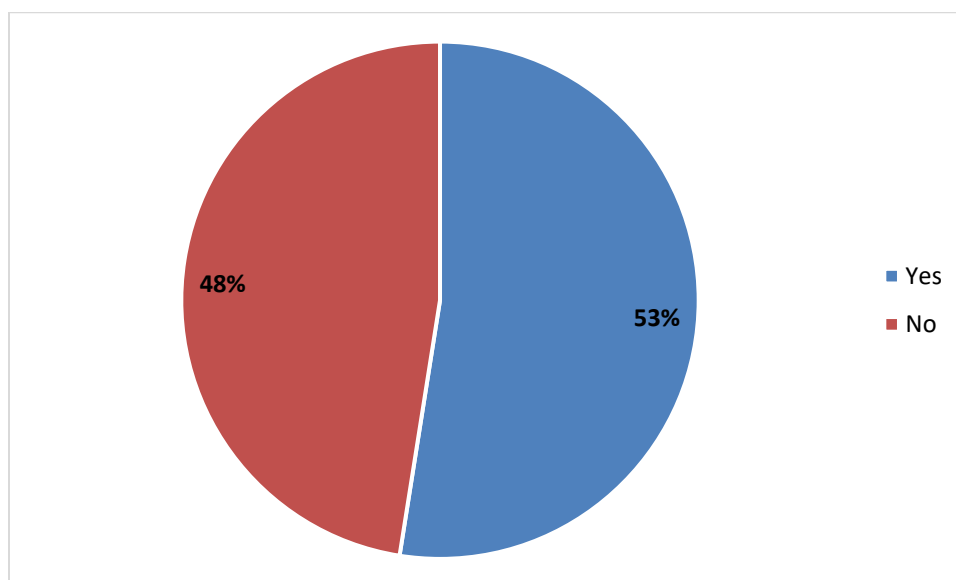
Eighty laboratories responded to this question. As multiple methods could be selected, a total of 146 selections were made to which methods are used for screening blood samples, 114 selections for screening urine samples, and 6 selections for screening oral fluid samples (Figure 23).

Laboratories also had the ability to comment on other methods routinely used for drug screening in DUID/traffic fatality testing (3 laboratories; 4%). Two laboratories stated that urine is outsourced to another laboratory for testing. One laboratory clarified that methods will be changing in August 2024.

<sup>6</sup> LC-HRMS includes HR TRAP, TOF, and QTOF.



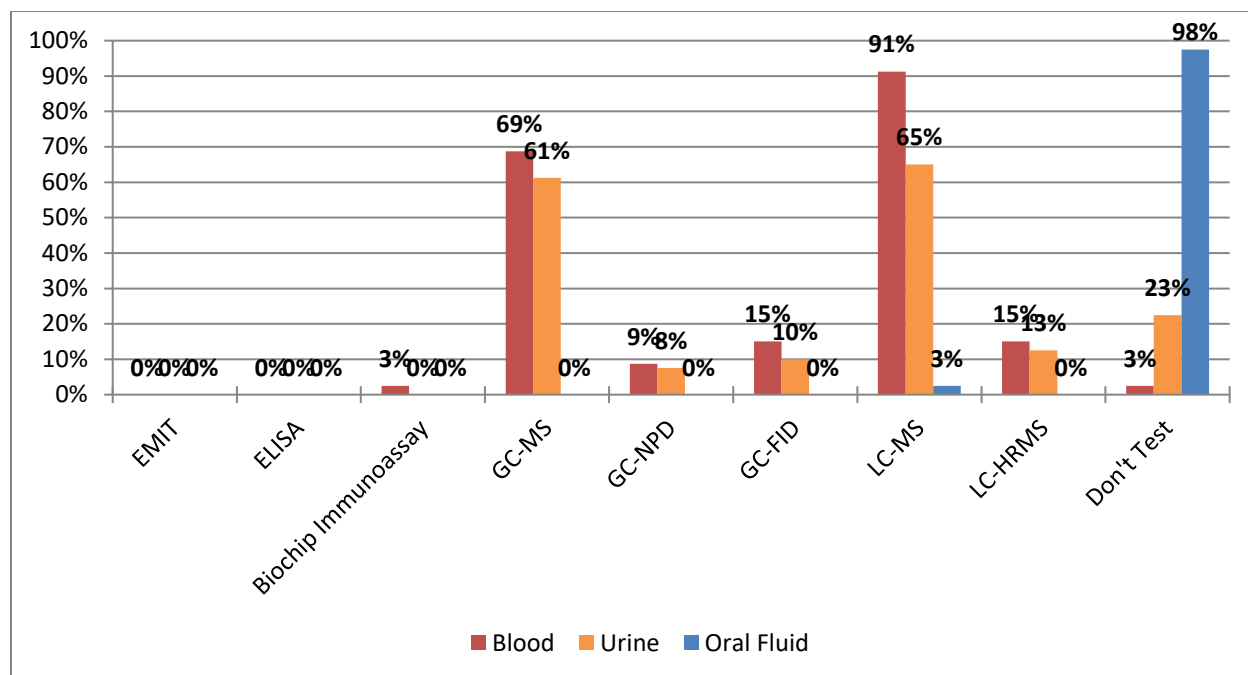
**Question 22:** Are you considering alternative techniques to implement for screening?



**Figure 21.** Laboratories considering alternative techniques to implement for screening (n = 80).

Eighty laboratories responded to this question. Forty-two laboratories explained what alternative techniques their laboratory is exploring to implement. One laboratory (1%) stated that they are considering Biochip Immunoassay. Thirty-one laboratories (39%) stated that they are considering and/or in the process of validating methods using LC-HRMS. Nine laboratories (11%) stated that they are considering and/or in the process of validating methods using LC-MS. Six laboratories (8%) stated that they are considering and/or in the process of validating methods using ELISA. Two laboratories (3%) stated that they are considering alternative techniques but did not specify.

**Question 23:** Please indicate what methods are routinely used for drug CONFIRMATION in DUID/traffic fatality testing:



**Figure 22.** Analytical methods routinely used for drug confirmation in DUID/traffic fatality testing (n = 80)<sup>7</sup>.

Eighty laboratories responded to this question. As multiple methods could be selected, a total of 161 selections were made to which methods are used for confirming blood samples, 125 selections for confirming urine samples, and 2 selections for confirming oral fluid samples (Figure 20).

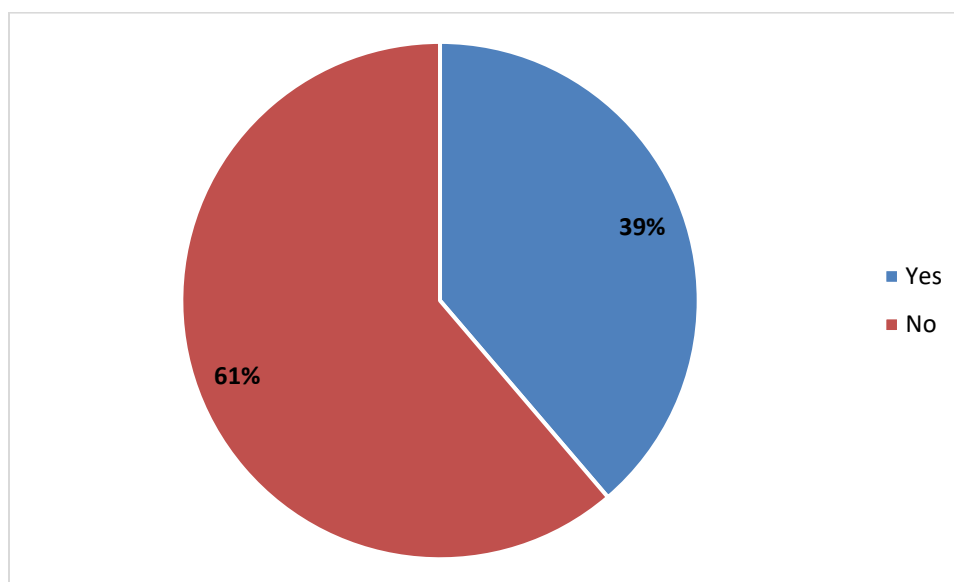
Laboratories also had the ability to comment on other methods routinely used for drug confirmation in DUID/traffic fatality testing (7 laboratories; 9%). One laboratory stated that oral fluid is not tested in deceased drivers. One laboratory stated that methods will be changing in August 2024; however, no further information was provided. One laboratory stated that urine testing is outsourced to another laboratory for confirmation testing. One laboratory stated that LC-MS testing is outsourced to another laboratory. Three laboratories reiterated which methods are used by their laboratory.

<sup>7</sup> LC-HRMS includes HR TRAP, TOF, and QTOF.

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**Question 24:** Does your laboratory report unconfirmed screening results?

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**Figure 23.** Laboratories reporting unconfirmed screening results (n = 80).

If the laboratory indicated that it reported unconfirmed screen results, then the laboratory had the ability to explain by a free text response comment. According to the 31 free text responses, one laboratory stated that a note/comment is added to prompt further inquiry.

One laboratory stated that preliminary drug screening results are released to customers.

Ten laboratories stated that unconfirmed screening results are reported if there is no confirmation method available. Three of these laboratories add a statement on the report that results should not be used for court purposes and/or should be confirmed prior to being used in legal proceedings. Two of these laboratories add a note on the report stating that no further confirmation testing was performed and/or why confirmation testing was not performed. One laboratory releases the report stating that a drug was indicated, and additional testing is being performed by an outside laboratory.

Six laboratories stated that cannabinoid unconfirmed screening results are reported in some circumstances. Laboratories clarified situations to include when carboxy-THC is indicated in urine, cannabinoids in postmortem blood, cannabinoids in non-traffic fatality cases, and when cannabinoids are indicated for passengers in traffic fatality cases.

One laboratory stated that screening reports are provided for the following drug/drug classes: amphetamines, benzodiazepines, cannabinoids, cocaine, opiates, and PCP.

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Four laboratories stated that unconfirmed screening results are reported for incidental findings or drugs that do not cause impairment. Drugs listed as examples included caffeine, cotinine, naproxen, ibuprofen, lisinopril, naloxone, and antidepressants.

Two laboratories stated that unconfirmed screening results are reported when sample volume is insufficient for confirmation testing.

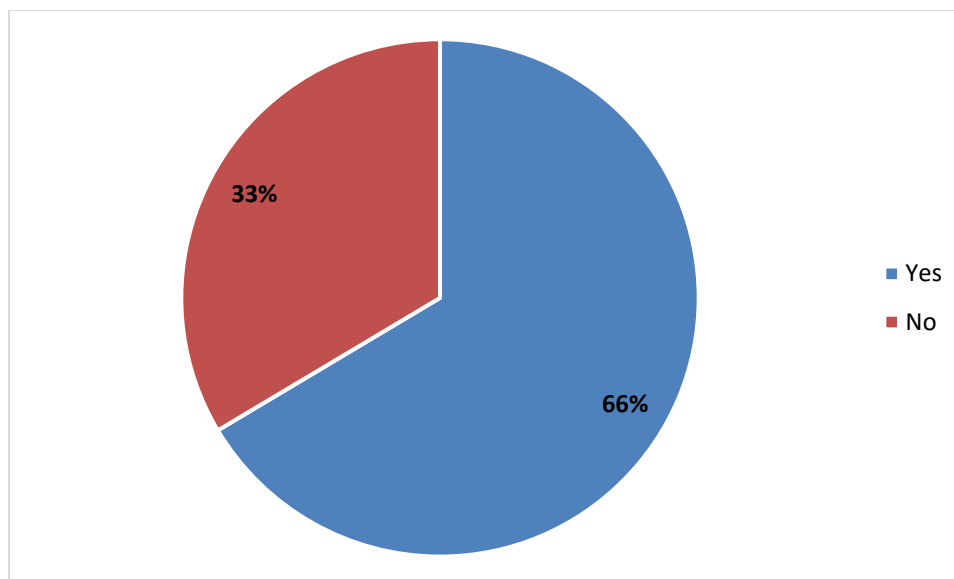
Two laboratories stated that drugs are not reported based on screening results, but samples have been reported as positive for one or more drugs without specifying the drug(s) and have requesters contact the laboratory for confirmation.

One laboratory stated that the following note is added to the report: “Preliminary Results: Initial testing indicates the possible presence of the preceding analytes. Please contact the laboratory if confirmatory testing is needed.”

One laboratory stated that if confirmatory testing is not pursued, the following note is added to the report: “Preliminary testing indicates the possible presence of \_\_\_\_, not pursued due to \_\_\_\_.”

One laboratory stated that only negative screening results are reported without being confirmed.

**Question 25:** If your laboratory reports unconfirmed screening results, do you indicate in your report that additional testing must be requested?



**Figure 24.** Laboratories reporting unconfirmed screening results with indications that additional testing must be requested (n = 30).

If the laboratory indicated that it reported unconfirmed screen results without indicating that additional testing must be requested, then the laboratory had the ability to explain by a free text response comment.

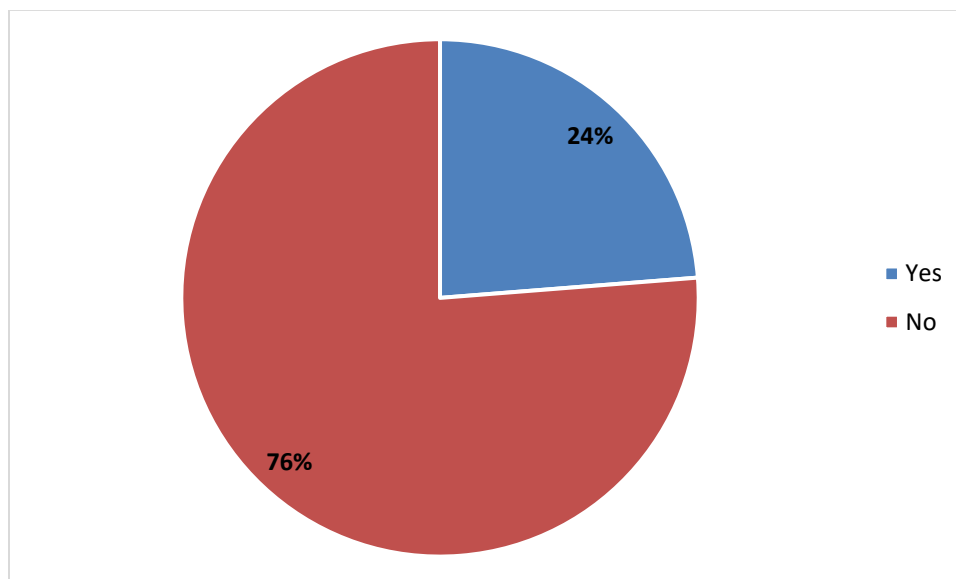
Thirteen of the twenty laboratories that responded with “Yes” provided further explanation. Four laboratories stated that preliminary results are reported but there is a note that confirmation testing needs to be performed prior to use in a court setting. Six laboratories stated that if confirmation testing is needed to please contact the laboratory, or if the laboratory does not have a method for confirmation testing then another laboratory should be contacted. One laboratory stated that a note is added but no additional information was provided. One laboratory stated that the client would need to contact the laboratory to find out which drugs were not confirmed, and if confirmation testing is needed for those drugs then further testing would need to be performed. One laboratory stated that cannabis is reported as presumptive positive and would require further analysis to confirm the presence of cannabinoids.

Six of the ten laboratories that responded with “No” provided further explanation. One laboratory stated that their clients are aware that they can request additional testing for any unconfirmed findings. One laboratory stated that confirmation testing is not automatically

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triggered for off-line methods. Two laboratories stated that presumptive results are only reported for samples with insufficient volume for confirmation testing. One laboratory stated that samples would be reported as positive without specifying the drugs and requesters would have to contact the laboratory for confirmation testing. One laboratory stated that the report lists why confirmation testing was not pursued; however, the agency has the ability to contact the laboratory if further testing is needed.

**Question 26:** Is your laboratory currently involved in research projects in the field of alcohol or drug impaired driving?



**Figure 25.** Laboratories involved in research projects in the field of alcohol or drug impaired driving (n = 80).

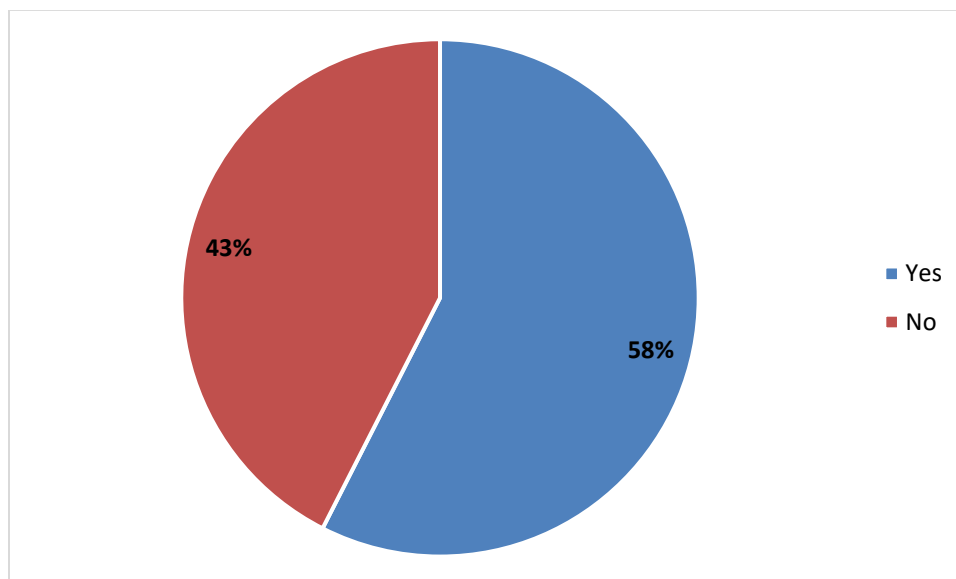
Nineteen laboratories responded with “Yes”; however, only 17 laboratories provided explanations. Research topics included:

- Results observed and drug positivity for regional outreach and education
- Ethanol and drug stability, blood versus oral fluid drug concentration comparison
- Breath alcohol study regarding a substance advertised to prevent people from getting drunk
- THC prevalence and concentrations in various states based on the legal status of cannabis
- Methamphetamine in DUID
- Prevalence and concentrations of delta-8 THC
- DUID project with the Center for Forensic Science Research & Education
- Development of new methods for the analysis of blood, urine, and tissues
- Development and validation of new methodology for blood alcohol (ex. more efficient methods)
- Designer benzodiazepines
- Acute psychotic episodes with cannabis

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- HRMS screening/confirmation
  - Testing an alternative vendor for blood vacutainers
  - Stop-limit testing where the sample is screened for drugs other than ethanol when originally testing was cancelled due to a high blood alcohol concentration
  - Oral fluid roadside screening device feasibility study
  - Statewide oral fluid pilot programs
  - Novel psychoactive substance (NPS) detection
  - Cannabis breath testing
  - Oral fluid drug testing program
  - Stability, interference, method development/validation
  - Drug trends
  - Reviewing laboratory data to compare concentration in traumatic deaths with non-traumatic deaths with the potential for collaboration with other local laboratories to evaluate linked incidents
  - Prevalence studies where some police reports/DRE reports are pulled to compare the toxicology to those reports



**Question 27:** Are there gaps in our knowledge of alcohol and drug impaired driving that you feel would benefit from research projects or collaborations?



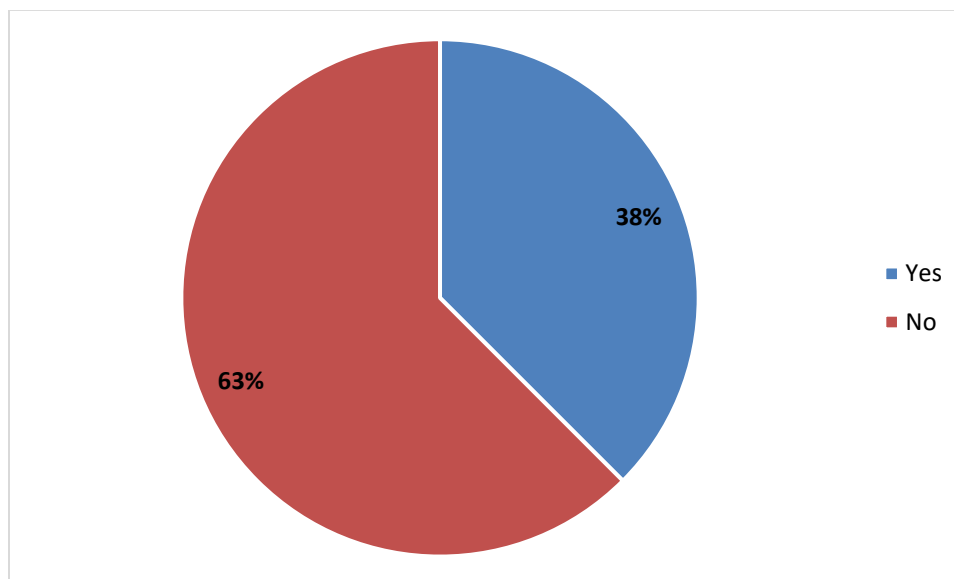
**Figure 26.** Laboratories that believe there are gaps in our knowledge of alcohol and drug impaired driving (n = 80).

Forty-six laboratories responded with “Yes”; however, only 37 laboratories provided examples of areas that need further research. Topics included:

- Metabolism of novel compounds, pharmacological activity of metabolites, effects
- THC and THC isomers – concentrations, impairment information, testing methods, reporting and testimony
- Detection window of drugs in blood
- Impairment by cannabinoids including more delta-8, 9, and 10, including relationships with the levels of the parent compounds along with active metabolites (ex. are there levels or relationships between parent/metabolite where all individuals would be impaired?)
- Better field tests for assessing impairment
- More designer drug studies
- Overall collaboration on methods across the country
- Polydrug cases – impairment and interpretation
- Volume of distribution determination in a larger portion of diverse groups
- The effects on THC concentrations and prevalence after the legalization of cannabis

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- Concentrations of THC in DUID drivers and fatal motor vehicle accident drivers (antemortem blood)
  - Interpretation of THC in combination with alcohol
  - Transgender individuals that have undergone hormone therapies or gender reassignment surgeries and how alcohol elimination and volume of distribution is impacted
  - More driving studies needed for drugs including prescription drugs
  - More case studies for NPS drugs, including effects on driving
  - Drug stability in various matrices
  - Pilot projects for breath testing drugs other than alcohol
  - What drugs are missed in cases where stop-limit testing is applied
  - Oral fluid and blood drug concentration/impairment correlation
  - Pursuit of testing for hallucinogens and synthetic cannabinoids in driving while intoxicated cases
  - d/l-methamphetamine
  - Collaboration on evaluating drug trends in different regions
  - Using higher levels of THC in the THC/COOH research
  - Reporting uncertainty for drug analysis
  - Attempting to correlate marijuana blood levels with either time of use or impairment
  - Higher levels of fentanyl seen in drivers
  - Relevance of oral fluid

**Question 28:** Are there questions that you have been asked in court that you feel could be answered with more research?



**Figure 27.** Questions in court that could be answered with more research (n = 80).

Thirty laboratories responded with “Yes”; however, only 23 laboratories provided examples of the most commonly asked questions in court. Topics included:

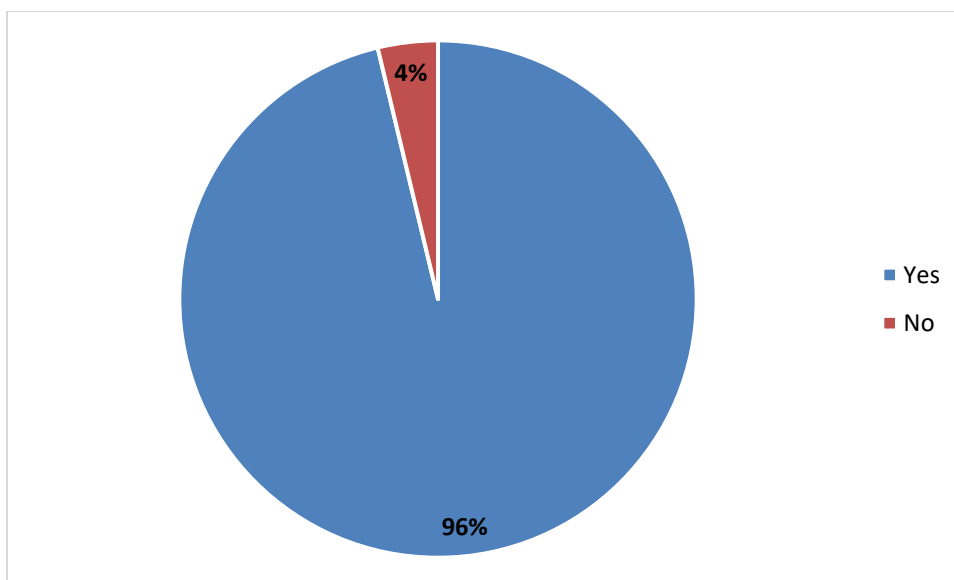
- More defined therapeutic ranges for prevalent novel compounds
- THC and THC isomers – general information and impairment (DUI and postmortem interpretation)
- Detection window of drugs in blood
- Combined effects of cannabis and drugs other than ethanol
- The relationship between cannabinoid levels seen in a case and a person’s driving conduct, and when use occurred
- Effects of NPS on driving
- Driving effects of illegal substances
- How to evaluate recent use using toxicology
- Polydrug intoxication
- Use of matrix matched blood volatile controls versus the use of aqueous controls
- Blood/plasma ratios for various drugs
- Drug impairment
- Microclot and stability issues for alcohol cases

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- THC curve with higher levels
  - THC and ethanol combined effects
  - Polydrug driving studies

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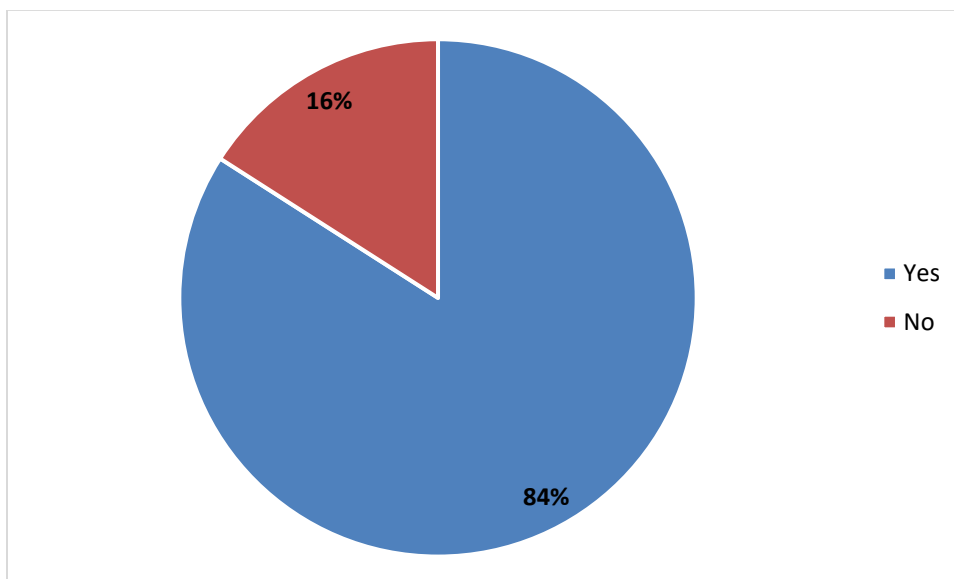
## **Drug Analysis – BLOOD**

**Question 29:** Does your laboratory provide BLOOD sample analytical services (screening or confirmation) for DUID/traffic fatality samples?



**Figure 28.** Laboratories providing BLOOD analytical services (screening or confirmation) for DUID/traffic fatality samples (n = 80).

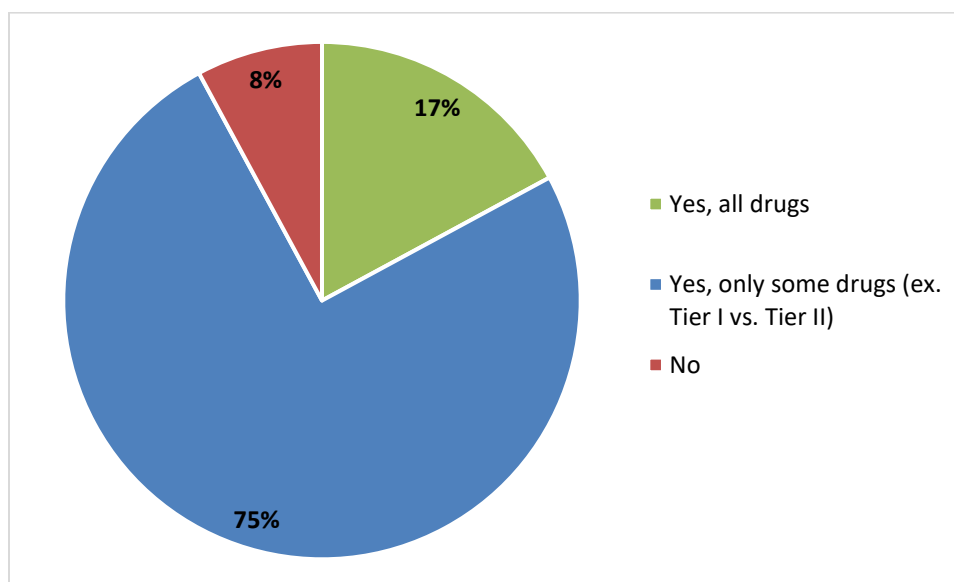
**Question 30:** Are the drug testing services (drug menu and sensitivities) identical for both DUID and traffic fatality cases?



**Figure 29.** Are drug testing services (drug menu and sensitivities) identical for DUID and traffic fatality cases (n = 69)?

If the laboratory indicated that their drug testing services (drug menu and sensitivities) are not identical for DUID and traffic fatality cases, then the laboratory had the ability to explain in a free text response comment. According to the 4 free text responses, three laboratories stated that there are different testing scopes and cutoffs for traffic fatality cases, and one laboratory stated that fatality cases with no detectable ELISA results will undergo a comprehensive screening by GC/MS.

## Question 31: Does your laboratory quantify drugs in BLOOD?



**Figure 30.** Does your laboratory quantify drugs in blood (n = 77)?

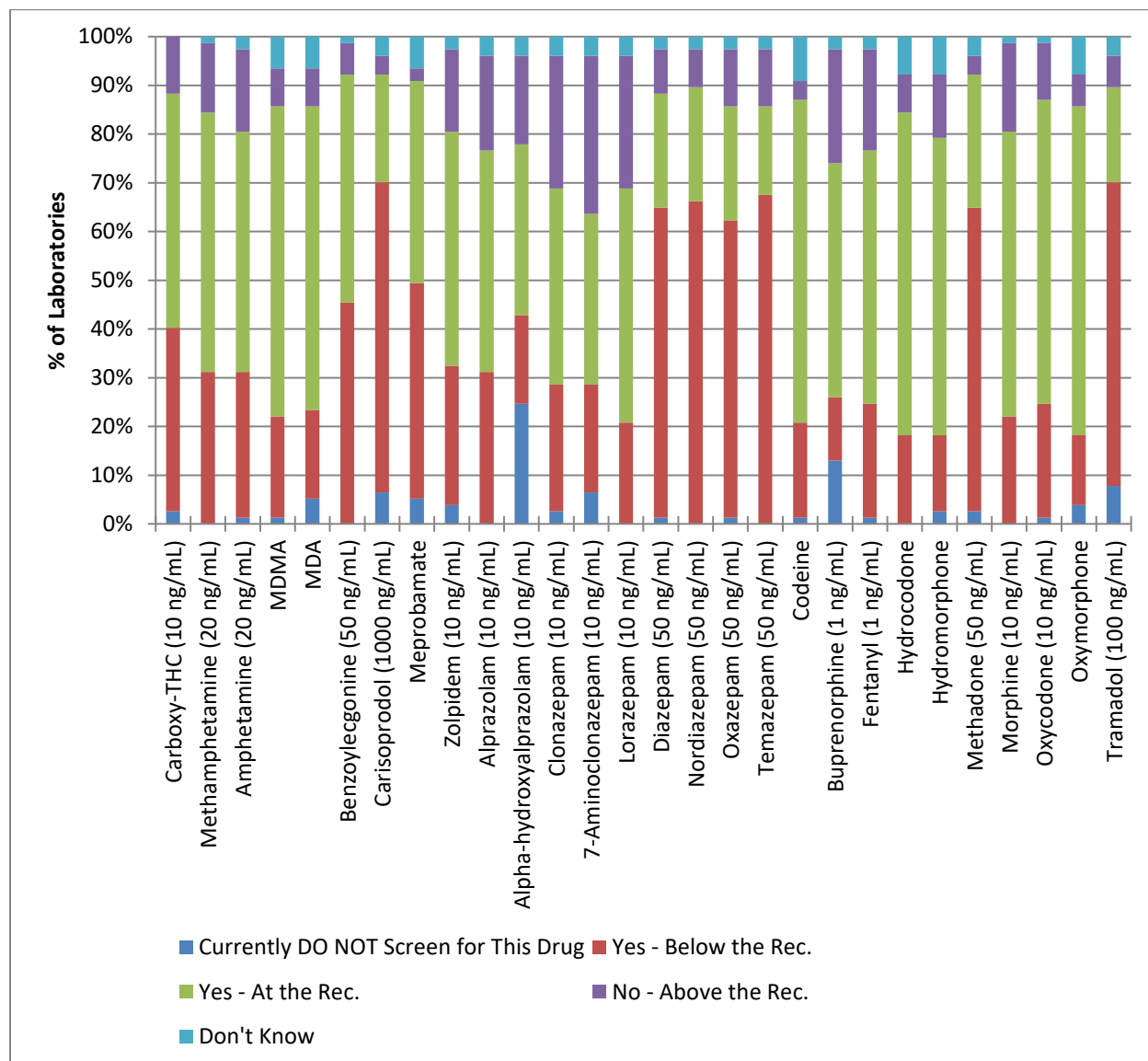
If the laboratory indicated that their laboratory quantifies only some drugs in blood, then the laboratory had the ability to explain the criteria in a free text response comment. Fifty-seven laboratories responded “Yes, only some drugs”, but only 51 laboratories explained the criteria. Eight laboratories stated that only controlled substances are quantitated. Two laboratories stated that only cannabinoids are not quantitated. Seven laboratories stated that the criteria depend on laboratory scope. One laboratory stated that the methods quantify but results are reported qualitatively. Two laboratories stated that it based on the type of case (ex. fatal versus non-fatal case). One laboratory stated that drugs are qualitatively confirmed while appropriate ranges are established through literature. One laboratory stated that the criteria is based on relevance to impairment, prevalence in casework, and the ASB recommendations. One laboratory stated that there are two secondary confirmations that are used if the screen does not match the confirmation. One laboratory stated that all drugs are reported quantitatively except for drugs that have had inconsistent quality results or a poor finding in a proficiency test.

Six laboratories stated that the criteria are Tier I versus Tier II drugs, where Tier I was prioritized and some or none of the Tier II drugs may have available quantitative testing. One laboratory quantifies all Tier I drugs except cocaethylene.

Twenty-one laboratories stated that this is limited based on completed validation methods and analytical capabilities. Eight of these laboratories stated that they are undergoing validation for additional quantitative methods.



**Question 32: Drug Analysis – BLOOD – SCREENING** Do you currently meet the guideline recommendations (given in parentheses) for SCREENING each of these drugs in BLOOD samples? (Graph Format)



**Figure 31.** Do laboratories currently meet the guideline recommendations for screening each drug in blood at the recommended cutoffs (n = 77)?

**Question 32: Drug Analysis – BLOOD – SCREENING** Do you currently meet the guideline recommendations (given in parentheses) for SCREENING each of these drugs in BLOOD samples? (Table Format)

Drug	Number of Laboratories who test for this drug ("Total that Test") (n)	% of Laboratories who test for this drug ("Total that Test")	% of Laboratories that meet or exceed the recommendation/ Total that Test
<b>Cannabis</b>			
Carboxy-THC (10 ng/mL)	75	97%	88%
<b>CNS Stimulants</b>			
Methamphetamine (20 ng/mL)	76	99%	86%
Amphetamine (20 ng/mL)	74	96%	82%
MDMA	71	92%	92%
MDA	68	88%	91%
Benzoylcegonine (50 ng/mL)	76	99%	93%
<b>CNS Depressants</b>			
Carisoprodol (1000 ng/mL)	69	90%	96%
Meprobamate	68	88%	97%
Zolpidem (10 ng/mL)	72	94%	82%
Alprazolam (10 ng/mL)	74	96%	80%
Alpha-hydroxyalprazolam (10 ng/mL)	55	71%	75%
Clonazepam (10 ng/mL)	72	94%	71%
7-aminoclonazepam (10 ng/mL)	69	90%	64%
Lorazepam (10 ng/mL)	74	96%	72%
Diazepam (50 ng/mL)	74	96%	91%
Nordiazepam (50 ng/mL)	75	97%	92%
Oxazepam (50 ng/mL)	74	96%	88%
Temazepam (50 ng/mL)	75	97%	88%
<b>Narcotic Analgesics</b>			
Codeine	69	90%	96%
Buprenorphine (1 ng/mL)	65	84%	72%
Fentanyl (1 ng/mL)	74	96%	78%
Hydrocodone	71	92%	92%
Hydromorphone	69	90%	86%
Methadone (50 ng/mL)	72	94%	96%

Morphine (10 ng/mL)	76	99%	82%
Oxycodone (10 ng/mL)	75	97%	88%
Oxymorphone	68	88%	93%
Tramadol (100 ng/mL)	68	88%	93%

**Table 7.** Numbers and percentages of those laboratories who test for the drug and what percentage of those who test meet or exceed the guideline recommendations for screening drugs in blood.

The percentage of laboratories who test for this drug was calculated by adding together the number of laboratories that meet the recommendation by being at or below the recommendation and laboratories that do not meet the recommendation by being above the recommendation. The result was termed the “Total that Test” and was used as the denominator for calculating the percentage of laboratories who test that meet or exceed the recommendation (third column). This percentage represents the percentage of laboratories that meet or exceed the recommendation out of the total percentage of laboratories that test for the drug. All subsequent data were calculated in this manner.

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## Cannabis

For **carboxy-THC** at the recommended screening cutoff of 10 ng/mL, 38% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 48% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 12% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 3% do not test for this drug.

## CNS Stimulants

For **methamphetamine** at the recommended screening cutoff of 20 ng/mL, 31% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 53% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 86% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 14% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 1% do not know if their laboratory meets the guideline recommendation.

For **amphetamine** at the recommended screening cutoff of 20 ng/mL, 30% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 49% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 17% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 3% do not know if their laboratory meets the guideline recommendation.

For **MDMA** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 21% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 64% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 8% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 6% do not know if their laboratory meets the guideline recommendation.

For **MDA** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 18% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 62% are at the recommended screening cutoff. Of

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the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 8% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 5% do not test for this drug, and 6% do not know if their laboratory meets the guideline recommendation.

For **benzoylecgonine** at the recommended screening cutoff of 50 ng/mL, 45% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 47% of laboratories reported meeting the guideline recommendation by being at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 6% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 1% do not know if their laboratory meets the guideline recommendation.

### CNS Depressants

For **carisoprodol** at the recommended screening cutoff of 1000 ng/mL, 64% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 22% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 4% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 6% do not test for this drug, and 4% do not know if their laboratory meets the guideline recommendation.

For **meprobamate** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 44% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 42% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 97% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 3% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 5% do not test for this drug, and 6% do not know if their laboratory meets the guideline recommendation.

For **zolpidem** at the recommended screening cutoff of 10 ng/mL, 29% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 48% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 17% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 4%

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do not test for this drug, and 3% do not know if their laboratory meets the guideline recommendation.

For **alprazolam** at the recommended screening cutoff of 10 ng/mL, 31% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 45% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 80% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 19% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 4% do not know if their laboratory meets the guideline recommendation.

For **alpha-hydroxyalprazolam** at the recommended screening cutoff of 10 ng/mL, 18% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 35% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 75% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 18% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 25% do not test for this drug, and 4% do not know if their laboratory meets the guideline recommendation.

For **clonazepam** at the recommended screening cutoff of 10 ng/mL, 26% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 40% of laboratories reported meeting the guideline recommendation by being at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 71% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 27% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 3% do not test for this drug, and 4% do not know if their laboratory meets the guideline recommendation.

For **7-aminoclonazepam** at the recommended screening cutoff of 10 ng/mL, 22% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 35% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 64% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 32% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 6% do not test for this drug, and 4% do not know if their laboratory meets the guideline recommendation.

For **lorazepam** at the recommended screening cutoff of 10 ng/mL, 21% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 48% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 72% reported meeting the guideline recommendation by being

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either below or at the recommended screening cutoff. A total 27% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 4% do not know if their laboratory meets the guideline recommendation.

For **diazepam** at the recommended screening cutoff of 50 ng/mL, 64% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 23% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 9% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 3% do not know if their laboratory meets the guideline recommendation.

For **nordiazepam** at the recommended screening cutoff of 50 ng/mL, 66% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 23% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 8% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 3% do not know if their laboratory meets the guideline recommendation.

For **oxazepam** at the recommended screening cutoff of 50 ng/mL, 61% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 23% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 12% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 3% do not know if their laboratory meets the guideline recommendation.

For **temazepam** at the recommended screening cutoff of 50 ng/mL, 68% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 18% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 12% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 3% do not know if their laboratory meets the guideline recommendation.

### **Narcotic Analgesics**

For **codeine** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 19% of laboratories reported meeting the guideline recommendation by being



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below the recommended screening cutoff, and 66% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 4% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 9% do not know if their laboratory meets the guideline recommendation.

For **buprenorphine** at the recommended screening cutoff of 1 ng/mL, 13% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 48% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 72% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 23% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 13% do not test for this drug, and 3% do not know if their laboratory meets the guideline recommendation.

For **fentanyl** at the recommended screening cutoff of 1 ng/mL, 23% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 52% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 78% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 21% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 3% do not know if their laboratory meets the guideline recommendation.

For **hydrocodone** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 18% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 66% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 8% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 8% do not know if their laboratory meets the guideline recommendation.

For **hydromorphone** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 16% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 61% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 86% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 13% of laboratories reported not meeting the guideline recommendation by being



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above the recommended screening cutoff, 3% do not test for this drug, and 8% do not know if their laboratory meets the guideline recommendation.

For **methadone** at the recommended screening cutoff of 50 ng/mL, 62% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 27% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 4% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 3% do not test for this drug, and 4% do not know if their laboratory meets the guideline recommendation.

For **morphine** at the recommended screening cutoff of 10 ng/mL, 22% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 58% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 18% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 1% do not know if their laboratory meets the guideline recommendation.

For **oxycodone** at the recommended screening cutoff of 10 ng/mL, 23% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 62% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 12% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 1% do not test for this drug, and 1% do not know if their laboratory meets the guideline recommendation.

For **oxymorphone** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 14% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 68% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total 6% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 4% do not test for this drug, and 8% do not know if their laboratory meets the guideline recommendation.

For **tramadol** at the recommended screening cutoff of 100 ng/mL, 62% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 19% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being

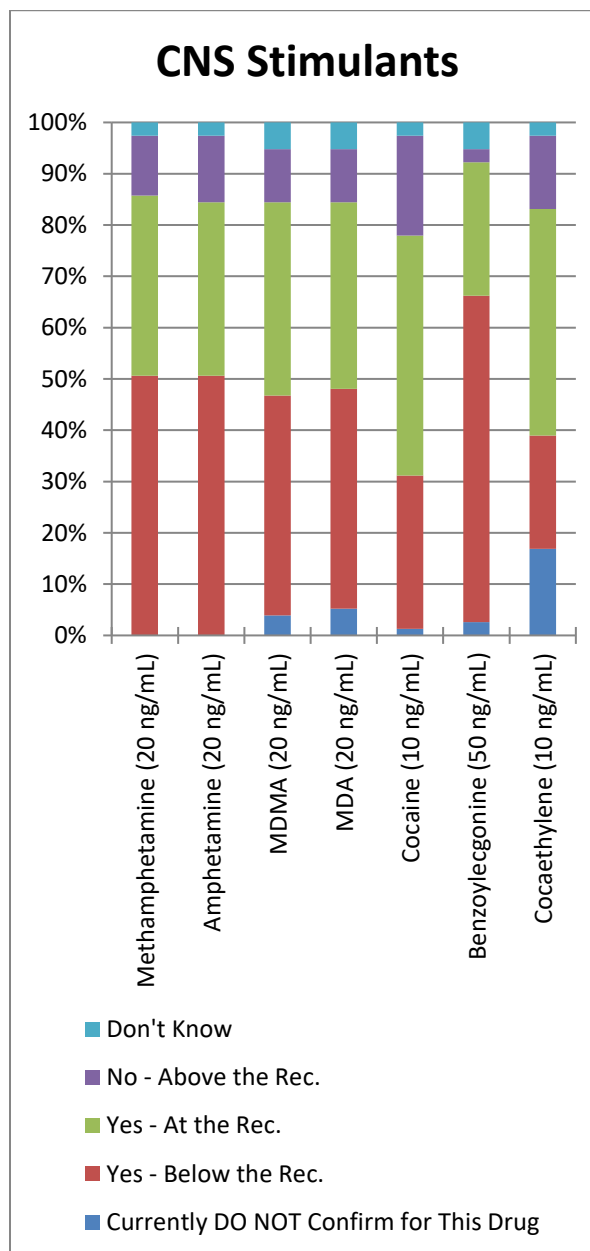
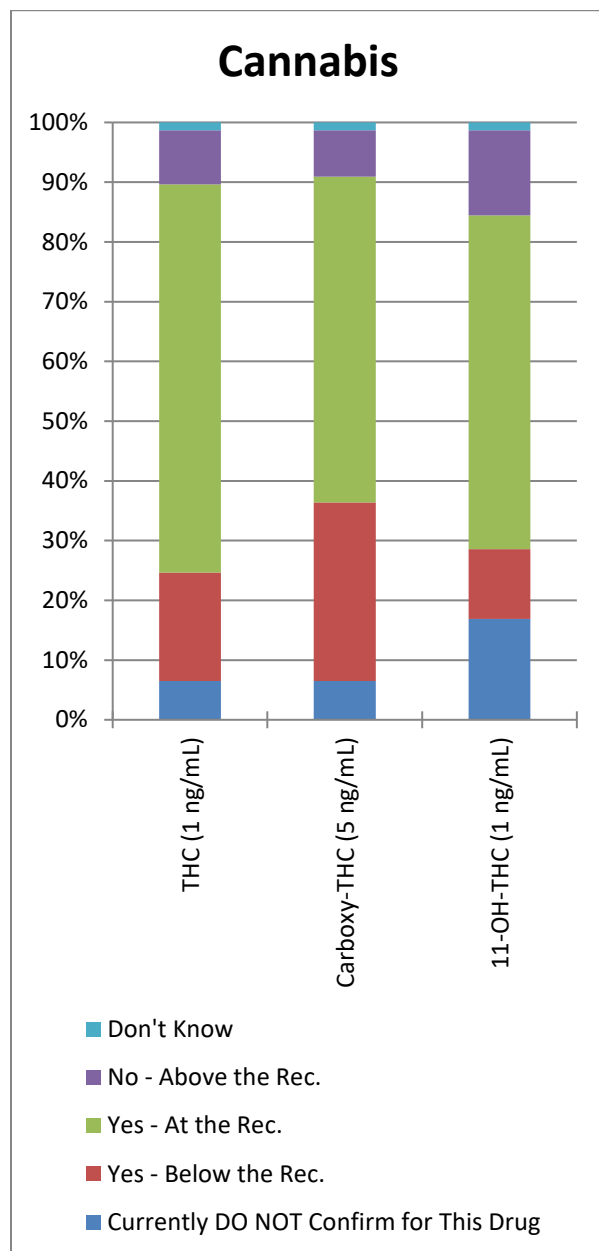
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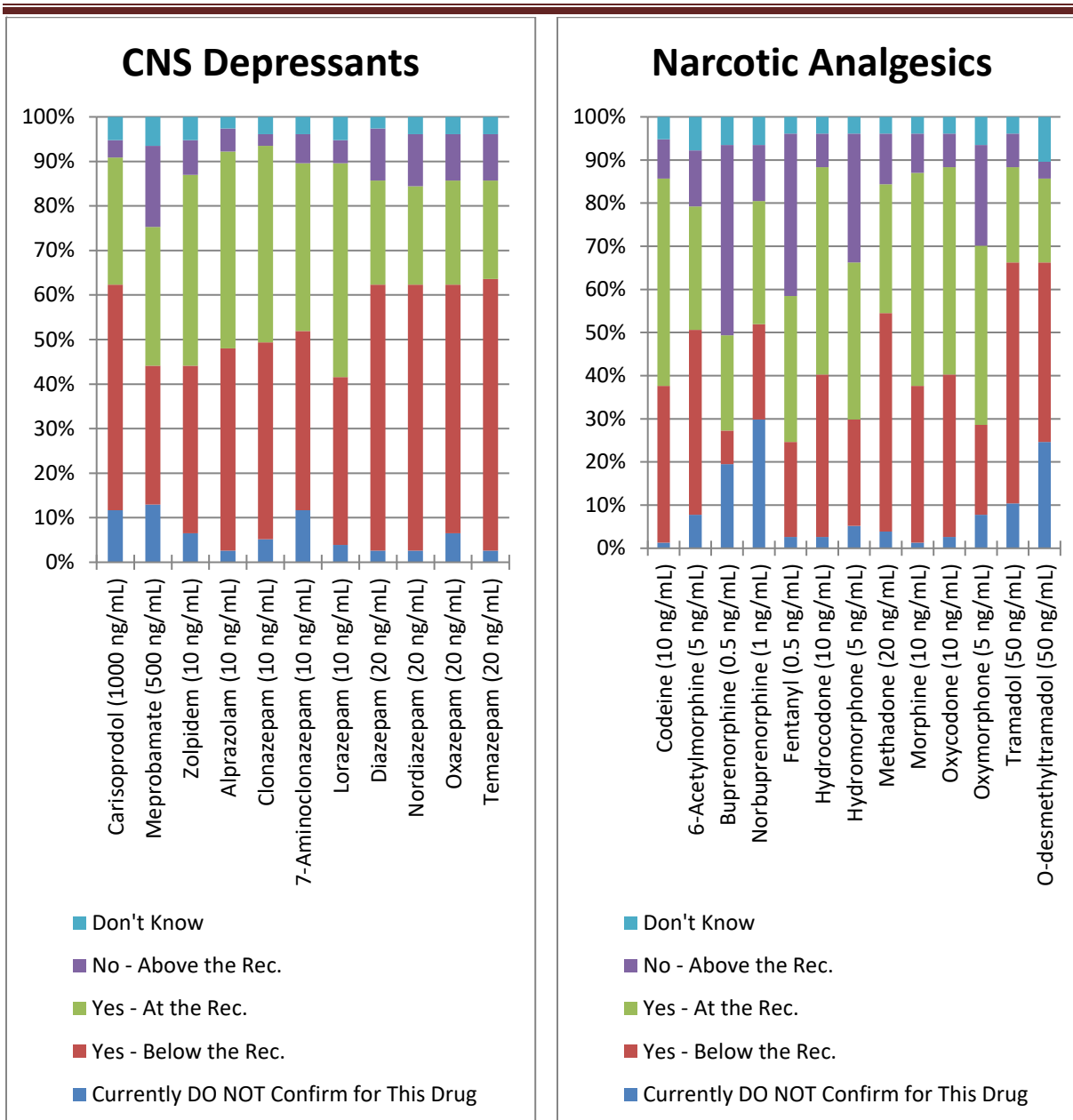
either below or at the recommended screening cutoff. A total 6% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 8% do not test for this drug, and 4% do not know if their laboratory meets the guideline recommendation.

Overall, **temazepam** was the most frequently reported (68%) drug in this set for meeting the guideline recommendation by being below the recommended screening cutoff.

**Oxymorphone** was the most frequently reported (68%) drug in this set for meeting the guideline recommendation by being at the recommended screening cutoff. **7-aminoclonazepam** was the most frequently reported (32%) drug in this set for not meeting the guideline recommendation by being above the recommended screening cutoff. No drug was reported as always being tested.

**Question 33: Drug Analysis – BLOOD – CONFIRMATION** Do you currently meet the guideline recommendations (given in parentheses) for CONFIRMING each of these drugs in BLOOD samples? (Graph Format)





**Figures 32-35.** Do laboratories currently meet the guideline recommendations for confirming each drug in blood at the recommended cutoffs (n = 77)?

**Drug Analysis – BLOOD – CONFIRMATION** Do you currently meet the guideline recommendations (given in parentheses) for **CONFIRMING** each of these drugs in **BLOOD** samples? (Table Format)

Drug	Number of Laboratories who test for this drug ("Total that Test") (n)	% of Laboratories who test for this drug ("Total that Test")	% of Laboratories that meet or exceed the recommendation/ Total that Test
<b>Cannabis</b>			
THC (1 ng/mL)	71	92%	90%
Carboxy-THC (5 ng/mL)	71	92%	92%
11-OH-THC (1 ng/mL)	63	82%	83%
<b>CNS Stimulants</b>			
Methamphetamine (20 ng/mL)	75	97%	88%
Amphetamine (20 ng/mL)	75	97%	87%
MDMA (20 ng/mL)	70	91%	89%
MDA (20 ng/mL)	69	90%	88%
Cocaine (10 ng/mL)	74	96%	80%
Benzoylcegonine (50 ng/mL)	71	92%	97%
Cocaethylene (10 ng/mL)	62	81%	82%
<b>CNS Depressants</b>			
Carisoprodol (1000 ng/mL)	64	83%	95%
Meprobamate (500 ng/mL)	62	81%	77%
Zolpidem (10 ng/mL)	68	88%	91%
Alprazolam (10 ng/mL)	73	95%	95%
Clonazepam (10 ng/mL)	70	91%	97%
7-aminoclonazepam (10 ng/mL)	65	84%	92%
Lorazepam (10 ng/mL)	70	91%	94%
Diazepam (20 ng/mL)	73	95%	88%
Nordiazepam (20 ng/mL)	72	94%	88%
Oxazepam (20 ng/mL)	69	90%	88%
Temazepam (20 ng/mL)	72	94%	89%
<b>Narcotic Analgesics</b>			

Codeine (10 ng/mL)	72	94%	90%
6-acetylmorphine (5 ng/mL)	65	84%	85%
Buprenorphine (0.5 ng/mL)	57	74%	40%
Norbuprenorphine (1 ng/mL)	49	64%	80%
Fentanyl (0.5 ng/mL)	72	94%	60%
Hydrocodone (10 ng/mL)	72	94%	92%
Hydromorphone (5 ng/mL)	70	91%	67%
Methadone (20 ng/mL)	71	92%	87%
Morphine (10 ng/mL)	73	95%	90%
Oxycodone (10 ng/mL)	72	94%	92%
Oxymorphone (5 ng/mL)	66	86%	73%
Tramadol (50 ng/mL)	66	86%	91%
O-Desmethyiltramadol (50 ng/mL)	50	65%	94%

**Table 8.** Numbers and percentages of those laboratories who test for the drug and what percentage of those who test meet or exceed the guideline recommendations for confirming drugs in blood.

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## Cannabis

For **THC** at the recommended confirmation cutoff of 1 ng/mL, 18% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 65% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 6% do not test for this drug, and 1% do not know if they meet the guideline recommendation.

For **carboxy-THC** at the recommended confirmation cutoff of 5 ng/mL, 30% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 55% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 8% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 6% do not test for this drug, and 1% do not know if they meet the guideline recommendation.

For **11-OH-THC** at the recommended confirmation cutoff of 1 ng/mL, 12% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 56% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 83% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 14% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 17% do not test for this drug, and 1% do not know if they meet the guideline recommendation.

## CNS Stimulants

For **methamphetamine** at the recommended confirmation cutoff of 20 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 35% of laboratories reported meeting the guideline recommendation by being at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff and 3% do not know if they meet the guideline recommendation.

For **amphetamine** at the recommended confirmation cutoff of 20 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended

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confirmation cutoff, and 34% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 87% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff and 3% do not know if they meet the guideline recommendation.

For **MDMA** at the recommended confirmation cutoff of 20 ng/mL, 43% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 38% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 89% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 10% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 4% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **MDA** at the recommended confirmation cutoff of 20 ng/mL, 43% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 36% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 10% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 5% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **cocaine** at the recommended confirmation cutoff of 10 ng/mL, 30% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 47% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 80% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 19% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 1% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **benzoylecgonine** at the recommended confirmation cutoff of 50 ng/mL, 64% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 26% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 97% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 3% of laboratories reported not meeting the guideline recommendation by being above the



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recommended confirmation cutoff, 3% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **cocaethylene** at the recommended confirmation cutoff of 10 ng/mL, 22% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 44% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 14% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 17% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

### **CNS Depressants**

For **carisoprodol** at the recommended confirmation cutoff of 1000 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 29% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 12% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **meprobamate** at the recommended confirmation cutoff of 500 ng/mL, 31% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 31% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 77% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 18% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 13% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **zolpidem** at the recommended confirmation cutoff of 10 ng/mL, 38% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 43% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 8% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 6% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

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For **alprazolam** at the recommended confirmation cutoff of 10 ng/mL, 45% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 44% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 5% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **clonazepam** at the recommended confirmation cutoff of 10 ng/mL, 44% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 44% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 97% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 3% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 5% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** at the recommended confirmation cutoff of 10 ng/mL, 40% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 38% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 12% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **lorazepam** at the recommended confirmation cutoff of 10 ng/mL, 38% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 48% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 94% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 5% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 4% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **diazepam** at the recommended confirmation cutoff of 20 ng/mL, 60% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 23% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 12% of laboratories

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reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **nordiazepam** at the recommended confirmation cutoff of 20 ng/mL, 60% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **oxazepam** at the recommended confirmation cutoff of 20 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 23% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 10% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 6% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **temazepam** at the recommended confirmation cutoff of 20 ng/mL, 61% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 89% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 10% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

### **Narcotic Analgesics**

For **codeine** at the recommended confirmation cutoff of 10 ng/mL, 36% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 48% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 1% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

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For **6-acetylmorphine** at the recommended confirmation cutoff of 5 ng/mL, 43% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 29% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 85% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 8% do not test for this drug, and 8% do not know if they meet the guideline recommendation.

For **buprenorphine** at the recommended confirmation cutoff of 0.5 ng/mL, 8% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 40% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 44% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 19% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **norbuprenorphine** at the recommended confirmation cutoff of 1 ng/mL, 22% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 29% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 80% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 30% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **fentanyl** at the recommended confirmation cutoff of 0.5 ng/mL, 22% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 34% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 60% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 38% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **hydrocodone** at the recommended confirmation cutoff of 10 ng/mL, 38% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 48% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of

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8% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **hydromorphone** at the recommended confirmation cutoff of 5 ng/mL, 25% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 36% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 67% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 30% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 5% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **methadone** at the recommended confirmation cutoff of 20 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 30% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 87% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 4% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **morphine** at the recommended confirmation cutoff of 10 ng/mL, 36% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 49% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 1% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **oxycodone** at the recommended confirmation cutoff of 10 ng/mL, 38% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 48% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 8% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **oxymorphone** at the recommended confirmation cutoff of 5 ng/mL, 21% of laboratories reported meeting the guideline recommendation by being below the recommended

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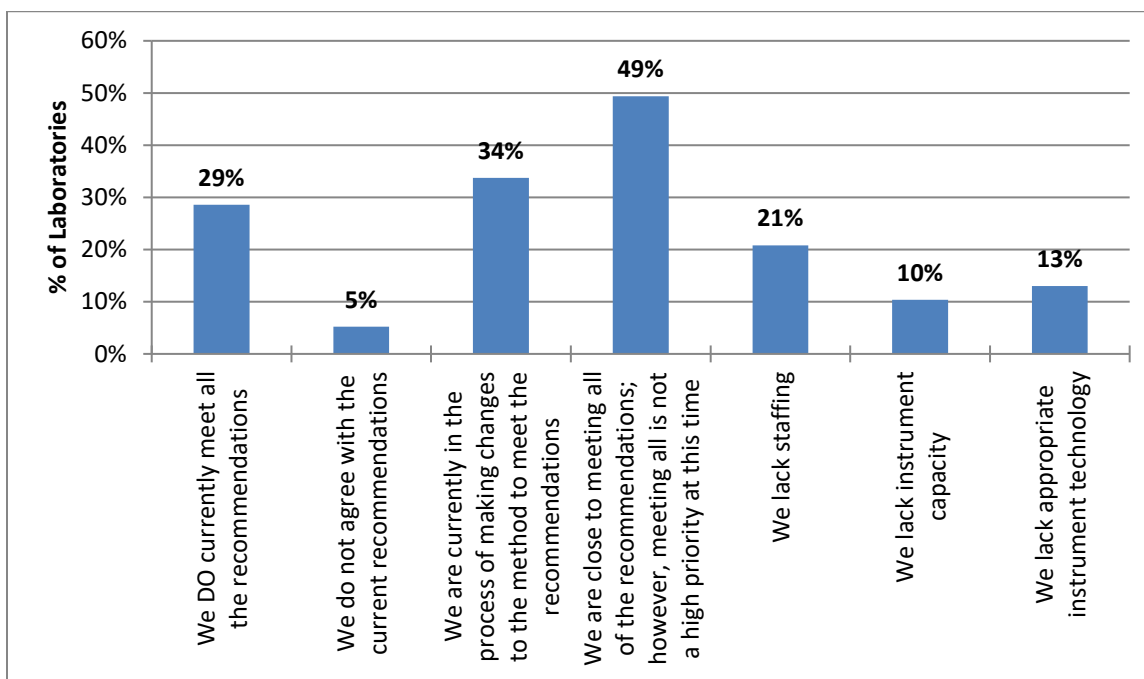
confirmation cutoff, and 42% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 73% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 23% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 8% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **tramadol** at the recommended confirmation cutoff of 50 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 8% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 10% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **O-Desmethyiltramadol** at the recommended confirmation cutoff of 50 ng/mL, 42% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 19% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 94% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 25% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

Overall, **benzoylecgonine** was the most frequently reported (64%) drug in this set for meeting the guideline recommendation by being below the recommended confirmation cutoff. **THC** was the most frequently reported (65%) drug in this set for meeting the guideline recommendation by being at the recommended confirmation cutoff. **Buprenorphine** was the most frequently reported (44%) drug in this set for not meeting the guideline recommendation by being above the recommended confirmation cutoff. No drug was reported as always being tested.

**Question 34:** For drug analysis that does not currently meet the SCREENING recommendations for BLOOD, please indicate the reasons (please check all that apply):



**Figure 36.** Reasons why laboratories do not currently meet the screening recommendations in blood samples (n = 77).

Multiple reasons could be selected by each laboratory. Laboratories also had the ability to comment on other reasons for not meeting the recommendations for blood samples (19 laboratories; 25%). Five laboratories stated that some methods cannot achieve lower sensitivity. Five laboratories stated that metabolites are typically detected with the parent drug so validating methods for these metabolites is not a priority at this time. Three laboratories stated that new instrumentation has been purchased and that method validation to meet guidelines will be performed. One laboratory stated that they do not agree with the recommendations. One laboratory stated that not all drugs listed has a recommended concentration (referring to those drugs that must achieve greater than or equal to 80% cross-reactivity). One laboratory stated that other projects have taken priority over updating cutoff levels and moving methods to newer instrumentation. One laboratory stated that they are following the ASB standards instead of the guidelines, and further noted differences in the two documents. One laboratory stated that MDA had to be removed due to an interference updated by the vendor of the LC column in use. One laboratory stated that increased sensitivity cannot be achieved with the number of drugs currently

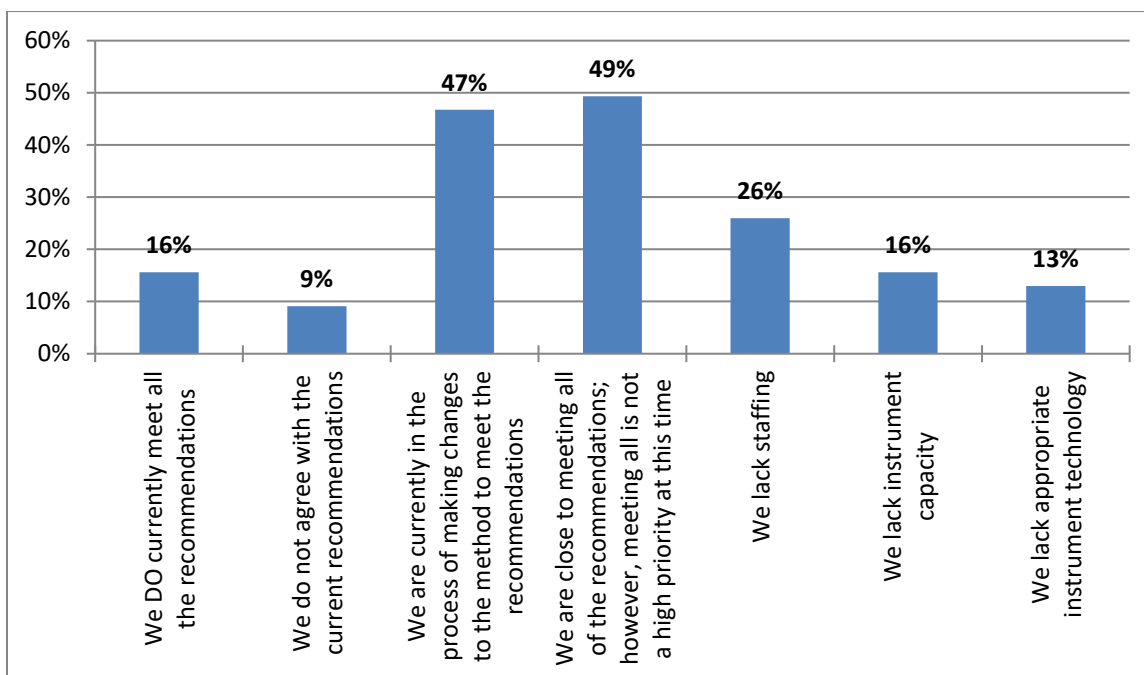


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being tested for in a single method. A single method has been put in place to improve capacity and case throughput.



**Question 35:** For drug analysis that does not currently meet the CONFIRMATION recommendations for BLOOD, please indicate the reasons (please check all that apply):

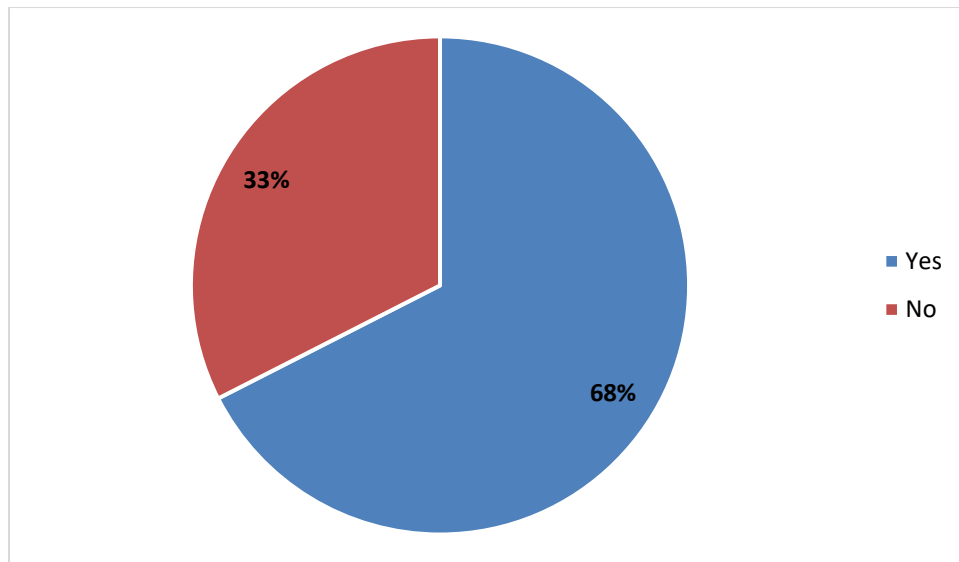


**Figure 37.** Reasons why laboratories do not currently meet the confirmation recommendations in blood samples (n = 77).

Multiple reasons could be selected by each laboratory. Laboratories also had the ability to comment on other reasons for not meeting the recommendations for blood samples (15 laboratories; 19%). Six laboratories stated that they are in the process of validating methods to meet the recommendations. Four laboratories stated that they do not agree with the recommendations, specifically for meprobamate and delta-9 THC. Two laboratories stated that other projects have taken priority over updating cutoff levels and moving methods to newer instrumentation. One laboratory stated that in instances where the laboratory cutoff is above the recommendation, laboratory procedure allows for reporting below the cutoff if all reporting criteria is met. One laboratory stated that MDA had to be removed due to an interference updated by the vendor of the LC column in use. One laboratory stated that increased sensitivity cannot be achieved with the number of drugs currently being tested for in a single method. A single method has been put in place to improve capacity and case throughput.

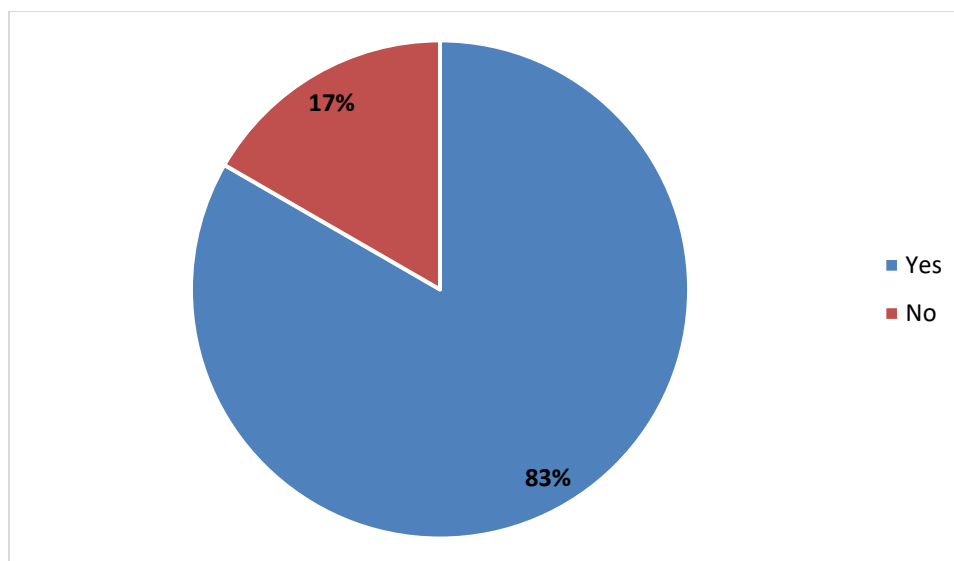
## **Drug Analysis – URINE**

**Question 36:** Does your laboratory provide URINE drug analytical services (screen or confirmation) for DUID/traffic fatality samples?



**Figure 38.** Does the laboratory provide analytical services (screening or confirmation) for urine in DUID samples (n = 80)?

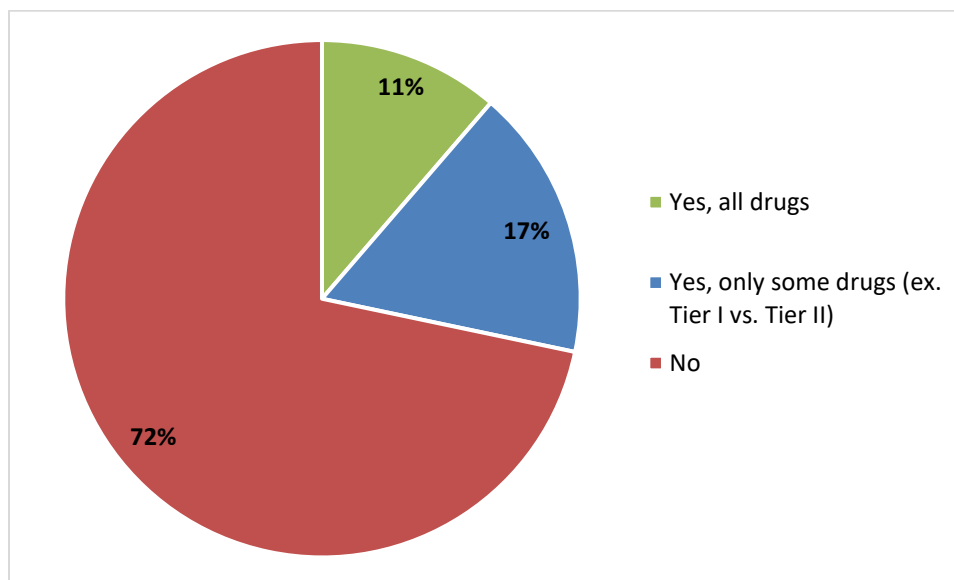
**Question 37:** Are the drug testing services (drug menu and sensitivities) identical for DUID and traffic fatality cases?



**Figure 39.** Are the drug testing services (drug menu and sensitivities) identical for DUID and traffic fatality cases (n = 52)?

If the laboratory indicated that their drug testing services (drug menu and sensitivities) are not identical for DUID and traffic fatality cases, then the laboratory had the ability to explain by a free text response comment. Nine laboratories (17%) provided an explanation. Six laboratories stated that scope and cutoffs differ. One of these laboratories further stated that only qualitative results are reported in urine. One laboratory stated that DUID cases involving fatalities with no detectable ELISA or EIA results will undergo a comprehensive screening by GC/MS.

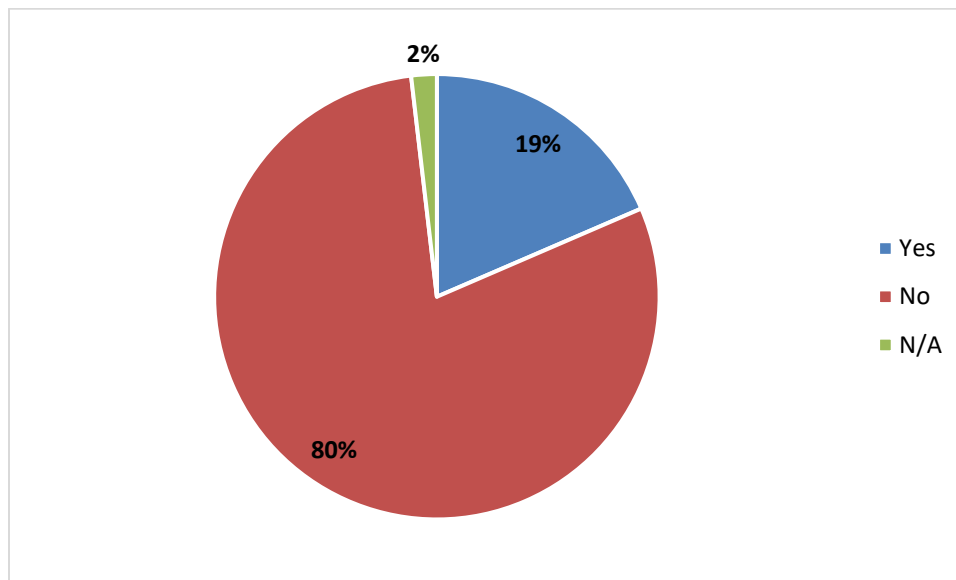
## Question 38: Does your laboratory quantitate drugs in URINE?



**Figure 40.** Does the laboratory quantify drugs in urine (n = 54)?

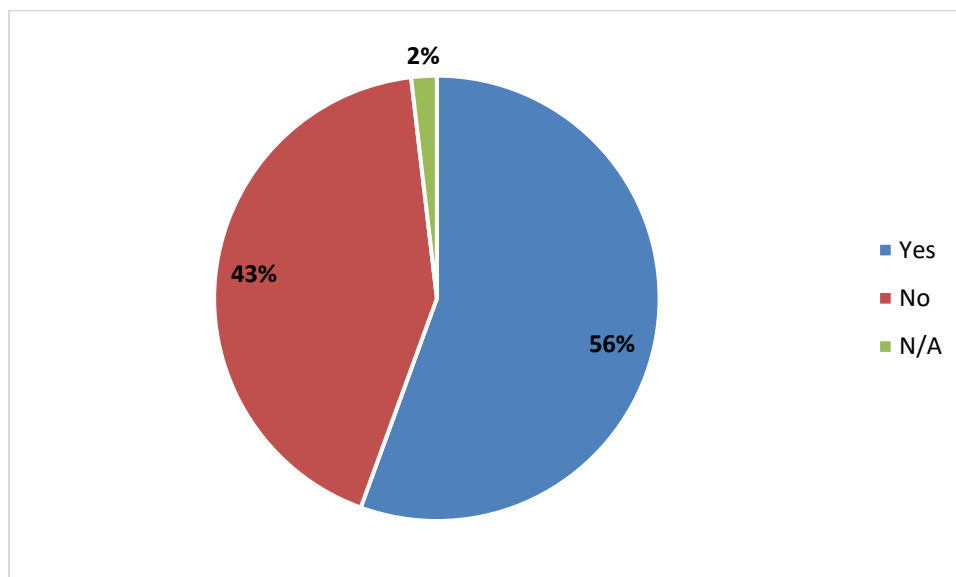
If the laboratory indicated “Yes, only some drugs” then the laboratory had the ability to explain by a free text response comment. Ten laboratories (19%) provided an explanation. Three laboratories stated that methods are validated quantitatively; however, results are reported qualitatively. Five laboratories stated that only per se drugs are quantitated in urine. One of these laboratories further stated that drugs detected without a per se are identified qualitatively. One laboratory stated that heart or blood pressure medications are validated and reported qualitatively. One laboratory stated that their goal is to quantitate all drugs in Tier I.

**Question 39:** Does your laboratory hydrolyze drug conjugates prior to screening?



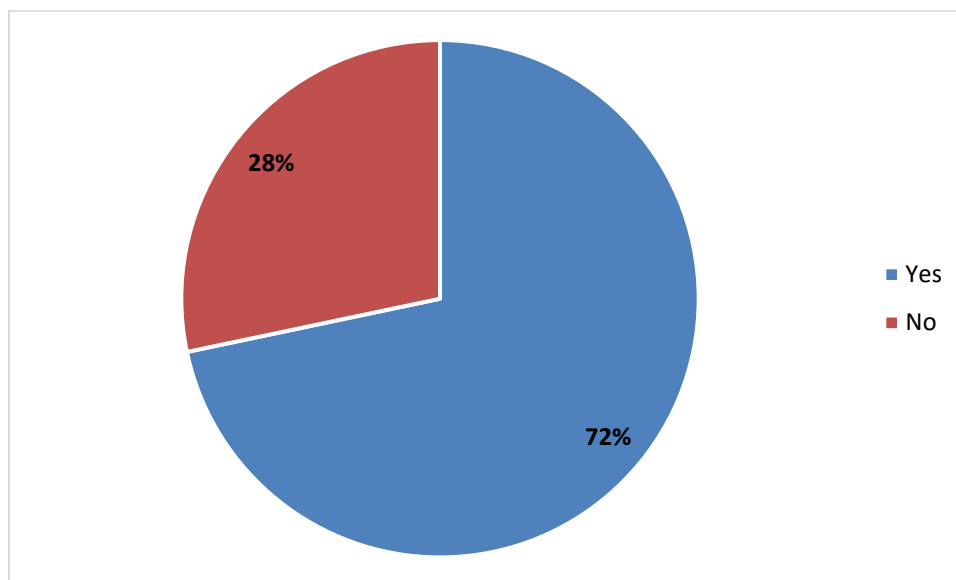
**Figure 41.** Does the laboratory hydrolyze drug conjugates prior to confirmation (n = 54)?

**Question 40:** Does your laboratory hydrolyze drug conjugates prior to confirmation?



**Figure 42.** Does the laboratory hydrolyze drug conjugates prior to confirmation (n = 54)?

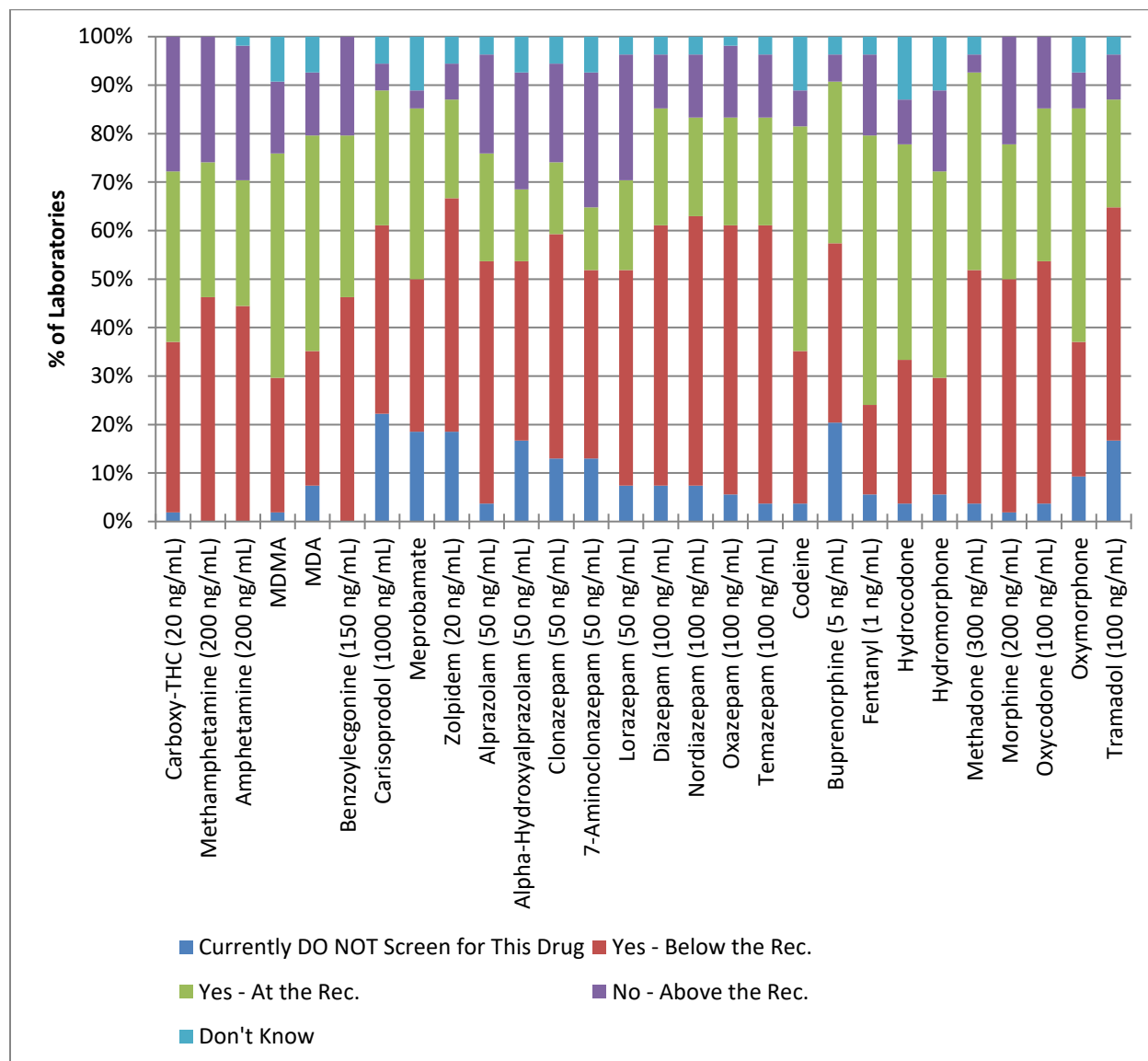
**Question 41:** Does your laboratory test URINE because it is statutorily allowed or required?



**Figure 43.** Does the laboratory test urine because it is statutorily allowed or required (n = 54)?

Laboratories were able to leave a comment with either response. Twenty-four laboratories (44%) provided a comment. Seven laboratories stated that urine is tested because it is statutorily allowed. Seventeen laboratories stated that urine is tested if the sample is sent to the laboratory and testing is requested by the submitting agency. Three of these laboratories further stated that urine is often submitted in cases where a phlebotomist is unavailable, if a person has a medical condition preventing a blood draw from occurring, or there is limited blood available for testing. One of these laboratories stated that they will test urine if received; however, strongly discourages the collection/submission for DUID casework.

**Question 42: Drug Analysis – URINE – SCREENING** Do you currently meet the guideline recommendations (given in parentheses) for SCREENING each of these drugs in URINE samples? (Graph Format)



**Figure 44.** Does the laboratory meet the guideline recommendation for screening each drug in urine at the recommended cutoffs (n = 54)?



**Question 42: Drug Analysis – URINE – SCREENING** Do you currently meet the guideline recommendations (given in parentheses) for SCREENING each of these drugs in URINE samples? (Table Format)

Drug	Number of Laboratories who test for this drug ("Total that Test") (n)	% of Laboratories who test for this drug ("Total that Test")	% of Laboratories that meet or exceed the recommendation/ Total that Test
<b>Cannabis</b>			
Carboxy-THC (20 ng/mL)	53	98%	72%
<b>CNS Stimulants</b>			
Methamphetamine (200 ng/mL)	54	100%	74%
Amphetamine (200 ng/mL)	53	98%	72%
MDMA	48	89%	83%
MDA	46	85%	85%
Benzoyllecgonine (150 ng/mL)	54	100%	80%
<b>CNS Depressants</b>			
Carisoprodol (1000 ng/mL)	39	72%	92%
Meprobamate	38	70%	95%
Zolpidem (20 ng/mL)	41	76%	90%
Alprazolam (50 ng/mL)	50	93%	78%
Alpha-hydroxyalprazolam (50 ng/mL)	41	76%	68%
Clonazepam (50 ng/mL)	44	81%	75%
7-aminoclonazepam (50 ng/mL)	43	80%	65%
Lorazepam (50 ng/mL)	48	89%	71%
Diazepam (100 ng/mL)	48	89%	88%
Nordiazepam (100 ng/mL)	48	89%	85%
Oxazepam (100 ng/mL)	50	93%	84%
Temazepam (100 ng/mL)	50	93%	86%
<b>Narcotic Analgesics</b>			
Codeine	46	85%	91%
Buprenorphine (5 ng/mL)	41	76%	93%
Fentanyl (1 ng/mL)	49	91%	82%
Hydrocodone	45	83%	89%
Hydromorphone	45	83%	80%
Methadone (300 ng/mL)	50	93%	96%
Morphine (200 ng/mL)	53	98%	77%

Oxycodone (100 ng/mL)	52	96%	85%
Oxymorphone	45	83%	91%
Tramadol (100 ng/mL)	43	80%	88%

**Table 9.** Numbers and percentages of those laboratories who test for the drug and what percentage of those who test meet or exceed the guideline recommendations for screening drugs in urine.

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## Cannabis

For **carboxy-THC** at the recommended screening cutoff of 20 ng/mL, 35% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 35% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 72% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 28% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 2% do not test for this drug.

## CNS Stimulants

For **methamphetamine** at the recommended screening cutoff of 200 ng/mL, 46% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 28% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 74% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 26% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

For **amphetamine** at the recommended screening cutoff of 200 ng/mL, 44% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 26% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 72% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 28% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 2% do not know if they meet the guideline recommendation.

For **MDMA** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 28% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 46% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 83% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 2% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **MDA** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 28% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 44% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 85% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A

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total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 7% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **benzoylecgonine** at the recommended screening cutoff of 150 ng/mL, 46% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 33% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 80% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 20% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

### CNS Depressants

For **carisoprodol** at the recommended screening cutoff of 1000 ng/mL, 39% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 28% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 92% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 22% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **meprobamate** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 31% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 35% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 19% do not test for this drug, and 11% do not know if they meet the guideline recommendation.

For **zolpidem** at the recommended screening cutoff of 20 ng/mL, 48% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 20% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 7% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 19% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **alprazolam** at the recommended screening cutoff of 50 ng/mL, 50% of laboratories reported meeting the guideline recommendation by being below the recommended screening

cutoff, and 22% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 78% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 20% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 4% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **alpha-hydroxyalprazolam** at the recommended screening cutoff of 50 ng/mL, 37% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 15% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 68% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 24% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 17% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **clonazepam** at the recommended screening cutoff of 50 ng/mL, 46% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 15% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 75% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 20% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 13% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** at the recommended screening cutoff of 50 ng/mL, 39% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 13% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 65% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 28% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 13% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **lorazepam** at the recommended screening cutoff of 50 ng/mL, 44% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 19% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 71% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 26% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 7% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **diazepam** at the recommended screening cutoff of 100 ng/mL, 54% of laboratories reported meeting the guideline recommendation by being below the recommended screening

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cutoff, and 24% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 11% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 7% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **nordiazepam** at the recommended screening cutoff of 100 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 20% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 85% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 7% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **oxazepam** at the recommended screening cutoff of 100 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 22% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 84% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 6% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

For **temazepam** at the recommended screening cutoff of 100 ng/mL, 57% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 22% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 86% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 4% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

### **Narcotic Analgesics**

For **codeine** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 31% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 46% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 7% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 4% do not test for this drug, and 11% do not know if they meet the guideline recommendation.

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For **buprenorphine** at the recommended screening cutoff of 5 ng/mL, 37% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 33% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 20% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **fentanyl** at the recommended screening cutoff of 1 ng/mL, 19% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 56% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 17% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 6% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **hydrocodone** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 30% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 44% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 89% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 4% do not test for this drug, and 13% do not know if they meet the guideline recommendation.

For **hydromorphone** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 24% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 43% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 80% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 17% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 6% do not test for this drug, and 11% do not know if they meet the guideline recommendation.

For **methadone** at the recommended screening cutoff of 300 ng/mL, 48% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 41% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 4% of laboratories reported not



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meeting the guideline recommendation by being above the recommended screening cutoff, 4% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **morphine** at the recommended screening cutoff of 200 ng/mL, 48% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 28% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 77% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 22% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 2% do not test for this drug.

For **oxycodone** at the recommended screening cutoff of 100 ng/mL, 50% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 31% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 85% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff and 4% do not test for this drug.

For **oxymorphone** with a requirement of greater than or equal to 80% cross-reactivity if using immunoassay, 28% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 48% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 7% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **tramadol** at the recommended screening cutoff of 100 ng/mL, 48% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 22% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 17% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

Overall, **temazepam** was the most frequently reported (57%) drug in this set for meeting the guideline recommendation by being below the recommended screening cutoff. **Fentanyl** was the most frequently reported (56%) drug in this set for meeting the guideline recommendation by being at the recommended screening cutoff. **Carboxy-THC**, **amphetamine**, and **7-aminoclonazepam** was the most frequently reported (28%) drug in this set for not meeting the

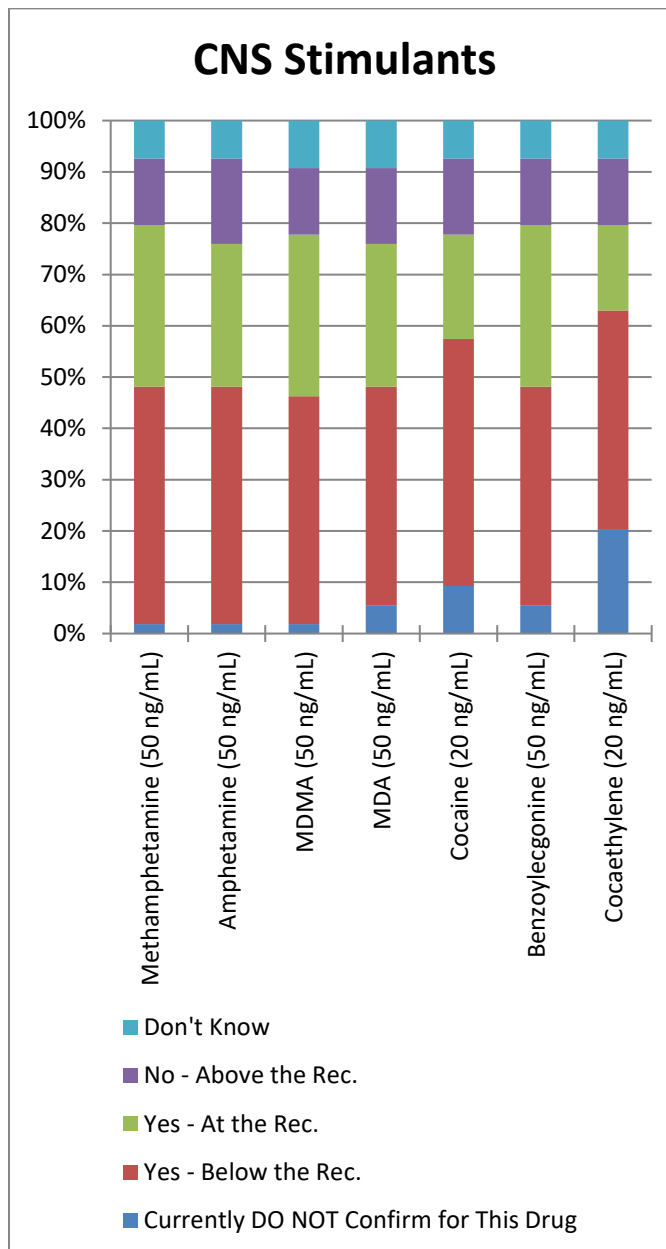
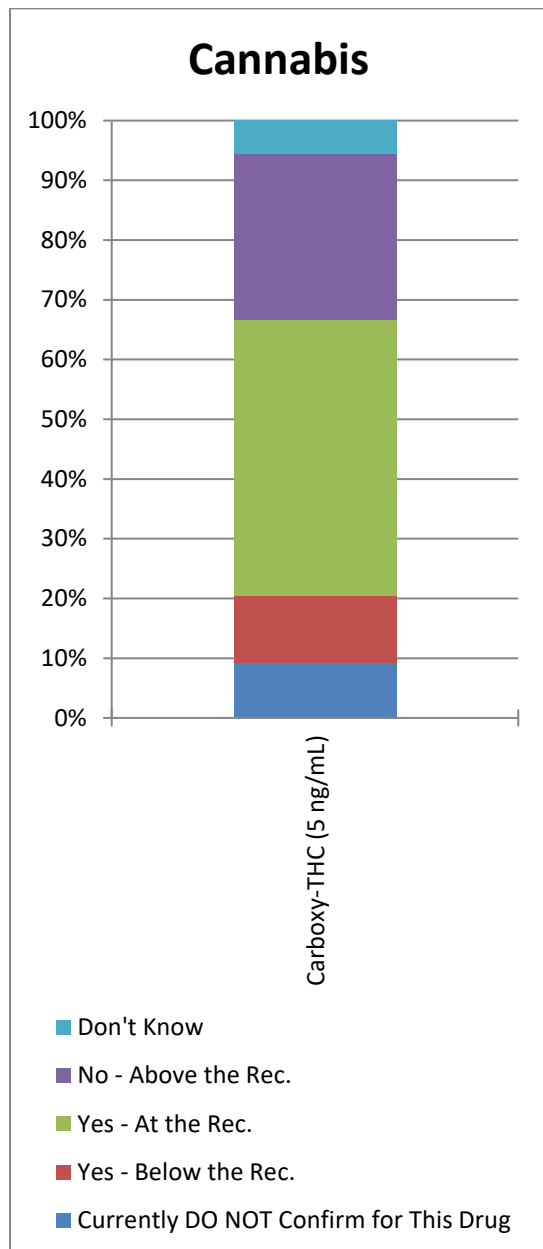


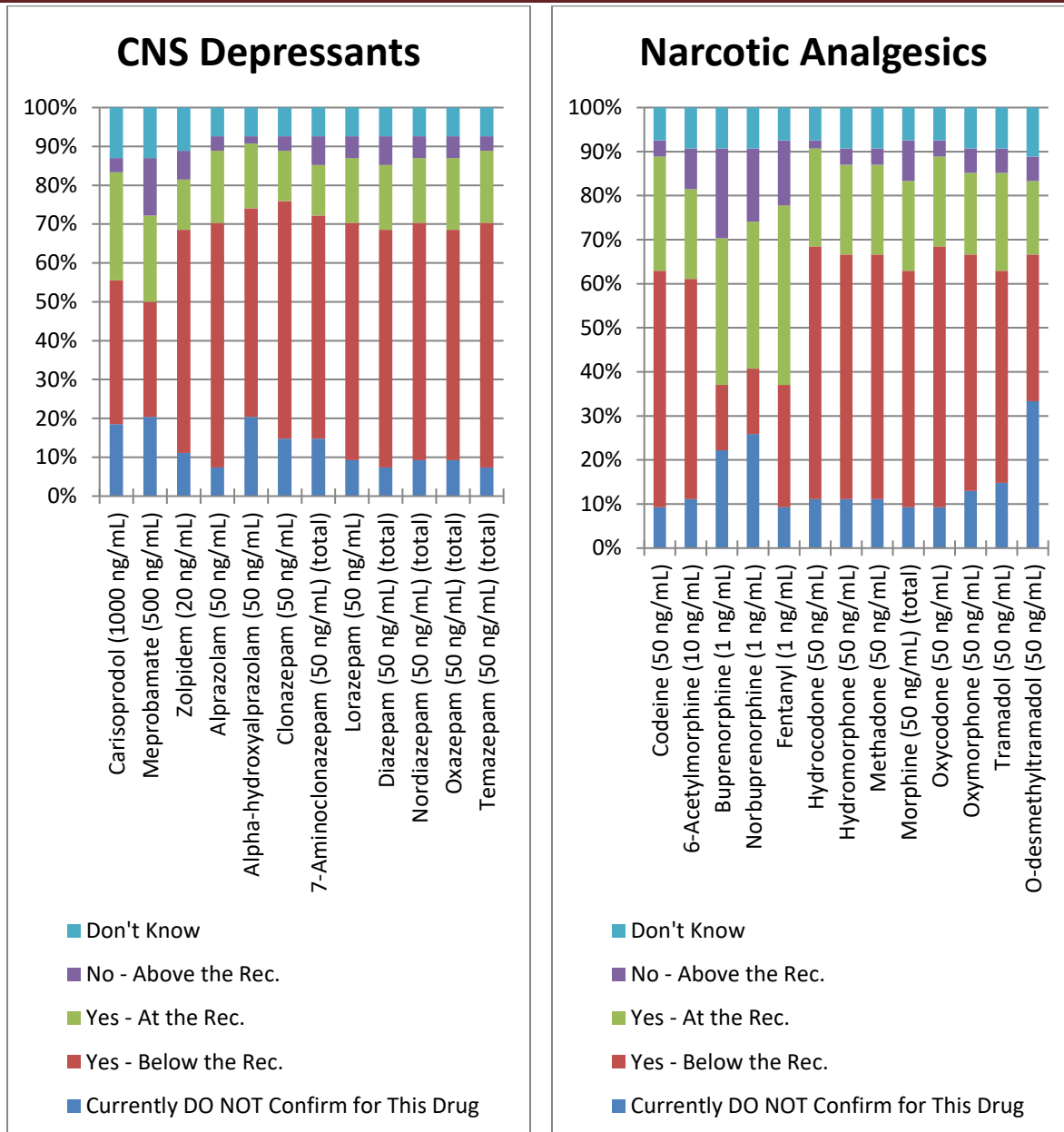
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guideline recommendation by being above the recommended screening cutoff.

**Methamphetamine** and **benzoylecgonine** were reported as always being tested.

**Question 43: Drug Analysis – URINE – CONFIRMATION** Do you currently meet the guideline recommendations (given in parentheses) for CONFIRMING each of these drugs in URINE samples? (Graph Format)





**Figure 45-48.** Does the laboratory meet the guideline recommendations for confirming each drug in urine at the recommended cutoffs (n = 54)?

Drug Analysis – URINE – CONFIRMATION Do you currently meet the guideline recommendations (given in parentheses) for CONFIRMING each of these drugs in BLOOD samples? (Table Format)

Drug	Number of Laboratories who test for this drug ("Total that Test") (n)	% of Laboratories who test for this drug ("Total that Test")	% of Laboratories that meet or exceed the recommendation/ Total that Test
<b>Cannabis</b>			
Carboxy-THC (5 ng/mL)	46	85%	67%
<b>CNS Stimulants</b>			
Methamphetamine (50 ng/mL)	49	91%	86%
Amphetamine (50 ng/mL)	49	91%	82%
MDMA (50 ng/mL)	48	89%	85%
MDA (50 ng/mL)	46	85%	83%
Cocaine (20 ng/mL)	45	83%	82%
Benzoylcegonine (50 ng/mL)	47	87%	85%
Cocaethylene (20 ng/mL)	39	72%	82%
<b>CNS Depressants</b>			
Carisoprodol (1000 ng/mL)	37	69%	95%
Meprobamate (500 ng/mL)	36	67%	78%
Zolpidem (20 ng/mL)	42	78%	90%
Alprazolam (50 ng/mL)	46	85%	96%
Alpha-hydroxyalprazolam (50 ng/mL)	39	72%	97%
Clonazepam (50 ng/mL)	42	78%	95%
7-aminoclonazepam (50 ng/mL)	42	78%	90%
Lorazepam (50 ng/mL)	45	83%	93%
Diazepam (50 ng/mL)	46	85%	91%
Nordiazepam (50 ng/mL)	45	83%	93%
Oxazepam (50 ng/mL)	45	83%	93%
Temazepam (50 ng/mL)	46	85%	96%
<b>Narcotic Analgesics</b>			
Codeine (50 ng/mL)	45	83%	96%
6-acetylmorphine (10 ng/mL)	43	80%	88%
Buprenorphine (1 ng/mL)	37	69%	70%

Norbuprenorphine (1 ng/mL)	35	65%	74%
Fentanyl (1 ng/mL)	45	83%	82%
Hydrocodone (50 ng/mL)	44	81%	98%
Hydromorphone (50 ng/mL)	43	80%	95%
Methadone (50 ng/mL)	43	80%	95%
Morphine (50 ng/mL)	45	83%	89%
Oxycodone (50 ng/mL)	45	83%	96%
Oxymorphone (50 ng/mL)	42	78%	93%
Tramadol (50 ng/mL)	41	76%	93%
O-Desmethyiltramadol (50 ng/mL)	30	56%	90%

**Table 10.** Numbers and percentages of those laboratories who test for the drug and what percentage of those who test meet or exceed the guideline recommendations for confirming drugs in urine.

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## Cannabis

For **carboxy-THC** at the recommended confirmation cutoff of 5 ng/mL, 11% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 46% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 67% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 28% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 6% do not know if they meet the guideline recommendation.

## CNS Stimulants

For **methamphetamine** at the recommended confirmation cutoff of 50 ng/mL, 46% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 31% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 86% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **amphetamine** at the recommended confirmation cutoff of 50 ng/mL, 46% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 28% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 17% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **MDMA** at the recommended confirmation cutoff of 50 ng/mL, 44% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 31% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 85% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **MDA** at the recommended confirmation cutoff of 50 ng/mL, 43% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation

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cutoff, and 28% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 83% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 6% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **cocaine** at the recommended confirmation cutoff of 20 ng/mL, 48% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **benzoylecgonine** at the recommended confirmation cutoff of 50 ng/mL, 43% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 31% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 85% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 6% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **cocaethylene** at the recommended confirmation cutoff of 20 ng/mL, 43% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 17% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 13% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 20% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

### **CNS Depressants**

For **carisoprodol** at the recommended confirmation cutoff of 1000 ng/mL, 37% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 28% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the

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recommended confirmation cutoff, 19% do not test for this drug, and 13% do not know if they meet the guideline recommendation.

For **meprobamate** at the recommended confirmation cutoff of 500 ng/mL, 30% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 78% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 20% do not test for this drug, and 13% do not know if they meet the guideline recommendation.

For **zolpidem** at the recommended confirmation cutoff of 20 ng/mL, 57% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 13% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 7% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 11% do not test for this drug, and 11% do not know if they meet the guideline recommendation.

For **alprazolam** at the recommended confirmation cutoff of 50 ng/mL, 63% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 19% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 7% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **alpha-hydroxyalprazolam** at the recommended confirmation cutoff of 50 ng/mL, 54% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 17% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 97% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 2% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 20% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **clonazepam** at the recommended confirmation cutoff of 50 ng/mL, 61% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 13% are at the recommended confirmation cutoff. Of the laboratories



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who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 15% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** at the recommended confirmation cutoff of 50 ng/mL, 57% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 13% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 7% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 15% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **lorazepam** at the recommended confirmation cutoff of 50 ng/mL, 61% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 17% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **diazepam** at the recommended confirmation cutoff of 50 ng/mL, 61% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 17% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 91% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 7% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 7% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **nordiazepam** at the recommended confirmation cutoff of 50 ng/mL, 61% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 17% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

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For **oxazepam** at the recommended confirmation cutoff of 50 ng/mL, 59% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 19% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **temazepam** at the recommended confirmation cutoff of 50 ng/mL, 63% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 19% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 7% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

### **Narcotic Analgesics**

For **codeine** at the recommended confirmation cutoff of 50 ng/mL, 54% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 26% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **6-acetylmorphine** at the recommended confirmation cutoff of 10 ng/mL, 50% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 88% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 11% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **buprenorphine** at the recommended confirmation cutoff of 1 ng/mL, 15% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 33% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 70% reported meeting the guideline

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recommendation by being either below or at the recommended confirmation cutoff. A total of 20% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 22% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **norbuprenorphine** at the recommended confirmation cutoff of 1 ng/mL, 15% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 33% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 74% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 17% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 26% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **fentanyl** at the recommended confirmation cutoff of 1 ng/mL, 28% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 41% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 82% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 15% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **hydrocodone** at the recommended confirmation cutoff of 50 ng/mL, 57% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 98% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 2% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 11% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **hydromorphone** at the recommended confirmation cutoff of 50 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 11% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

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For **methadone** at the recommended confirmation cutoff of 50 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 95% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 11% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **morphine** at the recommended confirmation cutoff of 50 ng/mL, 54% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 89% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 9% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **oxycodone** at the recommended confirmation cutoff of 50 ng/mL, 59% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 96% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 4% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **oxymorphone** at the recommended confirmation cutoff of 50 ng/mL, 54% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 19% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 13% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **tramadol** at the recommended confirmation cutoff of 50 ng/mL, 48% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 22% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 93% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories

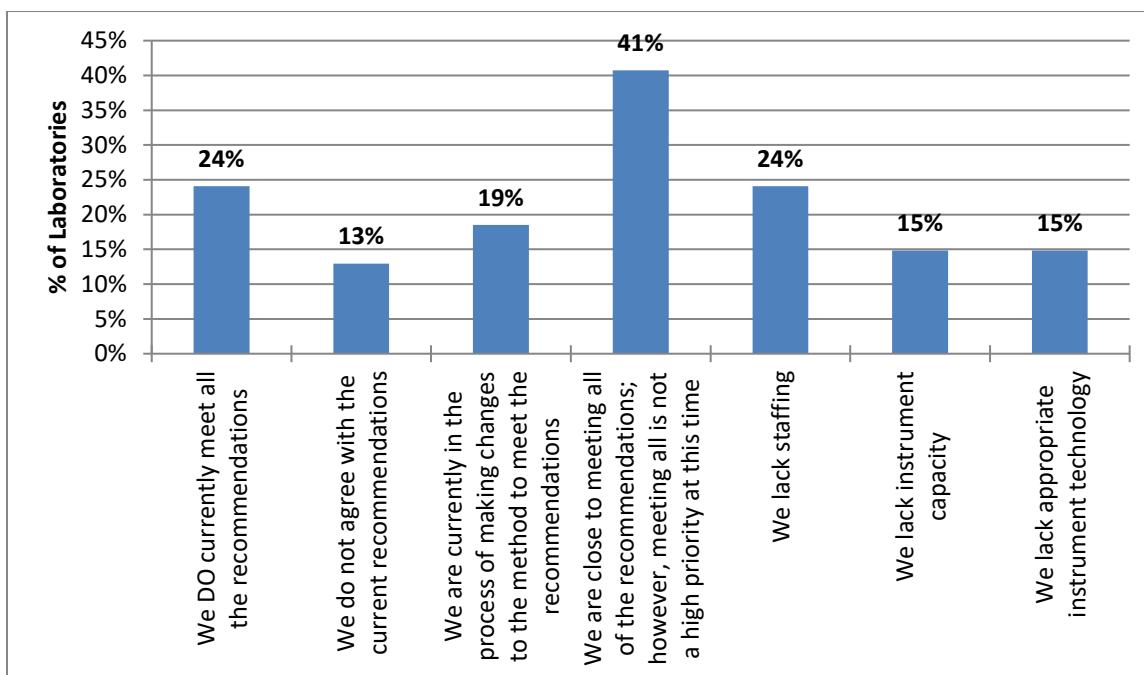
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reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 15% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **O-Desmethylnaloxone** at the recommended confirmation cutoff of 50 ng/mL, 33% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 17% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 90% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 6% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 33% do not test for this drug, and 11% do not know if they meet the guideline recommendation.

Overall, **alprazolam** and **temazepam** were the most frequently reported (63%) drug in this set for meeting the guideline recommendation by being below the recommended confirming cutoff. **Carboxy-THC** was the most frequently reported (46%) drug in this set for meeting the guideline recommendation by being at the recommended confirming cutoff and for not meeting the guideline recommendation by being above the recommended confirming cutoff (28%). All compounds from this set had at least one laboratory report that they do not test for this drug.

**Question 44:** For drug analysis that does not currently meet the SCREENING recommendations for URINE, please indicate the reasons (please check all that apply):



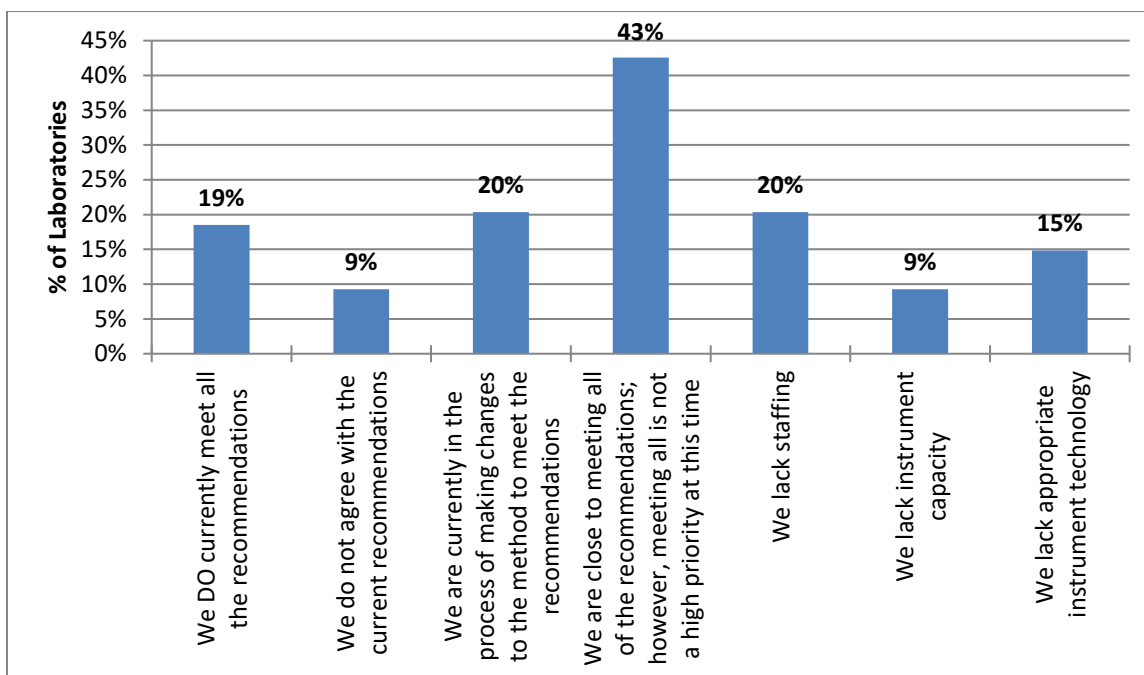
**Figure 49.** Reasons why laboratories do not currently meet the recommendations in urine samples (n = 54).

Multiple reasons could be selected by each laboratory. Laboratories also had the ability to comment on other reasons for not meeting the recommendations for urine samples (20 laboratories; 37%). Five laboratories stated that method validation is ongoing to meet the recommendations. Two laboratories stated that the analytical sensitivity cannot be achieved. Four laboratories stated that method validation for urine cannot be justified at this time since blood is the priority matrix. One laboratory stated that SAMHSA levels are followed for some drugs rather than the NSC recommendations. One laboratory stated that urine is received more for suspected consumption or investigative purposes for seized drug or parole/probation. One laboratory stated that lack of time and staffing has prevented the cross-reactivity recommendation to be achieved for applicable analytes. One laboratory stated that they lack appropriate instrument technology and rarely receive DUID urine samples. One laboratory stated that per state regulation, the laboratory is only permitted to use EMIT and FPIA; however, they have chosen to screen via GC/MS for drugs/metabolites not detectable via EMIT. Three laboratories stated that they do not agree with the recommendations. One laboratory stated that the cutoff for carboxy-THC is too low. Another laboratory stated that some of the metabolites are

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just below the 80% cross-reactivity recommendation but do not feel that any drugs are being missed at their current cutoff.

**Question 45:** For drug analysis that does not currently meet the CONFIRMATION recommendations for URINE, please indicate the reasons (please check all that apply):



**Figure 50.** Reasons why laboratories do not currently meet the recommendations in urine samples (n = 54).

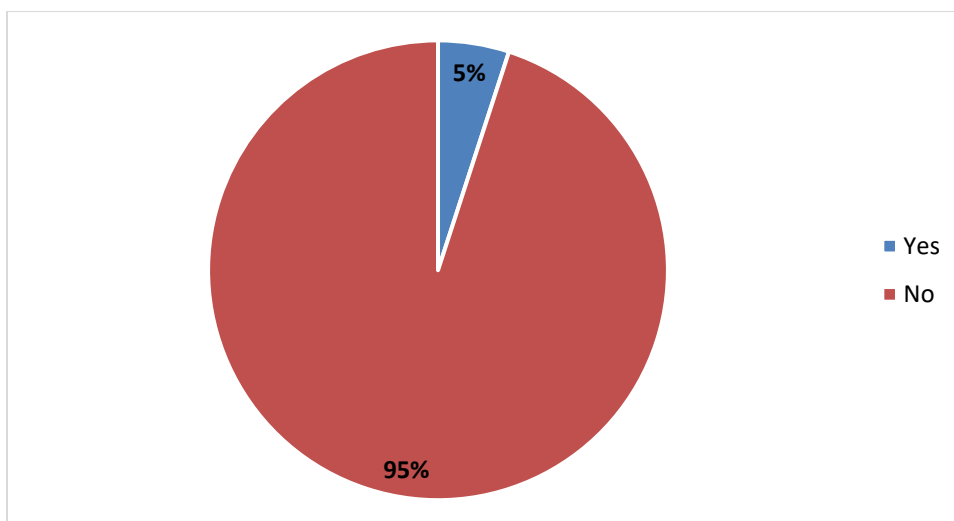
Multiple reasons could be selected by each laboratory. Laboratories also had the ability to comment on other reasons for not meeting the recommendations for urine samples (15 laboratories; 28%). Three laboratories stated that they are currently in the process of updating methods to meet the recommendations. One laboratory stated that the available instrumentation cannot achieve analytical sensitivity to meet the recommendations. Eight laboratories stated that method validation is a low priority at this time for urine since blood is the preferred matrix for DUID casework. One laboratory stated that they do not agree with all of the recommendations. One laboratory stated that urine is received more for suspected consumption or investigative purposes for seized drug or parole/probation. One laboratory stated that per state regulation, the laboratory is only permitted to use GC/MS, and the current hydrolysis method creates noisy data.



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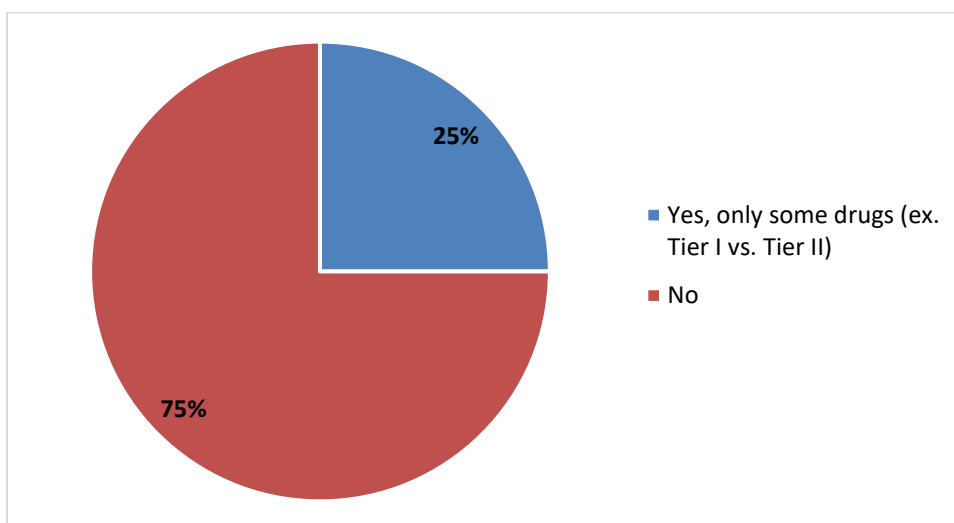
## **Drug Analysis – ORAL FLUID**

**Question 46:** Does your laboratory provide testing for drugs in ORAL FLUID in DUID/traffic fatality cases?



**Figure 51.** Does your laboratory provide testing for drugs in ORAL FLUID in DUID/traffic fatality cases (n = 80)?<sup>8</sup>

**Question 47:** Does your laboratory quantitate drugs in ORAL FLUID?



**Figure 52.** Does your laboratory quantitate drugs in ORAL FLUID (n = 4)?

One laboratory quantitates cannabinoids.

<sup>8</sup> Two of the four laboratories are in a pilot program collecting paired oral fluid and blood and/or urine samples.

**Question 48: Drug Analysis – ORAL FLUID – SCREENING** Below are all of the drugs listed in the guideline recommendation. Next to each drug, please list your laboratory's cutoff (numerical value with units) if you SCREEN for the drug in ORAL FLUID samples. If your laboratory does not SCREEN for the drug, please mark the field as "N/A".

Drug	Number of Laboratories who test for this drug ("Total that Test")	Cutoff by Laboratory #1 (ng/mL)	Cutoff by Laboratory #2 (ng/mL)	Cutoff by Laboratory #3 (ng/ml)	Cutoff by Laboratory #4 (ng/ml)
THC (4 ng/mL)	4	4	1	4	4
Methamphetamine (20 ng/mL)	4	20	20	20	20
Amphetamine (20 ng/mL)	4	20	20	20	20
MDMA (20 ng/mL)	3	-	20	20	20
MDA (20 ng/mL)	3	-	20	20	20
Cocaine (15 ng/mL)	4	10	8	15	8
Benzoylcegonine (15 ng/mL)	4	10	8	15	8
Carisoprodol (500 ng/mL)	4	100	100	15	8
Zolpidem (10 ng/mL)	4	10	10	10	10
Alprazolam (5 ng/mL)	4	1	1	5	5
Alpha-hydroxyalprazolam (5 ng/mL)	0	-	-	-	-
Clonazepam (5 ng/mL)	4	4	1	5	7.5
7-Aminoclonazepam (5 ng/mL)	3	-	1	5	10
Lorazepam (5 ng/mL)	4	10	1	5	8.5
Diazepam (5 ng/mL)	4	1	1	5	5
Nordiazepam (5 ng/mL)	4	1	1	5	5
Oxazepam (5 ng/mL)	3	-	1	5	5
Temazepam (5 ng/mL)	3	-	1	5	5
Codeine (30 ng/mL)	3	-	5	30	30
Buprenorphine (1 ng/mL)	4	4	2	1	1
Fentanyl (1 ng/mL)	4	1	0.5	1	1
Hydrocodone (30 ng/mL)	4	4	5	30	30
Hydromorphone (30 ng/mL)	3	-	5	30	30
Methadone (20 ng/mL)	4	10	10	20	20
Morphine (30 ng/mL)	4	4	5	30	30
Oxycodone (30 ng/mL)	4	4	5	30	30
Oxymorphone (30 ng/mL)	3	-	5	30	60
Tramadol (50 ng/mL)	4	10	10	50	50

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**Table 11.** Laboratories who test for drugs in oral fluid and associated laboratory cutoffs for screening drugs in oral fluid.<sup>9</sup>

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<sup>9</sup> Laboratories #3 and #4 are in a pilot program collecting paired oral fluid and blood and/or urine samples.

**Question 49: Drug Analysis – ORAL FLUID – SCREENING** For the following drugs that do not currently have recommended SCREENING guidelines, list your laboratory's cutoff (numerical value with units) if you SCREEN for the drug in ORAL FLUID samples. If your laboratory does not SCREEN for the drug, please mark the field as "N/A".

Drug	Number of Laboratories who test for this drug ("Total that Test")	Cutoff by Laboratory #1 (ng/mL)	Cutoff by Laboratory #2 (ng/mL)	Cutoff by Laboratory #3 (ng/mL)	Cutoff by Laboratory #4 (ng/mL)
Carboxy-THC	1	4	-	-	-
11-OH-THC	1	1	-	-	-
Cocaethylene	3	-	8	15	8
Meprobamate	4	100	100	2000	500
6-Acetylmorphine	3	1	1	1	-
Norbuprenorphine	0	-	-	-	-
O-Desmethyltramadol	0	-	-	-	-

**Table 12.** Laboratories who test for drugs in oral fluid and associated laboratory cutoffs for screening drugs in oral fluid.

**Question 50: Drug Analysis – ORAL FLUID – SCREENING** If your laboratory provides SCREENING in ORAL FLUID samples for drugs not listed in the guideline recommendations, please list the drugs and your laboratory's cutoff (numerical value with units). If your laboratory does not SCREEN for additional drugs, please mark the field as "N/A".

Drug	Number of Laboratories who test for this drug ("Total that Test")	Cutoff by Laboratory #1 (ng/mL)	Cutoff by Laboratory #2 (ng/mL)	Cutoff by Laboratory #3 (ng/mL)	Cutoff by Laboratory #4 (ng/mL)
Phencyclidine (PCP)	4	5	10	20	2.5
Delta-8 THC	2	-	1	-	1
Gabapentin	1	-	-	50	-
Ketamine	1	-	-	-	5

**Question 51: Drug Analysis – ORAL FLUID – CONFIRMATION** Below are all of the drugs listed in the guideline recommendation. Next to each drug, please list your laboratory's cutoff (numerical value with units) if you CONFIRM for the drug in ORAL FLUID samples. If your laboratory does not CONFIRM for the drug, please mark the field as "N/A".

Drug	Number of Laboratories who test for this drug ("Total that Test")	Cutoff by Laboratory #1 (ng/mL)	Cutoff by Laboratory #2 (ng/mL)	Cutoff by Laboratory #3 (ng/mL)	Cutoff by Laboratory #4 (ng/mL)
<b>Cannabis</b>					
THC (1 ng/mL)	4	1	1	1	1
<b>CNS Stimulants</b>					
Methamphetamine (20 ng/mL)	4	20	20	20	5
Amphetamine (20 ng/mL)	4	20	20	20	5
MDMA (20 ng/mL)	3	-	20	20	10
MDA (20 ng/mL)	3	-	20	20	10
Cocaine (8 ng/mL)	4	10	8	8	5
Benzoyllecgonine (8 ng/mL)	4	10	8	8	5
Cocaethylene (8 ng/mL)	3	-	8	8	5
<b>CNS Depressants</b>					
Carisoprodol (500 ng/mL)	4	100	100	500	200
Meprobamate (500 ng/mL)	4	100	100	500	200
Zolpidem (10 ng/mL)	4	10	10	10	5
Alprazolam (1 ng/mL)	4	1	1	1	1
Clonazepam (1 ng/mL)	4	4	1	1	1
7-Aminoclonazepam (1 ng/mL)	1	-	1	-	-
Lorazepam (1 ng/mL)	4	10	1	10	1
Diazepam (1 ng/mL)	4	1	1	1	1
Nordiazepam (1 ng/mL)	4	1	1	1	1
Oxazepam (1 ng/mL)	3	-	1	1	1
Temazepam (1 ng/mL)	3	-	1	1	1
<b>Narcotic Analgesics</b>					
Codeine (5 ng/mL)	3	-	5	5	5
6-Acetylmorphine (1 ng/mL)	4	1	1	1	1
Buprenorphine (2 ng/mL)	4	4	2	1	1
Fentanyl (0.5 ng/mL)	4	1	0.5	0.5	0.5
Hydrocodone (5 ng/mL)	4	4	5	5	5
Hydromorphone (5 ng/mL)	3	-	5	5	5
Methadone (10 ng/mL)	4	10	10	10	10
Morphine (5 ng/mL)	4	4	5	5	5

Oxycodone (5 ng/mL)	4	4	5	5	5
Oxymorphone (5 ng/mL)	3	-	5	5	5
Tramadol (10 ng/mL)	4	10	10	10	10

**Table 13.** Laboratories who test for drugs in oral fluid and associated laboratory cutoffs for confirming drugs in oral fluid.

**Question 52: Drug Analysis – ORAL FLUID – CONFIRMATION** For the following drugs that do not currently have recommended CONFIRMATION guidelines, list your laboratory's cutoff (numerical value with units) if you CONFIRM for the drug in ORAL FLUID samples. If your laboratory does not CONFIRM for the drug, please mark the field as "N/A". (Table Format)

Drug	Number of Laboratories who test for this drug ("Total that Test")	Cutoff by Laboratory #1 (ng/mL)	Cutoff by Laboratory #2 (ng/mL)	Cutoff by Laboratory #3 (ng/mL)	Cutoff by Laboratory #4 (ng/mL)
Carboxy-THC	1	4	-	-	-
11-OH-THC	1	1	-	-	-
Alpha-hydroxyalprazolam	0	-	-	-	-
Norbuprenorphine	1	-	-	-	1
O-Desmethyldiamadol	0	-	-	-	-

**Table 14.** Laboratories who test for drugs in oral fluid and associated laboratory cutoffs for confirming drugs in oral fluid.

**Question 53: Drug Analysis – ORAL FLUID – CONFIRMATION** If your laboratory provides CONFIRMATION in ORAL FLUID samples for drugs not listed in the guideline recommendations, please list the drugs and your laboratory's cutoff (numerical value with units). If your laboratory does not CONFIRM for additional drugs, please mark the field as "N/A".

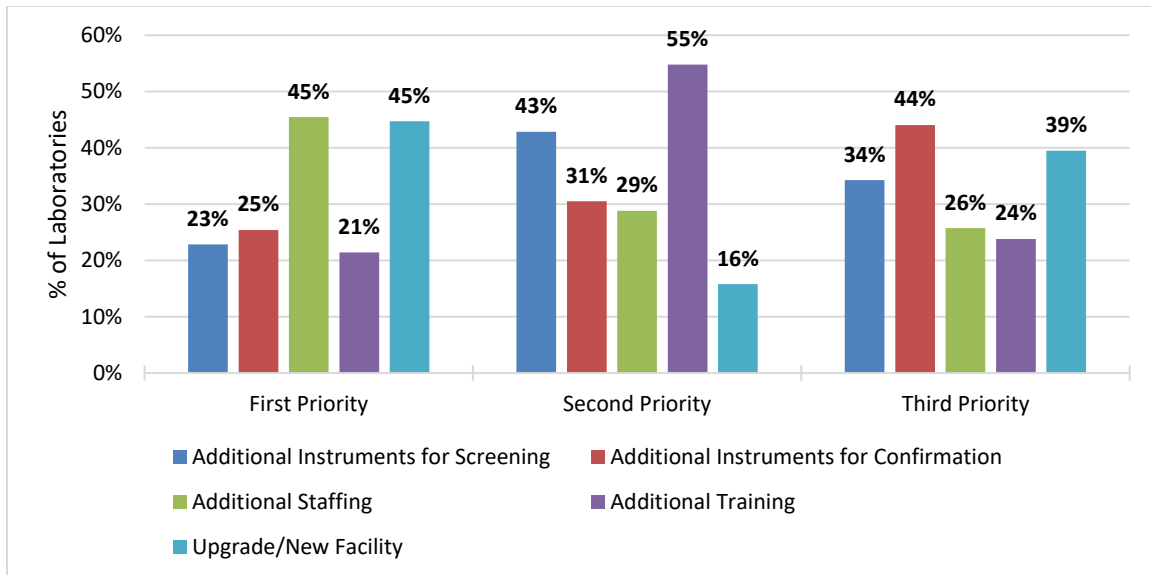
Drug	Number of Laboratories who test for this drug ("Total that Test")	Cutoff by Laboratory #1 (ng/mL)	Cutoff by Laboratory #2 (ng/mL)	Cutoff by Laboratory #3 (ng/mL)	Cutoff by Laboratory #4 (ng/mL)
Phencyclidine (PCP)	4	5	10	20	1
Delta-8 THC	2	-	1	-	1
Gabapentin	2	-	-	10	200
Ketamine	1	-	-	-	5
Cyclobenzaprine	1	-	-	-	1
Dextromethorphan	1	-	-	-	10



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## **Laboratory Resources**

**Question 54:** Please indicate your laboratory's top THREE priorities for additional resources by ranking the following options (number 1-3; 1 = highest priority):



**Figure 53.** What are the top three priorities for additional resources for laboratories performing DUI and DUID testing (n = 80)?

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**Question 55:** What additional resources are a critical need for your laboratory?

Eighty laboratories answered this question and multiple reasons were given in some of the responses. According to the free text responses, 18 laboratories indicated the need for instrumentation, specifying the need for more instruments for capacity and newer instrumentation to update methods. One laboratory indicated that they have one of all in-use instrumentation so if an instrument goes down, then testing is halted until it is fixed.

Twenty-seven laboratories indicated the need for additional staffing, while 6 laboratories specified the need for experienced staff members. A common theme was that additional staffing is needed for casework, which would allow experienced staff to transition over to working on method development and validation. Another theme was the need for additional staffing to keep up with increased casework sent to the laboratory. One laboratory indicated that additional staff would allow the laboratory to keep up with new drug emergence.

Ten laboratories indicated the need for time for training for their staff.

Nineteen laboratories indicated the need for time to develop methods or revalidate current methods to meet an increased demand, create redundancies, or transition testing to newer technologies. One laboratory indicated the need for guidance and support for method development and validation.

Nine laboratories indicated the need for funding to improve toxicology testing, outsource samples to reduce a backlog, purchase consumables, provide training to staff, and maintain service contracts.

Three laboratories indicated the need for assistance with maintenance and troubleshooting. Two laboratories indicated the need for service contracts.

Seventeen laboratories indicated the need for more laboratory space or a new facility. One laboratory indicated that their current facility struggles with availability of power for all instrumentation and irregular environmental conditions.

Three laboratories indicated the need for a better Laboratory Information Management System (LIMS) and/or LIMS support.

Two laboratories indicated the need for automation or higher throughput technologies for higher efficiency.

One laboratory indicated the need to use video technology for testimony.

One laboratory indicated the need for administrative help to manage subpoenas.

One laboratory indicated the need for drug reference standards.

Five laboratories indicated the need for time. Two laboratories specified that time is needed for case review; however, three laboratories did not specify what the time is needed for.

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One laboratory requested a consensus for instrument methods along with help or a community to help with integration including processing methods/workflows and LIMS data transfer.

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**Question 56:** What are the greatest areas of need for training for your toxicology staff?

Eighty laboratories answered this question and multiple reasons were given in some of the responses. According to the free text responses, 25 laboratories indicated the need for training on how to use instrumentation, software, and maintenance. One laboratory specified the need to learn about implementing new technologies into the workflow.

Eighteen laboratories indicated the need for pharmacology/pharmacodynamics training.

Eighteen laboratories indicated the need for training in method development and validation, including real world examples in webinars. One laboratory suggested it would be helpful for laboratories that already developed methods to share those with other laboratories.

Fourteen laboratories indicated the need for testimony training, specifically courtroom preparedness, mock trials, interpretation, cases that report quantitative results, and discussing impairment.

Twelve laboratories indicated the need for dedicated staff members to train newer employees.

Eight laboratories indicated the need for interpretation of toxicology results training, specifically on the topic of impairment and poly-drug use.

Four laboratories indicated the need for continuing education courses, with one laboratory requesting more in-person courses to help scientists better retain information. One laboratory is looking for training ranging from safety to new technology.

Four laboratories indicated the need for training on basic scientific principles of extraction and data analysis.

Three laboratories indicated the need for keeping up with toxicology happenings, specifically drug trends and recommendations by professional organizations.

Two laboratories indicated the need for funding.

One laboratory indicated the need for training in automation processes.

One laboratory indicated the need for ABFT prep.

One laboratory indicated the need for training with alcohol calculations.

One laboratory indicated the need for training on uncertainty of measurement.

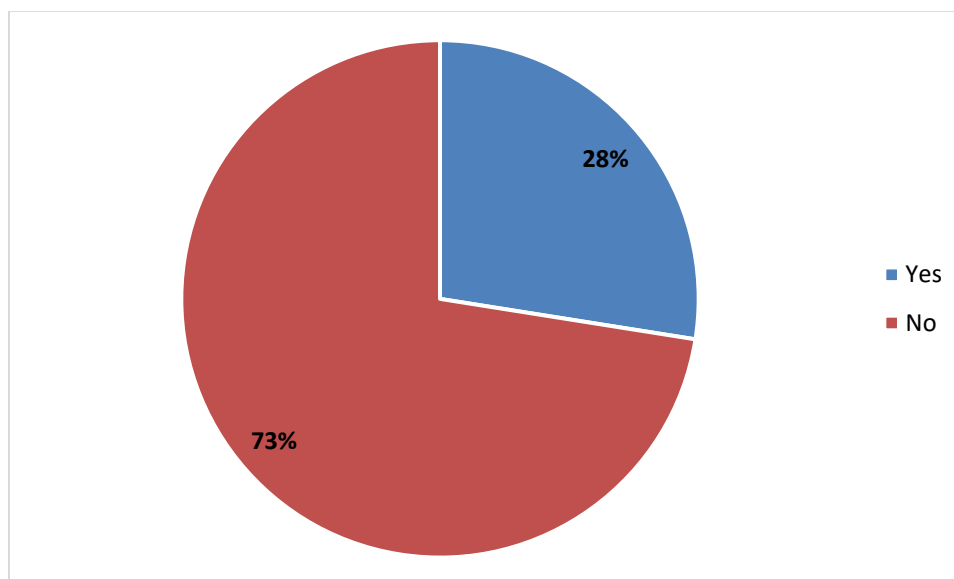
One laboratory indicated the need for time.

One laboratory indicated the need for stress management training.

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## **Additional Questions – Tier I and Tier II**

**Question 57:** Do you outsource any confirmatory testing in any fluid for Tier I drugs?



**Figure 54.** Does your laboratory currently outsource any confirmatory testing in any fluid for Tier I drugs (n = 80)?

Laboratories also had the ability to comment on reasons for outsourcing confirmatory testing in any fluid for Tier I drugs (21 laboratories; 26%). The most common reasons for outsourcing included the need to reduce backlog, no in-house confirmation testing available, and only qualitative in-house methods available but a quantitative result is needed.

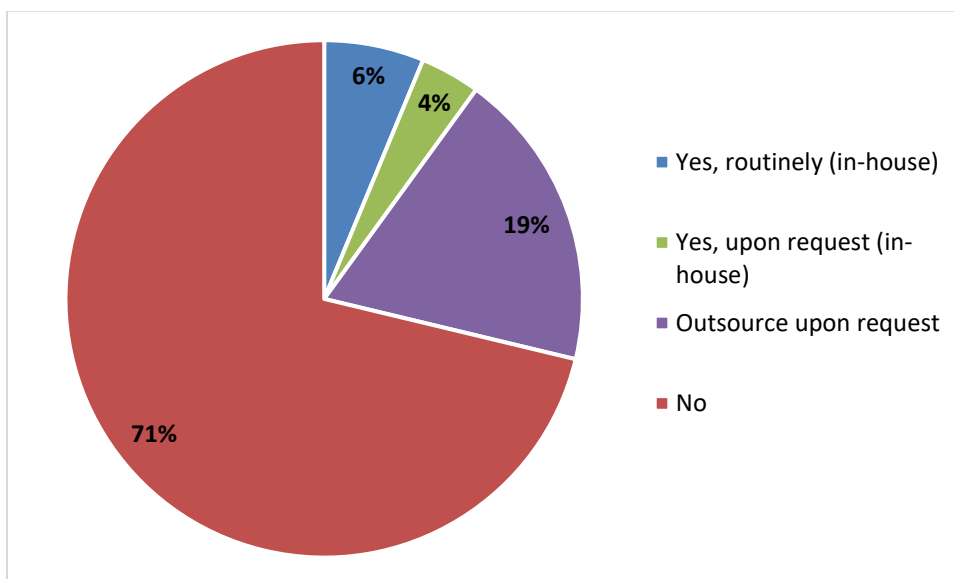
Fifteen laboratories provided specific compounds that are currently being outsourced for confirmatory testing, where answers included buprenorphine/norbuprenorphine, tramadol, cannabinoids (THC and metabolites, THCA), carisoprodol/meprobamate, barbiturates, amphetamines, opioids, benzodiazepines, NPS, inhalants, Z drugs, tricyclic antidepressants, MDMA, and MDA.

One laboratory stated that they are outsourcing testing for sulfhemoglobin.

One laboratory stated that there is the ability to outsource, if needed; however, the clients have issues with the cost of outsourced testimony, so the laboratory prefers not to utilize those services.

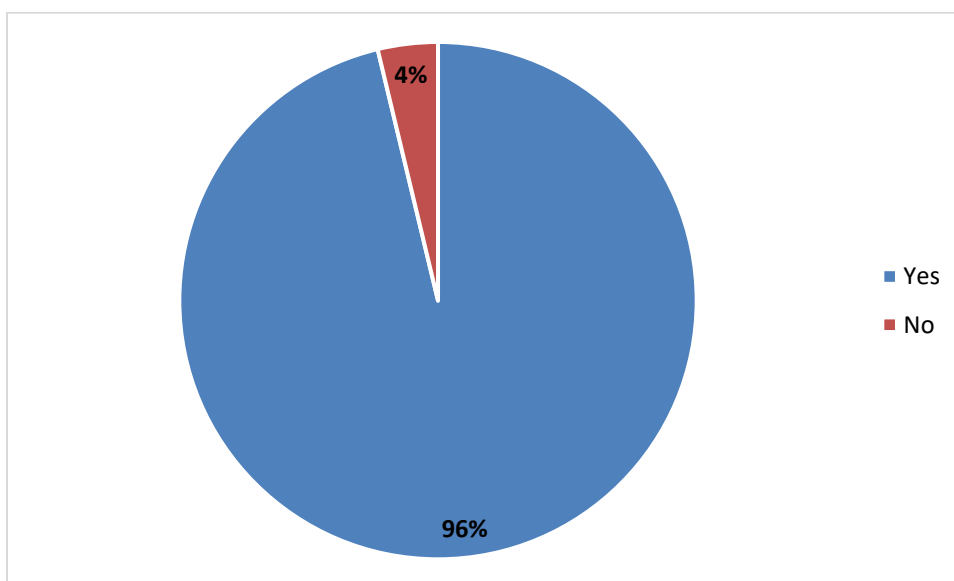
One laboratory stated that they are developing a method to differentiate d- and l-amphetamines.

**Question 58:** Do you differentiate between d/l amphetamines?



**Figure 55.** Does your laboratory differentiate between d/l amphetamines (n = 80)?

**Question 59:** Do you currently test for any Tier II compounds?



**Figure 56.** Does your laboratory currently test for any Tier II compounds (n = 80)?



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## **Additional Questions –Tier II**

**Question 60:** If you test for Tier II compounds, please indicate the specimen type and which ones are tested.

Drug(s)	Blood Samples Routinely Tested	Urine Samples Routinely Tested	Oral Fluid Samples Routinely Tested	Tested In-House Upon Request	Not Routinely Tested In-House, But Outsourced to Reference Laboratory	Not Routinely Tested In-House, Not Outsourced
Synthetic cannabinoids	9%	4%	0%	10%	39%	46%
Cathinones	33%	18%	0%	14%	20%	38%
Methylphenidate	51%	38%	0%	13%	9%	25%
Mitragynine	53%	34%	0%	14%	9%	24%
Atypical antipsychotics	40%	31%	0%	16%	16%	28%
Barbiturates	66%	40%	0%	9%	9%	14%
Carbamazepine	53%	31%	0%	11%	11%	21%
Chlordiazepoxide	64%	44%	1%	6%	6%	19%
Chlorpheniramine	54%	40%	0%	13%	8%	23%
Cyclobenzaprine	70%	45%	0%	8%	8%	13%
Diphenhydramine	71%	44%	0%	8%	5%	11%
Doxylamine	58%	38%	0%	11%	8%	23%
Gabapentin	51%	40%	0%	10%	10%	25%
GHB	11%	13%	0%	33%	20%	34%
Hydroxyzine	50%	31%	0%	13%	9%	28%
Lamotrigine	54%	38%	0%	9%	11%	23%
Mirtazapine	56%	36%	0%	10%	9%	21%
Novel Benzodiazepines	61%	39%	0%	11%	14%	20%
Phenytoin	48%	31%	0%	16%	9%	25%
Pregabalin	39%	25%	0%	9%	13%	40%
Secobarbital	53%	30%	0%	13%	8%	25%
Topiramate	46%	30%	0%	16%	11%	26%
Trazodone	65%	40%	0%	10%	6%	18%
Tricyclic antidepressants	65%	45%	0%	6%	6%	20%
Valproic acid	25%	13%	0%	20%	16%	41%
Zopiclone	49%	33%	0%	13%	14%	26%
Fentanyl analogs	59%	36%	0%	8%	13%	28%
Novel opioids	35%	21%	0%	13%	23%	35%
Tapentadol	44%	26%	0%	11%	13%	31%

Dextro/levo methorphan	68%	39%	0%	6%	6%	16%
Ketamine	71%	46%	0%	14%	5%	8%
PCP	88%	53%	3%	4%	4%	1%
Difluoroethane	49%	19%	0%	18%	14%	24%
Inhalant class	28%	11%	0%	19%	19%	39%
Hallucinogens	44%	30%	0%	13%	16%	31%

**Table 15.** Percentages of laboratories who routinely test for each Tier II compound in blood, urine, and/or oral fluid samples, test in-house upon request, outsource to a reference laboratory, or do not test/do not outsource (n=80).

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## **Final Comments**

**Question 61:** Please list the top 15 drugs present in DUID casework in 2023. (Number 1-15; 1 = most prevalent).

Prevalence	Compound/Class
1 (most prevalent)	THC and metabolites
2	Amphetamine/Methamphetamine
3	Fentanyl <sup>10</sup>
4	Cocaine and metabolites
5	Alprazolam/alpha-hydroxyalprazolam
6	Clonazepam/7-aminoclonazepam
7	Diphenhydramine
8	Oxycodone
9	Diazepam/nordiazepam
10	Hydrocodone
11	Lorazepam
12	Methadone and metabolite
13	Novel benzodiazepines
14	Zolpidem
15 (least prevalent)	Tramadol/O-Desmethytramadol

**Table 16.** Top 15 most prevalent drugs in DUID casework in 2023 (n = 80).

Laboratories also had the ability to comment on other compounds present in DUID casework not listed in the survey. Responses included the following compounds: delta-8 THC and metabolites, methadone and metabolite, morphine, citalopram and metabolite, sertraline and metabolite, fluoxetine and metabolite, lidocaine, etizolam, bromazolam, norfentanyl, midazolam, phentermine, trazodone, difluoroethane, fluorofentanyl, venlafaxine and metabolite, flualprazolam, xylazine, bupropion and metabolite, NSAIDs, metoprolol, phenobarbital, norchlorcyclizine, and norketamine.

Please note that the 6<sup>th</sup> most prevalent drug was alprazolam/alpha-hydroxyalprazolam; however, since alprazolam/alpha-hydroxyalprazolam was already listed as the 5<sup>th</sup> most prevalent drug, clonazepam/7-aminoclonazepam was selected.

The 7<sup>th</sup> most prevalent drug was clonazepam/7-aminoclonazepam; however, since clonazepam/7-aminoclonazepam was already listed as the 6<sup>th</sup> most prevalent drug, diphenhydramine was selected.

The 10<sup>th</sup> most prevalent drug was oxycodone; however, since oxycodone was already listed as the 8<sup>th</sup> most prevalent drug, hydrocodone was selected.

<sup>10</sup> Fentanyl excludes synthetic analogs.

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The 11<sup>th</sup> most prevalent drug was diazepam/nordiazepam; however, since diazepam/nordiazepam was already listed as the 9<sup>th</sup> most prevalent drug followed by oxycodone as the 8<sup>th</sup> most prevalent and hydrocodone as the 10<sup>th</sup> most prevalent, lorazepam was selected.

The 15<sup>th</sup> most prevalent drug was lorazepam; however, since lorazepam was already listed as the 11<sup>th</sup> most prevalent drug followed by a tie with hydrocodone already listed as 10<sup>th</sup> most prevalent and tramadol/O-Desmethyltramadol, tramadol/O-desmethyltramadol was selected.

**Question 61:** Please list the top 15 drugs present in DUID casework in 2023.

Compound	Number of laboratories reporting this compound/class in their top 15
Amphetamine/Methamphetamine*	91 <sup>11</sup>
Cocaine and metabolites*	78
THC and metabolites*	77
Alprazolam/alpha-hydroxyalprazolam*	75
Fentanyl (only)*	71
Diazepam/nordiazepam*	52
Oxycodone*	52
Clonazepam/7-aminoclonazepam*	50
Diphenhydramine**	38
Hydrocodone*	36
Buprenorphine/norbuprenorphine*	31
Lorazepam*	31
Methadone and metabolite*	31
Gabapentin**	30
Morphine*	27
Zolpidem*	26
Novel benzodiazepines**	22
Phencyclidine (PCP)**	20
Fentanyl analogs**	16
Tramadol/O-Desmethyltramadol*	15
Dextromethorphan**	12
Cyclobenzaprine**	11
Ketamine**	11
Trazodone**	11
3,4-methylenedioxymethamphetamine (MDMA)*	9
Citalopram and metabolite	9
Tricyclic antidepressants**	9
Carisoprodol/meprobamate*	8
Mitragynine**	8
Hydroxyzine**	7
Midazolam	7
Oxazepam*	6
Temazepam*	6
Atypical antipsychotics**	5
Barbiturates**	5
Codeine*	5
Fluoxetine and metabolite	5
Oxymorphone*	5

<sup>11</sup> Some laboratories separated amphetamine and methamphetamine, tracking those analytes separately which accounts for the greater number of laboratories reporting these analytes.

Xylazine	5
Doxylamine**	4
Lamotrigine**	4
Sertraline and metabolite	4
Zopiclone**	4
6-acetylmorphine*	3
Bupropion and metabolite	3
Chlordiazepoxide**	3
Hydromorphone*	3
Inhalants**	3
Norfentanyl	3
Pregabalin**	3
Cathinones**	2
Chlorpheniramine**	2
Delta-8 THC and metabolites	2
Hallucinogens**	2
NSAIDs	2
Topiramate**	2
Venlafaxine and metabolite	2
Carbamazepine**	1
Lidocaine	1
Methylphenidate	1
Metoprolol	1
Norchlorcyclizine	1
Norketamine**	1
Novel opioids**	1
Phentermine	1
Synthetic cannabinoids**	1
Valproic acid**	1

**Table 17.** Top 15 most prevalent drugs in DUID casework in 2023 (n = 80)<sup>12</sup>.

Laboratories also had the ability to comment on other compounds present in DUID casework not listed in the survey. Responses included the following compounds: delta-8 THC and metabolites, methadone and metabolite, morphine, citalopram and metabolite, sertraline and metabolite, fluoxetine and metabolite, lidocaine, etizolam, bromazolam, norfentanyl, midazolam, phentermine, trazodone, difluoroethane, fluorofentanyl, venlafaxine and metabolite, flualprazolam, xylazine, bupropion and metabolite, NSAIDs, metoprolol, phenobarbital, norchlorcyclizine, and norketamine.

<sup>12</sup> Those compounds/class of compounds listed as Tier I compounds are notated with one asterisk (\*), while those listed as Tier II compounds are notated with two asterisks (\*\*).



**Question 62:** What additional drugs should be included in the new recommendations for DUID testing and why?

Compound/Class of Compounds	Number of Laboratories Making This Request (n)
Gabapentin**	9
Delta-8 THC	6
Novel benzodiazepines**	5
Bromazolam**	4
Xylazine	4
Ketamine**	3
Pregabalin**	3
Psilocin**	3
Trazodone**	3
Diphenhydramine**	2
LSD**	2
Methadone*	2
Nitazenes**	2
PCP**	2
8-aminoclonazepam**	1
Baclofen	1
Butalbital**	1
Cyclobenzaprine**	1
DFE**	1
Flualprazolam**	1
Lamotrigine**	1
Levetiracetam	1
Methocarbamol	1
Mitragynine**	1
Phenobarbital**	1
Psilocybin**	1
Quetiapine	1
Selective serotonin reuptake inhibitors (SSRIs)	1
Tianeptine	1
Topiramate**	1
Venlafaxine	1

**Table 18.** Suggested drugs to be included in the new recommendations for DUID testing.<sup>13</sup>

<sup>13</sup> Those compounds/class of compounds listed as Tier II compounds are notated with two asterisks (\*\*).

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Thirty-nine laboratories provided answers to this question. Multiple drugs were allowed to be listed by each laboratory. The following compounds were suggested to move from Tier II to Tier I: gabapentin, novel benzodiazepines (specifically bromazolam, flualprazolam, 8-aminoclonazepam), ketamine, pregabalin, psilocin, trazodone, diphenhydramine, LSD, nitazenes, PCP, butalbital, cyclobenzaprine, difluoroethane, lamotrigine, mitragynine, phenobarbital, psilocybin, and topiramate. The following compounds were suggested to be added, but scope was not specified: delta-8 THC (THC analogs), xylazine, baclofen, levetiracetam, methocarbamol, quetiapine, selective serotonin reuptake inhibitors (SSRIs), tianeptine, and venlafaxine.

Five laboratories made additional requests beyond what this question asked. One laboratory requested that this committee follow the ASB/OSAC document to standardize the field and not have two documents. One laboratory stated that Tier II should be listed as “all other drugs”. One laboratory asked if classes like novel benzodiazepines can be specified to list a few of the most popular drugs. Two laboratories asked if hallucinogenic drugs can be listed in Tier I or Tier II since micro dosing, legalization, and decriminalization in some states is being considered and there is increased prevalence; therefore, laboratories can detect these with routine screening.

**Question 63:** What drugs should be removed in the new recommendations for DUID testing?

Compound/Class of Compounds	Number of Laboratories Making This Request
Carisoprodol*	7
Meprobamate*	7
Barbiturates**	4
Synthetic cannabinoids**	4
Tramadol*	4
O-Desmethyldramadol*	3
Codeine*	2
MDA*	2
Norbuprenorphine*	2
7-Aminoclonazepam*	1
Buprenorphine*	1
Carbamazepine**	1
Cathinones**	1
Fentanyl analogs**	1
Lamotrigine**	1
MDEA	1
MDMA*	1
Novel benzodiazepines**	1
PCP**	1
Phentermine	1
Phenytoin**	1
SSRIs	1
Valproic acid**	1

**Table 19.** Suggested drugs to be removed in the new recommendations for DUID testing<sup>14</sup>.

Twenty-five laboratories provided answers to this question. Multiple drugs were allowed to be listed by each laboratory. Two laboratories made additional requests beyond what this question asked. One laboratory stated that drugs should not be removed due to the vast regional differences in drugs findings. Another laboratory stated that Tier II does not need to be specified, but rather should be anything else aside from the Tier I drugs.

<sup>14</sup> Those compounds/class of compounds listed as Tier I compounds are notated with one asterisk (\*), while those listed as Tier II compounds are notated with two asterisks (\*\*).

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**Question 64:** If you have suggestions for changes to the cutoff for a currently listed drug, please comment below and specify why.

A total of 20 laboratories provided suggestions or comments for changes to the cutoff for a currently listed drug. Multiple suggestions were allowed to be provided by each laboratory. One laboratory suggested a cutoff of 1 ng/mL for delta-8 THC. Another laboratory stated that the carboxy-THC level in urine is very low when considering its interpretative value. One laboratory suggested that oral fluid cutoffs for THC and cocaine should be raised to better correlate to blood results. Three laboratories suggested changing the confirmation cutoff for buprenorphine and norbuprenorphine in blood to 1 ng/mL since it is analytically challenging to consistently detect 0.5 ng/mL. Another laboratory stated that a number of laboratories are struggling to achieve the recommended limits of detection for buprenorphine and norbuprenorphine.

One laboratory suggested that the confirmation limit of detection for cocaine in blood be lowered to 5 ng/mL since collection time effects detectable levels. Another suggestion was to decrease low-dose potent benzodiazepines to 5 ng/mL.

One laboratory suggested lowering clonazepam and 7-aminoclonazepam cutoffs in blood to 5 ng/mL since approximately 50% of their laboratory's samples quantitate between 5-10 ng/mL. Another suggestion was to lower amphetamine and methamphetamine cutoffs in blood to 10 ng/mL. It was noted that amphetamine, in the presence of low-level methamphetamine, is usually 10-fold less.

One laboratory stated that the confirmation cutoff for THC in blood is very difficult to achieve with current technology on a consistent basis. Further, 1 ng/mL for drivers is not significant whereas 2 ng/mL is more indicative of recent use. Concentrations of THC in drivers is trending upwards (median concentration in the laboratory's state is 4.5 ng/mL for over 1000 cases). Another laboratory also suggested a confirmation cutoff of 2 ng/mL for THC in blood.

One laboratory suggested increasing the confirmation cutoffs in blood for cocaine and cocaethylene to 20 ng/mL.

One laboratory stated that some of the screening cutoffs were lower than their laboratory's cutoffs, but it is believed to be a manufacturer thing. The laboratory's higher screening cutoffs usually still correspond to below recommendation confirmation levels.

One laboratory stated that if urine will be included in the new recommendations, then the carboxy-THC and benzoylecgonine screening and confirmation cutoff levels are much too low. The laboratory asked why anyone would want to confirm at 5 ng/mL for carboxy-THC. Suggested cutoffs were provided: benzoylecgonine screening cutoff at 300 ng/mL, carboxy-THC screening and confirmation cutoffs at 50 ng/mL. Further, the confirmation cutoff for meprobamate in blood should be raised to 1000 ng/mL, if included in the Tier I scope.

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One laboratory suggested changing the confirmation cutoffs for fentanyl and buprenorphine in blood to 1 ng/mL instead of 0.5 ng/mL. Another suggestion was to raise the confirmation cutoffs for hydromorphone and oxycodone in blood to 10 ng/mL instead of 5 ng/mL.

One laboratory stated that the cutoffs are good for DUI but reduce the cocaine confirmation cutoff in blood to 5 ng/mL. This is due to delayed sampling in the laboratory's jurisdiction.

One laboratory stated that the cutoffs for DUI testing tend to be too low. For example, the cutoff for methamphetamine is 20 ng/mL, and testifying that an individual is under the influence with such a low level of methamphetamine is a stretch. Cutoffs should reflect impairment levels.

One laboratory suggested raising the confirmation cutoffs for buprenorphine, norbuprenorphine, and fentanyl in urine to 5 ng/mL. Further, the screening cutoff for fentanyl in urine should be increased to 5 ng/mL. It is difficult to build a good method to analyze for those substances down to those low levels, even with LC-MS/MS.

One laboratory suggested lowering carisoprodol and meprobamate to Tier II since those drugs are only present in 0.37% of the laboratory's casework.

One laboratory stated that confirmation cutoffs for buprenorphine and fentanyl should be 1 ng/mL in blood. Further, the confirmation cutoff for carboxy-THC should be 10 ng/mL in urine.

One laboratory strongly suggested making the cutoff values consistent with the ASB standards.

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**Question 65:** Are there any other recommended changes you would like to propose? Please comment below and specify why.

A total of 11 laboratories provided suggestions or comments for changes to the cutoff for a currently listed drug. Multiple suggestions were allowed to be provided by each laboratory. One laboratory stated that MDMA, MDA, and PCP are regional drugs and should be considered for Tier II. Two laboratories suggested moving novel benzodiazepines (ex. clonazepam, 8-aminoclonazepam, flualprazolam, alpha-hydroxy flualprazolam) to Tier I with a limit of detection of 5 ng/mL. One laboratory stated that cutoffs for Tier II would be helpful. Another laboratory suggested expanding some of the more frequent designer drugs such as the benzodiazepines.

One laboratory commented that in the last publication there was a statement regarding future iterations not providing recommendations regarding urine cutoffs. While it is well-known the presence of drugs in an individual's urine does not directly equate to impairment, the same is true for many drugs in blood as well (ex. cannabinoids). Many laboratories do not have a choice but to test urine based on state statutes or the ability to get blood samples collected in remote unpopulated areas of a large state. For some jurisdictions it is not practicable for an officer to get a blood sample collected. Oral fluid might be an alternative but that would require statutory changes along with extensive method development/validations by the laboratory. Laboratories have little control over the samples that may be statutorily required but will have to face questions in court regarding a panel's recommendations discouraging the use of urine. The strongest evidence of impairment is the signs, symptoms and observations made by the officers and hopefully DREs.

One laboratory stated that the inclusion of inhalants and hallucinogens as categories in Tier II is too broad to be useful. If there is evidence of specific drugs being used in these classes, these should be suggested so as to assist laboratories in developing the correct methodology. Further, it was suggested that the NSC not address larger classes of NPS drugs in these lists as they are constantly changing and difficult for laboratories to adapt to as validations take an extremely long time. By the time a laboratory validates one of these methods for these "trendy" drugs, the users have moved on to different drugs. A list like this from a reputable body like the NSC should focus on the most common drugs to assist laboratories in testing for most (>95%) of the drugs seen in casework. Laboratories have limited resources and should focus their efforts on the bulk of the targets and not on the "one-off" cases. Those one-off cases can be outsourced if necessary. Another laboratory stated that more specification is needed for some of the Tier II compounds (ex. hallucinogens).

One laboratory stated that updates in technology should be addressed in this iteration.

One laboratory stated that they have seen an increase in methadone and buprenorphine cases, which is likely a result of the increase in fentanyl abuse cases.

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One laboratory stated that caveating in paper that blood is preferable over urine for DUID, and that if both blood and urine are submitted in a particular case then priority should be to test the blood evidence over the urine, if possible. The laboratory does very little urine testing now, and urine has little value when it comes to talking about impairment in DUID cases which is why meeting the recommendations for the urine Tier I/II drugs is not as important to our laboratory versus trying to meet them in blood testing.

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**Question 66:** If there is any other information you would like the DUID survey or NSC to have that was not covered in the survey questions, please comment below:

Laboratories were given an opportunity at the end of the survey to provide any information not covered in the survey questions. One laboratory asked to consider increasing cutoffs/limits of detection in oral fluid to better reflect the window of impairment (4-6 hours) after use. In oral fluid, blood ratios are often 2:1 or higher. Also, remove urine as a target for DUI testing.

One laboratory stated that their laboratory performs all confirmations by request only. Prevalence of drugs detected by the laboratory is within the cases that have been requested and may not be representative of the true prevalence across all cases.

One laboratory stated that they are a start-up section in an established laboratory, lacking both staffing and space. Currently there are nine blood drug methods undergoing validation on LC-MS/MS which will hopefully go live in 2024. There are also two urine drug methods undergoing validation on LC-MS/MS to improve sensitivity for a number of analytes in the laboratory's existing program.

One laboratory stated the survey needs to be broken out for postmortem-only laboratories. There is belief that this laboratory may be skewing data for their state if the other laboratories within state do not respond and cover the antemortem testing practices by their laboratories. This laboratory performs testing uniquely as a majority of testing may limit scope due to cause and manner of death overwhelmingly defined as multiple blunt force trauma and accident without considerable investment in toxicology testing. The laboratory is not opposed to attaining the scope recommendations but noted that certain priorities outweigh their implementation.

One laboratory stated that they are glad to see that the NSC is open to a broad perspective.

One laboratory stated that testimony and turnaround times were estimated as they are not tracked in the same way as requested. Data for reported drugs is through 2021.

One laboratory suggested more details for toxicology testimony detailing that scientists often get an overwhelming number of subpoenas, but rarely testify in their state. Also, information if each laboratory has more than one location.

One laboratory suggested more attention on psilocin, LSD, and related tryptamines.

One laboratory asked what percentage are other laboratories seeing for each drug? In this laboratory's state, THC is around 40% of cases, amphetamine and methamphetamine are around 35-40%, and after that there is a step drop off to fentanyl at 15%.



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One laboratory stated that it would be nice to have recommendations for how to quickly add a new substance to the scope of a current drug screen or drug confirmation test. One thing that substantially inhibits laboratories from getting new substances added to the scope of testing is the requirement to re-validate a method when changes are made.