

Updates for Recommendations for Drug Testing in DUI & Traffic Fatality Investigations

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2020

Toxicology
Laboratory
Survey

The Center for Forensic Science Research & Education at the Fredric Rieders Family Foundation
2300 Stratford Avenue, Willow Grove, PA 19090



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Toxicology Laboratories: Final Data Report

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The committee would like to thank all laboratory staff and directors who contributed data to the survey. This project is supported by the National Safety Council.

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Introduction:

Previous 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 in 2013 and 2017 by Logan, et al. This survey aims to critically review and update the current recommendations for the toxicology community. An online survey was sent to toxicology laboratories performing testing of impaired driving casework. Laboratories were selected from the Society of Forensic Toxicologists, the American Academy of Forensic Sciences, and the American Board of Forensic Toxicology mailing 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 2017 recommendations, and patterns and trends in drug impaired driving in the United States. Further questions regarding current practices and resource needs were included.

Members of the Drugs: Technology, Pharmacology and Toxicology Committee of the National Safety Council Alcohol, Drugs and Impairment Division (NSC ADID) expanded upon and updated the previous survey's questions to increase their scope and 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 SurveyMonkeyTM, an online web survey instrument.

Three hundred and twenty-five 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). Eighty-four 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 sixty-five laboratories completed the survey.

Each question is listed as presented in the survey to the laboratory at the time of survey completion. The following terms are used throughout: "DUI" for alcohol-only casework, and "DUID" for drug and alcohol casework combined.

Executive Summary

Summary:

In the 2020 survey, there was an increase in caseload reported per laboratory for both drug and alcohol cases. Caseload was plotted against analyst full time equivalents to determine if there was a trend among laboratories as caseload increased; however, no trend could be determined (Figure 1).

Between the 2016 and 2020 surveys, data for some laboratory policies remained the same, whereas laboratory methods saw a shift from GC to LC technology for both blood and urine samples (Tables 1 and 2). In 2016, 49% of laboratories reported stopping testing when a certain BAC result is met or exceeded, and similarly in 2020, 45% of laboratories reported stopping testing. The top 3 priorities for additional resources in 2016 were additional staffing, additional instruments for screening, and additional training; however, in 2020 laboratories report the need for additional staffing, additional instruments for confirmation, and additional training and upgraded/new facility. The percentage of laboratories reporting unconfirmed screening results was alarming in both 2016 and 2020, with 34% and 35% of laboratories reporting such results, respectively. One of the laboratories stated that their state uses screen results to determine if charges will be filed following an arrest. Laboratories should be cautious in reporting unconfirmed screening results, keeping in mind the associated legal ramifications. Laboratories are urged to provide clients with verbiage explaining the reason for reporting such results and suggest the pursuance of confirmation testing for the compound(s) presumptively positive. In the event that a compound screens positive but confirms negative, additional verbiage explaining these results should also be provided. This applies to those compounds capable of impairing human psychomotor performance.

When assessing percent compliance by drug for screening and confirmation in blood and urine samples, those cutoffs that did not change between the 2013 and 2017 recommendations saw an increase in compliance or remained about the same. Those cutoffs that were newly established in the 2017 recommendations saw 48%-100% compliance. Overall, in 2016, 17% of laboratories met or exceeded all recommendations for confirming in blood, 20% did not agree with the recommendations, and 52% were in the process of making changes to meet the recommendations, whereas in 2020, 12% of laboratories met or exceeded all recommendations, 19% did not agree with the recommendations, 40% were in the process of making changes to meet the recommendations, and 44% were close to meeting the recommendations but reported that doing so was not a priority at this time. Overall, in 2016, 18% of laboratories met or exceeded all recommendations for confirming in urine, 32% did not agree with the recommendations, and 36% were in the process of making changes to meet the recommendations, whereas in 2020, 10% of laboratories met or exceeded all recommendations, 22% did not agree with the recommendations, 29% were in the process of making changes to

meet the recommendations, and 45% were close to meeting the recommendations but reported that doing so was not a priority at this time. There was an increase in testing Tier II compounds between 2016 and 2020. In 2016, 81% of laboratories reported testing for Tier II compounds, and 91% of laboratories reported testing in 2020.

Between 2016 and 2020, there was a shift among the top drugs present in DUID casework¹. In 2016, the top 10 drugs were THC and metabolites, alprazolam/alpha-hydroxyalprazolam, amphetamine, cocaine and metabolites, oxycodone, clonazepam/7-aminoclonazepam, diazepam/nordiazepam, codeine, morphine, and lorazepam. In 2020, the top 15 drugs were THC and metabolites, methamphetamine, cocaine and metabolites, alprazolam/alpha-hydroxyalprazolam, clonazepam/7-aminoclonazepam, morphine, fentanyl, diazepam/nordiazepam, oxycodone, citalopram, hydrocodone, lorazepam, tramadol/O-desmethyltramadol, zolpidem, and temazepam. Among the top drugs listed in 2016 and 2020, all drugs, with the exception of citalopram, are listed as Tier I compounds in the 2017 recommendations. Citalopram was listed as a Tier II compound in the 2013 recommendations, but was removed from the 2017 recommendations due to low prevalence at the time.

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

¹ In 2016, only the top 10 was requested by laboratories; however, in 2020 the top 15 was requested.

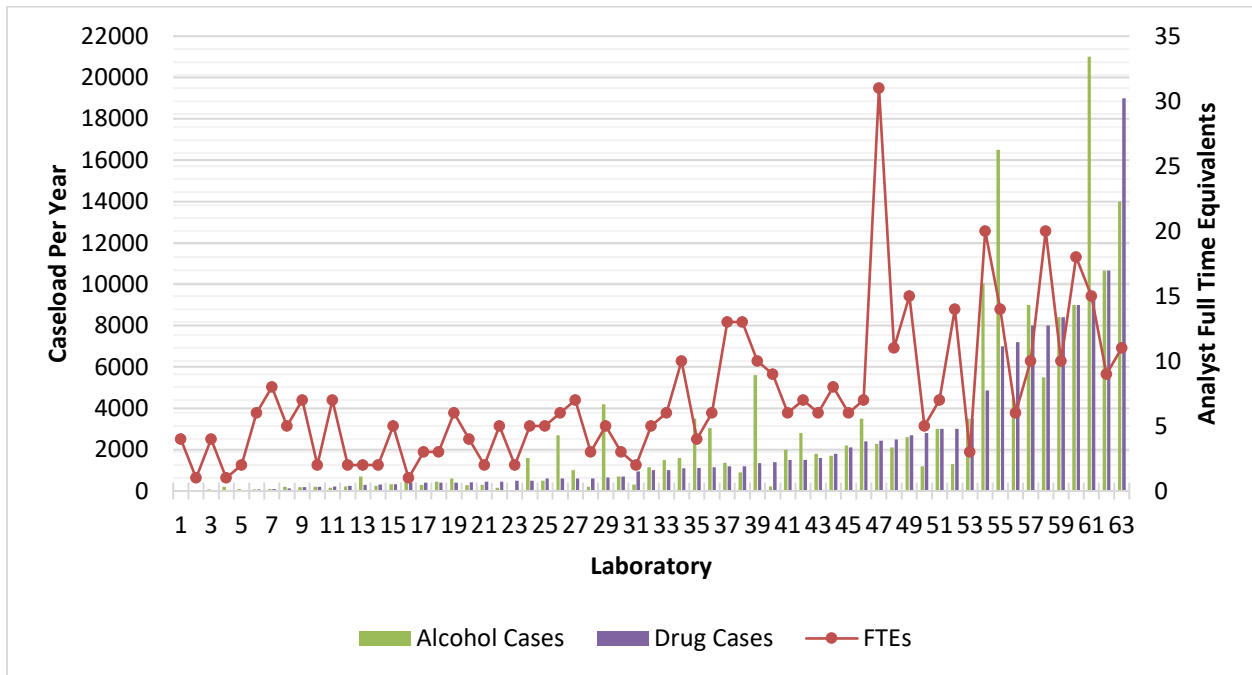


Figure 1. Caseload per year and analyst full time equivalents for each laboratory (n = 63).

Blood Samples			
Top 3 Screening Methods		Top 3 Confirming Methods	
2016	2020	2016	2020
ELISA - 74%	ELISA - 51%	GC-MS - 87%	LC-MS - 88%
GC-MS - 50%	GC-MS - 35%	LC-MS - 81%	GC-MS - 71%
LC-MS - 39%	LC-MS - 31%	LC-TOF - 4%	LC-HRMS - 12%

Table 1. Did laboratory methods change between 2016 and 2020 for blood samples?

Urine Samples			
Top 3 Screening Methods		Top 3 Confirming Methods	
2016	2020	2016	2020
ELISA - 49%	GC-MS - 34%	GC-MS - 77%	GC-MS - 62%
GC-MS - 37%	ELISA - 28%	LC-MS - 54%	LC-MS - 51%
LC-MS - 29%	EMIT, LC-HRMS - 23%	LC-TOF - 3%	LC-HRMS - 11%

Table 2. Did laboratory methods change between 2016 and 2020 for urine samples?

Basic Information

What status best describes your laboratory?

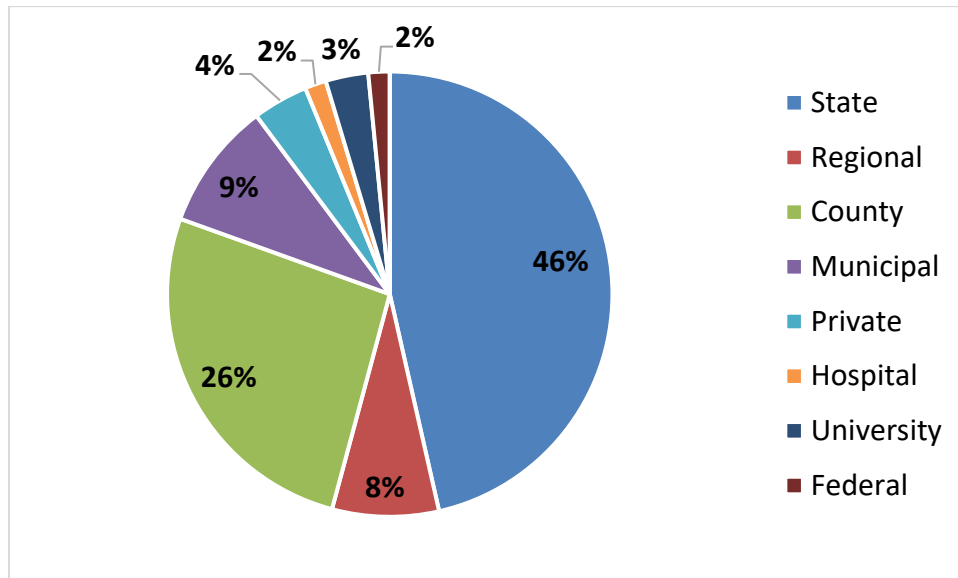


Figure 2. Categories of laboratories providing DUID survey data (n = 65).

What type of testing does your laboratory do?

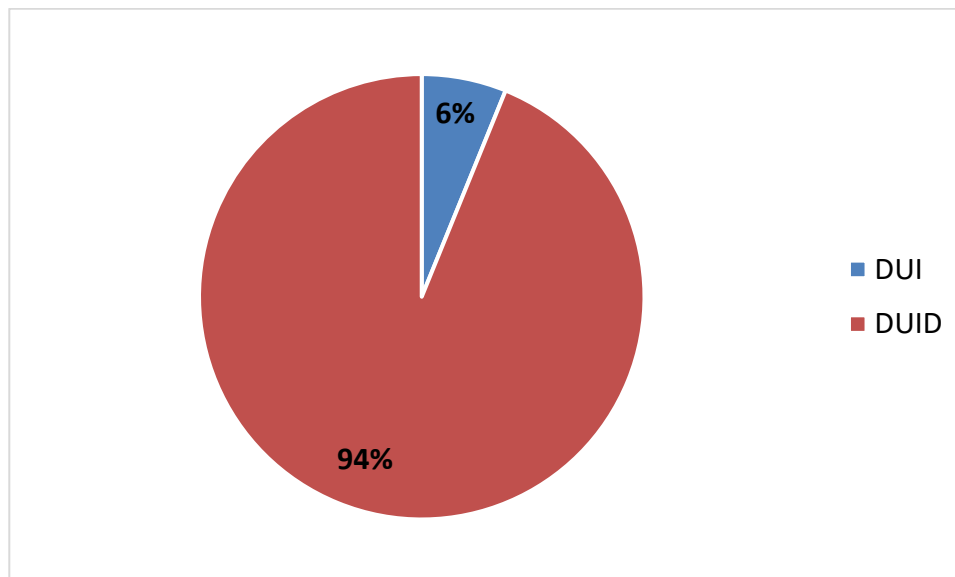


Figure 3. Types of testing performed by the laboratory (n = 65).

Toxicology Laboratory Statistics

Approximately how many analyst equivalents (full time) are doing impaired driving testing?

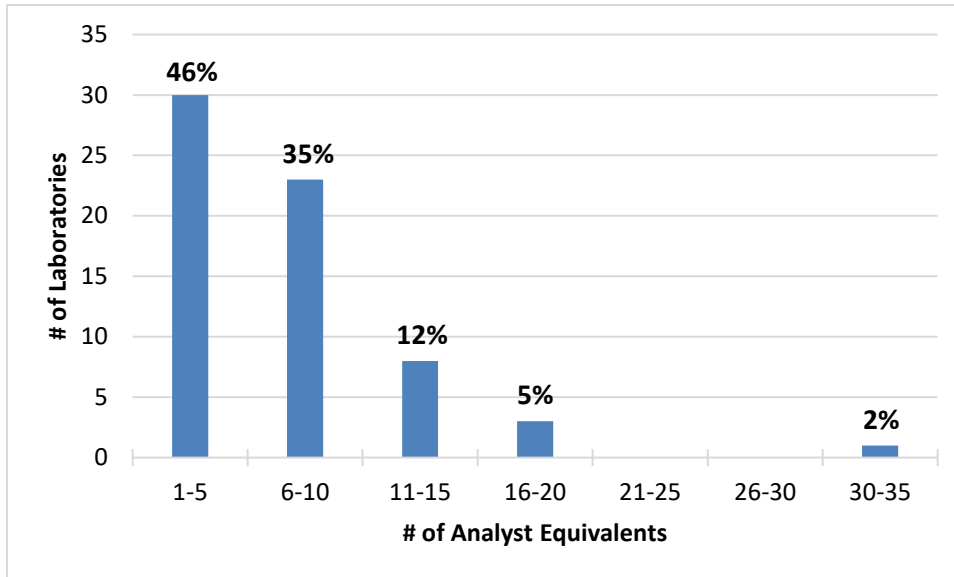


Figure 4. Full time analyst equivalents performing impaired driving testing by laboratory (n = 65).

Approximately how many impaired driving cases are tested for ALCOHOL each year?

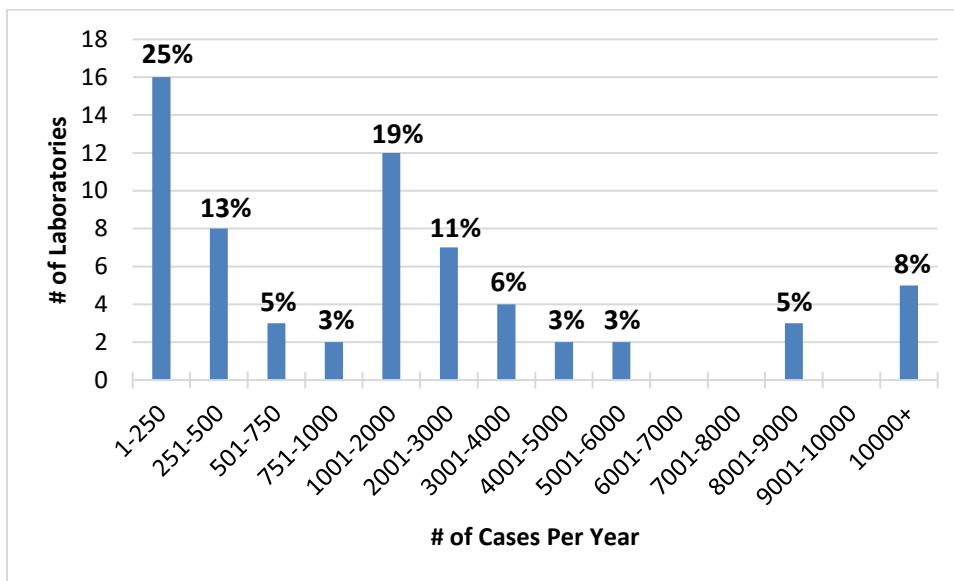


Figure 5. Number of impaired driving ALCOHOL cases per year performed by the laboratory (n = 64).

What is the approximate turnaround time of your laboratory in regard to ALCOHOL analysis?

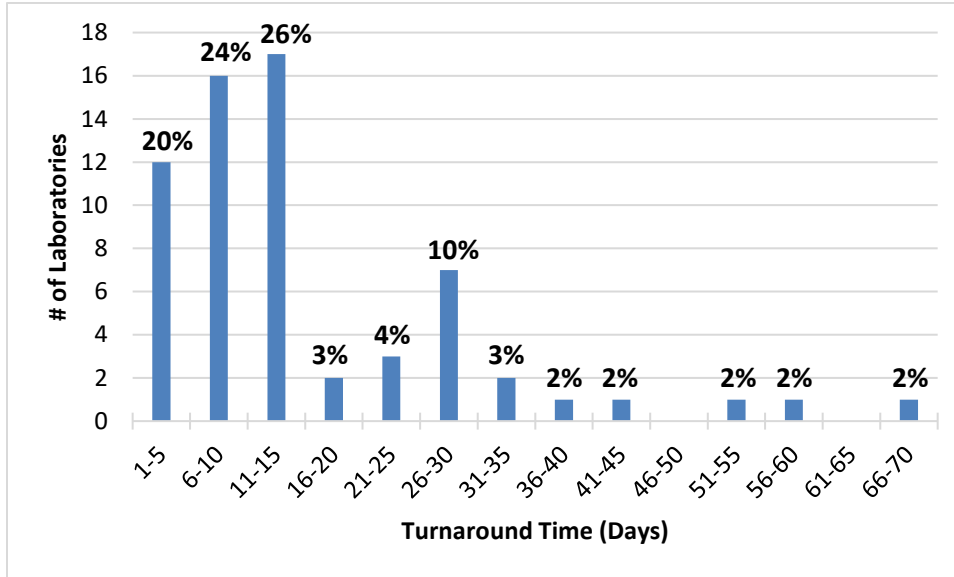


Figure 6. Approximate turnaround times for alcohol analysis by laboratory (n = 64).

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

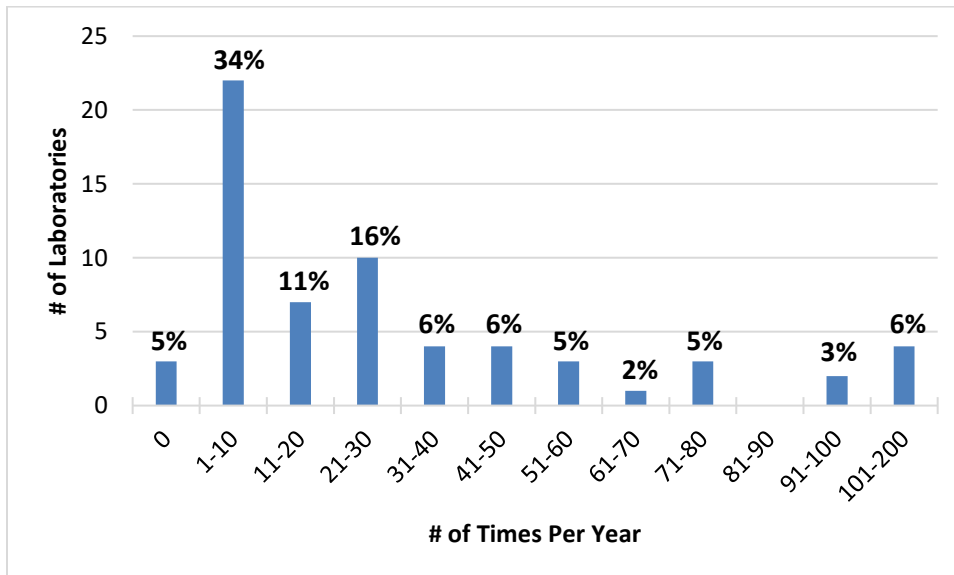


Figure 7. Alcohol testimony requests per year by laboratory (n = 64).

The number cases analyzed for alcohol in impaired driving cases ranged from six to 21,000 each year per laboratory, with a mean of 2,762 and a median of 1,250 (Figure 5). The approximate turnaround times for alcohol testing ranged from one to sixty-six days, with a mean of sixteen and a median of fourteen (Figure 6). Eighty-seven percent of laboratories had a turnaround of time of less than or equal to 30 days. The distribution for alcohol testimony ranged from zero to two hundred and sixty-eight per year, with a mean of thirty-eight and median of twenty-two (Figure 7). Three laboratories (5%) indicated they did not provide any alcohol testimony. One laboratory does not perform alcohol testing; therefore, sixty-four laboratories are represented in the alcohol data.

What is your laboratory's reporting limit for alcohol in human performance impaired driving cases?

Reporting Limit (g/dL)	# of Laboratories with this Reporting Limit	% of Laboratories with this Reporting Limit
0.005	2	3%
0.010	47	73%
0.016	1	2%
0.020	11	17%
0.025	1	2%
0.050	1	2%
0.400 ²	1	2%

Table 3. Reporting limit for alcohol concentration in human performance impaired driving cases by laboratory (n = 64)³.

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.

One laboratory does not perform alcohol testing.

² It is believed that this reporting limit was a typographical error by the submitting laboratory.

³ Reporting limits were submitted by laboratories in a variety of units. All reporting limits were converted to g/dL for uniformity.

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

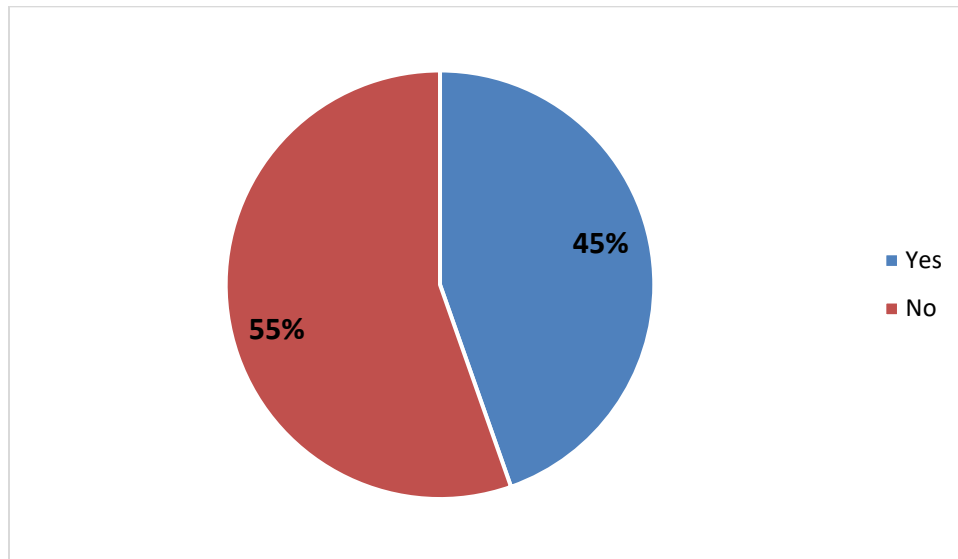


Figure 8. Is there an administrative decision to stop testing if a BAC result is at or above a certain concentration (n = 64)?

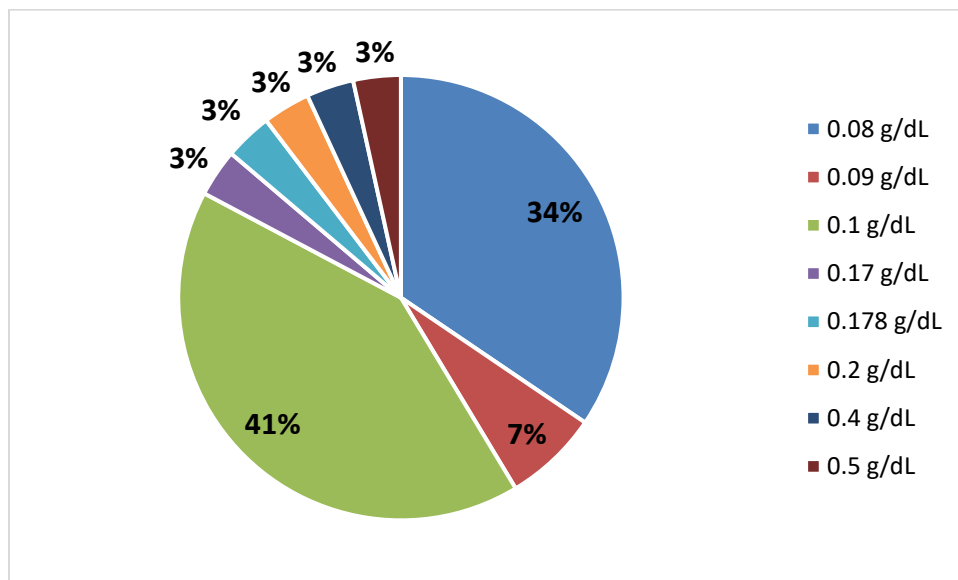


Figure 9. Is there a BAC concentration where there is an administrative decision to stop testing (n = 29)?

Reasons given for laboratories stopping testing if a BAC result is at or above a certain concentration included if a urine sample exceeded a specific concentration, requested by the client, the case involves a misdemeanor rather than a felony charge, or cases involving non-fatalities or non-serious bodily harm; however, testing will continue if a specific drug is mentioned, or extenuating circumstances such as an injury, assault, crash, or death are involved.

Is there a specific scope for drug testing if alcohol is below a certain limit?

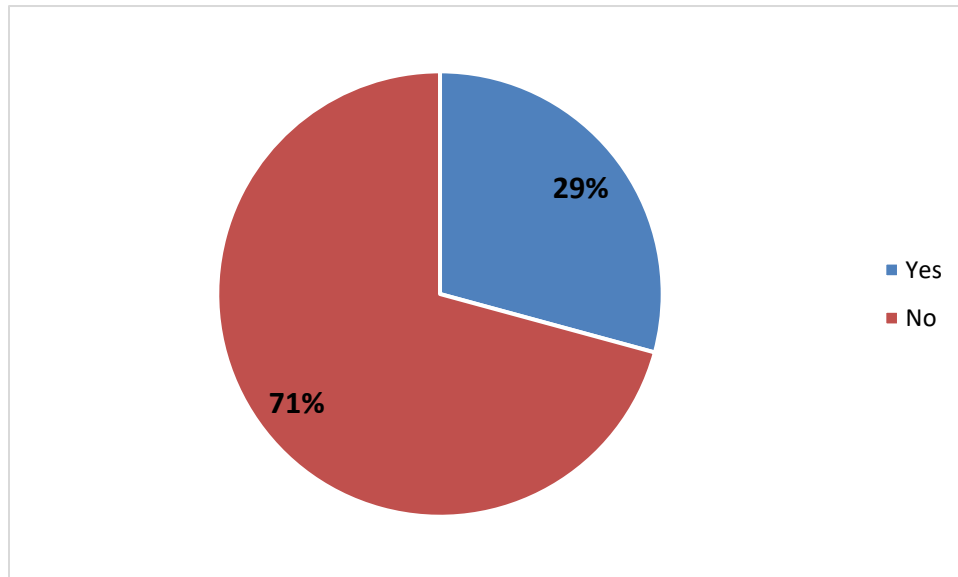


Figure 10. Is there a specific scope for drug testing if the alcohol result is below a certain limit by laboratory (n = 65)?

All nineteen 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 for some clients, if the BAC result is less than 0.02 g/dL then the laboratory will proceed with drug testing; however, some clients want alcohol-only testing or both alcohol and drug testing regardless of alcohol concentration.

One laboratory stated that their laboratory follows the 0.08 g/dL per se limit, but if drugs are involved then that information could be useful in determining impairment.

One laboratory stated that their laboratory’s scope is full toxicology testing.

One laboratory stated that for some agencies, if the alcohol concentration is below 0.08 g/dL then their laboratory will do a 10-panel screen for amphetamines, cocaine, opiates, PCP, benzodiazepines, THC, carisoprodol, fentanyl, oxycodone, and zolpidem. Similarly, another laboratory stated that their laboratory will submit a blood sample to a 16-panel enzyme-linked immunosorbent assay (ELISA) screen when requested by the submitting agency if the alcohol concentration is below 0.08 g/dL.

One laboratory stated that if the alcohol concentration is below 0.178 g/dL then their laboratory will do a complete drug screen using an 11-panel ELISA screen. If the ELISA panel comes back as none detected then a gas chromatography mass spectrometry (GC-MS) screen is performed.

One laboratory stated that their laboratory performs a 14-panel ELISA screen regardless of the BAC result.

One laboratory stated that if a BAC result is less than 0.10 g/dL then a sample will undergo a standard 6-panel screen; however, if that screen is negative then the sample will undergo a comprehensive panel.

One laboratory stated that their laboratory performs a basic extraction with scan GC-MS and ELISA for blood and urine cases for the following: amphetamines, barbiturates, benzodiazepines, buprenorphine, carisoprodol, cocaine and benzoylecgonine, fentanyl, methamphetamine and MDMA, opiates, oxycodone, THC, tramadol, methadone, and zolpidem.

One laboratory stated that if a BAC result is less than 0.09 g/dL then cases are analyzed using ELISA (benzodiazepines, cannabinoids, cocaine, and opiates), acid/neutral, and high-resolution mass spectrometry (QTOF) drug screens. Similarly, one laboratory stated that drug testing will be done if the alcohol concentration is less than 0.09 g/dL, and there is a request for drug testing.

One laboratory stated that their laboratory has a specific scope for drug testing if the alcohol concentration is below 0.08 g/dL for traditional DUI and 0.15 g/dL for felony DUI.

Two laboratories stated that their laboratory will automatically screen samples for drugs with a BAC result less than or equal to 0.08 g/dL.

One laboratory stated that their laboratory's drug testing scope depends on whether the sample is urine or blood and the type of DUI case (fatal vs. non-fatal vs. serious injury). Usually a concentration of 0.10 g/dL or greater is the deciding factor. Blood samples usually undergo a full drug analysis whereas urine samples receive an immunoassay result with a full drug analysis upon request.

One laboratory stated that their laboratory has a specific scope for drug testing when the alcohol concentration is below 0.10 g/dL.

One laboratory stated that if a BAC result is less than 0.085 g/dL then the sample is automatically forwarded for drug analysis covering the same scope as samples where drug analysis is requested.

One laboratory stated that if a BAC result is less than or equal to 0.10 g/dL then every case would undergo an ELISA and basic drug screen using GC-MS and gas chromatography with a nitrogen phosphorous detector (GC-NPD).

One laboratory stated that if drug testing is requested and the alcohol concentration is below 0.08 g/dL then the case is moved to drug testing.

One laboratory stated that if a BAC result is less than 0.08 g/dL and if drug testing is requested then blood enzyme immunoassay (EIA) is performed for barbiturates, cannabinoids, select benzodiazepines, cocaine and metabolites, and common opioids. Also, an liquid chromatography tandem mass spectrometry (LC-MS-MS) screening test is performed to check for approximately 118 additional compounds that may or may not be detected by EIA. If any compounds are detected, then the compounds are confirmed either quantitatively or qualitatively, depending on the drug.

Approximately how many impaired driving cases involving DRUGS does your laboratory currently analyze each year?

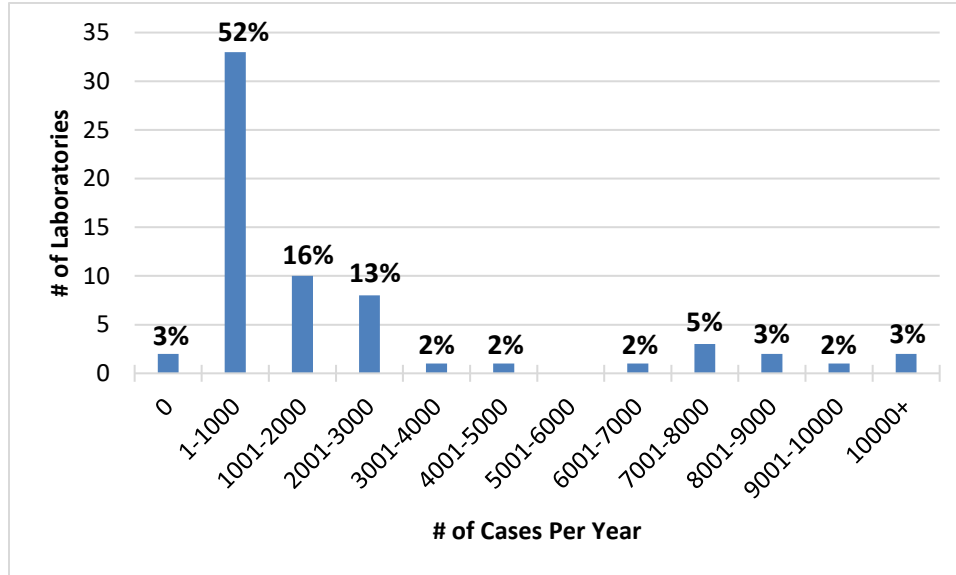


Figure 11. Number of impaired driving cases involving DRUGS each year by laboratory (n = 64).

What is the approximate turnaround time of your laboratory in regard to DRUG analysis?

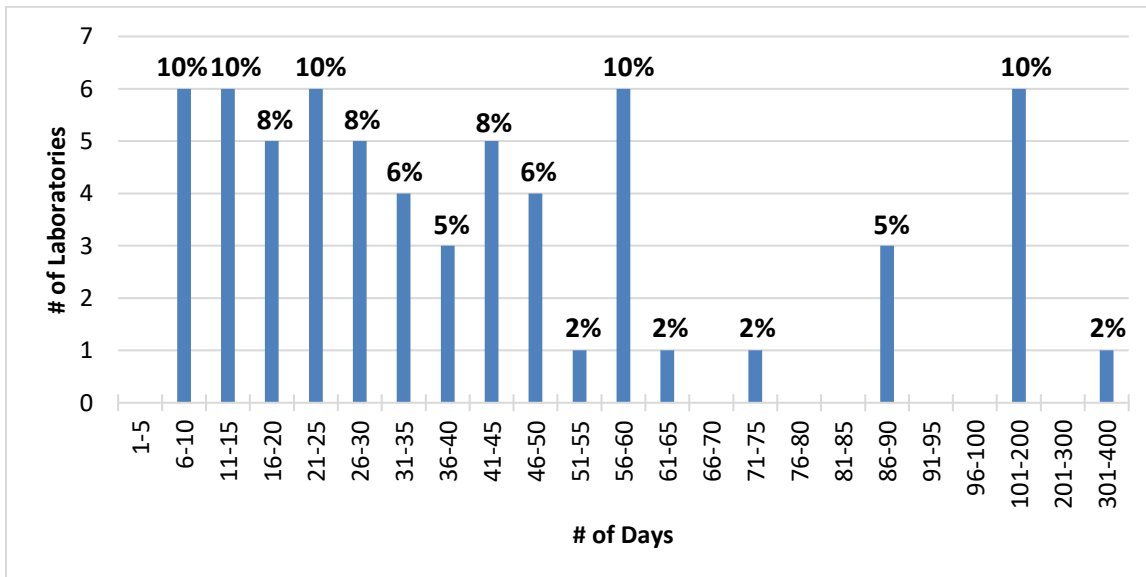


Figure 12. Approximate turnaround times for other drug analysis by laboratory (n = 63).

Approximately how many times each year does your laboratory supply toxicology testimony in impaired driving DRUG cases?

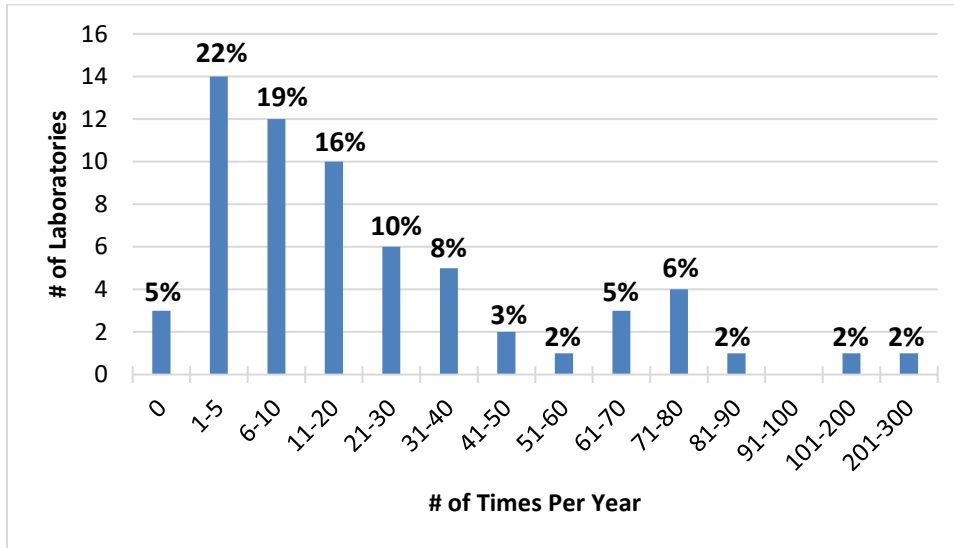


Figure 13. Drug impaired driving testimony requests per year by laboratory (n = 63).

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

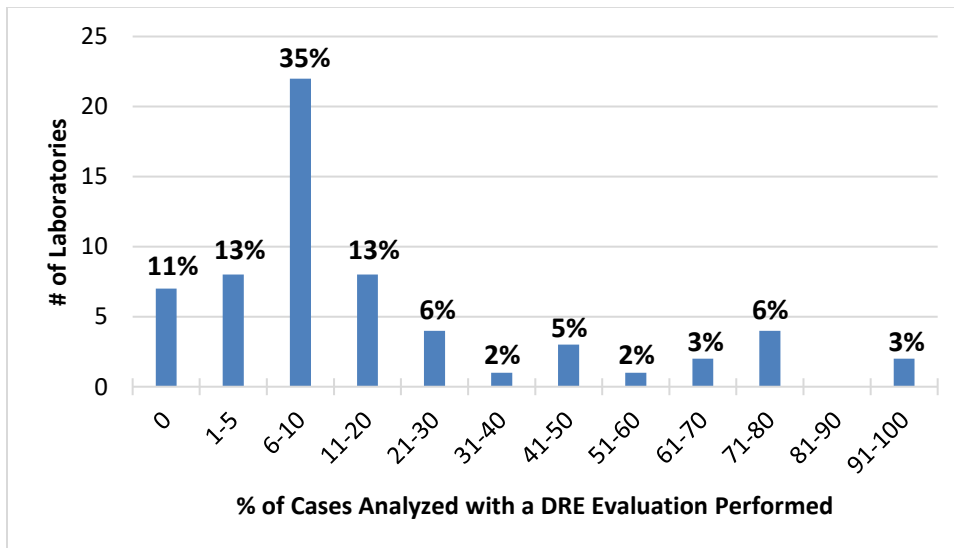


Figure 14. What percentage of all drug-impaired driving cases analyzed by your laboratory have a DRE evaluation performed (n = 62).

The number of cases analyzed for drugs in impaired driving cases ranged from zero to 19,000 per year, with a mean of 2,220 and a median of 820 (Figure 11). The approximate turnaround times for drug testing ranged from six to three hundred and sixty days, with a mean of fifty and a median of thirty-five (Figure 12). Eighty-one percent of laboratories had a turnaround of time of less than or equal to 60 days. The distribution for DUID testimony ranged from zero to two hundred and seventy-eight per year, with a mean of twenty-nine and a median of fifteen (Figure 13). Three laboratories (5%) 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 zero to one hundred percent, with a mean of 22 and a median of 10 (Figure 14). The number of laboratories represented in each data set (n) varies slightly based on the type of data each one collects.

Based on the sixty-two laboratories that track this information, an average of 20% of the 142,582 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. No data were available regarding the impact of DRE involvement on the need for toxicology testimony.

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)?

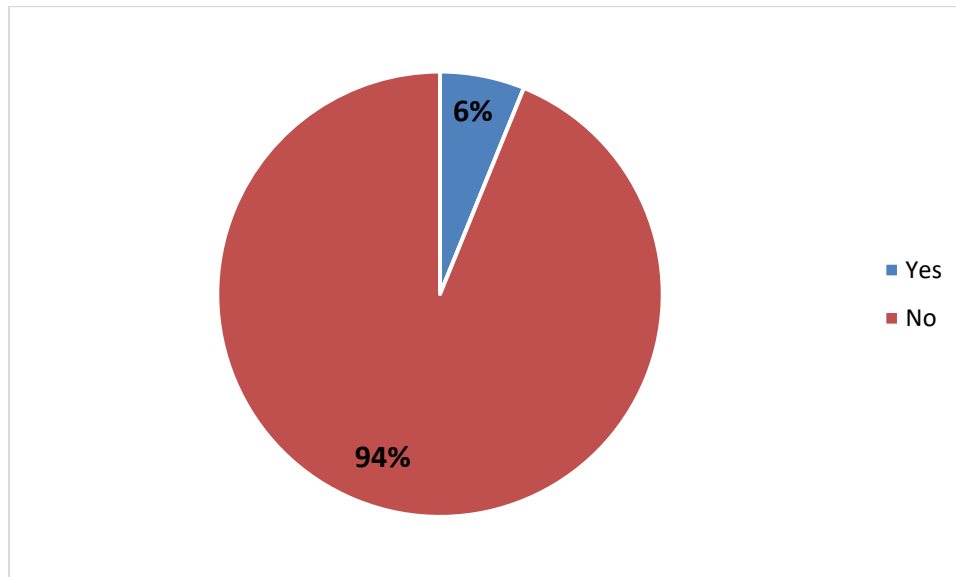


Figure 15. Is there an administrative decision to stop testing if a specific drug is detected at or above a certain concentration (n = 65)?

Four 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 their laboratory stops testing when THC is detected at 1 ng/mL and carboxy-THC is detected at 5 ng/mL. One laboratory stated that their laboratory stops testing when any Schedule I drug or drug enumerated in their state controlled substance statute is present. One laboratory stated that this policy differs for each drug. One laboratory stated that all drugs that are identified in the initial ELISA panel are quantitated. If these drugs are above the minimum levels in the State Bulletin, then no additional testing is performed.

Please indicate which describe your laboratory's scope of impaired driving testing.

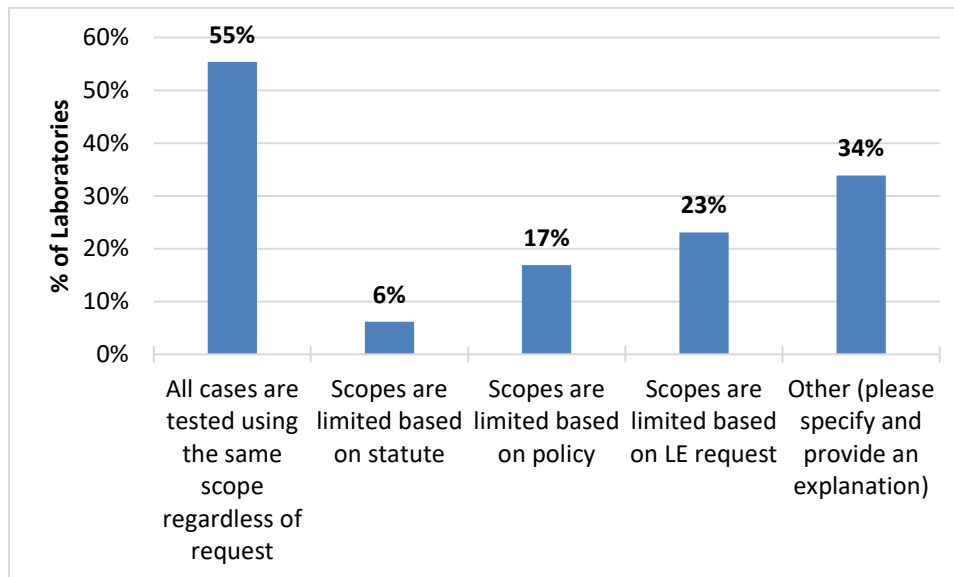


Figure 16. Laboratory's scope of impaired driving testing (n = 65).

Laboratories also had the ability to comment on other reasons for their laboratory's scope of impaired driving testing (twenty-two responses; 34% of the laboratories). Of these twenty-two responses, three laboratories reiterated their answer choices as noted in the graph above.

Eight laboratories stated that additional testing is performed if/when a customer requests further testing.

Four laboratories stated that scope of testing can vary if case history is available for the sample.

One laboratory stated that scope is based on specimen type, and another laboratory stated that scope is based on specimen amount.

Three laboratories stated that scope is based on BAC results. Two of the laboratories stated that drug testing is performed when the BAC is less than or equal to 0.10 g/dL. One laboratory stated that drug testing is performed when the BAC is less than 0.085 g/dL.

One laboratory stated that their state's public health law lists drugs that can be used for prosecution; however, their laboratory does not necessarily limit completely (diphenhydramine and designer drugs are included) but rather targets toward that law.

One laboratory stated that scope is based on whether or not a DRE evaluation is performed. For cases with DRE evaluations performed, their laboratory confirms all drugs belonging to the category called. All drugs not belonging to that category are reported as “indicated” (not confirmed) and have a disclaimer that “indicated” drug results should not be used for prosecution without additional confirmation testing. If a DRE calls depressants, but a depressant is not observed and the sample screens positive for a stimulant, then the stimulant is confirmed. If a depressant is observed, then the depressant will be confirmed, but the stimulant will be reported as “indicated”. All Tier I drugs will be screened as well as some Tier II drugs for DRE cases, but the search is limited to the DRE category called. For cases with no DRE evaluations, their laboratory used to confirm “all relevant drugs” indicated on the laboratory submission form and any visible peaks; however, now their laboratory looks for all Tier I drugs and some Tier II drugs via an ion extraction searching method as described when a DRE evaluation is performed.

Are cases involving deceased drivers handled differently than living drivers?

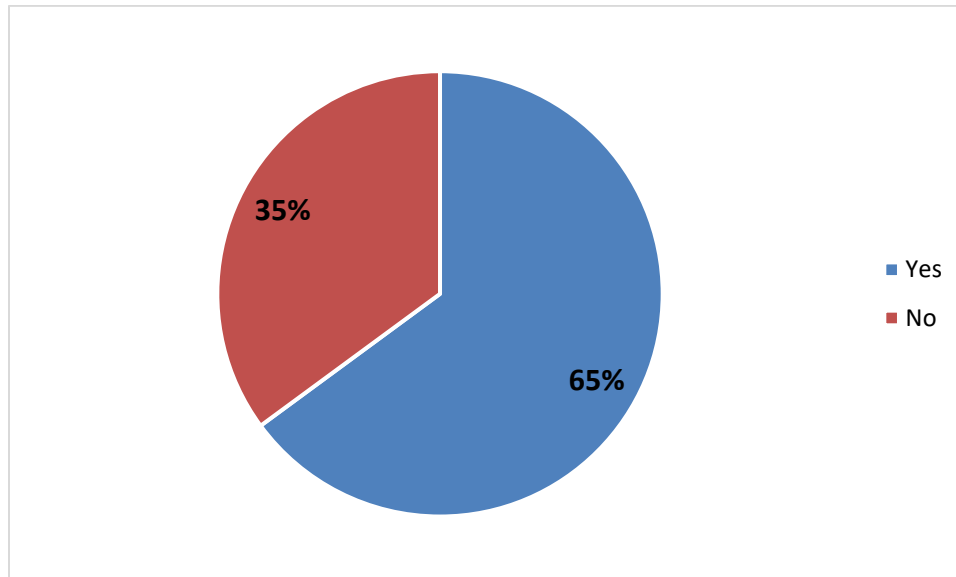


Figure 17. Do laboratories handle impaired driving cases on deceased drivers differently than living drivers (n = 57)?

Laboratories had the ability to comment on how and/or why cases involving deceased drivers are handled differently compared to cases involving living drivers (forty-five responses; 79% of the laboratories). Nineteen laboratories stated that their laboratory uses different screening and confirmation panels for cases, specifying various-sized ELISA panels, alcohol testing, volatile testing, GC-MS testing, LC-MS-MS testing, and LC-QTOF testing involving drugs of abuse, prescription drugs, and others not covered by immunoassay.

Eight laboratories stated that their laboratory uses different specimen types between the two cases. One laboratory stated that the same testing is performed for living and deceased drivers; however, different tissues are used during analysis. Another laboratory stated that there is an increased depth of testing for decedents due to additional specimen types; however, only blood is received for DUID cases. One laboratory stated that urine testing is only performed for deceased drivers. Another laboratory stated that their laboratory only analyzes urine for living drivers suspected of driving under the influence; however, blood and urine are analyzed for the medical examiner and drugs are quantitated in blood in deceased drivers. One laboratory stated that fatality cases may have additional samples such as urine or vitreous fluid submitted to the laboratory.

One laboratory stated that serious bodily injury or fatality cases are expedited. Two laboratories stated that the cutoff differs between cases involving deceased and living drivers.

Two laboratories stated that case history dictates how cases are handled in their laboratory.

Six laboratories stated that client or law enforcement (LE) request can change how a case is handled in their laboratory.

Two laboratories stated that scope differs between the two case types. These scopes range from drugs of abuse to non-impairing drugs to prescription drugs to others not included in immunoassay testing.

Eight laboratories stated that their laboratory does not test deceased drivers. Those cases are forwarded to the Medical Examiner's Office or a reference laboratory for analysis.

Please indicate the specimen(s) tested for each of the following case types.

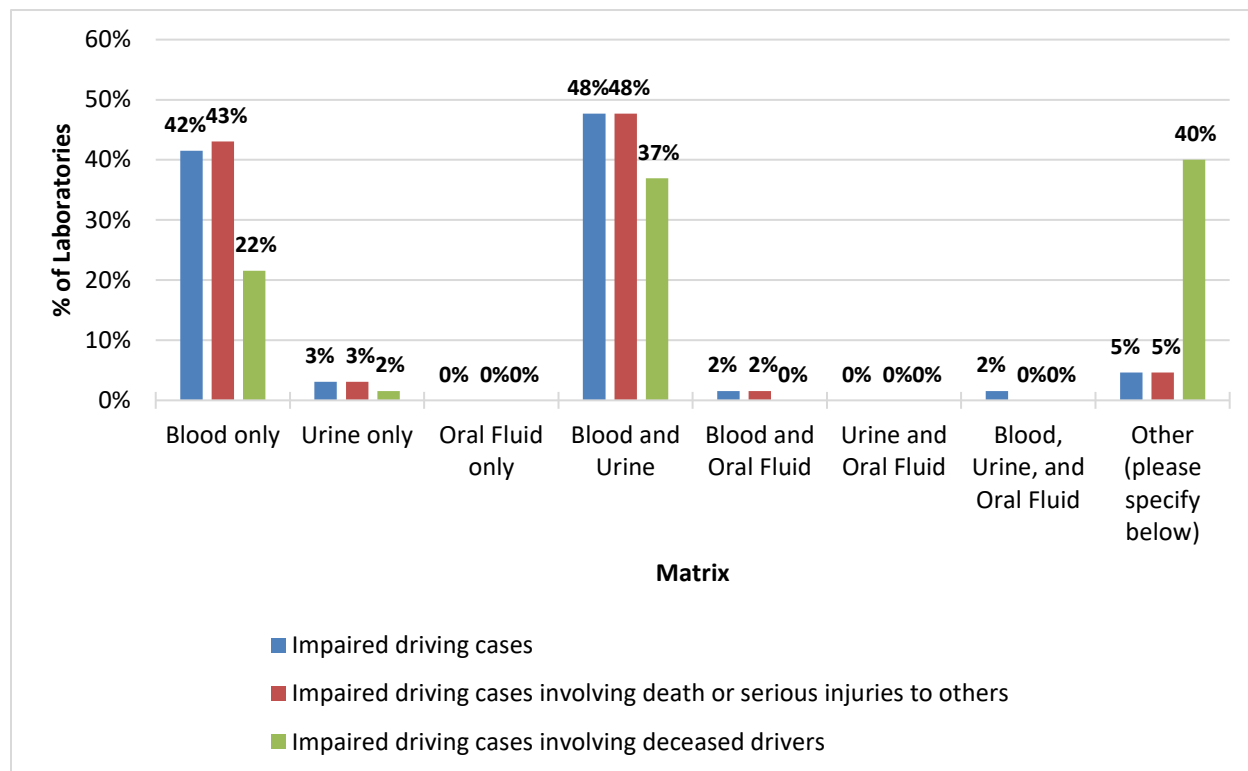


Figure 18. Biological specimen(s) tested for different case types (n = 65).

For the category labeled “Other”, three laboratories (5%) test other specimens for impaired driving cases including blood and breath, three laboratories (5%) for impaired driving cases involving death or serious injuries to others including blood, urine, vitreous fluid, and breath, and twenty-six laboratories (40%) for impaired driving cases involving deceased drivers including blood, urine, liver, gastric fluid, vitreous fluid, brain, breath, and other tissue types, or forwards these cases to the medical examiner’s office for analysis.

Some laboratories provided additional information about when other specimens were selected for cases. One laboratory stated that vitreous fluid is analyzed for volatiles, while vitreous fluid and urine are analyzed for heroin metabolites in their laboratory. One laboratory stated that blood is the only specimen type tested unless only urine is submitted to the laboratory. One laboratory stated that when urine is provided, drug testing is performed only if the driver is deceased. One laboratory stated that blood is preferentially tested in all cases, but if urine is available then it may be used for screening purposes. One laboratory stated that oral fluid tests

are available, and urine and vitreous fluid are often tested in deceased drivers to substantiate findings for drugs such as 6-monoacetylmorphine and ethanol. One laboratory stated that vitreous fluid is tested if the blood is positive for ethanol; further, vitreous fluid and urine are tested if morphine is detected in blood to determine if 6-monoacetylmorphine is present. One laboratory stated that non-felony cases have a choice between testing blood or breath samples; however, their laboratory only tests blood for fatality cases. One laboratory stated that their laboratory may also test vitreous fluid or brain tissue, depending on bodily damage caused in postmortem driving cases. One laboratory stated that a full range of tissues is secured at autopsy for testing.

Laboratory Methods

Please indicate what methods are routinely used for drug SCREENING in DUID/traffic fatality testing:

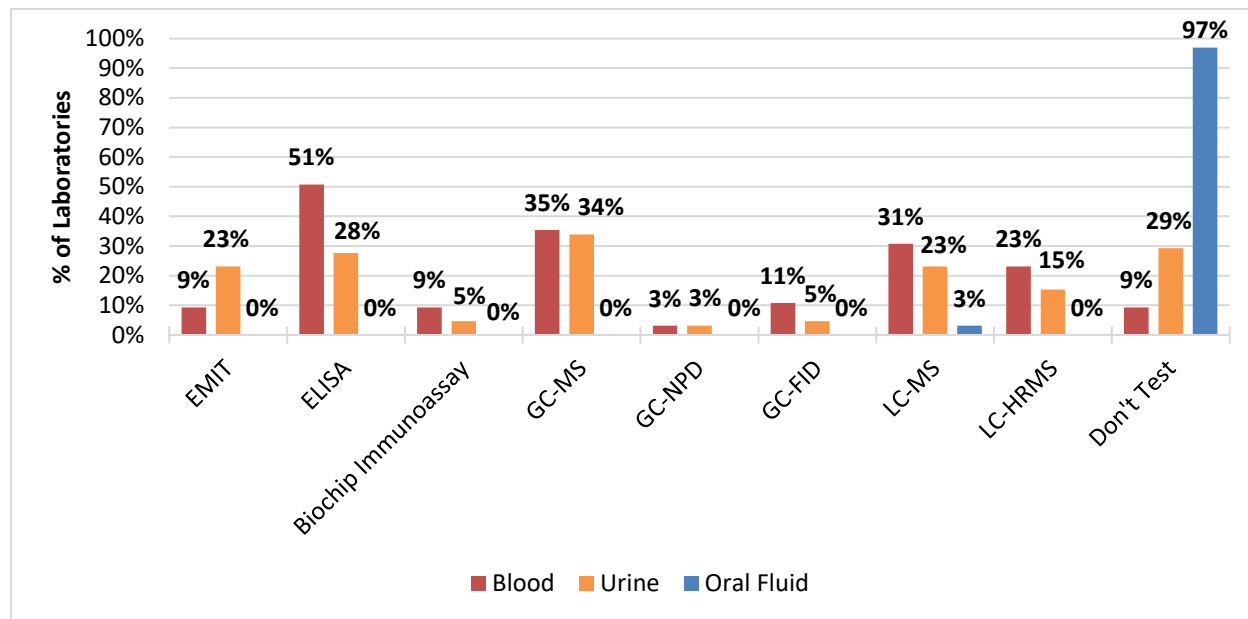


Figure 19. Analytical methods routinely used for drug screening in DUID/traffic fatality testing (n = 65)⁴.

Sixty-five laboratories responded to this question. As multiple methods could be selected, a total of 118 selections were made to which methods are used for screening blood samples, 107 selections for screening urine samples, and 65 selections for screening oral fluid samples (Figure 19).

Laboratories also had the ability to comment on other methods routinely used for drug screening in DUID/traffic fatality testing (five laboratories; 8%). One laboratory stated that their laboratory is validated for oral fluid but statute does not currently allow for collection. One laboratory stated that their laboratory does not test samples when a driver is deceased, but rather sends those samples to the Medical Examiner. One laboratory stated that their laboratory rarely receives urine samples for DUI/DUID casework. One laboratory stated that their laboratory uses HPLC for screening. One laboratory stated that their laboratory uses LC-MS-MS (Q-Trap) not just LC-MS.

⁴ LC-HRMS includes HR TRAP, TOF, and QTOF.

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

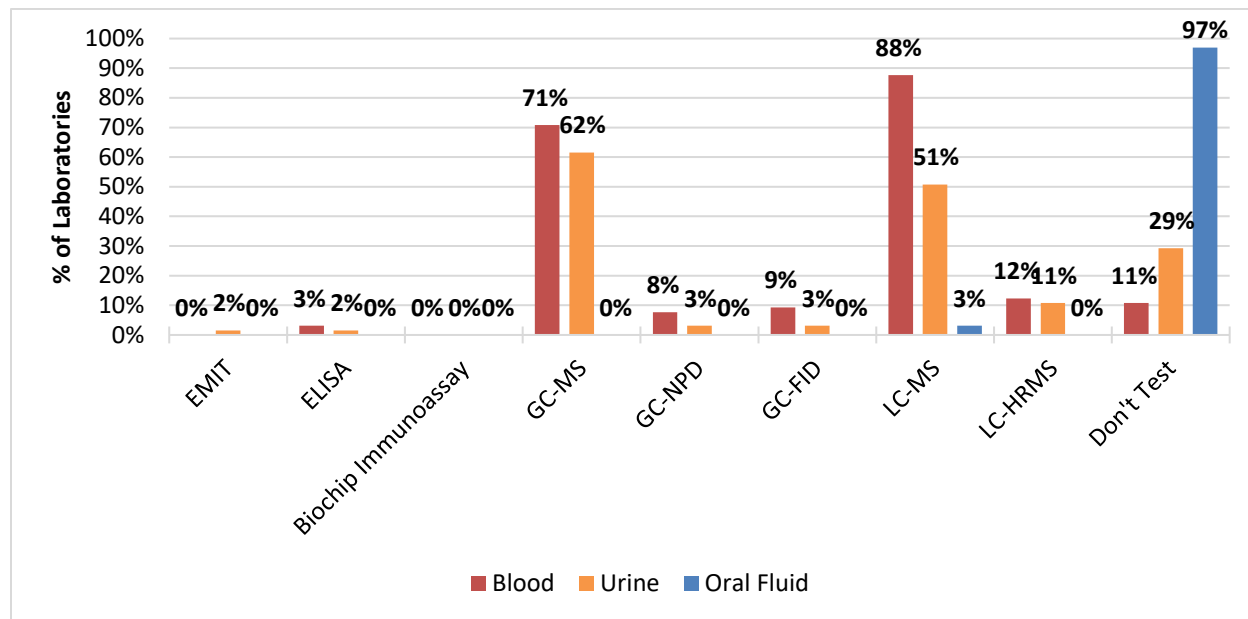


Figure 20. Analytical methods routinely used for drug confirmation in DUID/traffic fatality testing (n = 65)⁵.

Sixty-five laboratories responded to this question. As multiple methods could be selected, a total of 131 selections were made to which methods are used for confirming blood samples, 105 selections for confirming urine samples, and 65 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 (six laboratories; 9%). One laboratory stated that their laboratory uses GC-FID/NPD for quantitation only with confirmation done with GC-MS. One laboratory stated that their laboratory does not test samples when a driver is deceased, but rather sends those samples to the Medical Examiner. One laboratory stated that their laboratory rarely receives urine samples. One laboratory stated that their laboratory uses HPLC for confirmation. One laboratory stated that their laboratory uses LC-MS-MS (Q-Trap), not just LC-MS. One laboratory stated that their laboratory currently outsources their drug confirmation.

⁵ LC-HRMS includes HR TRAP, TOF, and QTOF.

Does your laboratory report unconfirmed screening results?

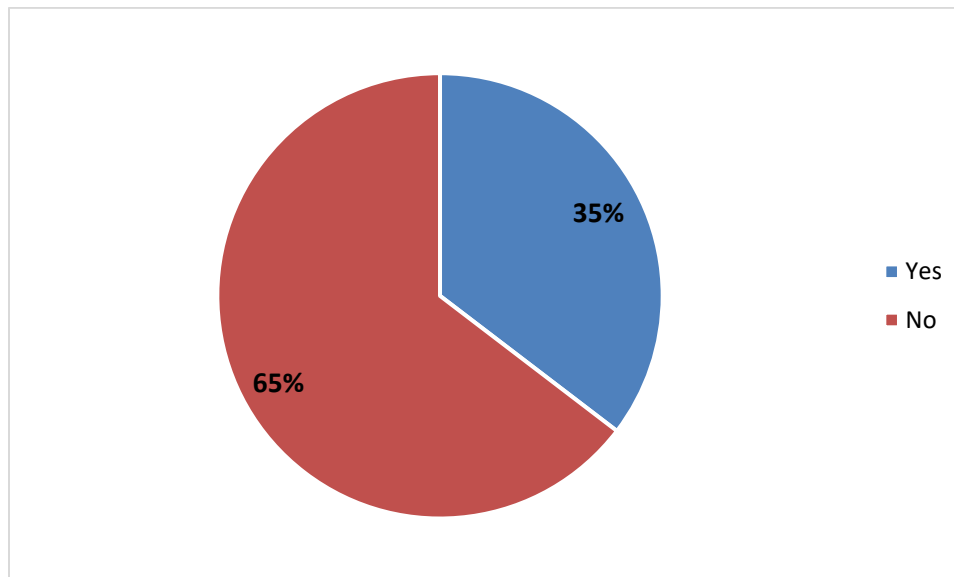


Figure 21. Laboratories reporting unconfirmed screening results (n = 65).

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 twenty-three free text responses, five laboratories stated that unconfirmed screen results are reported only for over-the-counter medications or non-impairing substances such as antibiotics, acetaminophen, NSAIDs, lidocaine, and caffeine.

Five laboratories stated that unconfirmed screen results are reported out to the client, but accompanied with a disclaimer such as “this drug has not been confirmed by an alternative analytical method”, “screening test was positive but confirmatory test did not confirm drug(s)”, or “screening test was positive but insufficient sample was present for confirmatory testing”. One of the laboratories stated that additional testing may not be pursued due to the presence of other compounds; however, a statement is included in the report stating “preliminary testing indicated the possible presence of (insert drug name here), not pursued due to the presence of other compounds”.

Four laboratories stated that they issue a report for presumptive positive results, but the report states that confirmation testing is being outsourced to another laboratory.

Six laboratories stated that their laboratory reports presumptive positive results and cannot pursue confirmation testing unless requested by the client. One of the laboratories stated that this only applies to urine samples in their laboratory. Two of the laboratories stated that confirmation testing is required for these samples if there is an appearance at trial. One of the laboratories stated that their state uses screen results to determine if charges will be filed following an arrest. One of the laboratories stated that drugs/drug categories are reported as “not identified” based on screen results.

Three laboratories stated that unconfirmed screen results are reported and not confirmed. One of the laboratories stated that some benzodiazepine screens are reported positive and not confirmed in their laboratory. One of the laboratories stated that only postmortem cases can be reported as detected and unconfirmed in their laboratory.

Drug Analysis – BLOOD

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

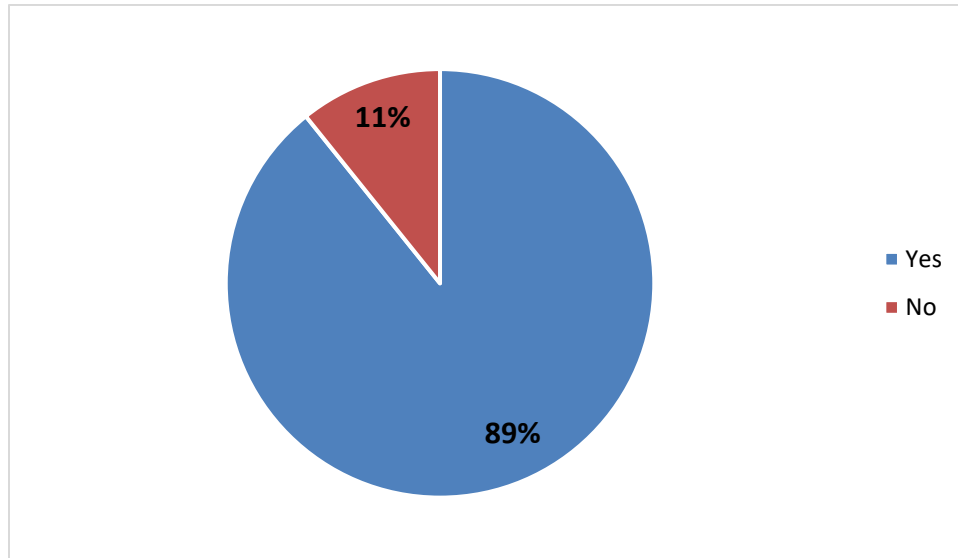


Figure 22. Laboratories providing BLOOD analytical services (screening or confirmation) for DUID/traffic fatality samples (n = 65).

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

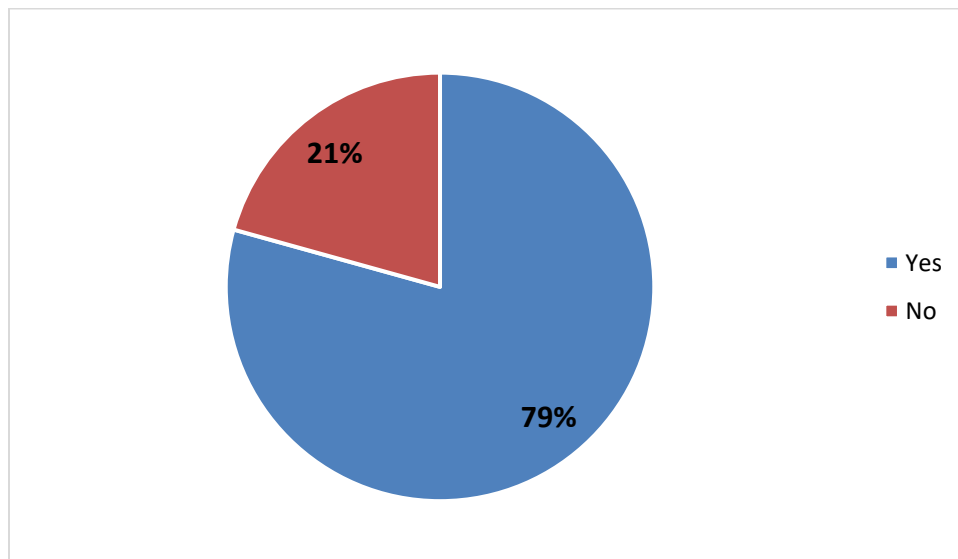


Figure 23. Are drug testing services (drug menu and sensitivities) identical for DUID and traffic fatality cases (n = 57)?

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 eleven free text responses, three laboratories stated that the samples goes through an additional screening method for a traffic fatality case, such as a GC-MS screen in addition to an ELISA screen, or an LC-MS-MS screen in addition to a GC-MS screen.

Five laboratories indicated that there are different testing scopes and cutoffs for a DUID case versus a traffic fatality case.

Two laboratories stated that testing is determined by client request.

One laboratory stated that their laboratory does not perform postmortem testing.

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)

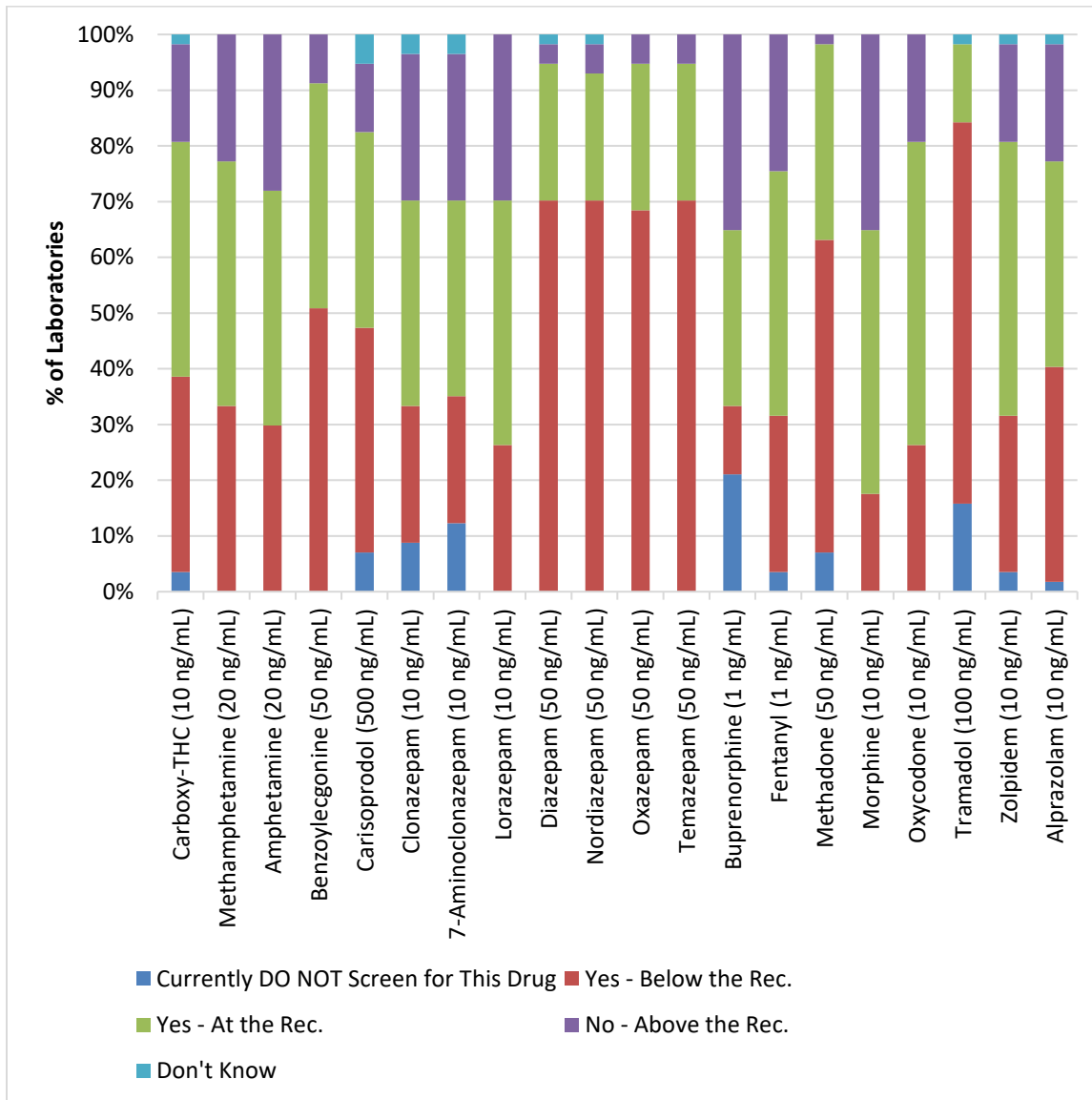


Figure 24. Do laboratories currently meet the guideline recommendations for screening each drug in blood at the recommended cutoffs (n = 57)⁶?

⁶ As a disclaimer, one participant’s answers to Drug Analysis – Blood – Screening and Drug Analysis – Blood – Confirmation were omitted due to misinterpretation of the question.

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
Cannabis			
Carboxy-THC	54	95%	81%
CNS Stimulants			
Methamphetamine	57	100%	77%
Amphetamine	57	100%	72%
Benzoylcegonine	57	100%	91%
CNS Depressants			
Carisoprodol	50	88%	86%
Clonazepam	50	88%	70%
7-aminoclonazepam	48	84%	69%
Lorazepam	57	100%	70%
Diazepam	56	98%	96%
Nordiazepam	56	98%	95%
Oxazepam	57	100%	95%
Temazepam	57	100%	95%
Zolpidem	54	95%	81%
Alprazolam	55	96%	78%
Narcotic Analgesics			
Buprenorphine	45	79%	56%
Fentanyl	55	96%	75%
Methadone	53	93%	98%
Morphine	57	100%	65%
Oxycodone	57	100%	81%
Tramadol	47	82%	100%

Table 4. 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.

Cannabis

For **carboxy-THC** at the recommended screening cutoff of 10 ng/mL, 35% 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 81% 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, 3% do not test for this drug, and 2% do not know if their laboratory meets the guideline recommendation.

CNS Stimulants

For **methamphetamine** at the recommended screening cutoff of 20 ng/mL, 33% 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 77% 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.

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 42% 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.

For **benzoylecgonine** at the recommended screening cutoff of 50 ng/mL, 51% 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 91% 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.

CNS Depressants

For **carisoprodol** at the recommended screening cutoff of 500 ng/mL, 41% 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 86% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 7% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **clonazepam** at the recommended screening cutoff of 10 ng/mL, 25% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 37% 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 70% 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, 9% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** 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 35% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 69% 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, 12% do not test for this drug, and 4% do not know if they meet the guideline recommendation.

For **lorazepam** 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 44% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 70% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 30% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

For **diazepam** at the recommended screening cutoff of 50 ng/mL, 70% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 25% 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 3% 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 **nordiazepam** at the recommended screening cutoff of 50 ng/mL, 70% 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 95% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 5% 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 **oxazepam** at the recommended screening cutoff of 50 ng/mL, 69% 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 95% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 5% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

For **temazepam** at the recommended screening cutoff of 50 ng/mL, 70% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 25% 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 5% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

For **zolpidem** at the recommended screening cutoff of 10 ng/mL, 28% 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 81% 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, 4% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

For **alprazolam** 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 37% 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 21% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 2% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

Narcotic Analgesics

For **buprenorphine** at the recommended screening cutoff of 1 ng/mL, 12% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 32% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 56% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 35% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, and 21% do not test for this drug.

For **fentanyl** at the recommended screening cutoff of 1 ng/mL, 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 75% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 25% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, and 3% do not test for this drug.

For **methadone** at the recommended screening cutoff of 50 ng/mL, 56% 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 98% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 2% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, and 7% do not test for this drug.

For **morphine** 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 47% 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 35% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

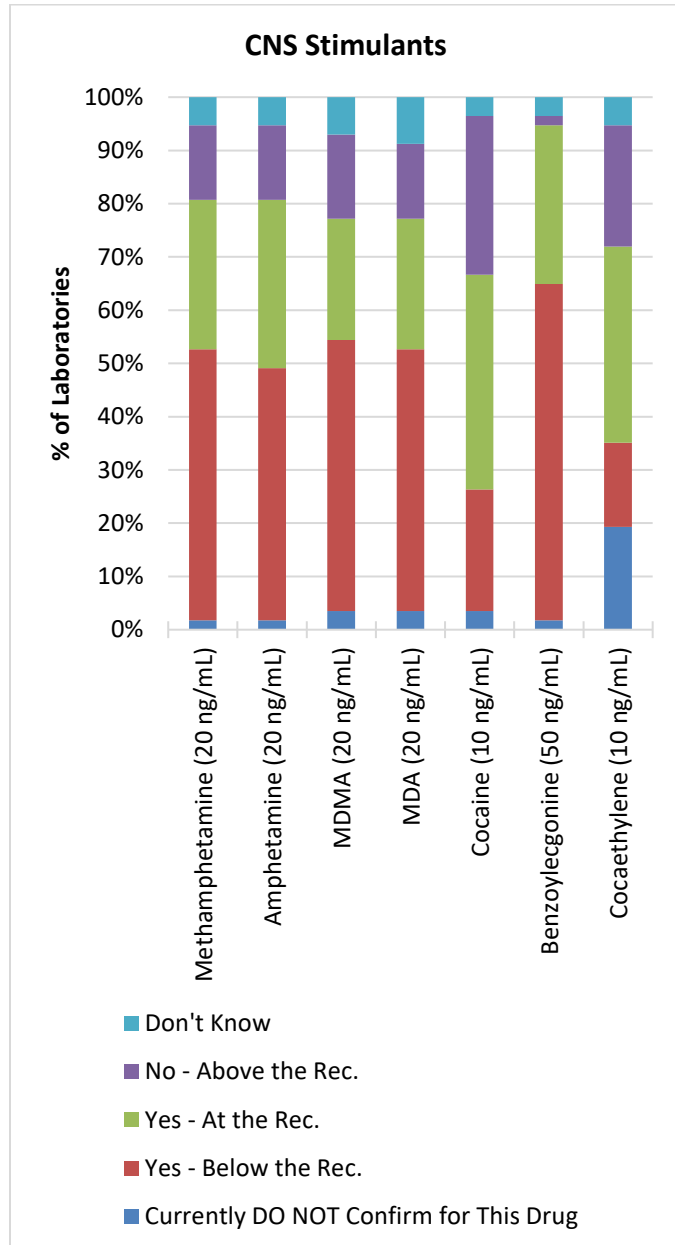
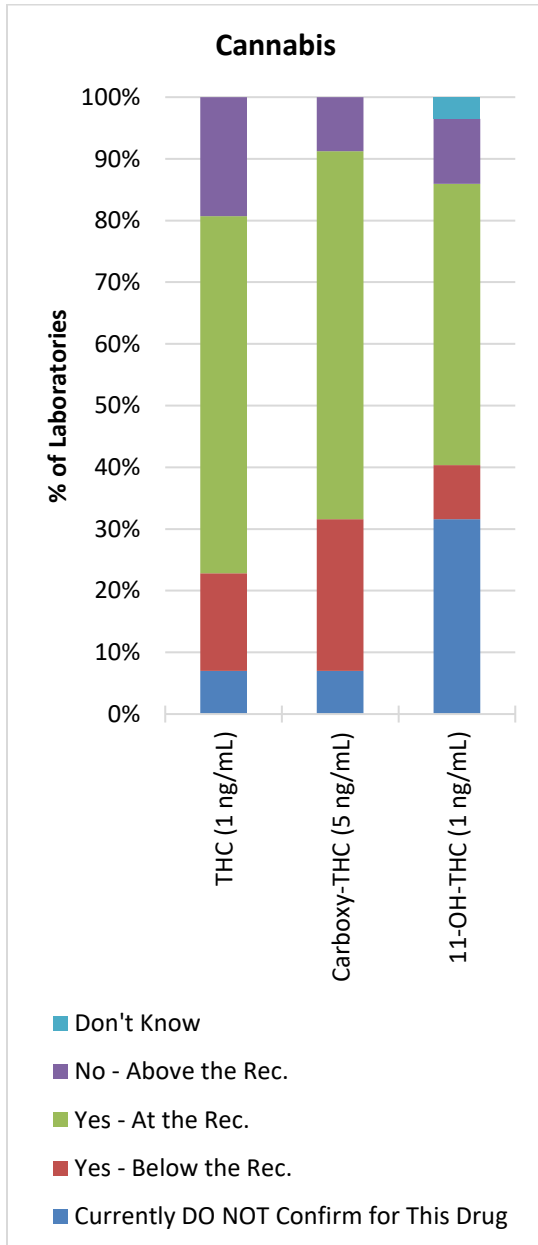
For **oxycodone** at the recommended screening cutoff of 10 ng/mL, 26% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 55% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 81% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 19% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

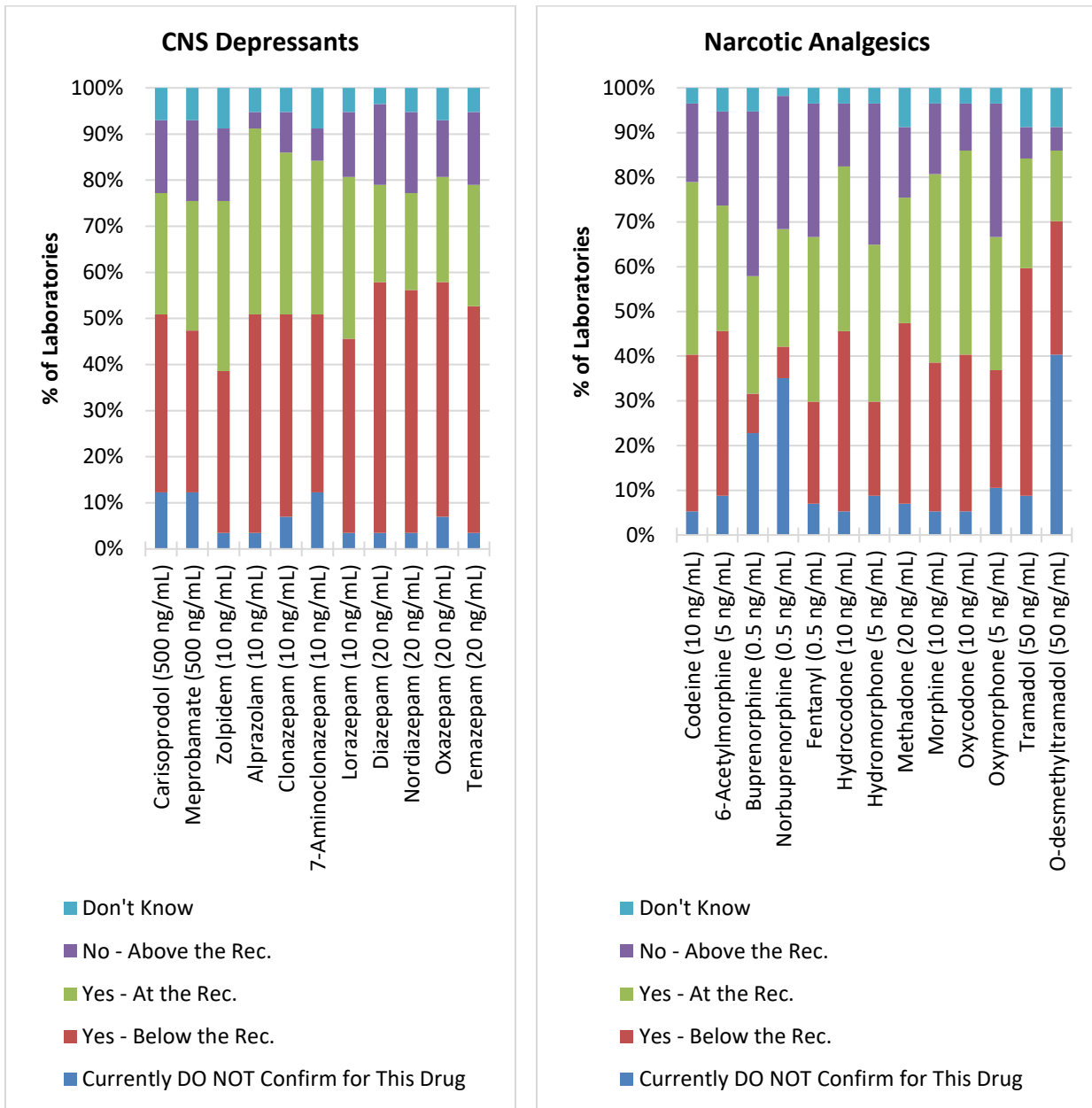
For **tramadol** at the recommended screening cutoff of 100 ng/mL, 68% of laboratories reported meeting the guideline recommendation by being below the recommended screening

cutoff, and 14% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 100% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 16% of laboratories reported that they do not test for this drug, and 2% do not know if they meet the guideline recommendation.

Overall, **diazepam, nordiazepam, and temazepam** were the most frequently reported (70%) drugs in this set for meeting the guideline recommendation by being below the recommended screening cutoff. **Oxycodone** was the most frequently reported (55%) drug in this set for meeting the guideline recommendation by being at the recommended screening cutoff. **Buprenorphine** and **morphine** were the most frequently reported (35%) drugs in this set for not meeting the guideline recommendation by being above the recommended screening cutoff. **Methamphetamine, amphetamine, benzoylecgonine, lorazepam, oxazepam, temazepam, morphine, and oxycodone** were reported as always being tested.

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 25-28. Do laboratories currently meet the guideline recommendations for confirming each drug in blood at the recommended cutoffs (n = 57)?

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
Cannabis			
THC	53	93%	79%
Carboxy-THC	53	93%	91%
11-OH-THC	57	65%	84%
CNS Stimulants			
Methamphetamine	53	93%	85%
Amphetamine	53	93%	85%
MDMA	51	89%	82%
MDA	50	88%	84%
Cocaine	53	93%	68%
Benzoyllecgonine	54	95%	98%
Cocaethylene	43	75%	70%
CNS Depressants			
Carisoprodol	46	81%	80%
Meprobamate	46	81%	78%
Zolpidem	50	88%	82%
Alprazolam	52	91%	96%
Clonazepam	50	88%	90%
7-aminoclonazepam	45	79%	91%
Lorazepam	52	91%	85%
Diazepam	53	93%	81%
Nordiazepam	52	91%	81%
Oxazepam	49	86%	86%
Temazepam	52	91%	83%
Narcotic Analgesics			
Codeine	52	91%	81%
6-acetylmorphine	49	86%	76%
Buprenorphine	41	72%	49%
Norbuprenorphine	36	63%	53%
Fentanyl	51	89%	67%
Hydrocodone	52	91%	85%

Hydromorphone	50	88%	64%
Methadone	48	84%	81%
Morphine	52	91%	83%
Oxycodone	52	91%	88%
Oxymorphone	49	86%	65%
Tramadol	47	82%	91%
O-desmethyltramadol	29	51%	90%

Table 5. 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.

Cannabis

For **THC** at the recommended confirmation cutoff of 1 ng/mL, 16% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 58% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 79% 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, and 7% do not test for this drug.

For **carboxy-THC** at the recommended confirmation cutoff of 5 ng/mL, 24% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 60% 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 9% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, and 7% do not test for this drug.

For **11-OH-THC** at the recommended confirmation cutoff of 1 ng/mL, 9% 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 84% 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, 32% do not test for this drug, and 3% 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 28% 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 85% 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, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **amphetamine** at the recommended confirmation cutoff of 20 ng/mL, 47% of laboratories reported meeting the guideline recommendation by being below the recommended

confirmation cutoff, and 32% 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 14% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **MDMA** 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 23% 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 16% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **MDA** at the recommended confirmation cutoff of 20 ng/mL, 49% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 25% are at the recommended confirmation 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 confirmation cutoff. A total of 14% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% 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 10 ng/mL, 23% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 40% are at the recommended confirmation 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 confirmation cutoff. A total of 30% 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 **benzoylecgonine** 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 30% 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, 2% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **cocaethylene** at the recommended confirmation cutoff of 10 ng/mL, 16% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 37% 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 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, 19% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

CNS Depressants

For **carisoprodol** at the recommended confirmation cutoff of 500 ng/mL, 39% 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 80% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 16% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 12% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **meprobamate** at the recommended confirmation cutoff of 500 ng/mL, 35% 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 78% 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, 12% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **zolpidem** at the recommended confirmation cutoff of 10 ng/mL, 35% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 37% 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 16% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **alprazolam** at the recommended confirmation cutoff of 10 ng/mL, 47% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 40% 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, 4% do not test for this drug, and 5% 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 35% 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, 7% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** at the recommended confirmation cutoff of 10 ng/mL, 39% 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 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, 12% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

For **lorazepam** at the recommended confirmation cutoff of 10 ng/mL, 42% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 35% 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 14% 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, 54% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 21% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 81% 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, 4% 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, 53% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 21% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 81% 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, 3% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **oxazepam** 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 23% 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 12% 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 **temazepam** at the recommended confirmation cutoff of 20 ng/mL, 49% 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 83% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 16% 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.

Narcotic Analgesics

For **codeine** at the recommended confirmation cutoff of 10 ng/mL, 35% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 39% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 81% 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, 5% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **6-acetylmorphine** at the recommended confirmation cutoff of 5 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 76% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 21% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **buprenorphine** at the recommended confirmation cutoff of 0.5 ng/mL, 9% 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 49% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 37% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 23% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **norbuprenorphine** at the recommended confirmation cutoff of 0.5 ng/mL, 7% 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 53% 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, 35% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

For **fentanyl** at the recommended confirmation cutoff of 0.5 ng/mL, 23% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 37% 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, 7% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **hydrocodone** 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 37% 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 14% 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 **hydromorphone** at the recommended confirmation cutoff of 5 ng/mL, 21% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 35% are at the recommended confirmation 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 confirmation cutoff. A total of 32% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 9% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **methadone** at the recommended confirmation cutoff of 20 ng/mL, 40% 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 81% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 16% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 7% 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 10 ng/mL, 33% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 42% 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 16% 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 **oxycodone** at the recommended confirmation cutoff of 10 ng/mL, 35% 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 88% reported meeting the guideline

recommendation by being either below or at the recommended confirmation cutoff. A total of 11% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 5% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **oxymorphone** at the recommended confirmation cutoff of 5 ng/mL, 26% 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 65% 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, 11% do not test for this drug, and 3% do not know if they meet the guideline recommendation.

For **tramadol** at the recommended confirmation cutoff of 50 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 25% 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, 9% do not test for this drug, and 8% do not know if they meet the guideline recommendation.

For **O-desmethyltramadol** at the recommended confirmation cutoff of 50 ng/mL, 30% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 16% 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 5% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 40% do not test for this drug, and 9% do not know if they meet the guideline recommendation.

Overall, **benzoylecgonine** was the most frequently reported (63%) drug in this set for meeting the guideline recommendation by being below the recommended confirmation cutoff. **Carboxy-THC** was the most frequently reported (60%) drug in this set for meeting the guideline recommendation by being at the recommended confirmation cutoff. **Buprenorphine** was the most frequently reported (37%) drug in this set for not meeting the guideline recommendation by being above the recommended confirmation cutoff. All compounds from this set had at least one laboratory report that they do not test for this drug.

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

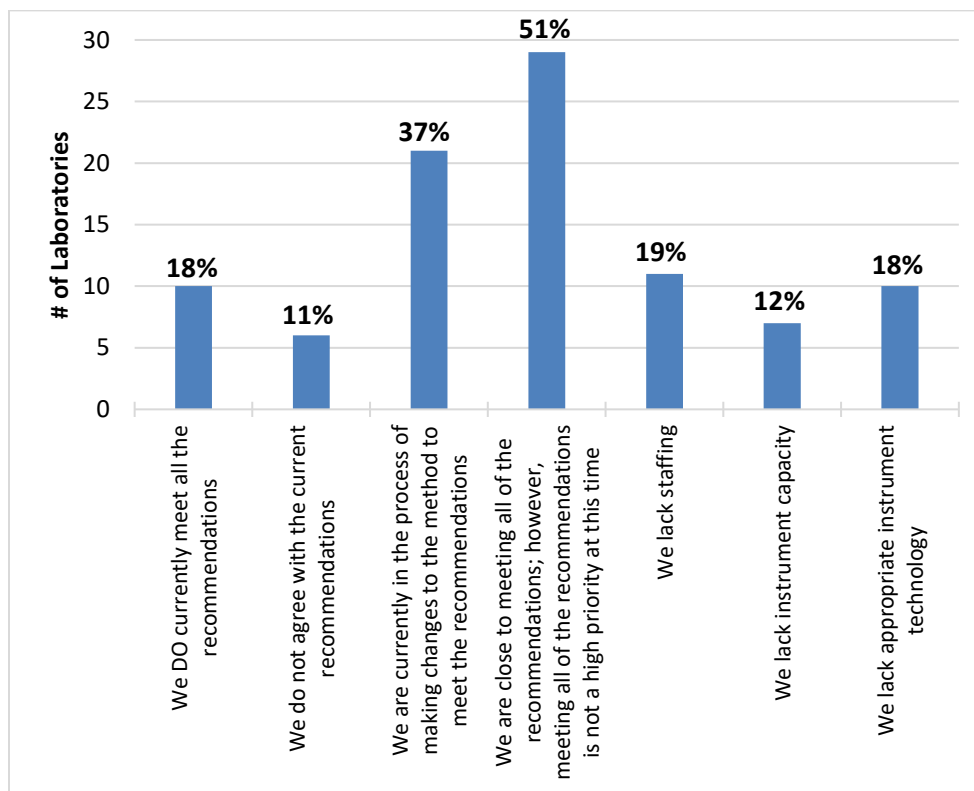


Figure 29. Reasons why laboratories do not currently meet the screening recommendations in blood samples (n = 57).

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 (twenty-five laboratories; 44%). One laboratory stated that their laboratory is changing their methods to meet the recommendations, but is unsure if the instrument technology can meet such cutoffs.

One laboratory stated that their laboratory is waiting for the OSAC/ASB guidelines to be published, and will proceed with those rather than the NSC’s guidelines and recommendations.

Three laboratories stated that their laboratories do not meet the recommendations because they do not test for all compounds listed or outsource testing for some compounds.

Four laboratories stated that they are in the process of changing their methods due to implementation of new technology in their laboratory.

Eight laboratories reiterated that their laboratories are close to meeting all of the recommendations and are in the process of changing their methods to meet the recommendations.

Thirteen laboratories stated that their laboratory is close to meeting all of the recommendations; however, they cannot change their current methods at this time. Reasons included a lack of time, money, and staffing, belief that current methods are fit for purpose after not being able to achieve the recommended cutoff following extensive method development, and desire to expand testing in other areas rather than lower cutoffs. One laboratory explained that their laboratory runs a targeted multi-drug quantitation and LC-MS-QTOF screen concurrently for all samples; the targeted LC-MS quantitation method meets the recommendations where the QTOF lacks sensitivity. Another laboratory stated that Clonazepam and 7-Aminoclonazepam are almost always detected together and their laboratory does not feel like setting the reporting limit for each compound to 10 ng/mL is necessary. Further, their laboratory cannot accommodate running three additional plates for low-dose benzodiazepines. One laboratory expressed that their laboratory is a postmortem toxicology laboratory forced to perform DUI/DUID/DFC testing without funding in addition to their normal ME casework; therefore, without consideration or accommodation, there has already been a loss of time and productivity resulting from excessive time required for less than 20% of the caseload, while trying to maintain turnaround time and postmortem casework. Another laboratory stated that although laboratory's cutoffs for some benzodiazepines are higher than the recommendations, they are flagged if they are between the low and positive cutoff and sent for quantitation. One laboratory expressed that it is not worth their laboratory's time and effort to redo method validation to meet the screening cutoff for fentanyl for 0.25 ng/mL difference. Similarly, another laboratory stated that their laboratory screens for fentanyl using the Biochip Immunoassay method at a higher cutoff; however, it is not a high priority to revalidate the method since all samples causing any elevation in the assay are forwarded for additional LC-MS-MS testing with a method that achieves a lower cutoff than the recommendations. Another laboratory stated that their laboratory's current LC-MS-MS screening method for buprenorphine can detect between 1-2 ng/mL, but the confirmation method is more sensitive and can detect below 1 ng/mL. Further, their laboratory's immunoassay screening cutoff for morphine is 20 ng/mL and does not believe this will change in the foreseeable future.

One laboratory stated that some screening cutoffs are not possible to achieve with immunoassay, especially if validating to conform with ASB 036.

One laboratory stated that their laboratory does not agree with the current recommendations for THC and metabolites stating they are too high.

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

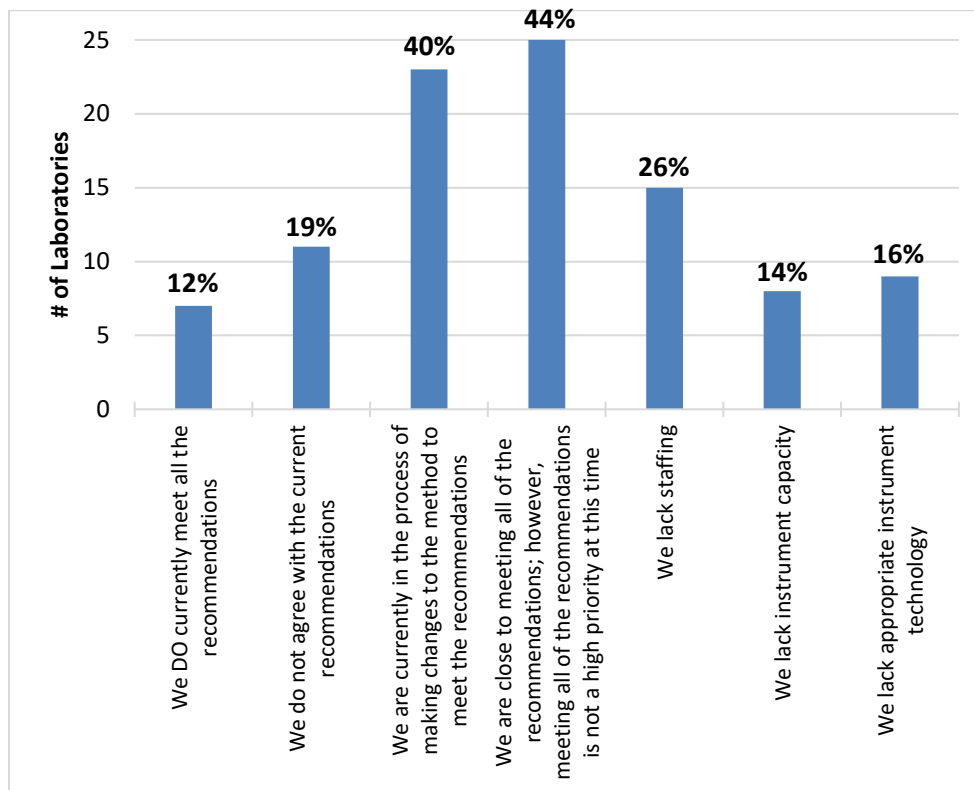


Figure 30. Reasons why laboratories do not currently meet the confirmation recommendations in blood samples (n = 57).

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 (twenty-three laboratories; 40%). One laboratory stated that their laboratory is waiting for the OSAC/ASB guidelines to be published, and will proceed with those rather than the NSC’s guidelines and recommendations.

Three laboratories stated that their laboratories do not meet the recommendations because they do not test for all compounds listed or outsource testing for some compounds. One laboratory stated that their laboratory outsources confirmation testing for several analytes to another laboratory and does not plan on providing any in-house testing for those analytes in the near future.

Four laboratories stated that they are in the process of changing their methods due to implementation of new technology in their laboratory.

Five laboratories reiterated that their laboratories are close to meeting all of the recommendations and are in the process of changing their methods to meet the recommendations.

Twelve laboratories stated that their laboratory is close to meeting all of the recommendations; however, they cannot change their current methods at this time. Reasons included a lack of time, money, and staffing, belief that current methods are fit for purpose after not being able to achieve the recommended cutoff following extensive method development, and desire to expand testing in other areas rather than lower cutoffs. One laboratory expressed that their laboratory is a postmortem toxicology laboratory forced to perform DUI/DUID/DFC testing without funding in addition to their normal ME casework; therefore, without consideration or accommodation, there has already been a loss of time and productivity resulting from excessive time required for less than 20% of the caseload, while trying to maintain turnaround time and postmortem casework. Two laboratories expressed that it is not worth their laboratory's time and effort to redo method validation to meet a cutoff for 5 ng/mL difference or less, nor does it make much of a difference when trying to determine impairment levels of these drugs. One laboratory stated that while their laboratory uses the same confirmatory method for drug-impaired driving cases and postmortem death investigations, the laboratory has established a quantitative range that strikes the best operational balance while falling within +/- 20% of the recommendations; however, should the laboratory adjust cutoffs to meet the recommendations, the postmortem cases would likely exceed that quantitative range and need repeat analysis. Another laboratory stated that their laboratory will adjust their limit of quantitation when the state starts seeing lower levels. One laboratory stated that their laboratory's thresholds for fentanyl and buprenorphine/norbuprenorphine are at 1 ng/mL rather than the recommendation of 0.5 ng/mL; however, the laboratory feels this threshold is sufficient. Similarly, another laboratory stated that changing their laboratory's cutoffs for fentanyl and buprenorphine does not fit into the laboratory's testing schematic without taking away time and resources from higher priority items. Two laboratories stated that they cannot achieve a reliable quantitation for fentanyl, buprenorphine, and norbuprenorphine at a cutoff of less than 1 ng/mL. Another laboratory stated that their laboratory does not test for O-desmethyltramadol, and it is not a priority to do so since there are significant levels of tramadol in most, if not all DUID cases.

Two laboratories stated that their laboratory does not agree with the current recommendations. One of the laboratories stated that the recommendations for THC and metabolites are too low. The other laboratory stated that their laboratory does not agree with the recommendations for meprobamate, carisoprodol, oxymorphone, and hydromorphone.

Five laboratories stated that their laboratory reports qualitative results for confirmation testing for some or most compounds. One laboratory stated that their laboratory has not established limits of detections for most analytes; however, the laboratory is in the process of adding methods for quantitative results where limits of detection will be established for those drugs reported with a quantitative value. Another laboratory stated that their laboratory only quantitates cannabinoids.

Drug Analysis – URINE

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

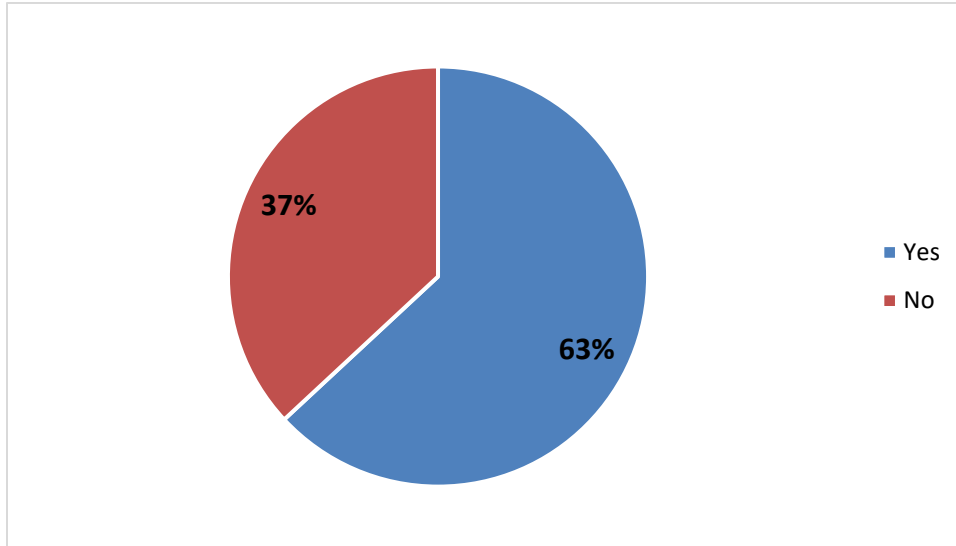


Figure 31. Does the laboratory provide analytical services (screening or confirmation) for urine in DUID samples (n = 65)?

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

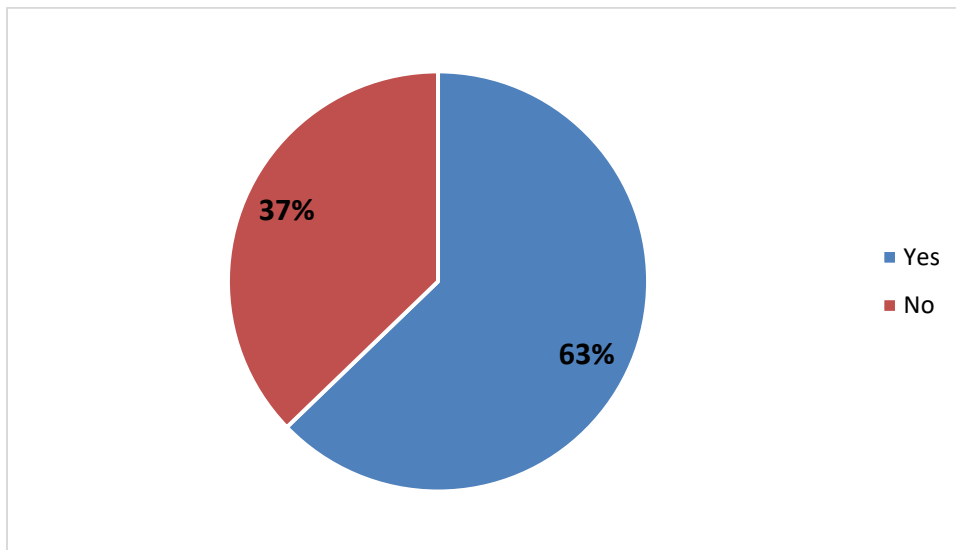


Figure 32. Are the drug testing services (drug menu and sensitivities) identical for DUID and traffic fatality cases (n = 43)?

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. According to the fifteen free text responses, seven laboratories (47%) stated that the samples goes through an additional screening method for a traffic fatality case, such as a GC-MS screen in addition to an ELISA screen, or an LC-MS-MS screen in addition to a GC-MS screen. Three laboratories indicated that there are different test scopes and cutoffs for a DUID case versus a traffic fatality case. One laboratory stated that testing is determined by client request. Three laboratories stated that their laboratory does not perform postmortem testing. One laboratory stated that urine is rarely tested for DUID cases when blood is also sent to the laboratory.

Does your laboratory quantitate drugs in URINE?

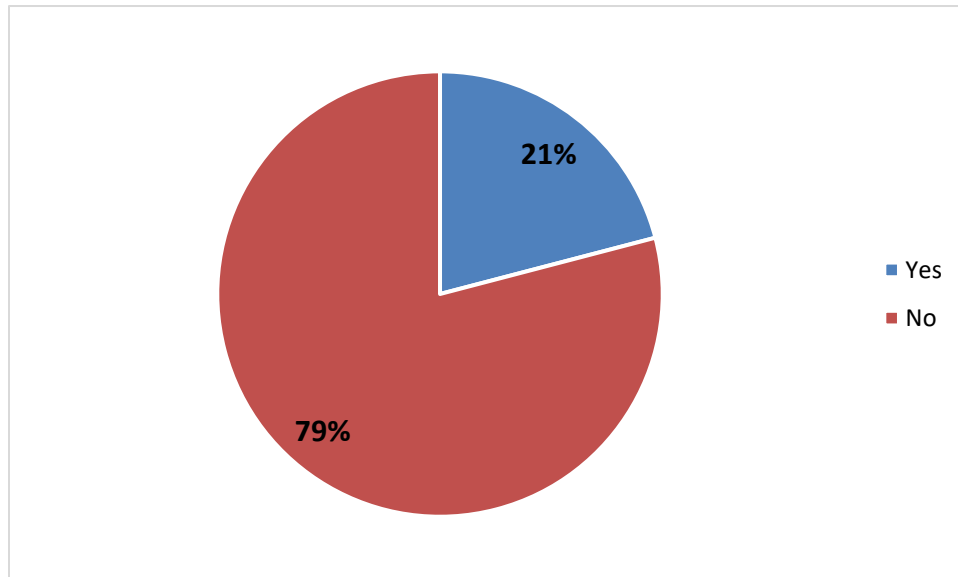


Figure 33. Does the laboratory quantify drugs in urine (n = 43)?

Does your laboratory hydrolyze prior to confirmation?

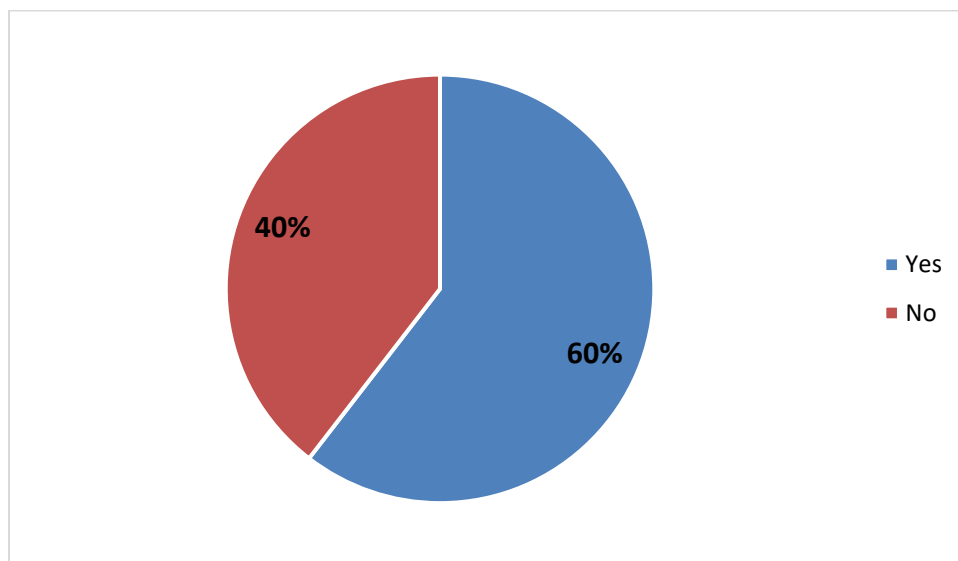


Figure 34. Does the laboratory hydrolyze prior to confirmation (n = 43)?

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)

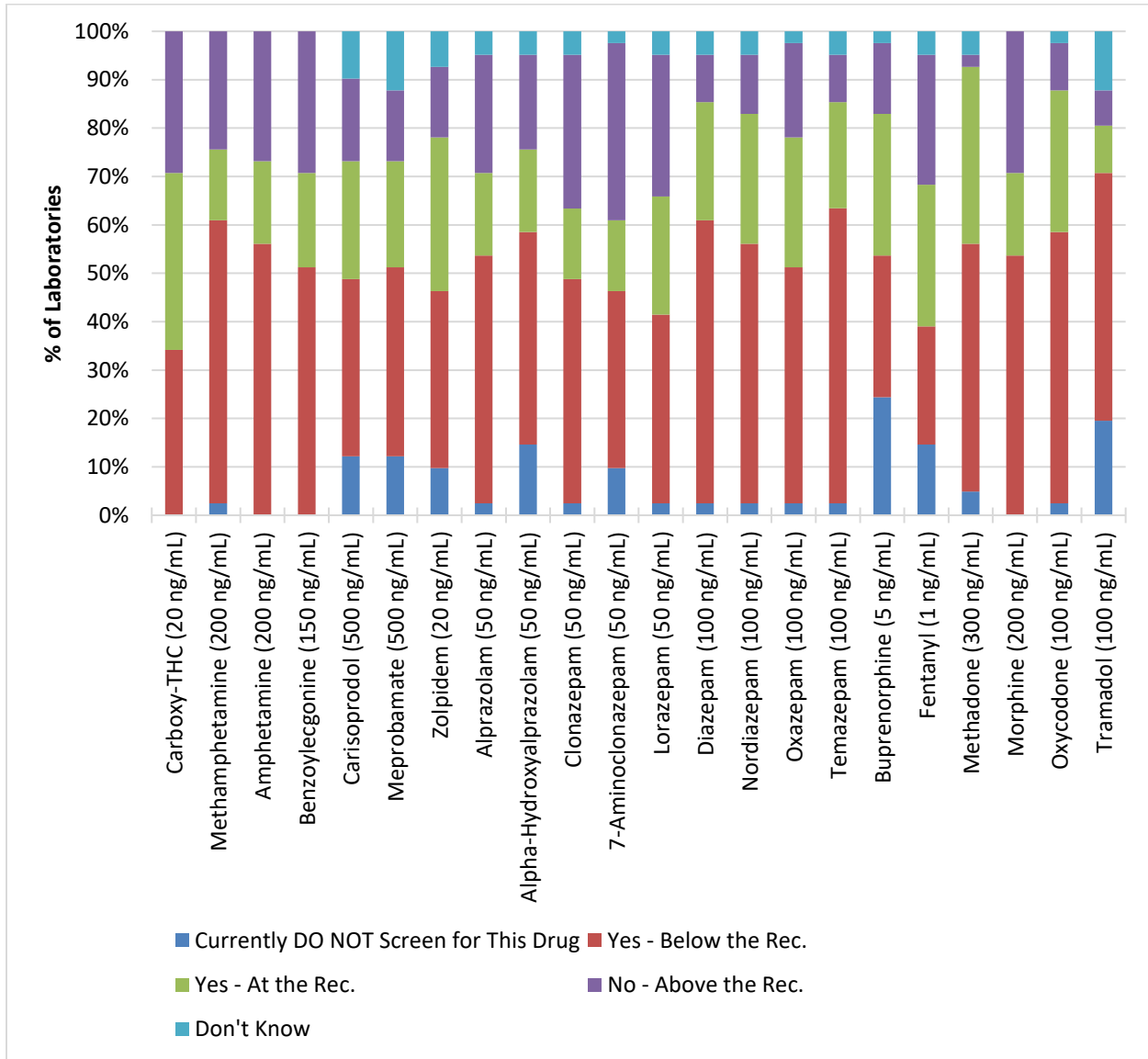


Figure 35. Does the laboratory meet the guideline recommendation for screening each drug in urine at the recommended cutoffs (n = 41)?

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
Cannabis			
Carboxy-THC	41	100%	71%
CNS Stimulants			
Methamphetamine	40	98%	75%
Amphetamine	41	100%	73%
Benzoyllecgonine	41	100%	71%
CNS Depressants			
Carisoprodol	32	78%	78%
Meprobamate	31	76%	81%
Zolpidem	34	83%	82%
Alprazolam	38	93%	74%
Alpha-hydroxyalprazolam	33	80%	76%
Clonazepam	38	93%	66%
7-aminoclonazepam	36	88%	58%
Lorazepam	38	93%	68%
Diazepam	38	93%	89%
Nordiazepam	38	93%	87%
Oxazepam	39	95%	79%
Temazepam	38	93%	89%
Narcotic Analgesics			
Buprenorphine	30	73%	80%
Fentanyl	33	80%	80%
Methadone	37	90%	97%
Morphine	41	100%	71%
Oxycodone	39	95%	90%
Tramadol	28	68%	89%

Table 6. 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.

Cannabis

For **carboxy-THC** at the recommended screening cutoff of 20 ng/mL, 34% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 37% 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 29% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

CNS Stimulants

For **methamphetamine** at the recommended screening cutoff of 200 ng/mL, 59% 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 24% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, and 2% do not test for this drug.

For **amphetamine** at the recommended screening cutoff of 200 ng/mL, 56% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 17% are at the recommended screening 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 screening cutoff. A total of 27% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

For **benzoylecgonine** at the recommended screening cutoff of 150 ng/mL, 51% 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 71% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 29% 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 500 ng/mL, 37% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 24% 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 17% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 12% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **meprobamate** at the recommended screening cutoff of 500 ng/mL, 39% 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 81% 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, 12% do not test for this drug, and 12% do not know if they meet the guideline recommendation.

For **zolpidem** at the recommended screening cutoff of 20 ng/mL, 37% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 32% 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 15% 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 **alprazolam** at the recommended screening cutoff of 50 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 17% 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 25% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **alpha-hydroxyalprazolam** 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 17% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 76% 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, 14% do not test for this drug, and 5% 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 66% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 32% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** 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 58% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 36% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 10% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

For **lorazepam** 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 24% 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 29% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 3% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **diazepam** at the recommended screening cutoff of 100 ng/mL, 59% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 24% 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 10% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **nordiazepam** at the recommended screening cutoff of 100 ng/mL, 54% 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 87% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the

recommended screening cutoff, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **oxazepam** at the recommended screening cutoff of 100 ng/mL, 49% 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 79% 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, 2% 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, 61% 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 89% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 10% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 2% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

Narcotic Analgesics

For **buprenorphine** at the recommended screening cutoff of 5 ng/mL, 29% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 29% 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 15% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 25% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

For **fentanyl** at the recommended screening cutoff of 1 ng/mL, 24% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 29% are at the recommended screening 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 screening cutoff. A total of 27% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 15% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

For **methadone** at the recommended screening cutoff of 300 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended screening

cutoff, and 37% 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 of 2% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 5% do not test for this drug, and 5% do not know if they meet the guideline recommendation.

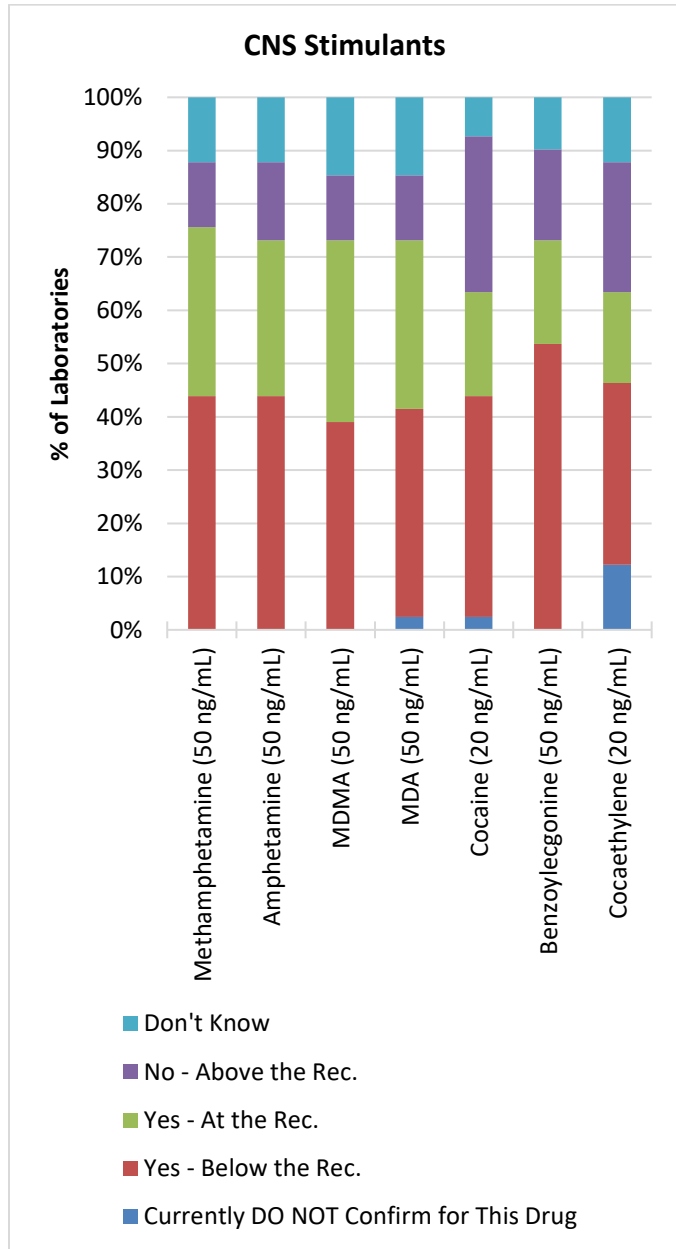
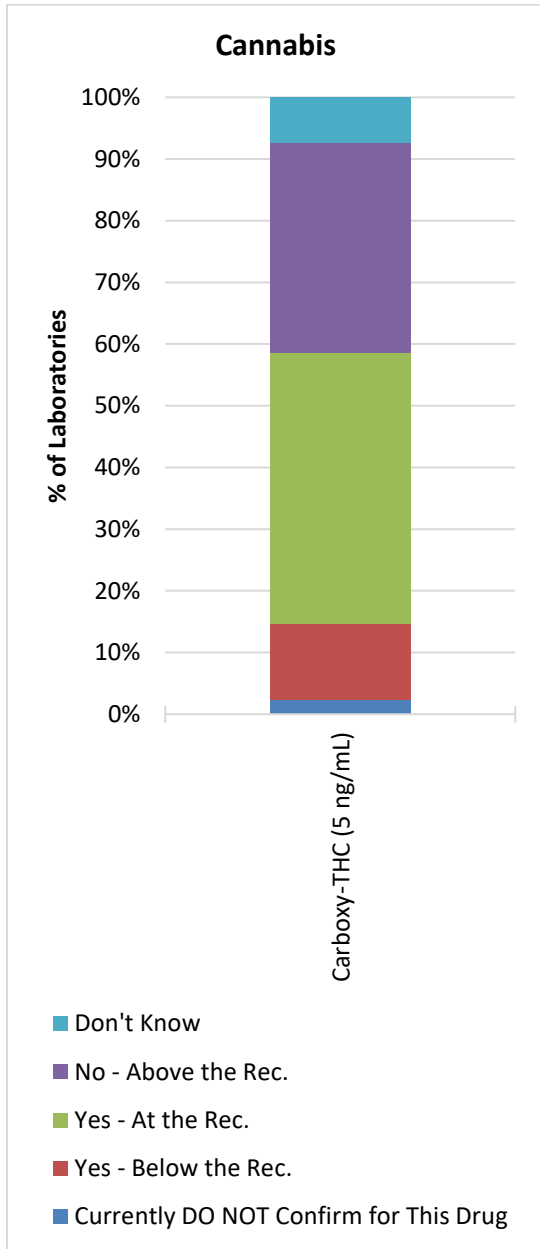
For **morphine** at the recommended screening cutoff of 200 ng/mL, 54% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 17% are at the recommended screening cutoff. Of the laboratories who reported that they test for this drug, a total of 71% reported meeting the guideline recommendation by being either below or at the recommended screening cutoff. A total of 29% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff.

For **oxycodone** 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 29% 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 10% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 3% do not test for this drug, and 2% do not know if they meet the guideline recommendation.

For **tramadol** at the recommended screening cutoff of 100 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended screening cutoff, and 10% 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 7% of laboratories reported not meeting the guideline recommendation by being above the recommended screening cutoff, 20% do not test for this drug, and 12% do not know if they meet the guideline recommendation.

Overall, **temazepam** was the most frequently reported (61%) drug in this set for meeting the guideline recommendation by being below the recommended screening cutoff. **Carboxy-THC** and **methadone** were the most frequently reported (37%) drug in this set for meeting the guideline recommendation by being at the recommended screening cutoff. **7-aminoclonazepam** was the most frequently reported (37%) drug in this set for not meeting the guideline recommendation by being above the recommended screening cutoff. **Carboxy-THC**, **amphetamine**, **benzoylcegonine**, and **morphine** were reported as always being tested.

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)



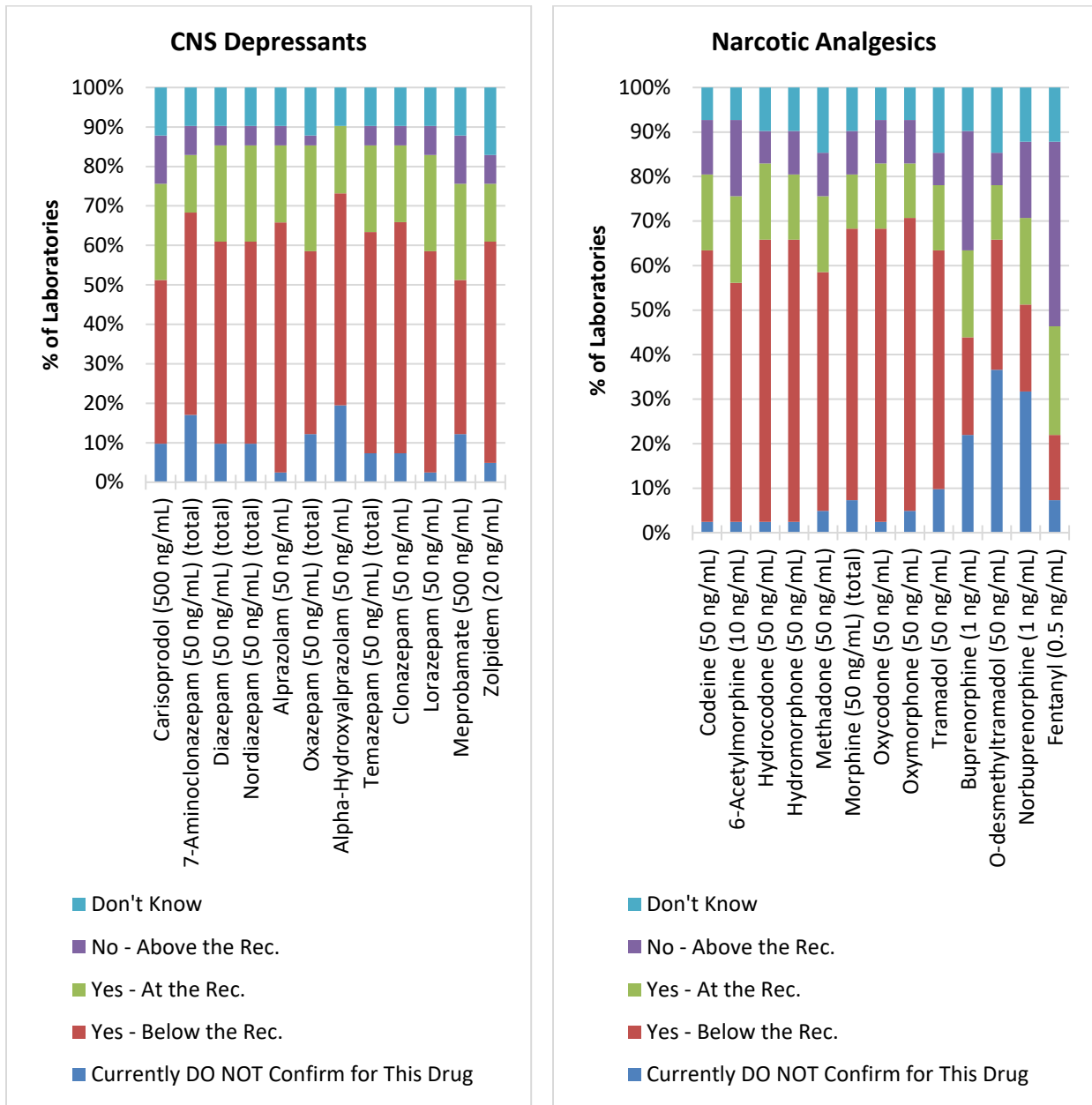


Figure 36-39. Does the laboratory meet the guideline recommendations for confirming each drug in urine at the recommended cutoffs (n = 41)?

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
Cannabis			
Carboxy-THC	37	90%	62%
CNS Stimulants			
Methamphetamine	36	88%	86%
Amphetamine	36	88%	83%
MDMA	35	85%	86%
MDA	34	83%	85%
Cocaine	37	90%	68%
Benzoylcegonine	37	90%	81%
Cocaethylene	31	76%	68%
CNS Depressants			
Carisoprodol	32	78%	84%
7-aminoclonazepam	30	73%	90%
Diazepam	33	80%	94%
Nordiazepam	33	80%	94%
Alprazolam	36	88%	94%
Oxazepam	31	76%	97%
Alpha-hydroxyalprazolam	29	71%	100%
Temazepam	34	83%	94%
Clonazepam	34	83%	94%
Lorazepam	36	88%	92%
Meprobamate	31	76%	84%
Zolpidem	32	78%	91%
Narcotic Analgesics			
Codeine	37	90%	86%
6-acetylmorphine	37	90%	81%
Hydrocodone	36	88%	92%
Hydromorphone	36	88%	89%
Methadone	33	80%	88%
Morphine	34	80%	88%
Oxycodone	37	90%	89%

Oxymorphone	36	88%	89%
Tramadol	31	76%	90%
Buprenorphine	28	68%	61%
O-desmethyiltramadol	20	49%	85%
Norbuprenorphine	23	56%	70%
Fentanyl	33	80%	48%

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 confirming drugs in urine.

Cannabis

For **carboxy-THC** at the recommended confirmation cutoff of 5 ng/mL, 12% 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 62% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 34% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 8% do not know if they meet the guideline recommendation.

CNS Stimulants

For **methamphetamine** 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 32% 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 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, and 12% do not know if they meet the guideline recommendation.

For **amphetamine** 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 29% 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, and 12% do not know if they meet the guideline recommendation.

For **MDMA** at the recommended confirmation cutoff of 50 ng/mL, 39% 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 86% 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 15% do not know if they meet the guideline recommendation.

For **MDA** at the recommended confirmation cutoff of 50 ng/mL, 39% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 32% 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 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 15% do not know if they meet the guideline recommendation.

For **cocaine** at the recommended confirmation cutoff of 20 ng/mL, 41% 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 68% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 29% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 2% do not test for this drug, and 8% do not know if they meet the guideline recommendation.

For **benzoylecgonine** 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 81% 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, and 9% do not know if they meet the guideline recommendation.

For **cocaethylene** at the recommended confirmation cutoff of 20 ng/mL, 34% 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 68% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 25% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 12% do not test for this drug, and 12% do not know if they meet the guideline recommendation.

CNS Depressants

For **carisoprodol** at the recommended confirmation cutoff of 500 ng/mL, 41% of laboratories reported meeting the guideline recommendation by being below the recommended

confirmation cutoff, and 25% are at the recommended confirmation 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 confirmation cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 10% do not test for this drug, and 12% do not know if they meet the guideline recommendation.

For **7-aminoclonazepam** at the recommended confirmation cutoff of 50 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 15% 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, 17% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **diazepam** at the recommended confirmation cutoff of 50 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 24% 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, 10% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **nordiazepam** at the recommended confirmation cutoff of 50 ng/mL, 51% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 24% 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, 10% do not test for this drug, and 10% 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 20% 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, 2% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **oxazepam** 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 27% 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, 12% do not test for this drug, and 12% 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 100% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 19% of laboratories reported that they do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **temazepam** 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 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, 7% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **clonazepam** 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 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, 7% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **lorazepam** 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 24% 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 7% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 3% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **meprobamate** at the recommended confirmation cutoff of 500 ng/mL, 39% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 24% are at the recommended confirmation 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 confirmation cutoff. A total of 12% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 12% 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, 56% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 15% 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, 5% do not test for this drug, and 17% do not know if they meet the guideline recommendation.

Narcotic Analgesics

For **codeine** 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 86% 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, 2% do not test for this drug, and 8% do not know if they meet the guideline recommendation.

For **6-acetylmorphine** at the recommended confirmation cutoff of 10 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 81% 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 **hydrocodone** 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 17% 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, 2% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **hydromorphone** 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 15% 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, 2% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **methadone** 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 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 14% do not know if they meet the guideline recommendation.

For **morphine** 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 12% 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, 7% do not test for this drug, and 10% do not know if they meet the guideline recommendation.

For **oxycodone** at the recommended confirmation cutoff of 50 ng/mL, 66% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 15% 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, 2% 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, 66% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 12% 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, 5% do not test for this drug, and 7% do not know if they meet the guideline recommendation.

For **tramadol** 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 15% 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, 10% do not test for this drug, and 14% do not know if they meet the guideline recommendation.

For **buprenorphine** 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 20% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 61% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 27% 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 **O-desmethyltramadol** at the recommended confirmation cutoff of 50 ng/mL, 29% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 12% 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 7% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 37% do not test for this drug, and 15% do not know if they meet the guideline recommendation.

For **norbuprenorphine** at the recommended confirmation cutoff of 1 ng/mL, 20% 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 70% 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, 31% do not test for this drug, and 12% do not know if they meet the guideline recommendation.

For **fentanyl** at the recommended confirmation cutoff of 0.5 ng/mL, 15% of laboratories reported meeting the guideline recommendation by being below the recommended confirmation cutoff, and 24% are at the recommended confirmation cutoff. Of the laboratories who reported that they test for this drug, a total of 48% reported meeting the guideline recommendation by being either below or at the recommended confirmation cutoff. A total of 41% of laboratories reported not meeting the guideline recommendation by being above the recommended confirmation cutoff, 8% do not test for this drug, and 12% do not know if they meet the guideline recommendation.

Overall, **oxycodone** and **oxymorphone** were the most frequently reported (66%) drug in this set for meeting the guideline recommendation by being below the recommended confirming cutoff. **Carboxy-THC** was the most frequently reported (44%) drug in this set for meeting the guideline recommendation by being at the recommended confirming cutoff. **Fentanyl** was the most frequently reported (41%) drug in this set for not meeting the guideline recommendation by being above the recommended confirming cutoff. All compounds from this set had at least one laboratory report that they do not test for this drug.

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

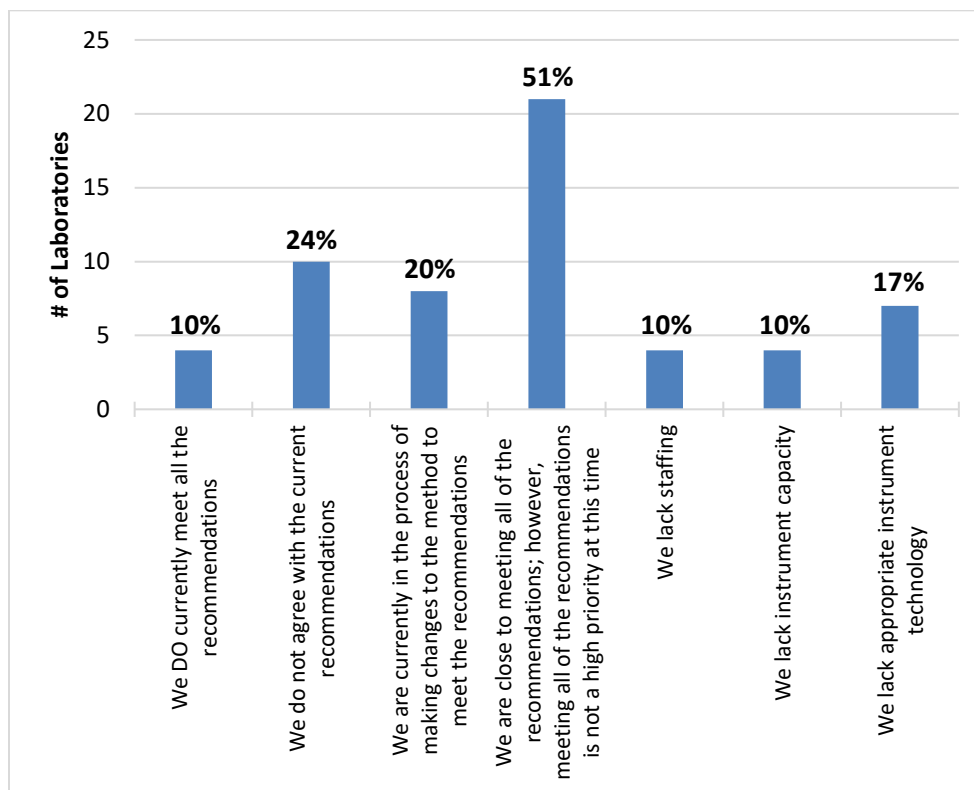


Figure 40. Reasons why laboratories do not currently meet the recommendations in urine samples (n = 41).

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 (sixteen laboratories; 39%). One laboratory stated that their laboratory is waiting for the OSAC/ASB guidelines to be published, and will proceed with those rather than the NSC’s guidelines and recommendations.

Two laboratories stated that their laboratory does not meet the recommendations. One laboratory stated that their laboratory does not quantitate all drugs. The other laboratory stated that their laboratory has cutoff levels defined in the state code for the initial screen.

Five laboratories stated that their state prioritizes testing blood samples over urine samples and rarely receives urine samples; therefore, updating methods to meet the

recommendations is not a priority. One laboratory stated that the presence of drugs in urine does not hold any value in most courtrooms in their state. Another laboratory stated that urine samples are only tested for certain compounds after they have been detected in blood samples and are confirmed qualitatively in urine; however, there are a few instances where urine is the only matrix submitted.

One laboratory reiterated that their laboratory is close to meeting all of the recommendations and is in the process of changing their methods to meet the recommendations.

Five laboratories stated that their laboratory is close to meeting all of the recommendations; however, they cannot change their current methods at this time. Reasons included a lack of time, money, and staffing, and belief that current methods are fit for purpose rather than lower cutoffs. One laboratory explained that their laboratory runs a targeted confirmation method via LC-MS-MS alongside a GC-MS or GC-NPD and an LC-MS-QTOF screen for all samples; by running these three methods concurrently, their laboratory is at or below the recommendations for almost all of the compounds. Another laboratory expressed that their laboratory is a postmortem toxicology laboratory forced to perform DUI/DUID/DFC testing without funding in addition to their normal ME casework; therefore, without consideration or accommodation, there has already been a loss of time and productivity resulting from excessive time required for less than 20% of the caseload, while trying to maintain turnaround time and postmortem casework. One laboratory stated that screening for alpha-hydroxyalprazolam is not a priority when alprazolam can be detected. Another laboratory stated that their laboratory still uses EMIT to screen and does not have time or resources to validate urine drug screens using Biochip Immunoassay or funding to purchase additional instrumentation. One laboratory stated that expanding testing for drug-facilitated crime samples will potentially get prioritized over expanding immunoassay testing for DUID samples.

One laboratory stated that their laboratory does not agree with the current recommendations for THC and metabolites stating they are too low to be relevant.

One laboratory stated that state regulation limits their laboratory to using only EMIT for screening since LC-MS is currently not an allowed screening or confirmation technique for DUID testing.

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

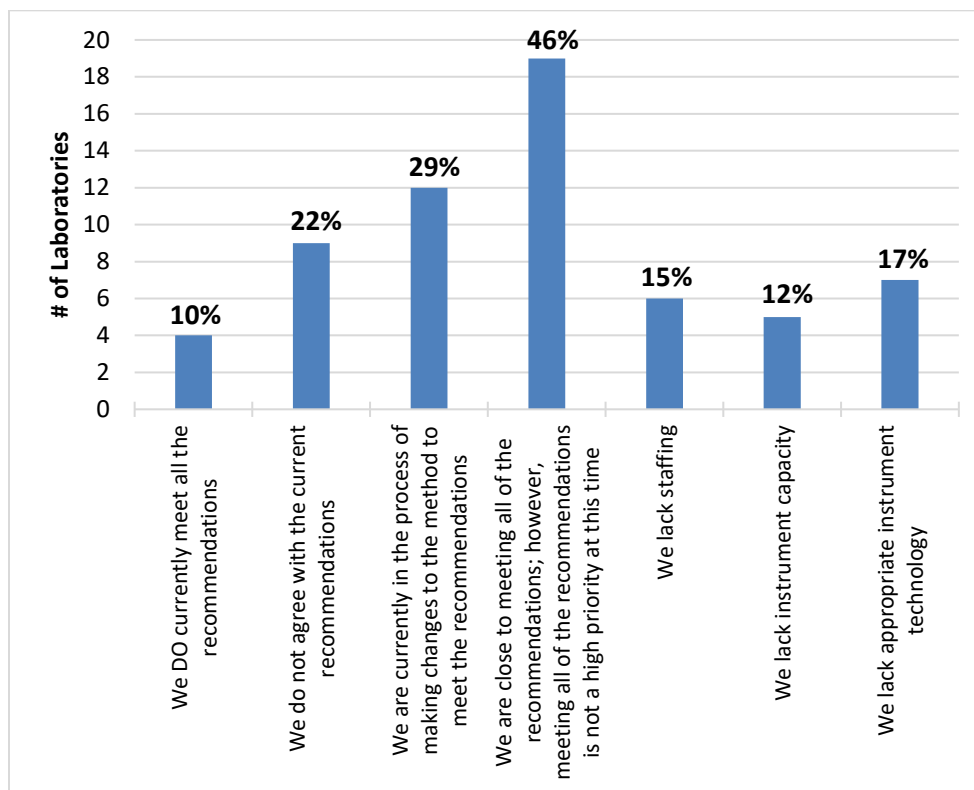


Figure 41. Reasons why laboratories do not currently meet the recommendations in urine samples (n = 41).

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 (fifteen laboratories; 37%). One laboratory stated that their laboratory is waiting for the OSAC/ASB guidelines to be published and will proceed with those rather than the NSC’s guidelines and recommendations.

Two laboratories stated that their laboratory does quantitate all drugs.

Four laboratories stated that their state prioritizes testing blood samples over urine samples and rarely receives urine samples; therefore, updating methods to meet the recommendations is not a priority. One laboratory stated that the presence of drugs in urine does not hold any value in most courtrooms in their state.

One laboratory reiterated that their laboratory is close to meeting all of the recommendations and is in the process of changing their methods to meet the recommendations.

Six laboratories stated that their laboratory is close to meeting all of the recommendations; however, they cannot change their current methods at this time. Reasons included a lack of time, money, and staffing, and belief that current methods are fit for purpose after not being able to achieve the recommended cutoff following extensive method development. One laboratory expressed that their laboratory is a postmortem toxicology laboratory forced to perform DUI/DUID/DFC testing without funding in addition to their normal ME casework; therefore, without consideration or accommodation, there has already been a loss of time and productivity resulting from excessive time required for less than 20% of the caseload, while trying to maintain turnaround time and postmortem casework.

One laboratory stated that their laboratory does not agree with the current recommendations for THC and metabolites stating they are too low to be relevant.

Drug Analysis – ORAL FLUID

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

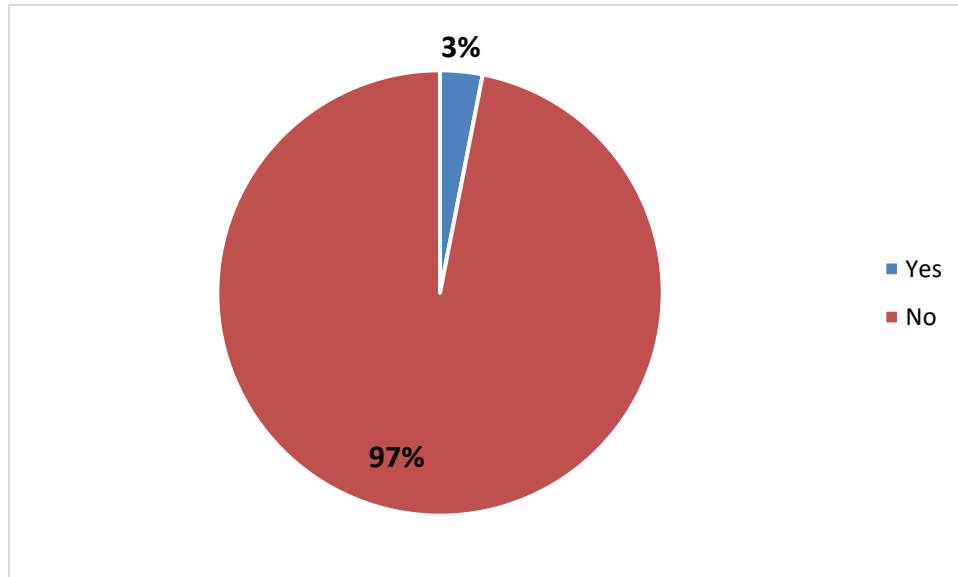


Figure 42. Does your laboratory provide testing for drugs in ORAL FLUID in DUID/traffic fatality cases (n = 65)?

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 cut-off (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")	Cut-off Provided by Laboratory #1 (ng/mL)	Cut-off Provided by Laboratory #2 (ng/mL)
Cannabis			
THC (4 ng/mL)	2	2	0.5
CNS Stimulants			
Methamphetamine (20 ng/mL)	2	10	20
Amphetamine (20 ng/mL)	2	10	20
MDMA (20 ng/mL)	1	1	-
MDA (20 ng/mL)	1	10	-
Cocaine (20 ng/mL)	2	10	10
Benzoyllecgonine (20 ng/mL)	2	5	10
CNS Depressants			
Carisoprodol (100 ng/mL)	1	-	100
Meprobamate (100 ng/mL)	1	-	100
Zolpidem (10 ng/mL)	1	-	10
Alprazolam (5 ng/mL)	2	6	1
Alpha-hydroxyalprazolam (5 ng/mL)	0	-	-
Clonazepam (5 ng/mL)	2	6	4
7-Aminoclonazepam (5 ng/mL)	1	-	-
Lorazepam (5 ng/mL)	2	6	10
Diazepam (5 ng/mL)	2	6	1
Nordiazepam (5 ng/mL)	2	6	1
Oxazepam (5 ng/mL)	1	8.8	-
Temazepam (5 ng/mL)	1	6	-
Narcotic Analgesics			
Buprenorphine (1 ng/mL)	1	-	4
Fentanyl (1 ng/mL)	1	-	1
Methadone (25 ng/mL)	2	10	10
Morphine (10 ng/mL)	2	8	4
Oxycodone (10 ng/mL)	2	8	4
Oxymorphone (10 ng/mL)	1	8	-
Tramadol (50 ng/mL)	0	-	-

Table 8. Laboratories who test for drugs in oral fluid and associated laboratory cut-offs for screening drugs in oral fluid.

Drug Analysis – ORAL FLUID – SCREENING For the following drugs that do not currently have recommended SCREENING guidelines, list your laboratory’s cut-off (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”)	Cut-off Provided by Laboratory #1 (ng/mL)	Cut-off Provided by Laboratory #2 (ng/mL)
Carboxy-THC	1	-	1
11-OH-THC	1	-	4
Cocaethylene	1	5	-
Codeine	1	8	-
6-Acetylmorphine	2	8	0.5
Norbuprenorphine	0	-	-
Hydrocodone	2	8	4
Hydromorphone	1	8	-
O-desmethyltramadol	0	-	-

Table 9. Laboratories who test for drugs in oral fluid and associated laboratory cut-offs for screening drugs in oral fluid.

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 cut-off (numerical value with units). If your laboratory does not **SCREEN** for additional drugs, please mark the field as “N/A”.

Both laboratories provided their laboratory’s screening cut-offs for additional drugs not listed in the guideline recommendations.

One laboratory listed the following cut-offs: chlordiazepoxide 100 ng/mL, midazolam 4.4 ng/mL, EDDP 10 ng/mL, dihydrocodeine 8 ng/mL, PCP 4 ng/mL, and DMX 100 ng/mL.

Another laboratory listed the following cut-offs: CBD 0.2 ng/mL, CBN 0.5 ng/mL, and CBG 0.2 ng/mL.

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 cut-off (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")	Cut-off Provided by Laboratory #1 (ng/mL)	Cut-off Provided by Laboratory #2 (ng/mL)
Cannabis			
THC (2 ng/mL)	2	2	0.5
CNS Stimulants			
Methamphetamine (20 ng/mL)	2	10	20
Amphetamine (20 ng/mL)	2	10	20
MDMA (20 ng/mL)	1	10	-
MDA (20 ng/mL)	1	10	-
Cocaine (8 ng/mL)	2	10	10
Benzoylcegonine (8 ng/mL)	2	5	10
Cocaethylene (8 ng/mL)	1	5	-
CNS Depressants			
Carisoprodol (100 ng/mL)	1	-	100
Meprobamate (100 ng/mL)	1	-	100
Zolpidem (10 ng/mL)	1	-	10
Alprazolam (1 ng/mL)	2	6	1
Clonazepam (1 ng/mL)	2	6	4
7-Aminoclonazepam (1 ng/mL)	0	-	-
Lorazepam (1 ng/mL)	2	6	10
Diazepam (1 ng/mL)	2	6	1
Nordiazepam (1 ng/mL)	2	6	1
Oxazepam (1 ng/mL)	1	8.8	-
Temazepam (1 ng/mL)	1	6	-
Narcotic Analgesics			
Codeine (5 ng/mL)	1	8	-
6-Acetylmorphine (2 ng/mL)	1	8	0.5
Buprenorphine (0.5 ng/mL)	1	-	4
Norbuprenorphine (0.5 ng/mL)	0	-	-
Fentanyl (0.5 ng/mL)	1	-	1
Hydrocodone (5 ng/mL)	2	8	4
Hydromorphone (5 ng/mL)	1	8	-
Methadone (10 ng/mL)	2	10	10
Morphine (5 ng/mL)	2	8	4
Oxycodone (5 ng/mL)	2	8	4

Oxymorphone (5 ng/mL)	1	8	-
Tramadol (10 ng/mL)	0	-	-
O-desmethyltramadol (10 ng/mL)	0	-	-

Table 10. Laboratories who test for drugs in oral fluid and associated laboratory cut-offs for confirming drugs in oral fluid⁷.

⁷ Both laboratories use the same procedure technique for screening and confirmation.

Drug Analysis – ORAL FLUID – CONFIRMATION For the following drugs that do not currently have recommended CONFIRMATION guidelines, list your laboratory’s cut-off (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”)	Cut-off Provided by Laboratory #1 (ng/mL)	Cut-off Provided by Laboratory #2 (ng/mL)
Carboxy-THC	1	-	1
11-OH-THC	1	-	4
Alpha-hydroxyalprazolam	0	-	-

Table 11. Laboratories who test for drugs in oral fluid and associated laboratory cut-offs for confirming drugs in oral fluid.

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 cut-off (numerical value with units). If your laboratory does not **CONFIRM** for additional drugs, please mark the field as “N/A”.

Both laboratories provided their laboratory’s confirmation cut-offs for additional drugs not listed in the guideline recommendations.

One laboratory listed the following cut-offs: chlordiazepoxide 100 ng/mL, midazolam 4.4 ng/mL, EDDP 10 ng/mL, dihydrocodeine 8 ng/mL, PCP 4 ng/mL, and DMX 100 ng/mL.

Another laboratory listed the following cut-offs: CBD 0.2 ng/mL, CBN 0.5 ng/mL, and CBG 0.2 ng/mL.

Laboratory Resources

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

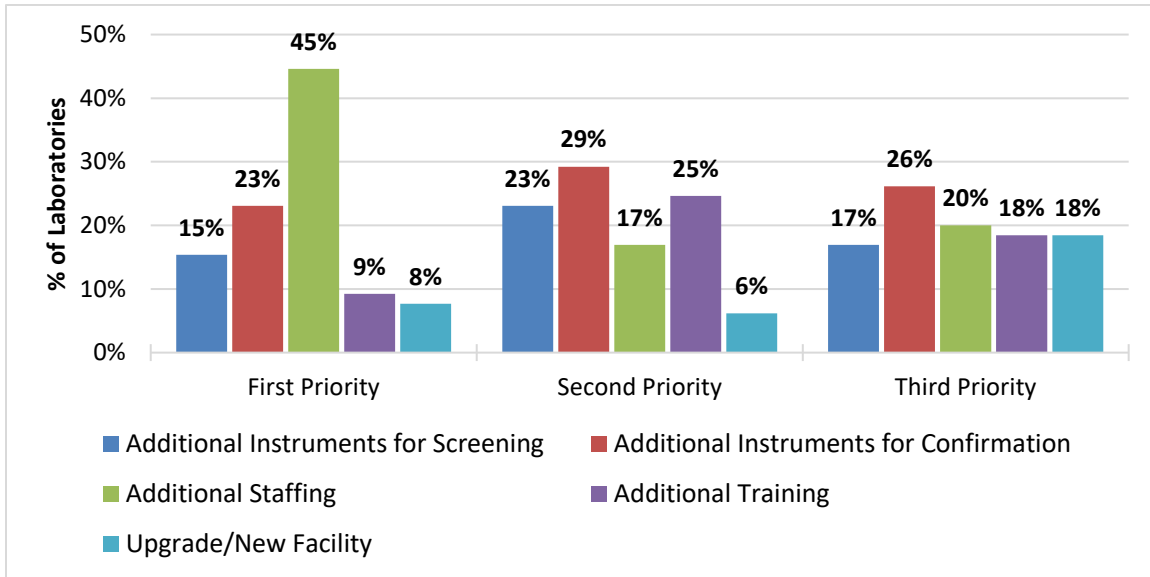


Figure 43. What are the top three priorities for additional resources for laboratories performing DUI and DUID testing (n = 65)?

What additional resources are a critical need for your laboratory?

Sixty-five laboratories answered this question and multiple reasons were given in some of the responses. According to the free text responses, twenty-eight laboratories indicated the need for instrumentation. Twenty-six laboratories indicated the need for additional staffing, while four specified the need for experienced staff members. Eight laboratories indicated the need for training for their staff. Seven 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. Five laboratories indicated the need for funding. Four laboratories indicated the need for more laboratory space or a new facility. Two laboratories indicated the need for a better Laboratory Information Management System (LIMS). Two laboratories indicated the need for a better testing protocol in their laboratory rather than testing being driven by client request. Two laboratories indicated the need for automated extraction devices. Two laboratories indicated the need for data analysis/calculation software. One laboratory indicated the need for interfacing an instrument with their laboratory's LIMS system. One laboratory indicated the need for testimony support. One laboratory indicated the need for service contracts. One laboratory indicated the need for a liaison between the laboratory and the Criminal Justice system. One laboratory indicated the need for administrative help. One laboratory indicated the need for drug reference standards. One laboratory indicated the need for IT support. One laboratory indicated the need for Quality Assurance staff.

What are the greatest areas of need for training for your toxicology staff?

Sixty-five laboratories answered this question and multiple reasons were given in some of the responses. According to the free text responses, fifteen laboratories indicated the need for pharmacology training. Twenty-one laboratories indicated the need for training how to use instrumentation, and fourteen specified the need for liquid chromatography (LC) training coupled to various detectors. Nine laboratories indicated the need for training on instrument maintenance and troubleshooting. Eight laboratories indicated the need for training in method development and validation. Eight laboratories indicated the need for training on basic scientific principles of extraction and daily job responsibilities. Eight laboratories indicated the need for money to travel to continuing education courses. Six laboratories indicated the need for testimony training. Five laboratories indicated the need for training on instrument software. Four laboratories indicated the need for senior analysts/staff to train newer employees. Three laboratories indicated the need for data analysis training. Two laboratories indicated the need for internal cross-training. Two laboratories indicated the need for training on understanding accreditation standards. One laboratory indicated the need for training in automation processes.

Additional Questions – Tier I and Tier II

Do you outsource any confirmatory testing in any fluid for Tier I drugs?

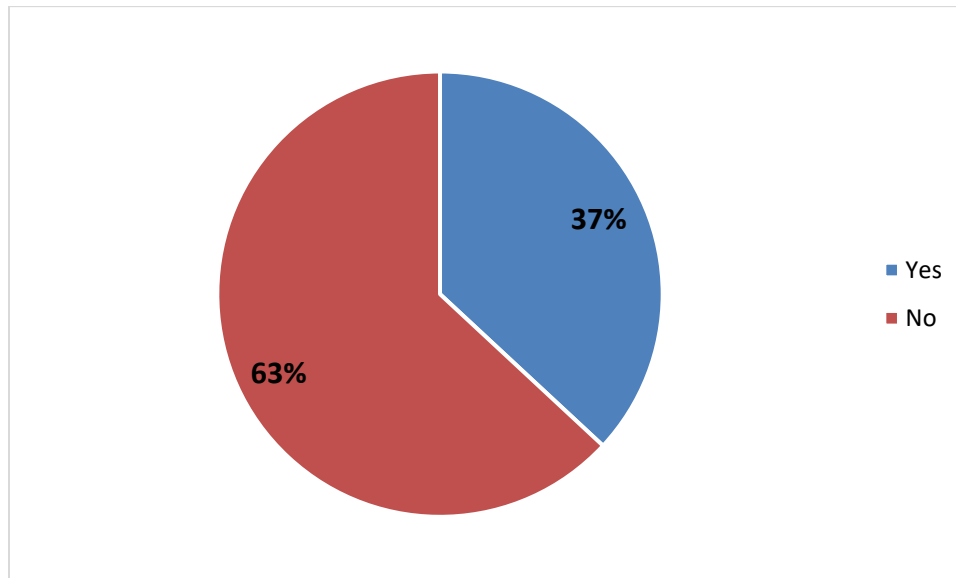


Figure 44. Does your laboratory currently outsource any confirmatory testing in any fluid for Tier I drugs (n = 65)?

Laboratories also had the ability to comment on reasons for outsourcing confirmatory testing in any fluid for Tier I drugs (twenty-three laboratories; 35%). One laboratory stated that their laboratory is outsourcing in order to reduce their backlog. One laboratory stated that their laboratory is outsourcing oral fluid samples as a pilot study. Two laboratories stated that their laboratory is outsourcing samples while an in-house method is undergoing validation. Seventeen laboratories provided specific compounds that are currently being outsourced for confirmatory testing, where answers included buprenorphine, norbuprenorphine, opioids, carisoprodol, , clonazepam, 7-aminoclonazepam, hydromorphone, oxymorphone, lorazepam, THC and metabolites, prescriptions, tramadol, benzodiazepines, CNS depressants, and narcotic analgesics. One laboratory added that all blood quantitations are outsourced since their laboratory is located in a urine state. One laboratory stated that all drugs except alcohol are outsourced. Another laboratory stated that all drugs except THC are outsourced.

Do you currently test for any Tier II compounds?

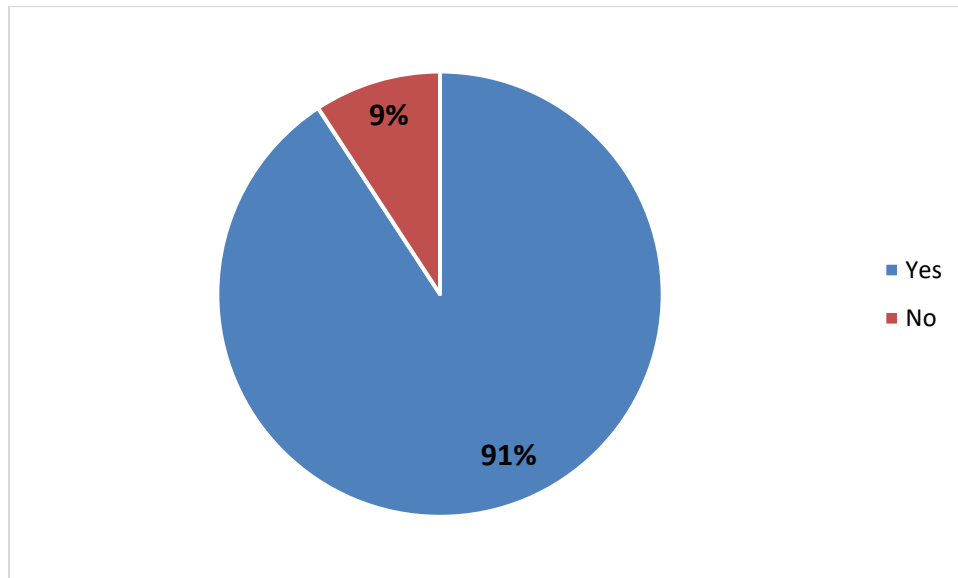
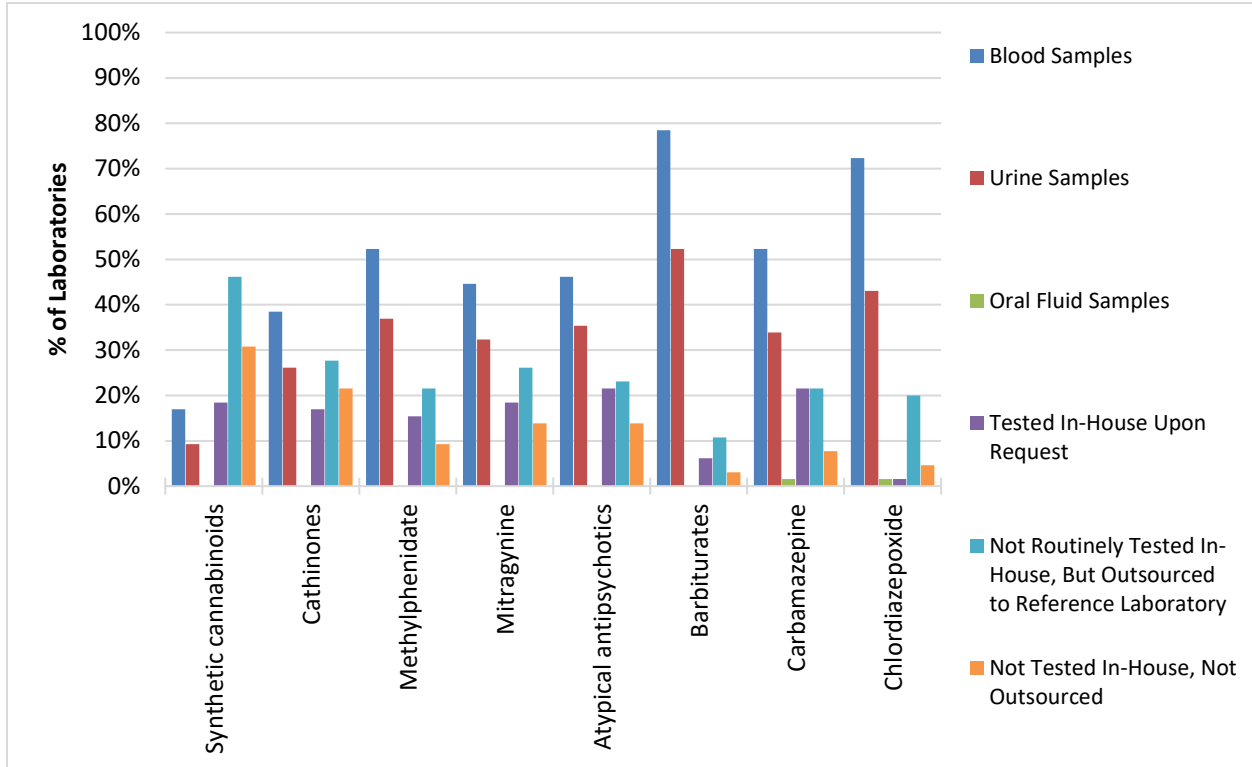
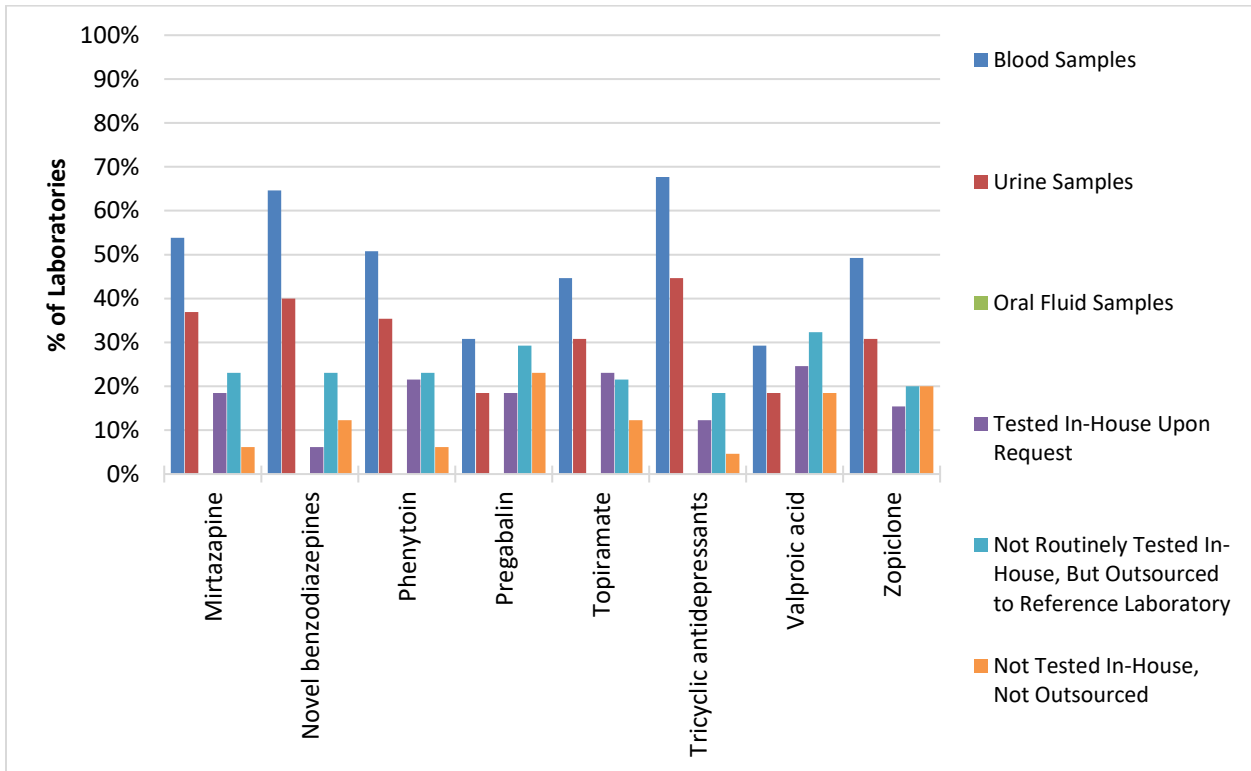
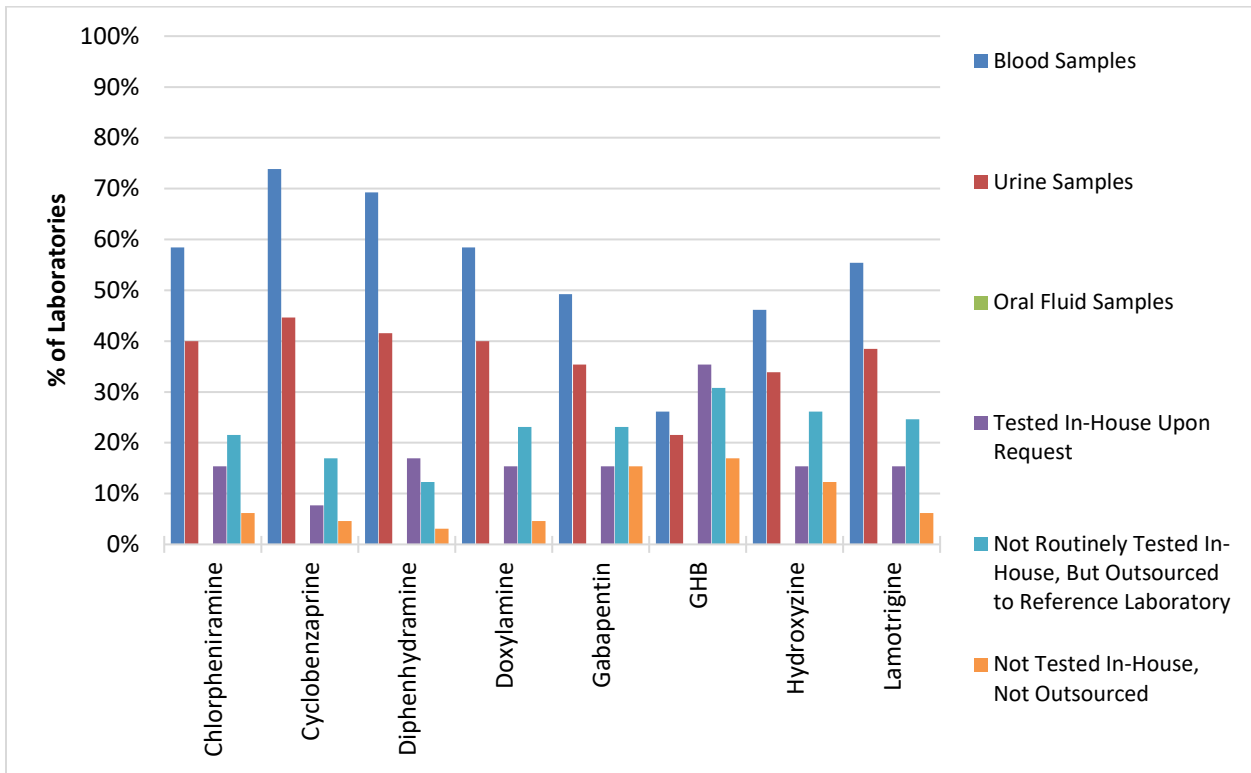


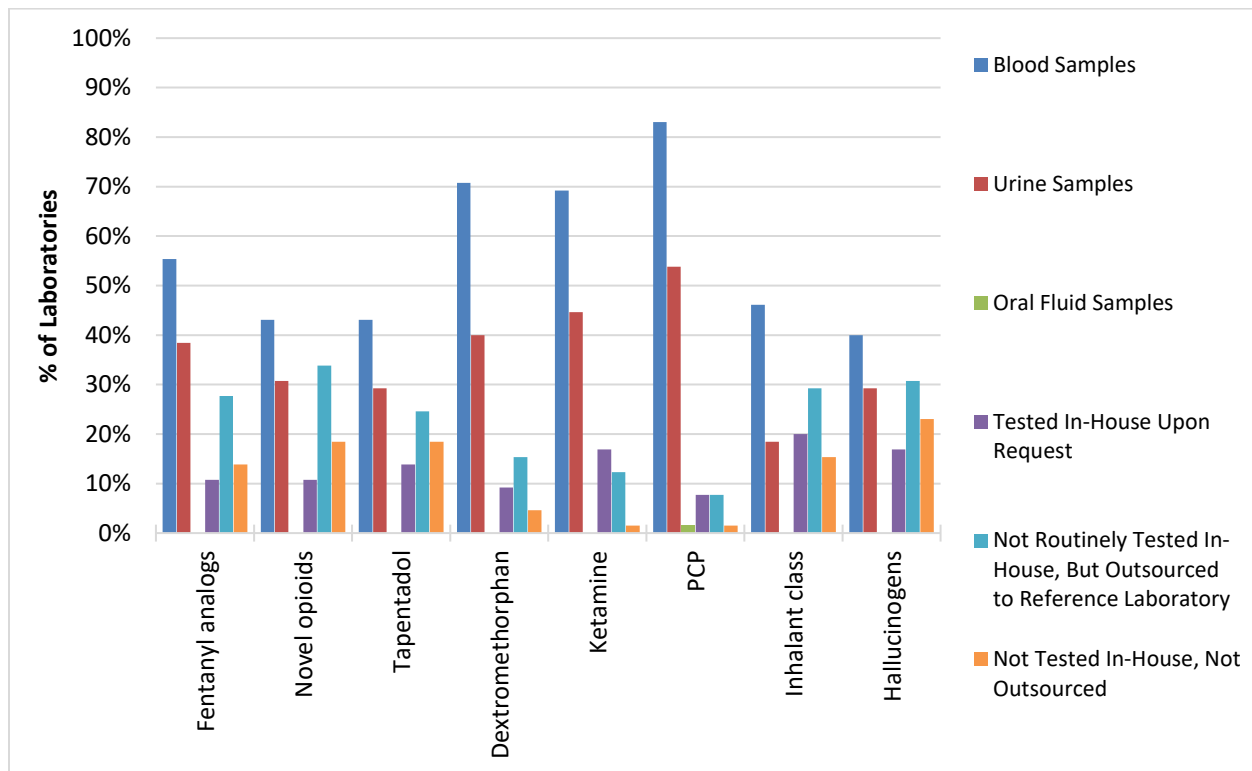
Figure 45. Does your laboratory currently test for any Tier II compounds (n = 65)?

Additional Questions –Tier II

If you test for Tier II compounds, please indicate the specimen type and which ones are routinely tested? (Graph Format)







Figures 46-49. 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 or outsource (n = 65).

If you test for Tier II compounds, please indicate the specimen type and which ones are routinely tested? (Table Format)

Drug(s)	Blood Samples	Urine Samples	Oral Fluid Samples	Tested In-House Upon Request	Not Routinely Tested In-House, But Outsourced to Reference Laboratory	Not Tested In-House, Not Outsourced
Synthetic cannabinoids	17%	9%	0%	18%	46%	31%
Cathinones	38%	26%	0%	17%	28%	22%
Methylphenidate	52%	37%	0%	15%	22%	9%
Mitragynine	45%	32%	0%	18%	26%	14%
Atypical antipsychotics	46%	35%	0%	22%	23%	14%
Barbiturates	78%	52%	0%	6%	11%	3%
Carbamazepine	52%	34%	2%	22%	22%	8%
Chlordiazepoxide	72%	43%	2%	2%	20%	5%
Chlorpheniramine	58%	40%	0%	15%	22%	6%
Cyclobenzaprine	74%	45%	0%	8%	17%	5%
Diphenhydramine	69%	42%	0%	17%	12%	3%
Doxylamine	58%	40%	0%	15%	23%	5%
Gabapentin	49%	35%	0%	15%	23%	15%
GHB	26%	22%	0%	35%	31%	17%
Hydroxyzine	46%	34%	0%	15%	26%	12%
Lamotrigine	55%	38%	0%	15%	25%	6%
Mirtazapine	54%	37%	0%	18%	23%	6%
Novel Benzodiazepines	65%	40%	0%	6%	23%	12%
Phenytoin	51%	35%	0%	22%	23%	6%
Pregabalin	31%	18%	0%	18%	29%	23%
Topiramate	45%	31%	0%	23%	22%	12%
Tricyclic antidepressants	68%	45%	0%	12%	18%	5%
Valproic acid	29%	18%	0%	25%	32%	18%
Zopiclone	49%	31%	0%	15%	20%	20%
Fentanyl analogs	55%	38%	0%	11%	28%	14%
Novel opioids	43%	31%	0%	11%	34%	18%
Tapentadol	43%	29%	0%	14%	25%	18%
Dextromethorphan	71%	40%	0%	9%	15%	5%

Ketamine	69%	45%	0%	17%	12%	2%
PCP	83%	54%	2%	8%	8%	2%
Inhalant class	46%	18%	0%	20%	29%	15%
Hallucinogens	40%	29%	0%	17%	31%	23%

Table 12. 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 or outsource.

Do you outsource any confirmatory testing in any fluid for Tier II drugs?

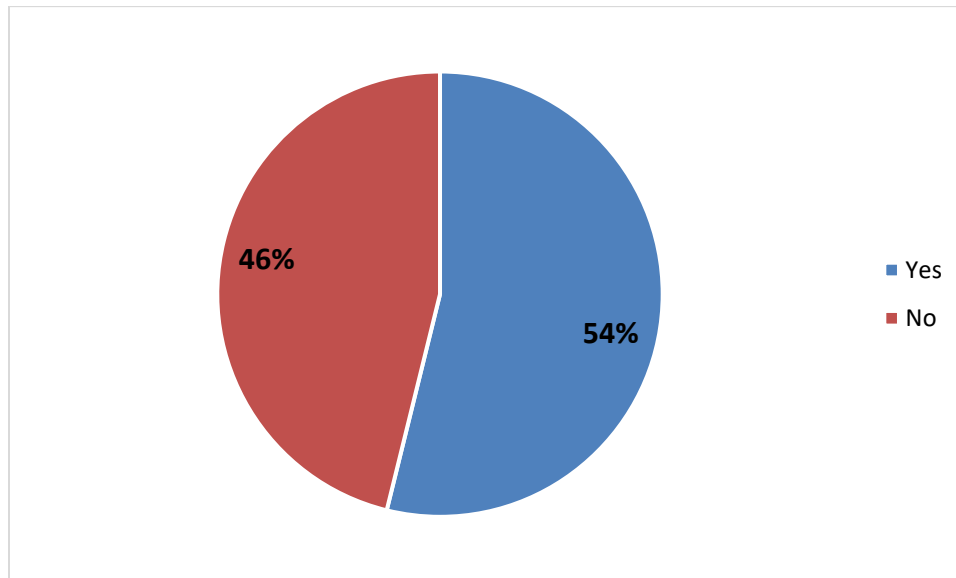


Figure 50. Does your laboratory outsource any confirmatory testing in any fluid for Tier II drugs (n = 65)?

Laboratories also had the ability to comment on other reasons for outsourcing confirmatory testing in any fluid for Tier II drugs (thirty-nine laboratories; 60%). Nine laboratories indicated that their laboratory would outsource any confirmatory testing for Tier II compounds only if requested. One laboratory stated that their laboratory outsources Tier II compounds only if they cannot obtain a standard or do not have a validated method. Twenty-nine laboratories provided specific compounds that are currently being outsourced for confirmatory testing, listing at least one of the Tier II compounds. All of the Tier II compounds were listed by at least one laboratory.

Final Comments

What additional drugs should be included in the new recommendations for DUID testing?

Compound/Class of Compounds	Number of Laboratories Making This Request (n)
Novel Benzodiazepines	8
Gabapentin	8
Etizolam	6
Flualprazolam	5
Trazodone	4
Acetyl fentanyl	2
Fentanyl analogs	2
Mitragynine and metabolites	2
Quetiapine	2
Venlafaxine	2
Cannabidiol	1
Carfentanil	1
Citalopram	1
Designer Opioids	1
Difluoroethane	1
Diphenhydramine	1
Fluoxetine	1
Hydroxyzine	1
Loperamide	1
Modafinil	1
PCP	1
Pregabalin	1
Promethazine	1
Sertraline	1
Suvorexant	1
Zaleplon	1
Zopiclone	1

Table 13. Suggested drugs to be included in the new recommendations for DUID testing.

Thirty-three 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, fentanyl analogs, novel benzodiazepines, mitragynine, hydroxyzine, PCP, and acetyl fentanyl. The following compounds were suggested to be added to the Tier II scope: trazodone, specific novel benzodiazepines (specifically etizolam and flualprazolam), and quetiapine.

Two 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. Another laboratory stated that the recommendations are unrealistic and unnecessary. Further the laboratory stated, the alleged experts dictating requirements to other laboratories is arrogant, presumptuous, unprofessional, and places a significant burden on laboratories more qualified to determine their local needs than the under-qualified, under-worked, politically powerful elite.

What drugs should be removed in the new recommendations for DUID testing?

Compound/Class of Compounds	Number of Laboratories Making This Request
Carisoprodol*	4
GHB**	3
Meprobamate*	3
Tramadol*	3
7-Aminoclonazepam*	2
Alpha-hydroxyalprazolam*	2
Barbiturates**	2
O-desmethyltramadol*	2
Buprenorphine*	1
Hydromorphone*	1
Hydroxyzine**	1
Methadone*	1
Norbuprenorphine*	1
Oxazepam*	1
Oxymorphone*	1
PCP**	1
Phenytoin**	1
Temazepam*	1

Table 14. Suggested drugs to be removed in the new recommendations for DUID testing⁸.

Fifteen laboratories provided answers to this question. Multiple drugs were allowed to be listed by each laboratory. Three 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 the recommendations are unrealistic and unnecessary. Further that laboratory stated the alleged experts dictating requirements to other laboratories is arrogant, presumptuous, unprofessional, and places a significant burden on laboratories more qualified to determine their local needs than the under-qualified, under-worked, politically powerful elite. One laboratory requested that regional trends be taken into consideration.

⁸ 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 (**).

If you have suggestions for changes to the cut-off for a currently listed drug, please comment below:

A total of twenty-one laboratories provided suggestions or comments for changes to the cut-off for a currently listed drug. Multiple suggestions were allowed to be provided by each laboratory. One laboratory suggested antipsychotics such as haloperidol, risperidone, and ziprasidone should be at 1 ng/mL. Another laboratory suggested changing the blood cutoffs for carisoprodol and meprobamate to 1 mcg/mL since they seem too low as is; however, for urine the cutoffs seem too low for carboxy-THC, benzoylecgonine, carisoprodol, and meprobamate. One laboratory stated higher cutoffs should be considered for oral fluid samples if collected at roadside or close to the driving event. Another laboratory suggested moving the cutoffs for high-dose benzodiazepines to 25 ng/mL rather than 20 ng/mL. One laboratory stated that fentanyl should be 1 ng/mL. Another laboratory suggested fentanyl and buprenorphine should be raised to 1 ng/mL in blood.

One laboratory stated that the cutoffs for buprenorphine and fentanyl in urine are too low, and their laboratory cannot achieve this cutoff using an LC-QTOF. Another laboratory suggested making all of the benzodiazepines 10 ng/mL, since their laboratory sees a lot of low-level diazepam and metabolites with a little alcohol, which can cause problems. One laboratory stated that low-dose benzodiazepines and zolpidem in blood should be 5 ng/mL for screening. Another laboratory suggested lowering the screening and confirmation cutoffs for fentanyl and 6-acetylmorphine. One laboratory stated that cutoffs for meprobamate and carisoprodol should be 1 mg/L. Another laboratory suggested raising the cutoff for buprenorphine and norbuprenorphine to 1 ng/mL, while lowering the cutoff for oxycodone to 1 ng/mL.

One laboratory stated that THC and metabolites should be increased to a meaningful minimum cutoff. Another laboratory suggested updating the oral fluid cutoffs now that there should be more data since the last survey. One laboratory stated that the recommendations committee should follow the ABS/OSAC document to standardize the field rather than having two documents. Another laboratory suggested loosening the hard cutoffs to approximate values or possibly a +/- 20% range to allow for some variability in meeting the recommendations. One laboratory stated immunoassay performance should be considered when establishing the screening cutoffs for benzodiazepines and opioids, since not all laboratories can conduct targeted drug screening. Another laboratory suggested raising the urine confirmation cutoffs for buprenorphine and norbuprenorphine, raising the urine screening and confirmation cutoffs for fentanyl, and considering minor adjustments to low-dose benzodiazepine screening to allow for immunoassay.

One laboratory asked that with the increase in prevalence and use of THC concentrates as well as higher THC content marijuana, is a delta-9-THC cutoff of 1 ng/mL really representative

of what is seen in the population for impairing effects anymore, or should it be higher? Another laboratory suggested the recommendations are unrealistic and unnecessary; further stated the alleged experts dictating requirements to other laboratories is arrogant, presumptuous, unprofessional, and places a significant burden on laboratories more qualified to determine their local needs than the under-qualified, under-worked, politically powerful elite. One laboratory stated that it is not clear how the cutoffs became recommendations.

Please list the top 15 drugs present in DUID casework in 2019. (number 1-15; 1 = most prevalent).

Prevalence	Compound/Class
1 (most prevalent)	THC and metabolites
2	Methamphetamine
3	Cocaine and metabolites
4	Alprazolam/alpha-hydroxyalprazolam
5	Clonazepam/7-aminoclonazepam
6	Morphine
7	Fentanyl
8	Diazepam/nordiazepam
9	Oxycodone
10	Citalopram
11	Hydrocodone
12	Lorazepam
13	Tramadol/O-desmethyltramadol
14	Zolpidem
15 (least prevalent)	Temazepam

Table 15. Top 15 most prevalent drugs in DUID casework in 2019 (n = 64).

Laboratories also had the ability to comment on other compounds present in DUID casework not listed in the survey. Responses included the following compounds: citalopram, ethanol, etizolam, flualprazolam, guaifenesin, heroin, midazolam, morphine, olanzapine, phentermine, phenylpropanolamine, pseudoephedrine, sertraline, synthetic cannabinoids, trazodone, and venlafaxine.

Please note that the 5th most prevalent drug resulted in a tie between clonazepam/7-aminoclonazepam and cocaine and metabolites. Since cocaine and metabolites was already listed as the 3rd most prevalent drug, clonazepam/7-aminoclonazepam was selected.

The 9th most prevalent drug resulted in a tie between clonazepam and oxycodone. Since clonazepam was already listed as the 5th most prevalent drug, oxycodone was selected.

The 10th most prevalent drug was diazepam/nordiazepam; however, since diazepam/nordiazepam was already listed as the 8th most prevalent drug, the next most prevalent resulted in a tie between clonazepam/7-aminoclonazepam and citalopram. Since clonazepam/7-aminoclonazepam was already listed as the 5th most prevalent drug, citalopram was selected.

The 11th most prevalent drug was diazepam/nordiazepam; however, since diazepam/nordiazepam was already listed as the 8th most prevalent drug, hydrocodone was the next most prevalent and selected.

The 13th most prevalent drug was oxycodone; however, since oxycodone was already listed as the 9th most prevalent drug, the next most prevalent resulted in a tie between hydrocodone and lorazepam. Since hydrocodone was already listed as the 11th most prevalent drug and lorazepam as the 12th most prevalent drug, the next most prevalent drug resulted in a tie between diazepam/nordiazepam and tramadol/O-desmethyltramadol. Since diazepam/nordiazepam was already listed as the 8th most prevalent drug, tramadol/O-desmethyltramadol was selected.

The 15th most prevalent drug was tramadol/O-desmethyltramadol; however, since tramadol/O-desmethyltramadol was already listed as the 13th most prevalent drug, temazepam was the next most prevalent and selected.

Please list the top 15 drugs present in DUID casework in 2019.

Compound	Number of laboratories reporting this compound/class in their top 15
THC and metabolites*	62
Alprazolam/alpha-hydroxyalprazolam*	57
Cocaine and metabolites*	57
Methamphetamine*	56
Diazepam/nordiazepam*	48
Clonazepam/7-aminoclonazepam*	45
Fentanyl*	45
Amphetamine*	43
Hydrocodone*	34
Morphine*	34
Oxycodone*	34
Diphenhydramine**	30
Lorazepam*	26
Zolpidem*	23
Methadone*	22
Gabapentin**	21
Codeine*	18
Buprenorphine/norbuprenorphine*	15
Tramadol/O-desmethyltramadol*	14
Phencyclidine (PCP)**	12
6-acetylmorphine*	11
Fentanyl analogs**	11
Oxazepam*	11
Temazepam*	10
Citalopram	9
3,4-methylenedioxymethamphetamine (MDMA)*	8
Carisoprodol/meprobamate*	8
Cyclobenzaprine**	8
Dextromethorphan**	8
Hydromorphone*	6
Novel benzodiazepines**	6
Trazodone	6
Mitragynine**	4
Doxylamine**	3
Novel opioids**	3
Oxymorphone*	3
Tricyclic antidepressants**	3
Etizolam	2
Heroin	2
Inhalants**	2

Ketamine**	2
Midazolam	2
Phenylpropanolamine	2
Pseudoephedrine	2
Sertraline	2
Barbiturates**	1
Cathinones**	1
Chlorpheniramine**	1
Ethanol	1
Flualprazolam	1
Guaifenesin	1
Hydroxyzine**	1
Lamotrigine**	1
Methylphenidate**	1
Olanzapine	1
Phentermine	1
Synthetic cannabinoids**	1
Valproic acid**	1
Venlafaxine	1

Table 16. Top 15 most prevalent drugs in DUID casework in 2019 (n = 64)⁹.

Laboratories also had the ability to comment on other compounds present in DUID casework not listed in the survey. Responses included the following compounds: citalopram, ethanol, etizolam, flualprazolam, guaifenesin, heroin, midazolam, morphine, olanzapine, phentermine, phenylpropanolamine, pseudoephedrine, sertraline, synthetic cannabinoids, trazodone, and venlafaxine.

⁹ 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 (**).

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 said that they would like to see the following questions included in the survey the next time around: expert witness vs. fact witness, if expert witness then case-specific interpretations vs. general pharmacology-based drug characteristics/descriptions, and top 5 drugs among Tier II compounds.

One laboratory stated that their laboratory is pursuing the concept of qualitative-only toxicology services, since there is no per se value for DUID drugs other than ethanol which assist prosecutors in court. Further, there can be too much subjectivity within toxicologist testimonies and there are no single values for what concentration of drug causes impairment. Attorneys have been heard stating, “we hate the nanogram”, so why do quantitation if it is not needed by the customer?

One laboratory suggested cannabis laws/per se limits in states with marijuana legalization, either medical or recreational.

One laboratory stated that acetaminophen was detected in 17% of their laboratory’s 2018 drug-impaired driving cases. Also, the laboratory sees a fair bit of alprazolam, but it is likely due to its prevalence as an adulterant in heroin. Further, they think it would be of value for the NSC to make a recommendation to limit the scope of testing for compounds which do not produce human psychomotor impairment (for example, citalopram, acetaminophen, naproxen, etc.). Direction to laboratories to not test and/or quantify these compounds could provide needed guidance to help make DUID testing more efficient.

One laboratory noted that the majority of morphine’s prevalence in their laboratory’s casework is probably heroin use where the laboratory did not detect 6-acetylmorphine, but case history shows history of heroin abuse. Further, they would like to see fentanyl, fentanyl analogs, 6-acetylmorphine, and morphine lumped together into one selection for the top 15 drugs detected in casework as the majority of these cases are linked to heroin/fentanyl abuse.

One laboratory stated that it is critical for regional laboratories to be aware of drug trends in their area. In this laboratory’s area, fentanyl and acetyl fentanyl are in the top ten of the drugs identified in DUID cases, yet they do not see any PCP.

One laboratory clarified that for urine confirmations where it is total drug, their laboratory confirms the drug, however, the sample is not hydrolyzed to obtain total drugs.

One laboratory said that they would like to see a question about LIMS systems used in laboratories included in the survey the next time around.

One laboratory suggested rephrasing some of the questions in the survey the next time around stating that not all laboratories performing DUID testing also perform postmortem testing for vehicle fatalities.

One laboratory explained that their laboratory only receives blood for DUID cases and results are reported qualitatively (per state statute/per se state); however, for postmortem cases, quantitative blood results are reported and urine results are qualitative. Further, their laboratory is validating an LC-MS-MS method to quantitate benzodiazepines.

One laboratory stated that their state statute only requires testing for ethanol, and suggested that perhaps that should change.

One laboratory explained that their laboratory started doing blood drug casework at the end of 2019, whereas all drug DUID work was previously in urine samples. Further, the laboratory has approximately a one-year backlog for urine samples due mostly to lack of staffing, and therefore, had to outsource some samples to help reduce the backlog. The laboratory does not quantitate in urine, nor has any validation for lower limit of detection for testing; however, the laboratory is currently performing method validation for urine testing.

One laboratory stated that their laboratory's testing plan and cutoffs are the same in urine as they are for blood, but urine cases are reported only as qualitative.