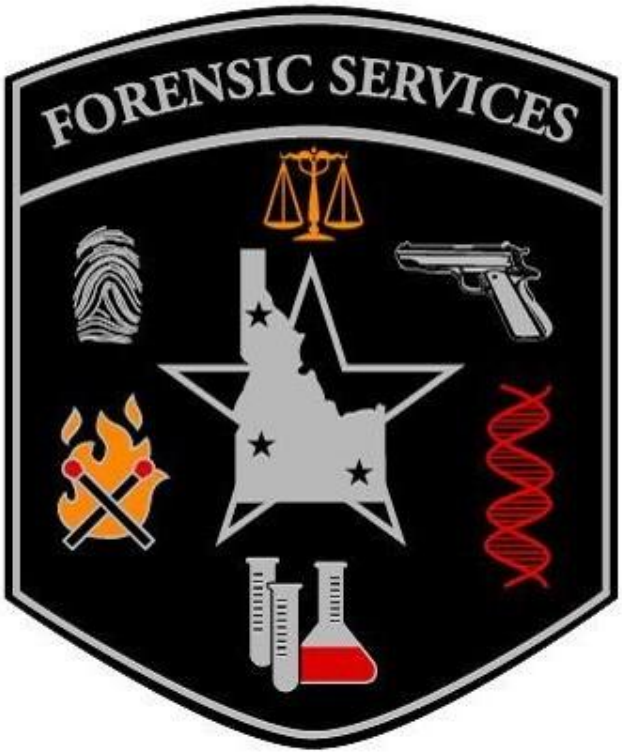
IDAHO STATE POLICE



Toxicology Program Trends

2015

2015 IDAHO STATE POLICE FORENSIC SERVICES: TOXICOLOGY TRENDS

Overview and Background

This report discusses trends in the toxicology program, as well as the number of toxicology cases submitted to the following Idaho State Police Forensic Services (ISPFS) laboratories for the fiscal year 2015 (FY2015): District 1, Coeur d' Alene; District 5, Pocatello; and District 3, Meridian (blood alcohol only). A "toxicology case" is any case which has urine or blood submitted to the laboratory for qualitative drug analysis and/or volatiles analysis; volatiles analysis may also be performed on vitreous humor samples. Volatiles analysis quantitates ethyl alcohol (drinking alcohol) and detects a wide range of other alcohols or inhalants. Toxicology analysis falls under three major disciplines: alcohol (the level of alcohol in blood, urine, vitreous humor, or unknown liquids), blood toxicology (drugs in blood) and urine toxicology (drugs in urine).

A case may have multiple items submitted for analysis (e.g. blood and urine samples taken from both drivers in a two car auto accident account for one case with four items). The case counts in the Toxicology Tracking Information table do not account for multiple items in one case; this total also applies to any items not analyzed (e.g. insufficient sample for analysis). The results discussions in the Alcohol and Toxicology sections of the report are based solely on actual items tested – so if there are multiple items in a case, each item is accounted for in the results discussion. The Alcohol and Toxicology sections do not account for any items not analyzed.

These statistics were compiled from the Idaho Laboratory Information Management System (ILIMS), which was used to log in and track all evidence submitted to the forensic laboratory system during FY2015. All case information is provided by the submitting agencies to the laboratory.

For the purposes of this and all subsequent years, "juvenile" refers to any subject under age 18 as of the incident date, except for alcohol analyses. Subjects under age 21 as of the incident date are considered juveniles for alcohol analysis statistics. This clarification to the "juvenile" definition for alcohol statistics is based on the per se level of 0.02 g% for persons under age 21.

Alcohol statistics for this year's report are expressed in g% units, as not all cases analyzed were blood. The g% unit includes blood (g/100cc blood), urine (g/67mL urine), and vitreous humor (g/100cc vitreous humor). Any liquid alcohol samples have been excluded from the statistical analysis presented here.

Toxicology Tracking Information

	Blood Toxicology	Alcohol/Volatiles	Urine Toxicology	Total	FY2015 Percent
DUI					
Adult	590	1033	339	1962	**78.48%**
Juvenile	10	69	9	88	
Probation Violations*					
Adult	0	0	16	16	**0.77%**
Juvenile	0	0	4	4	
Drug/Narcotic Violations**					
Adult	41	21	45	107	**4.36%**
Juvenile	0	4	3	7	
Other***	46	40	17	91	**3.94%**
Auto Accident Fatalities	46	74	1	121	**4.63%**
Accident Victim Kits	3	10	0	13	**0.50%**
Death (non-homicide)	43	41	5	89	**3.41%**
Murder	3	3	0	6	**0.23%**
Rape****	13	20	33	66	**2.53%**
NJDT	0	0	0	0	**0%**
Total:	**799**	**1332**	**481**	**2612**	**98.85%**

Table 1: Statistics were compiled from the Idaho Laboratory Information Management System (ILIMS) which was used to log in and track all evidence submitted to the forensic laboratory system during FY2015. The ILIMS system allows for agencies to enter multiple charges instead of forcing the agencies to list only the highest charge. Many cases with a drug charge were also DUI cases. Any cases in which a date of birth (DOB) was not provided are classified as "adult" to prevent significant statistical changes to the juvenile category.

*Includes Juvenile, Misdemeanor, and Felony; **Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution/Use by a Minor; ***Includes Abuse/Exploitation of a Vulnerable Adult, Assault/Battery (Aggravated or not), Burglary, Domestic Violence, Evidence Destruction/Alteration/Concealment, Officer Involved Shooting/Accident, Possession of liquor not subject to regulation by division, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful exercise of functions of peace officers, Vehicular Manslaughter; ****Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor.

Terms and Drug Categories

Central Nervous System Depressants (CNS-D), Central Nervous System Stimulants (CNS- S), and carboxy-THC (THC) account for most of the positive toxicology results obtained from analysis. The report

appendix includes term definitions, drug category descriptions, and examples of drugs included in each category.

Carboxy-THC is an inactive metabolite of marijuana (MJ). After ingestion, MJ is broken down in the body to a form that the body can eliminate as waste. There are many MJ metabolites, and carboxy-THC is one of them. ISPFS current methods for extracting MJ from blood and urine will extract this metabolite. ISPFS has recently approved a method which will allow the lab to identify several cannabinoids, including the active component of MJ (delta9-THC) and its metabolites, in blood and urine. This method was not used during FY2015; the laboratory system is also intending to provide quantitative results for delta9-THC sometime during FY2016. It is expected that the toxicology discipline caseload will increase significantly once ISPFS has quantitative methods validated for use in casework. It has been expressed to ISPFS personnel that coroners especially require quantitative results for meaningful interpretation of toxicology results in death investigations. Also, prosecutors have expressed an increasing desire for quantitative results in prosecuting criminal cases.

Driving under the influence of impairing prescription drugs is an increasing problem in Idaho. Some of the most impairing drugs fall under the CNS-D category of drugs. Drugs that exhibit CNS-D effects are found in a wide range of therapeutic categories: anti-depressant, anti-anxiety, anti-histamine, barbiturate, narcotic analgesic (NA), and others.

- ***Narcotic****--a drug that in moderate doses dulls the senses, relieves pain, and induces profound sleep but in excessive doses causes stupor, coma, or convulsions.*
- ***Analgesic****--relives pain.*

Some of the most commonly confirmed narcotic analgesics in Idaho DUI cases are hydrocodone, oxycodone, and methadone.

The benzodiazepine class drugs are anti-anxiety or tranquilizers; the most commonly found benzodiazepines in casework were alprazolam, diazepam, lorazepam, and nordiazepam.

The laboratory tracks cases with positive inhalant results. Investigators suspect inhalation of paint or air duster in most of these cases. Fluorinated hydrocarbons (e.g. 1,1-difluoroethane (DFE)) are the compounds typically found from air duster inhalation; acetone and toluene are volatiles found from canned paint inhalation.

Highly impairing CNS-S drugs such as methamphetamine and cocaine are usually not distributed in prescription form. Amphetamine can be obtained as a prescription, but is most commonly seen as an active metabolite of methamphetamine. Methamphetamine is reduced to amphetamine after ingestion, and is excreted partly as amphetamine. Once broken down into amphetamine, the amphetamine acts as its own drug (i.e. it is an active metabolite), and produces stimulant effects aside from those produced by methamphetamine. ISPFS laboratory analysis yields relatively few positive results for cocaine. This does not necessarily mean cocaine is not being abused in Idaho. Cocaine is

eliminated from the body very rapidly. If a significant amount of time passes between use and sample collection, cocaine may not be detected. However, the inactive cocaine metabolite, benzoylecgonine, has a longer detection window. This means that toxicology results can support allegations of cocaine use, even if no active drug is detected in the sample.

ISPFS lists drug combinations in each of the drug toxicology categories because drug combinations can cause *additive* or *synergistic* effects. Hydrocodone (Vicodin) used in conjunction with carisoprodol (Soma) has greater impairing effects than either drug used alone. An anti-depressant taken alone in therapeutic amounts (prescribed quantities) may not have any impairing effects, but taken in conjunction with other CNS-Ds (e.g. alcohol or other anti-depressants) may display additive effects (i.e. 1 + 1 = 2). Some drugs produce synergistic effects. *Synergistic* means that the drug combination may cause effects much greater than either drug alone (i.e. 1 + 1 = 5). A common example of this would be the mixture of codeine and acetaminophen for the relief of moderate pain. Taken separately either of these substances will provide relief for a lesser amount of pain, but when taken together the synergistic reaction between the two drugs allows for a greater amount of pain relief than if the drugs were taken separately.

A negative sample result in one discipline (i.e. alcohol, blood toxicology, or urine toxicology) only reflects the testing performed in that discipline; the sample may have a positive result from testing in another discipline. For example, a case may have a negative alcohol result, but a positive result for drugs. ISPFS laboratory policy is not to process a sample for toxicology if the blood alcohol result is above 0.10 g%. In special circumstances, such as sexual assault or death investigations, injury to a child, or possible overdose cases, the toxicology may still be analyzed even if the blood alcohol is above 0.10 g%. An ISPFS policy change in 2013 required performance of requested toxicology analyses on samples from deceased drivers in fatality accidents when the alcohol level is below 0.20 g% of blood.

Toxicology Discipline FY2015

The ISPFS laboratory system received 2,612 toxicology cases for FY2015, a decrease of 5 cases from FY2014. The minimal decrease in the number of cases likely means the effects of the *Missouri v. McNeely* decision, which essentially negated implied consent, have stabilized. Most Idaho officers have been advised to obtain a warrant to obtain an evidentiary blood sample, with rare exceptions. The stability of the caseload observed (as opposed to a large increase) might also be due to ISPFS toxicology analysis limitations, particularly in the area of drug quantitation. Many prosecutors are determining that quantitation of the drugs in toxicology samples is necessary for prosecuting cases; ISPFS is currently only able to provide qualitative identification of the drugs in samples, with the exception of ethyl alcohol. This means that ISPFS can identify which drugs are present, but not how much of the drug is present.

Topics covered in this report include:

Alcohol and Other Volatiles	Adult and Juvenile Trends
	Fatality Accidents
	Other Offenses
Toxicology	Adult and Juvenile Trends
	DUI Related Trends
	Other Offenses

Figure 1 contains a line graph of the total yearly toxicology submissions for the last ten years. Multiple items for a single case are often submitted, but are not accounted for in the totals. Samples may be counted twice because an alcohol sample may also be processed for toxicology. The average number of cases submitted to ISPFS for the last 5 years is 3152 cases.

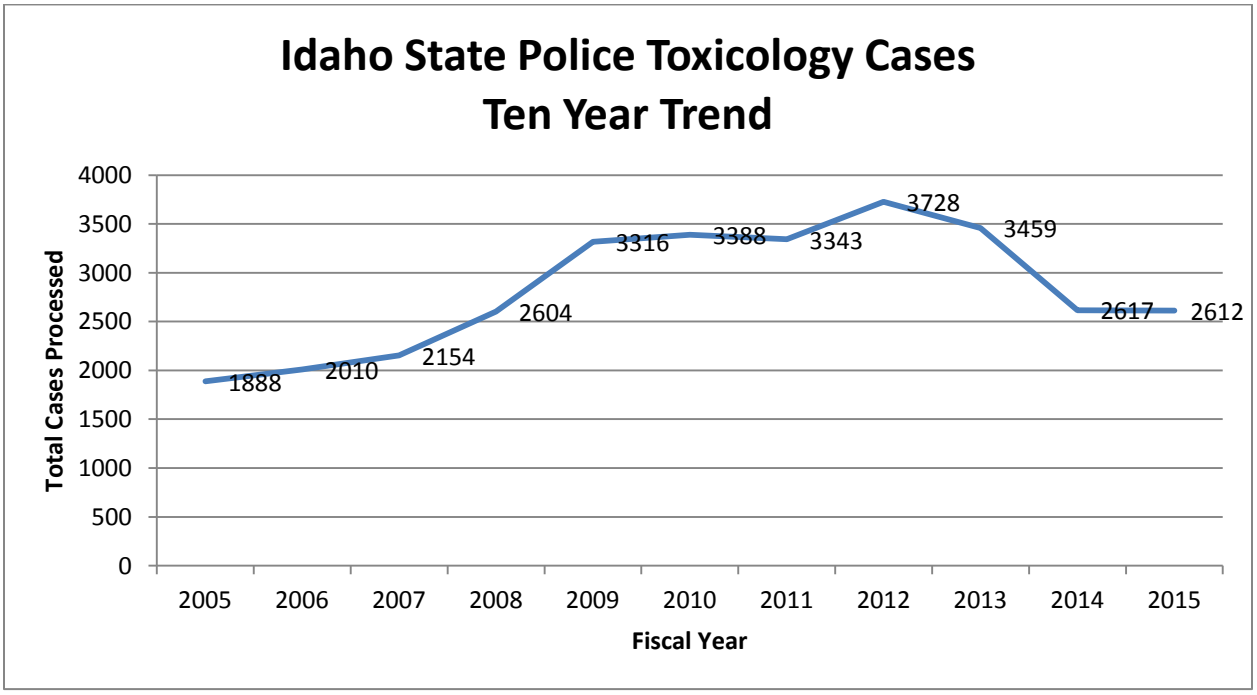


FIGURE 1 – Toxicology Caseload 10-Year Trend

Alcohol and Other Volatiles

The number of alcohol case submissions to ISPFS increased by 23 cases from FY2014 to FY2015. A possible explanation for this trend is forced blood draw constitutionality concerns (*Missouri v. McNeely*). Once the legal decision over forced blood draws was rendered, case submissions began to slowly resume; submissions have not returned to normal submission levels, but submissions do appear to have stabilized. ISPFS provides support for breath testing in Idaho; the scientists working in this discipline have reported a significant increase in breath testing workload. It is likely that officers are opting to perform breath tests rather than obtain warrants, except in cases where drugs other than alcohol are also suspected.

Alcohol analysis requests span a wide range of case types: DUI, rape, accident, death investigation, and other offense cases. The alcohol result category levels are: none detected/ below reportable limit (<0.02 g%), ≥0.02 g% and <0.08 g%, and ≥0.08 g%. Many inhalants and other volatiles can be detected when alcohol analysis is performed.

Adult Alcohol Concentrations

This section's statistics are based not on a total number of cases, but on total alcohol results. This may result in different numbers than the previous table, as some cases have multiple items and others were not analyzed. ISPFS processed 1234 adult samples for alcohol and inhalants during FY2015. The analysis results are tabulated below. Each sample for which alcohol analysis is requested is simultaneously tested for the presence of inhalants. Of the 1234 adult alcohol samples, 28 were urines and 3 were vitreous humor. The total 1201 samples reported in the table below does not include beverage samples, inhalant results, or unanalyzed samples.

Number of Adult Samples	Result Category
3 (not included in total)	Not analyzed
263	<0.02 g%
70	≥0.02 g% and <0.08 g%
868	≥0.08 g%
1201 (Total reflects ethanol results only)	

For the purposes of this report, any alcohol result that was reported as "none detected" or "below reportable limit" is categorized as <0.02 g%. The 263 samples with a result of <0.02 g% are 23 more than the same result category for FY2014. If alcohol and toxicology testing are both requested, then a negative alcohol sample is also processed for drugs. Samples may be positive for drugs other than alcohol. **Figure 2** is a depiction of the overall adult alcohol results for FY2015; this chart includes DUIs, death investigations, auto accident fatalities, and a wide variety of other case types.

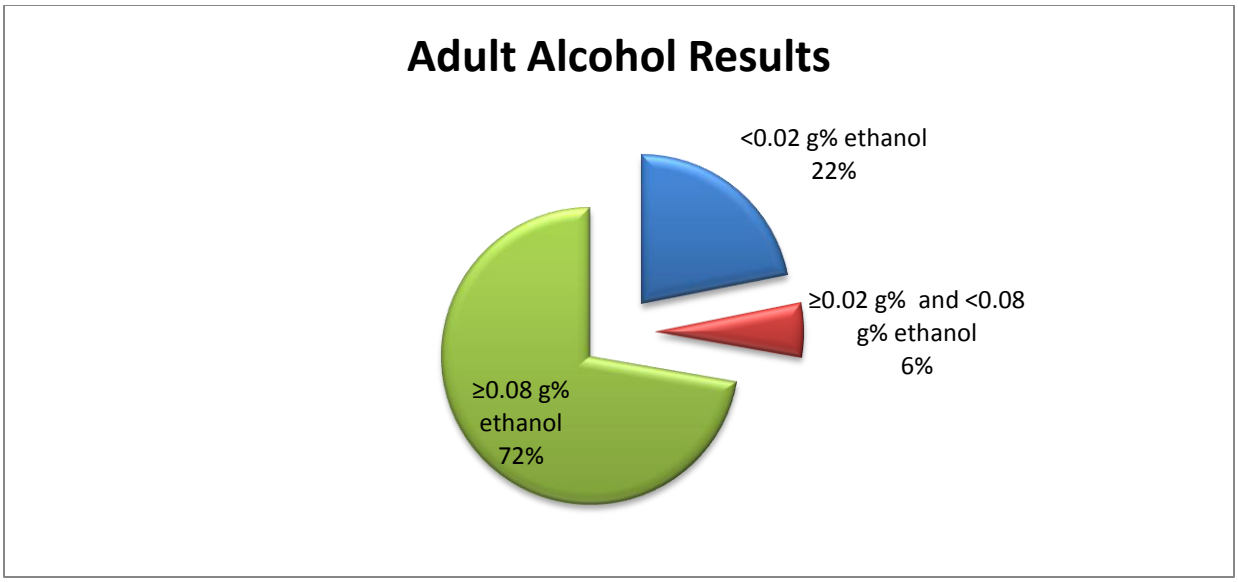


FIGURE 2 – Adult Alcohol Levels for FY2015

Fourteen adult samples tested positive for inhalants. Adults tested positive for inhalants over 4.5 times more frequently than juveniles, as only three juvenile samples were positive for inhalants. The adult population appears more likely to use inhalants. Considering the 1201 adult alcohol samples submitted, 14 positive inhalant samples is not a significant percentage. The inhalants confirmed in the 14 positive samples include:

- 2 samples positive for fluorinated hydrocarbons (air duster)
- 10 samples positive for acetone (nail polish remover, formed in the body during ketoacidosis)
- 1 sample positive for acetaldehyde (formed in the body from ethanol)
- 1 sample positive for isopropanol (rubbing alcohol)

Adult samples submitted for **pending DUI charges** constituted 1016 of the total 1201 (84.6%). Of these 1016 samples, 808 were over the per se limit of 0.08 g% (79.5%). If alcohol and toxicology were both requested on submission, any sample with alcohol results below 0.10 g% was automatically forwarded for drug testing. ISPFS also provides toxicology analysis for those cases where the alcohol level is ≥0.10 g% if there are extenuating circumstances. Extenuating circumstances can include sexual assault or death investigations, injury to a child, or aggravated offenses.

When urine samples are submitted for inhalant testing, they undergo simultaneous alcohol testing as it is the same test. Urine alcohol results are of questionable value, and are reported by ISPFS with a disclaimer statement. The questionable value of these results is based on several reasons. First, bacteria and yeast can grow in the urine. Bacteria and yeast can be common in urine samples and produce alcohol. Second, urine collection procedures are critical for meaningful interpretation of

results. The urine needs to be voided, and then a 15 minute wait period observed before a fresh urine sample is collected for alcohol analysis. ISPFS discourages the use of urine for alcohol analysis due to the questionable value of results (IDAPA 11.03.01), but urine samples are occasionally submitted for alcohol and/or inhalants analysis.

One category of particular interest is **adult auto accident fatalities**. A total of 69 adult auto accident fatality case samples were submitted to ISPFS in FY2015; this is a decrease of 4 cases as compared to FY2014. Of the 69 cases, 60.9% contained <0.02 g% alcohol, but 33.3% were at or above the legal limit of 0.08 g%. The samples at or above the legal per se level is up over 5% for FY2015. **Figure 3** shows the BAC results for the adult auto accident fatalities.

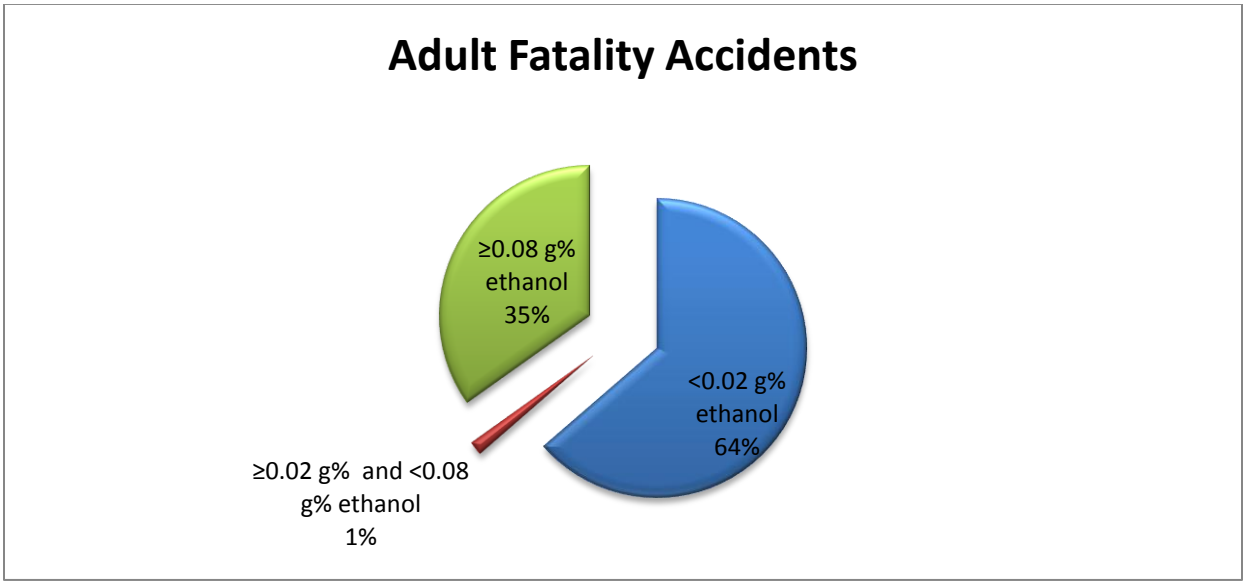


FIGURE 3 – Results for Adult Fatality Accidents

Figure 4 depicts the ten year trend of adult auto accident fatality cases submitted to ISPFS. The ten year average of 73 submissions is relatively stable. Law enforcement efforts, including their increased presence on Idaho roads, have helped to keep these cases from rising significantly. One particularly good example of inter-department cooperation in this public safety effort is the Idaho Department of Transportation (IDT) contributing funds to increase trooper saturation on the highways during high-risk time periods (i.e. holiday weekends).

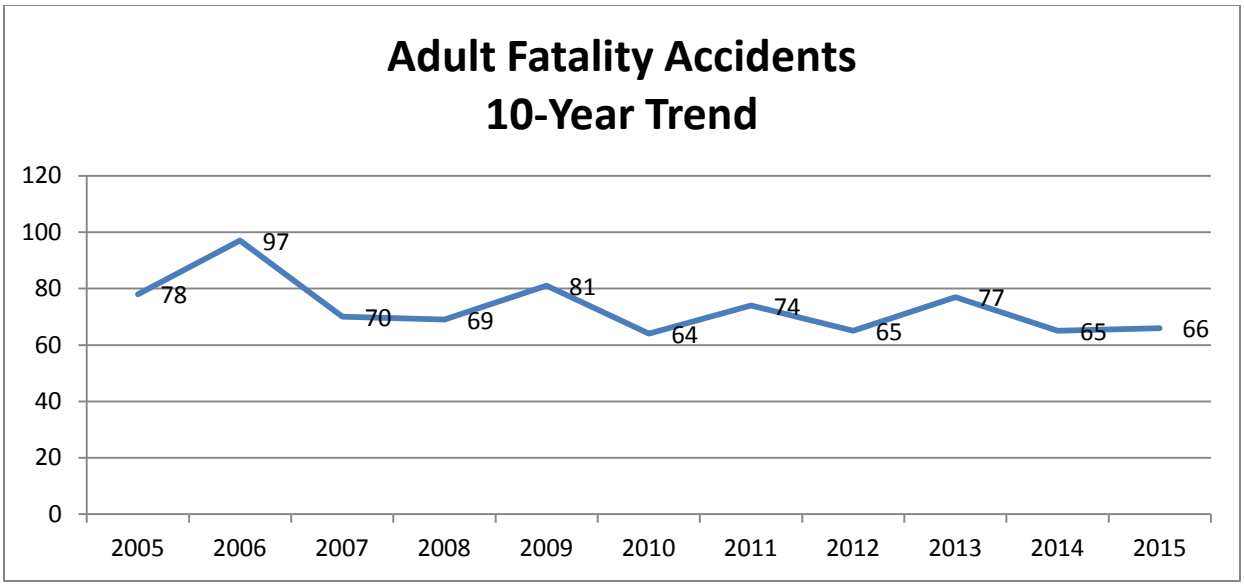


Figure 4 – Ten Year Adult Fatality Accident Trend

Juvenile Alcohol Concentrations

ISPFS processed 125 juvenile BAC cases in FY2015. Of these samples, 58% were over the legal limit for persons under age 21 (0.02 g%). While the number of samples submitted increased, the percentage of alcohol-positive results was stable in FY2015. Of the 125 juvenile alcohol samples submitted to ISPFS, 94 were **juvenile DUI cases**; 58% of these cases were over the juvenile (under age 21) legal limit of 0.02 g%. **Figure 5** displays the overall juvenile case results; these results include DUIs, accident fatalities, and various other case types.

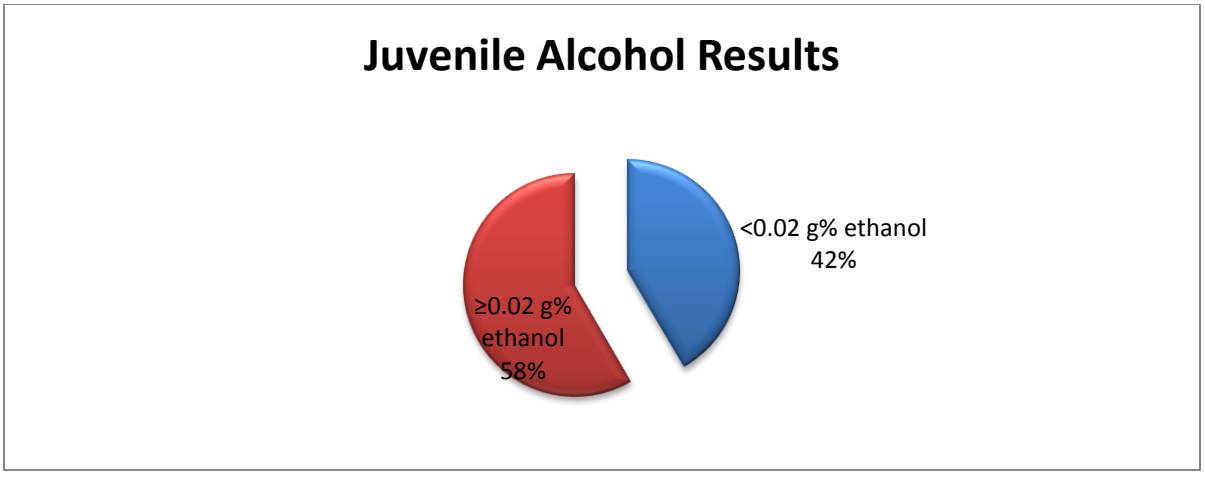


FIGURE 5 – Juvenile Alcohol Results

Inhalants were not found in the same abundance in juvenile samples as they were in the adult samples. One DUI sample tested positive for difluoroethane (air duster). FY2014 had four positive results for fluorinated hydrocarbon(s) in juvenile samples. Inhalants are volatiles and evaporate easily. Inhalants do not stay in the blood or urine in detectable amounts for long periods of time, so the laboratory results may not be indicative of the prevalence of use.

Juvenile alcohol samples submitted in **fatality cases** decreased by 3 from FY2014 (11 cases) to FY2015 (8 cases). One-quarter of the FY2015 juvenile fatality cases had an alcohol result above the per se 0.02 g%.

Figure 6 is trend chart to show the juvenile auto accident fatality cases submitted over the last 10 years.

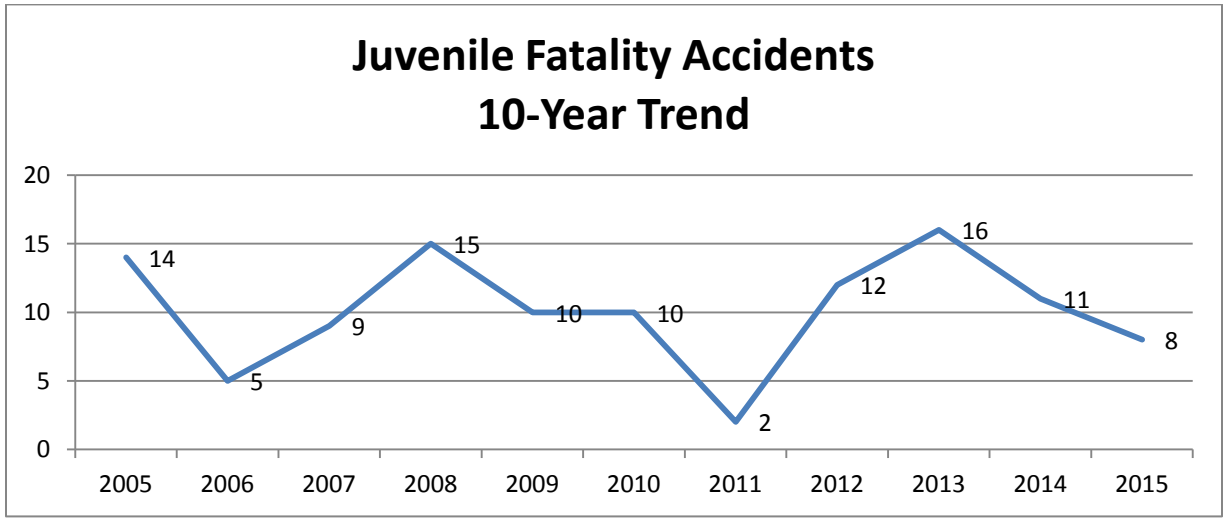


Figure 6 – Ten Year Juvenile Fatality Accident Trend

Other Offense Alcohol Concentrations

Cases submitted for alcohol analysis in FY2014 also included several other offenses. **Figures 7** is a graphic depiction of offenses (other than DUI) for which samples were submitted for alcohol analysis. **Figures 8 and 9** are depictions the results breakdowns for these other offenses for adults and juveniles, respectively. Death investigations (non-homicide) can be suicides, unattended deaths, or any other death that is deemed non-criminal. Many of the cases listed with negative or low alcohol concentrations may have a positive result for other drugs in the toxicology section of this report.

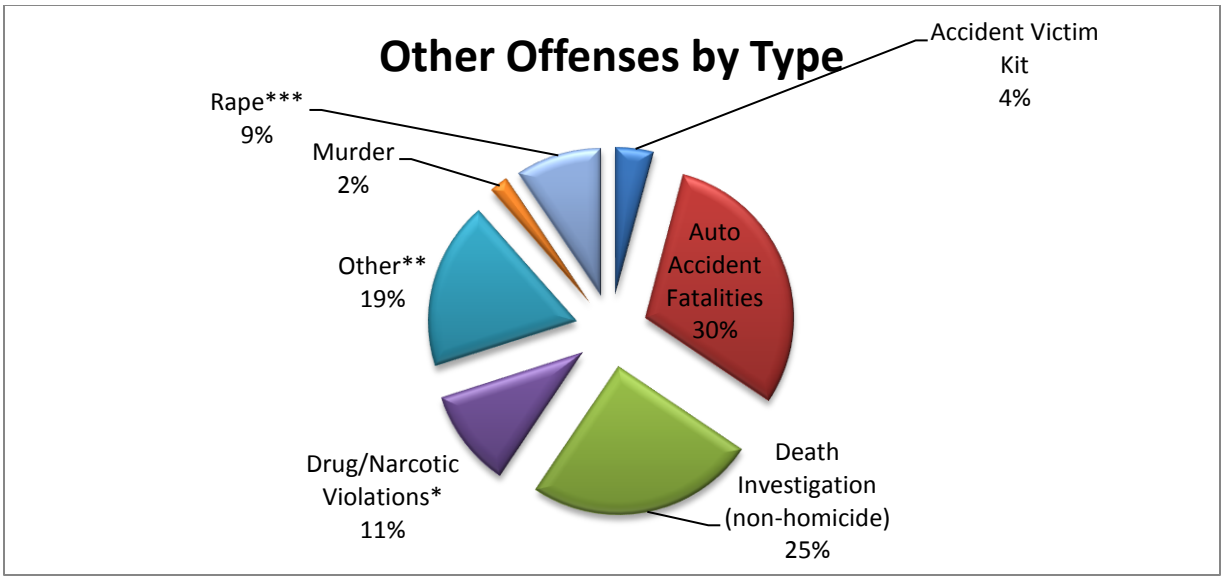


Figure 7 – Alcohol Analysis Requests by Other Offense Types

* Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution/Use by a Minor; **Includes Abuse/Exploitation of a Vulnerable Adult, Assault/Battery (Aggravated or not), Burglary, Domestic Violence, Evidence Destruction/Alteration/Concealment, Officer Involved Shooting/Accident, Possession of liquor not subject to regulation by division, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful exercise of functions of peace officers, Vehicular Manslaughter; ***Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor.

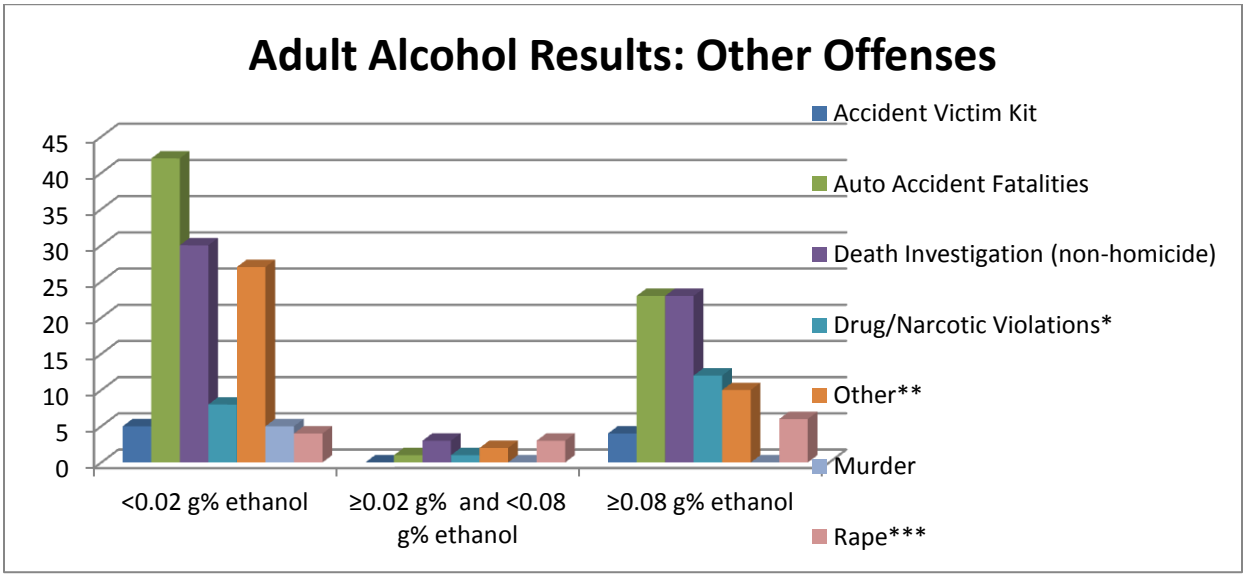


Figure 8 – Adult Alcohol Results for Other Offenses

* Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution/Use by a Minor; **Includes Abuse/Exploitation of a Vulnerable Adult, Assault/Battery (Aggravated or

not), Burglary, Domestic Violence, Evidence Destruction/Alteration/Concealment, Officer Involved Shooting/Accident, Possession of liquor not subject to regulation by division, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful exercise of functions of peace officers, Vehicular Manslaughter; ***Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor.

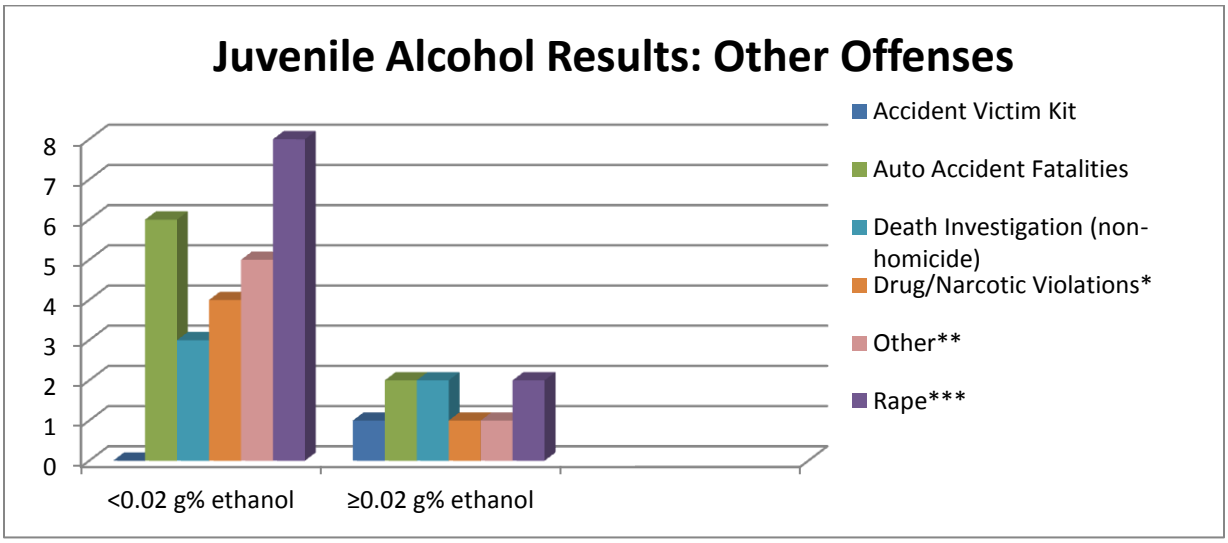


Figure 9 – Juvenile Alcohol Results for Other Offenses

* Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution/Use by a Minor; **Includes Abuse/Exploitation of a Vulnerable Adult, Assault/Battery (Aggravated or not), Burglary, Domestic Violence, Evidence Destruction/Alteration/Concealment, Officer Involved Shooting/Accident, Possession of liquor not subject to regulation by division, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful exercise of functions of peace officers, Vehicular Manslaughter; ***Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor.

It should also be noted that ISPFS annually provides each analyst one proficiency test in each discipline in which s/he is certified. The successful completion of this annual test is required for analysts to be permitted to continue to perform analyses on casework. Furthermore, analysts are also provided a competency test prior to becoming certified to perform analysis. The proficiency and competency test statistics are not applicable to this report, and therefore not included.

Toxicology (Drugs in Blood and Urine)

The difference between the blood and urine matrices submitted for testing drugs (toxicology) depends on many things: pH, methods of analysis, drug metabolism, and many others. Based on this knowledge, some drugs may be found in one matrix and not the other. For instance, carboxy-THC may be found in urine many days after use, but not in blood. If carboxy-THC is found in the blood, it may be indicative of more recent use. The type of fluid sample sent for toxicology analysis may depend on legal considerations. Blood is a better sample for alcohol, and can easily be retained for toxicology testing. Blood is often the preferred sample for toxicology because it gives the best indicator for possible impairment, and blood is usually obtained for legal purposes. Urine is filtered by the kidneys and is a much cleaner matrix; urine allows faster extractions of drugs. Further, urine pools in the bladder and often provides a greater concentration of drug than in blood. Obtaining a urine sample is not an invasive procedure, whereas a blood sample collection is invasive; also, it is usually possible to obtain a much larger volume of urine than blood. Blood is the preferred sample for purposes where current impairment is in question, so urine is often not collected. The blood and urine results cannot be directly compared against each other, but using both blood and urine methods allows for more diverse and comprehensive analysis. It also allows for more accurate interpretation of results.

ISPFS toxicology policy states that samples with a result over a set amount of alcohol will not be tested for toxicology unless extenuating circumstances are present. ISPFS accepted 762 blood samples and 476 urine samples for toxicology testing in FY2014. There was an increase of 2 blood toxicology samples submitted to the laboratory system between FY2014 and FY2015, and a decrease of 72 urine toxicology samples submitted during the same period.

All toxicology graphs use red for blood, yellow for urine. ISPFS occasionally receives blood/urine combination kits; the numbers for that type of kit received in FY2015 was very small (14), and are not included in the graphs below. Graphical representation of the “Single Drug” category refer to samples that only had a single therapeutic drug category present – some of these samples had multiple drugs within that same category. For example, diphenhydramine (Benadryl) and zolpidem (Ambien) are both in the CNS-D category; a sample containing both drugs will show up in the “Single Drug” category despite the presence of multiple drugs in the sample.

Adult

Figure 10 shows the adult blood and urine toxicology results for FY2015 by therapeutic category. For example, hallucinogens (Hall) might be ecstasy (MDMA); narcotic analgesics (NA) might be drugs such as morphine or hydrocodone.

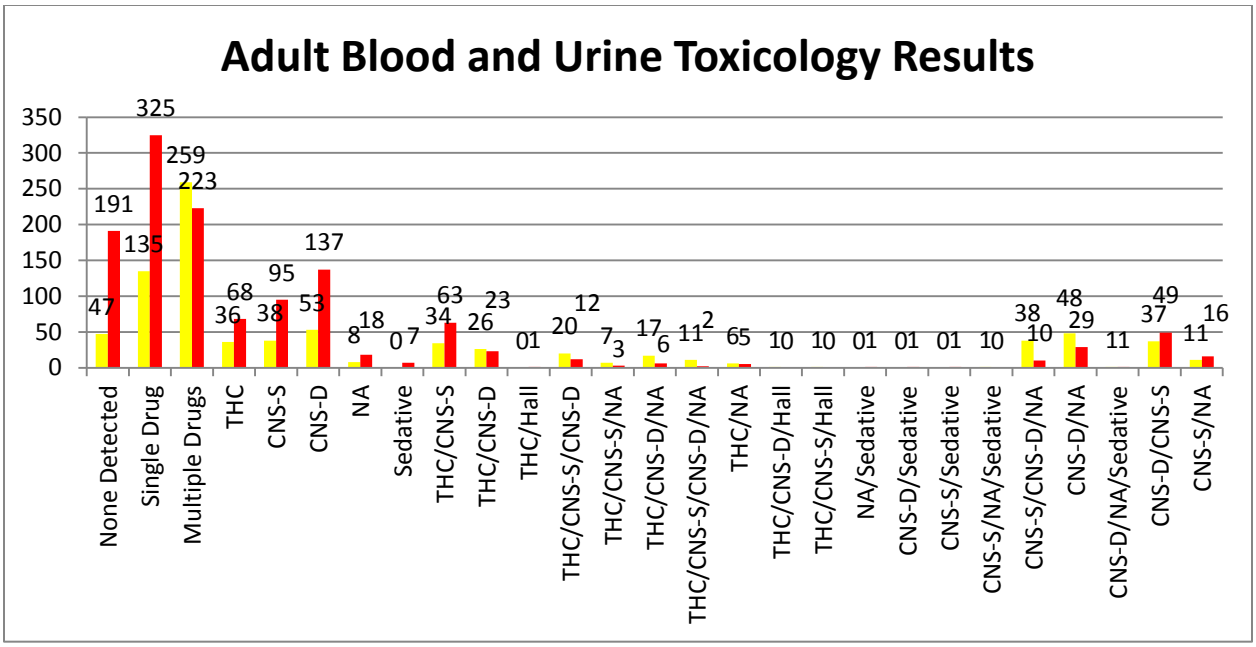


FIGURE 10 – Adult Blood and Urine Toxicology Results by Category

The data for adult blood and urine samples show some interesting differences. For instance, blood analysis data indicates single-category drug use is more prevalent than multiple drug category combinations. Urine analysis shows the opposite indication. The results included in the "None Detected" designation include samples that were not analyzed for reasons such as insufficient sample volume. Also included in the "None Detected" category are those drugs that do not fit into a specific therapeutic category (e.g. metoprolol). Many of the blood samples submitted had a request for both alcohol and toxicology testing. When the alcohol result is 0.10 g% or higher, the blood sample and urine sample (if present for the same case) is returned without toxicology testing in most cases.

It is common in Idaho for the **most common single drugs** present in both adult urine and blood matrices to be a central nervous system depressant (CNS-D), followed by a central nervous system stimulant (CNS-S), and then carboxy-THC. CNS-Ds can be many drugs; examples include Valium, Xanax, and Ambien. CNS-Ss include drugs like Ritalin, Adderall, and methamphetamine. Carboxy-THC is commonly the metabolite of either MJ or the prescription drug Dronabinol.

Data from FY2015 indicates the **most prevalent drug combination** in urine is CNS-D and a narcotic analgesic (NA), followed by a combination of CNS-D, CNS-S, and NA. In blood, the most prevalent drug combination is CNS-S and carboxy-THC, followed by CNS-D combined with CNS-S. The drug combination of CNS-D/NA is often prescribed together (e.g. muscle relaxers and pain killers), though ISPFS detected that combination more frequently in urine than in blood. This may be due in part to the current method limitations for confirming opiates in blood. Alprazolam (anti-anxiety /tranquilizer), citalopram (anti-depressant) and diphendramine (OTC cold medicine/ motion sickness medication) are the most prevalent CNS-D's found, followed by carisoprodol, meprobamate (active metabolite of the muscle

relaxer Carisoprodol) and zolpidem (sleeping pill). Other popular CNS-D's are lorazepam, diazepam, and nordiazepam. Hydrocodone is by far the most commonly found narcotic analgesic. Narcotic analgesics and benzodiazepine-class compounds (e.g. alprazolam) are widely abused and addictive.

The most common CNS-Ss are methamphetamine and amphetamine. CNS-Ss also include cocaine and phentermine (commonly prescribed for weight loss). If methamphetamine is present in a urine or blood sample, amphetamine will likely be present as well. Amphetamine is an active metabolite of methamphetamine; it is impossible to determine whether any confirmed amphetamine in a sample is a result of prescription or illicit drug use. Amphetamine is available as prescription Adderall®. The metabolite amphetamine is less abundant in blood samples because the methamphetamine may not have metabolized completely. A urine sample will have amphetamine present in almost all cases where methamphetamine is present because of increased time in the body for metabolism of the methamphetamine to amphetamine.

The final breakdown of the adult drug results is as follows: 1,180 samples tested for adult toxicology (blood and urine). 238 total samples for blood and urine were negative, 460 samples contained a single drug category, and 482 samples contained multiple drug categories.

Figure 11 illustrates adult drug results for both blood and urine associated with DUI. The pattern is the same as demonstrated with overall adult toxicology (see **Figure 10).** This trend is expected since the majority of cases submitted for toxicology are DUI's.

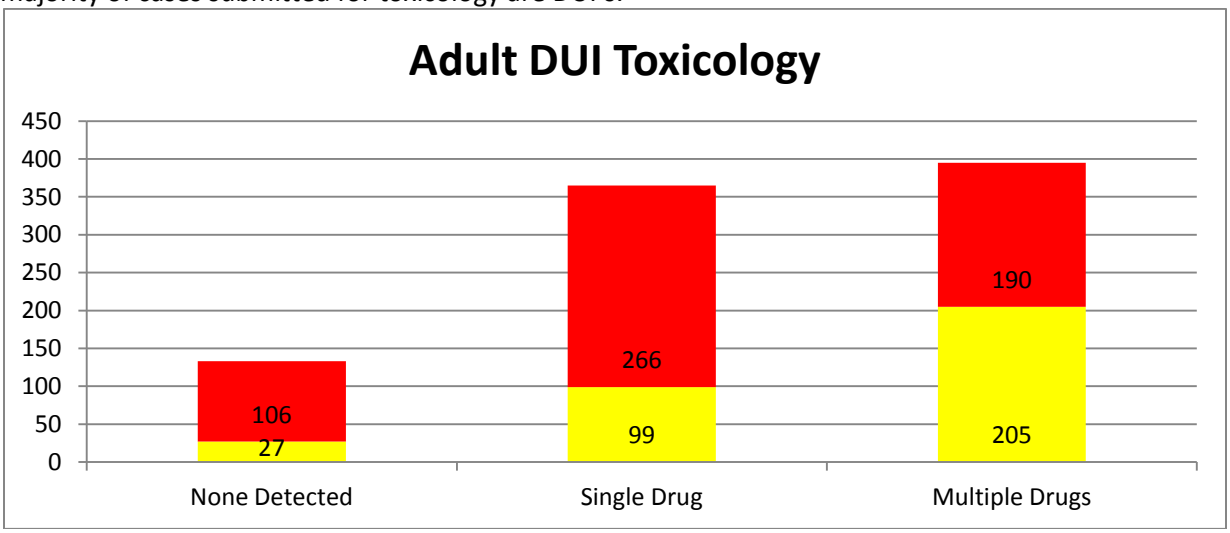


Figure 11 – Adult DUI Toxicology Results

Figure 12 shows the result categories for the 47 toxicology accident fatality samples submitted for toxicology in FY2015. This is a large decrease in fatality accidents as compared to FY2014.

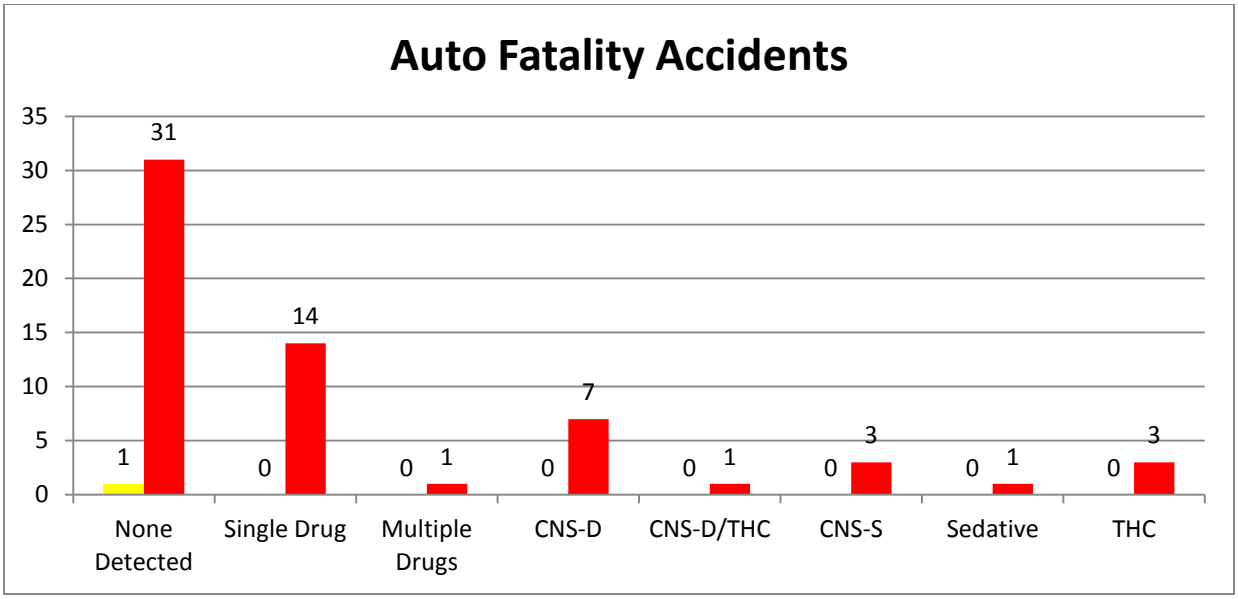


Figure 12 –Toxicology Summary for Fatality Accidents, by Category

In FY2015, 68% of the 47 cases submitted for fatality cases had no drugs confirmed (None Detected category). The most common drug category present in drug-positive cases was CNS-D, followed by Carboxy-THC and CNS-S in equal measure.

Juvenile

Juvenile toxicology case submissions remained stable. Year after year, ISPFS reports carboxy–THC in the majority of juvenile cases. Carboxy- THC is an inactive metabolite of MJ.

ISPFS reported 65.5% of blood and urine samples contained at least one drug. 55.2% (blood and urine samples) were positive for a single drug category; 17.9% of juvenile samples contained multiple drug categories. The majority of drug combination samples contained carboxy-THC. Overall, 34% of juvenile samples contained carboxy-THC, either alone or in combination with other drugs. 34.5% of the total juvenile samples were negative. The percentage of negative results may be partially due to limitations in ISPFS drug detection methods; ISPFS has limited capabilities to analyze toxicology samples for many designer drugs and/or their metabolites.

Some of the most commonly reported drug combinations are carboxy-THC with a CNS-D, and carboxy-THC with a CNS-S. Over-the-counter (OTC) drugs are commonly abused, as they are easily and legally obtained; the drugs are taken in higher than recommended doses for the side effects. Abuse of these drugs seems to be more common in juveniles than adults. **Figure 13** shows the distribution of results in the juvenile blood and urine toxicology categories.

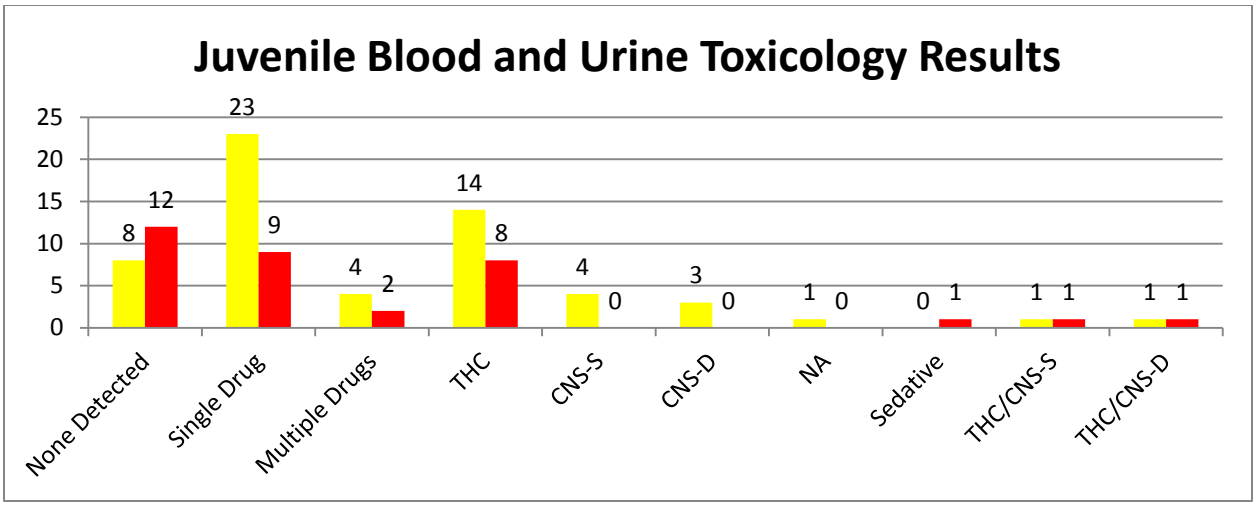


Figure 13 – Juvenile Blood and Urine Toxicology Results by Category

Figure 14 illustrates juvenile DUI results. Juvenile DUI results had a slightly higher incidence of single drug categories detected (60.7%) than the overall results for all juvenile laboratory submissions (55%). Carboxy–THC is commonly reported in juvenile DUI cases. CNS-Ss (methamphetamine/amphetamine) are reported as a distant second in juvenile DUI cases. Methamphetamine continues to be problematic in both adult and juvenile populations.

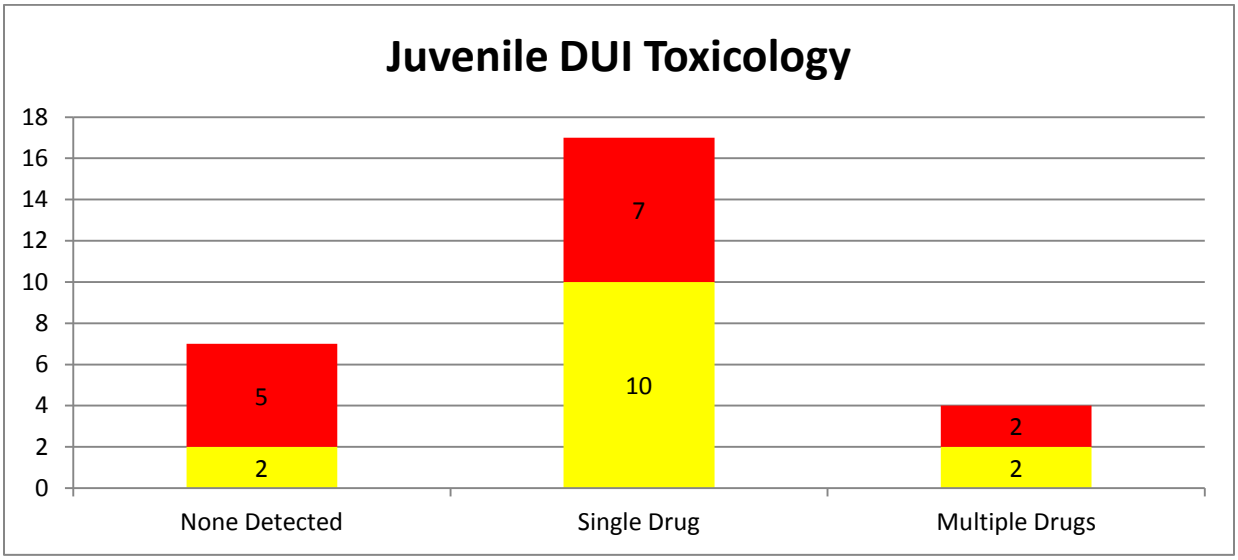


Figure 14 – Juvenile DUI Toxicology Results

Juvenile accident fatalities in which toxicology analysis was performed numbered 2 in FY2015, a decrease from the 3 analyzed in FY2014. One sample resulted in no drugs detected, the other contained a single drug category.

Other Offense Toxicology Results

Cases submitted for toxicology analysis in FY2015 also included several other offenses.

Adults:

Count	Offense	Toxicology Results
4	Murder	• 2 negative • 2 Positive—CNS-D, THC, CNS-S.
36	Rape****	• 8 negative • 28 Positive –CNS-S, CNS-D, and carboxy-THC were the most common results by far.
90	Drug Violations*	• 11 negative • 79 Positive – the most common categories detected were THC or CNS-S, either alone or in combination with other drugs.
14	Probation Violations**	• 5 negative • 9 Positive – Most contained a CNS-S, either alone or in combination with a CNS-D
58	Other Offenses***	• 25 negative • 33 Positive—mostly CNS-Ds and CNS-Ss
38	Death Investigations*****	• 21 negative • 17 Positive-- CNS-D and carboxy-THC most common, either in combination or alone

Juveniles:

Count	Offense	Toxicology Results
3	Drug Violations*	• All positive, all contained carboxy-THC
7	Probation Violations**	• 3 negative • 4 Positive—all contained carboxy-THC, either alone or in combination with a CNS-S
5	Other Offenses***	• 1 negative • 4 Positive – CNS-D, CNS-S, carboxy-THC
12	Rape****	• 7 negative • 5 Positive--CNS-D, CNS-S, and carboxy-THC

* Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution/Use by a Minor; **Includes Juvenile, Misdemeanor, and Felony; ***Includes Abuse/Exploitation of a Vulnerable Adult, Assault/Battery (Aggravated or not), Burglary, Domestic Violence, Evidence Destruction/Alteration/Concealment, Officer Involved Shooting/Accident, Possession of liquor not subject to regulation by division, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful exercise of functions of peace officers, Vehicular Manslaughter; ****Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor; *****Death investigations can be suicides, unattended deaths or any other death that is deemed non-criminal.

Top ten ISPFS reported drugs:

1. Carboxy- THC

2. Methamphetamine (CNS-S)

3. Amphetamine (CNS-S)*

4. Alprazolam (CNS-D)

5. Hydrocodone (NA)

6. Diphenhydramine (CNS-D)

7. Citalopram (CNS-D)

8. Zolpidem (CNS-D)

9. Nordiazepam (CNS-D)**

10. 7-Aminoclonazepam/alpha-Hydroxyalprazolam (CNS-D)***

*Amphetamine may be a metabolite of methamphetamine.

**Nordiazepam may be a metabolite of diazepam.

***7-Aminoclonazepam is an active metabolite of clonazepam. Alpha-hydroxyalprazolam is an active metabolite of alprazolam.

Summary

The laboratory system received 2,612 toxicology cases in FY2015, 5 cases fewer cases than in FY2014.

Urine toxicology case submission continued to decline in FY2015. This trend has been predicted over the last few years. We expect further decline in urine toxicology submission in FY2016, particularly as ISPFS expands its blood analytical capabilities to include some quantitative methods. ISPFS is moving toward testing only blood for DUI cases whenever possible.

ISPFS maintained improved turnaround times in FY2015. Despite continued staffing shortages, trained scientists have worked diligently to successfully reduce backlogs. Training a toxicologist is a long and expensive process, but backlogs will continue to be problematic without new analysts and instrumentation.

In FY2014, ISPFS began validation of a new extraction method using Liquid Chromatography / Tandem Mass Spectrometry (LC QQQ). This method allows analysts to extract more of the cannabinoid class compounds (MJ) from samples than the Gas Chromatograph/ Mass Spectrometry (GC/MS) methods were capable of doing. This new method was recently approved for use, and has increased the number of active compounds able to be detected in blood and urine. ISPFS successfully completed training of analysts in both laboratories as of beginning FY2016, and this method is now offered at both the Pocatello and Coeur d'Alene laboratories.

Adult toxicology trends in every category (DUI'S, fatalities, other offenses, etc.) remained fairly consistent with data from FY2014. One difference in results from FY2014 was that the single drug category was seen more frequently than multi-drug (blood only). The highest single drug categories reported from blood and urine testing were CNS-Ds, followed by CNS-Ss, then carboxy-THC (marijuana metabolite). The CNS-D category covers a wide range of drugs and drug classes, so this result was expected. The significant CNS-D drugs found in samples were alprazolam, citalopram, diphenhydramine, meprobamate, and zolpidem. CNS-S data may not be as prominent as CNS-D data because the category covers a much smaller range of drugs than CNS-D. Methamphetamine and amphetamine were the most prominent CNS-S drugs reported by ISPFS. Methamphetamines are overwhelmingly the most common CNS-S. Methamphetamine continues to be a large problem in Idaho. Methamphetamine is a close second to carboxy-THC in frequency reported by ISPFS. Marijuana and methamphetamine continue to appear in most case categories. Year after year, carboxy-THC becomes more prevalent in toxicology test results. This trend is expected to continue, particularly due to recreational and medical MJ legalization in the states surrounding Idaho. Perhaps educating Idaho residents more aggressively can help reduce these numbers.

For FY2016, it continues to be essential that ISPFS personnel get the funding, training, methods, and instruments needed to be improve ISPFS detection of opiates, including heroin, from toxicology samples. These drugs have widely impacted our controlled substances section, and they will also impact

the toxicology section when the testing can be accomplished. It is anticipated that many of our current "negative" samples would test positive for designer drugs and opiates that we are currently unable to detect. ISPFS frequently receives requests for analysis of designer drugs in toxicology samples. ISPFS scientists are working hard to reduce backlogs, but more analysts, instruments, and space (bench space and work areas) are needed to keep up with the demands of Idaho population growth and law enforcement activities.

APPENDIX

Non Random Juvenile Drug Testing (NJDT) Please see Idaho Statues *Title 33. Education, Chapter 2.*

Drug Evaluation and Classification (Information below was provided by the NHTSA *Drug Evaluation and Classification Training Manual,* January 2006 edition.) Changes have been made to help the understanding of the reader, such as Benzodiazepines have been added to anti-anxiety column in the chart and Methamphetamine has been added to list of stimulants.

Central Nervous System Depressants

Central Nervous System Depressants (CNS-D) slow down the operation of the brain. They first affect those areas of the brain that control a person's conscious, voluntary actions. As dosage increases, depressants begin to affect the parts of the brain controlling the body's automatic, unconscious processes, such as heartbeat and respiration.

Possible Effects of CNS Depressants:

- ✓ Reduced social inhibitions
- ✓ Divided attention impairment
- ✓ Slowed reflexes
- ✓ Impaired judgment and concentration
- ✓ Impaired vision and coordination
- ✓ Slurred, mumbled or incoherent speech
- ✓ A wide variety of emotional effects, such as euphoria, depression, suicidal tendencies, laughing or crying for no apparent reason, etc.

Alcohol is the model for the CNS Depressant category of drugs.

Some major subcategories of CNS Depressants other than alcohol include:

- Barbiturates
- Non-Barbiturates (synthetic compounds with a variety of chemical structures)
- Anti-Anxiety Tranquilizers
- Anti-Depressants (to combat psychological depression)
- Anti-Psychotic Tranquilizers
- Combinations of the above five subcategories

Examples of CNS Depressants

Barbiturates	Other	Anti-Anxiety Tranquilizers Benzodiazepines	Anti-Depressants	Anti-Psychotic Tranquilizers	Combinations
Amobarbital	Carisoprodol Meprobamate-M	Alprazolam	Amitriptyline Hydrochloride	Chlorpromazine	Chlordiazeproxide and Amitriptyline
Pentobarbital	Chloral Hydrate	Chlordiazepoxide	Bupropion	Droperidol	Chlordiazepoxide Hydrochloride and Clidinium Bromide
Phenobarbital	Diphenhydramine Hydrochloride	Clonazepam	Citalopram	Lithium Carbonate	Perphenazine And Amitriptyline
			Desipramine Hydrochloride	Lithium Citrate	
Secobarbital	Diphenylhydantoin Sodium	Diazepam	Doxepin Hydrochloride	Haloperidol	
			Escitalopram		
Barbital	Ethchlorvynol	Estazolam			
	Gamma-Hydroxybutyrate (GHB)	Flunitrazepam	Fluoxetine		
		Flurazepam	Impramine		
	Glutethimide	Lorazepam	Paroxetine		
	Methaqualone	Oxazepam	Phenelzine Sulfate		
	Paraldehyde	Temazepam	Sertaline		
	Zolpidem	Triazolam	Venlafaxine		

Central Nervous System Stimulants

Central Nervous System Stimulants (CNS-S) speed up the operation of the brain and spinal cord. It is important to emphasize that "speed up" does *not* mean "improve" or "enhance". Some CNS Stimulants can improve cognitive functions in very low doses; however, most definitely do not make the brain work better. Rather, they cause the brain and the rest of the nervous system to work *harder*, and often to make more mistakes.

The "speeding up" caused by CNS Stimulants results in significantly increased heartbeat, respiration and blood pressure, all of which can lead to physical harm to the abuser. In addition, the stimulant user experiences nervousness, irritability and an inability to concentrate or think clearly.

Possible Effects of CNS Stimulants

- ✓ Euphoria
- ✓ Anesthetic effect
- ✓ Hyperactive
- ✓ Impaired ability to perceive time and distance
- ✓ Confusion and loss of the ability to concentrate or to think clearly for any length of time

Some major subcategories of CNS Stimulants

- ➢ Cocaine
- ➢ Amphetamines
- ➢ Methamphetamines
- ➢ Others such as phentermine, methylphenidate, ephedrine/pseudoephedrine

Hallucinogens

Hallucinogens (Hall) are drugs or substances that affect a person's perception, sensation thinking, self awareness and emotions. They may also cause hallucinations. A hallucination is a sensory experience of something that does not exist outside the mind. It may involve hearing, seeing, smelling, tasting or feeling something that isn't really there. Or, it may involve distorted sensory perceptions so that things look, sound, smell, taste or feel differently from the way they actually are.

Possible Effects of Hallucinogens

- ✓ Hallucination
- ✓ Perception of reality severely distorted
- ✓ Delusions
- ✓ Illusions

Examples of Hallucinogens

Naturally occurring Hallucinogens

- ➢ Peyote
- ➢ Psilocybin

Synthetically manufactured Hallucinogens

- LSD
- MDA, MDMA, MMDA, TMA, STP, DET, DMT

Narcotic Analgesics

There are two subcategories of Narcotic Analgesics (NA). The first subcategory consists of the Opiates. The second subcategory is the Synthetic Opioids.

Possible Effects of Narcotic Analgesics

- ✓ "On the nod" (a semiconscious state of deep relaxation, eyelids will be droopy and the head will slump.)
- ✓ Slowed reflexes
- ✓ Slow and raspy speech
- ✓ Slow, deliberate movement
- ✓ Inability to concentrate
- ✓ Slow breathing
- ✓ Skin cool to touch
- ✓ Possible vomiting
- ✓ Itching of the face, arms, or body

Commonly-Abused Opiates and Their Derivation From Opium

- Morphine
- Codeine
- Heroin
- Dilaudid
- Hydrocodone
- Numorphan
- Oxycodone

Common Synthetic Opiates

- Demerol
- Methadone
- Fentanyl
- MPPP
- Darvon