Toxicology Program Trends

FY 2019

FY2019 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 2019 (FY2019): District 1, Coeur d' Alene; District 5, Pocatello; and District 3, Meridian (blood alcohol only). A "toxicology case" is any case that 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). If blood and/or urine is also taken from any passenger(s) in either vehicle, those samples will also be contained under the same case number. 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 FY2019. 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 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.

Both the Pocatello and Coeur d'Alene labs were using new toxicology methods in FY 2018, which greatly decreased the time it takes to process case samples and blood toxicology turnaround times have continued to decline from those seen in recent years.

In addition to decreasing the amount of time it takes to process blood toxicology cases, the new methods implemented also included the ability to report out quantitative values for numerous compounds. The labs will continue to collect data for additional compounds and start reporting out quantitative values for those additional compounds as appropriate uncertainties are established.

Best practice in toxicology testing is to use two different technologies to screen and confirm compounds. Sometimes this is not possible so workarounds such as using the same instrument but different mobile

phases, columns, and methods for the screening and confirmatory testing can be employed. This was how the toxicology section was and has been functioning for some time.

Toward the end of FY 2019, the toxicology section received two new instruments (LC-QTOF). One instrument went to the Pocatello laboratory and the other went to the Coeur d'Alene laboratory. The validation process for those instruments will be ongoing and is expected to be completed during FY2020. These instruments will be used for preliminary screening procedures for both blood and urine. The use of these instruments will allow us to follow the best practices guidelines and have two different technologies for screening and confirmatory testing. In addition, unlike the LC-QQQ instruments that are currently being used for preliminary testing (screening), the new LC-QTOF instruments will allow us to go back and search data that has been run on the instrument for additional compounds that are not covered on our targeted screen. Therefore, if a particular drug starts becoming prevalent in Idaho but it is not something that is covered under our screening method, we can go back and search the data to determine if this compound was present in previous samples we had run.

Terms and Drug Categories

After a drug enters the body, it starts getting broken down into compounds that are easier for the body to eliminate. This is referred to as metabolism. Compounds that the drugs are broken down into are termed metabolites. Some metabolites do not produce any pharmacological effects (inactive metabolites), while others do have pharmacological properties and cause effects of their own. During the metabolic process, there will be a combination of both the original drug (or parent drug) and the metabolites. In the case of active metabolites, both the parent drug and metabolite(s) can simultaneously cause pharmacological effects on the body.

The central nervous system (CNS) is comprised of the brain and spinal cord. Drugs that act to speed up the processes of the central nervous system are called Central Nervous System Stimulants (CNS-S). Drugs that slow the processes of the central nervous system are termed Central Nervous System Depressants (CNS-D). Central Nervous System Stimulants, Central Nervous System Depressants, and cannabinoids (marijuana) account for the vast majority 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.

Highly impairing CNS-S drugs, such as methamphetamine and cocaine, are typically not distributed in prescription form. Amphetamine can be obtained as a prescription, but is most commonly seen as an active metabolite of methamphetamine. Since amphetamine is an active metabolite, it will act as its own drug and produce stimulant effects aside from those produced by methamphetamine. While cocaine is a well-known stimulant and is seen in many other states, ISPFS laboratory analysis yields relatively few positive results for cocaine. However, this does not necessarily mean cocaine is not being abused in Idaho. Since 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 in the sample. An inactive cocaine metabolite, benzoylecgonine, has a longer detection window, and can sometimes be detected in samples if the individual has recently used cocaine. This means that toxicology results can support allegations of cocaine use, even if cocaine itself is not detected in the sample.

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.

The active component of marijuana is tetrahydrocannabinol (THC). There are numerous THC metabolites, including hydroxy-THC and carboxy-THC. Before the implementation of the new methods, ISPFS was only able to detect the inactive metabolite (produces no pharmacological effects), carboxy-THC in blood samples. The current method for blood not only allows for the detection of THC, hydroxy-THC and carboxy-THC, but allows THC and hydroxy-THC quantities to be reported. The current method used for urine analysis allows for the detection of the carboxy-THC only. For simplification, THC will be listed on graphs and referred to in discussion of graphs, even though the results are referring to cannabinoids and could be THC, hydroxy-THC or carboxy-THC.

Narcotic analgesics are prescribed to relieve pain and also to induce profound sleep. If these drugs are taken in excess of the prescribed dose, stupor, convulsions, and coma can result. Some of the most commonly confirmed narcotic analgesics in Idaho DUI cases are hydrocodone, oxycodone, and methadone. Since fentanyl has become so popular nationwide, it and one of its metabolites (norfentanyl) were added to the new methods to allow for the reporting of those compounds in blood. Acetyl fentanyl (a designer drug that is similar to fentanyl) and its metabolite, acetyl norfentanyl, were also added.

Benzodiazepine class drugs are typically prescribed for anti-anxiety, and as tranquilizers. The most well known benzodiazepines include Xanax (alprazolam), Valium (diazepam), Klonopin (clonazepam), and Ativan (lorazepam). There are many different drugs under this class; however, we typically only see a few different ones. The most commonly found benzodiazepines in casework were alprazolam, clonazepam/7-aminoclonazepam, and lorazepam. Due to an increase in the number of designer benzodiazepines or Novel Psychoactive Substances (NPS), the toxicology section has been monitoring what the controlled substance section has been seeing as well as what agencies are requesting or suspecting. During FY2019, an increase in the number of etizolam submissions was noted and this drug was added to our testing panel.

Drug combinations are discussed in this report because these 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 more marked effects. (i.e. 1 + 1 = 2). These combinations are both examples of additive effects. 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 either drug was taken on its own.

One important factor to keep in mind is that 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, 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 toxicology analysis (if requested) on samples from deceased drivers in fatality accidents when the alcohol level is below 0.20 g% of blood.

A negative toxicology result does also not necessarily mean that there was no drug in the sample. It could be that there was a drug or drugs in the sample but that we are not able to detect it/them with our methods, or it could also mean that the drug(s) present is/are below our limits of detection. There are, of course, cases in which there is no drug detected because there is no drug present, but it is important to keep in mind that there are testing limitations and these limitations should be considered when a negative result arises.

General Toxicology Discipline Breakdown for FY2019

Statistics included in this report were obtained from the Idaho Laboratory Information Management System (ILIMS). This is the system that is used to log in and track all evidence submitted to the forensic laboratory system during FY2019. The ILIMS system allows for agencies to enter multiple charges instead of forcing the agencies to list only the highest charge; therefore, many cases with a drug charge were also DUI cases. It should be noted that 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. A summary of the number and types of cases for specific categories are shown in **Table 1**.

	Blood Toxicology	Alcohol/Volatiles	Urine Toxicology	Total	FY2019 Percent
DUI					
Adult	705	1100	198	2003	66.8%
Juvenile	20	51	10	81	
Probation Violations*					
Adult	1	1	6	8	0.3%
Juvenile	0	0	1	1	
Drug/Narcotic Violations**					
Adult	82	26	27	135	4.5%
Juvenile	3	3	0	6	
Other***	126	50	18	194	6.2%
Auto Accident Fatalities	101	108	2	211	6.7%
Accident Victim Kits	8	13	0	21	0.7%
Death (non-homicide)	18	9	2	29	1.0%
Murder	0	0	0	0	0
Rape****	11	60	67	138	4.4%
Cases Closed Before Analysis*****	258	23	11	292	9.4%
Total:	1333	1444	342	**3119**	100%

Table 1- Statistical Representation of the Number and Distribution of Toxicology Cases for FY2019.

*Includes Juvenile, Misdemeanor, and Felony; **Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution/Use by a Minor; ***Includes Assault/Battery (Aggravated or not), Domestic Violence, Officer Involved Shooting/Accident, Injury Accidents, Injury to Child, Grand Theft, Under the Influence in Public, Unlawful possession of a firearm, Leaving the scene of an accident, Manslaughter, Vehicular Manslaughter, and Lewd Conduct; ****Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor, and Penetration with a Foreign Object. *****Cases can be closed either because the testing is no longer necessary per the agency or if other evidence proves to be probative and testing

of another type is no longer warranted (i.e. blood alcohol and blood toxicology are both requested but the alcohol result is greater than 0.10 g%, so the blood toxicology request is closed without analysis).

The ISPFS laboratory system received 3,119 toxicology cases for FY2019, which was an increase of 360 cases from FY2018. This number corresponds to an increase of approximately 12.25%. This increase is likely due to the population growth in Idaho. As the population climbs as more and more people are choosing to move here, it is likely that the number of cases submitted to the laboratory for volatiles and/or toxicological analysis will also continue to climb.

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

Figures 1a and 1b (below) show the ten-year trend for toxicology cases as well as the breakdown of the individual matrices/testing requested. 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 2815 cases.

There appears to be a trend in which there were a much higher number of cases submitted between FY2010 and FY2013 than there were between FY2014 and FY2019. In fact, the 5-year average for FY2010-FY2013 is 25% higher than the average for FY2014-FY2019. One possible explanation for the large change in cases submitted could be due to the Supreme Court ruling on Missouri vs. McNeely in which it was decided that if an evidentiary blood draw is desired, a warrant must be obtained prior to collecting the blood. **Figure 1b** further supports this hypothesis as the rapid decline in the number of alcohol/volatiles is seen. The number of cases submitted for alcohol/volatiles analysis seemed to be fairly consistent from FY2009 to FY2013, then in FY2014, a drastic decline occurred. The Supreme Court ruling on Missouri vs. McNeely was issued just before FY2014. If this hypothesis is correct, one would expect to see an increase in the number of breath alcohol cases, starting in FY2014.

Interestingly, the number of cases submitted for FY2019 increased substantially from the previous five years. As mentioned earlier, this is likely due to the continuing population increase in Idaho. It is anticipated that the population will continue to increase, and as such, it is likely that the number of cases submitted for the next three years will be similar or greater than that of the number of cases submitted for FY2019. If this is the case, the section of the graph (**Figure 1a**) for FY2019-FY2022 will look very similar to FY2010-FY2013, before the large decrease in FY2014.

The number of urine toxicology cases has been slowly declining for the last ten years. It is unknown why this is happening but one possible explanation is that it is due to a decrease in the turnaround time and an increase in the scope of testing (including quantitation) for blood toxicology analysis. So more officers are choosing to collect blood where at all possible versus collecting urine.

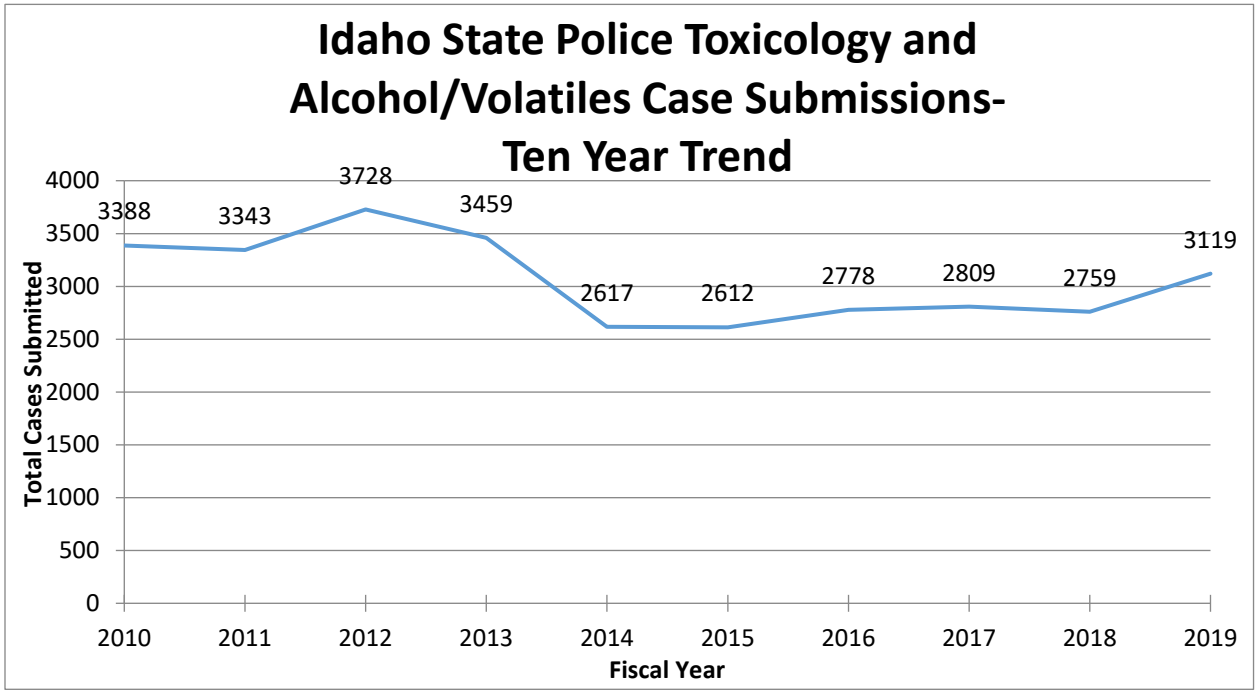

FIGURE 1a- Ten-Year Trend for Toxicology Case Submissions

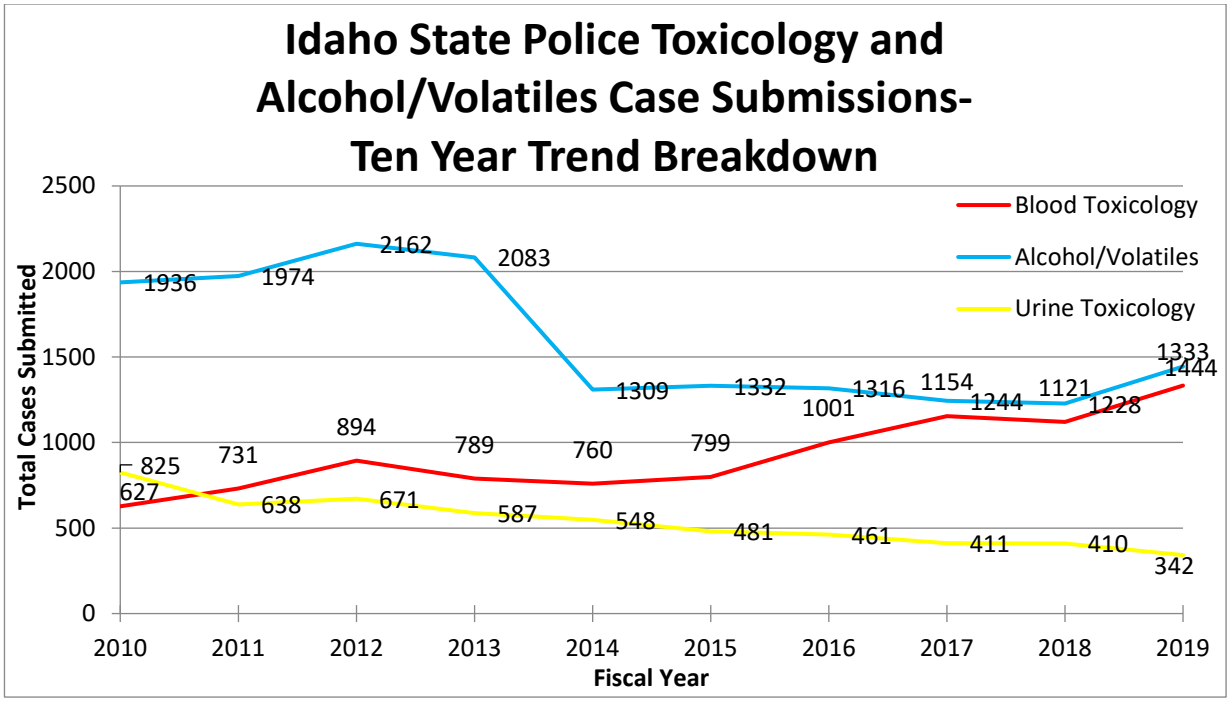

FIGURE 1b- Breakdown of the Ten-Year Trend for Toxicology Case Submissions

Alcohol and Other Volatiles

The number of alcohol/volatiles case submissions to ISPFS increased by 212 cases from 1,121 in FY2018 to 1,333 in FY2019. This corresponds to a 17.3% increase. There were significantly more alcohol/volatiles cases submitted prior to the McNeely decision in 2013. Then in FY2014, there was the dramatic decline in the number of alcohol/volatiles cases submitted and since then, the number has stayed fairy consistent or has slightly increased or decreased but no dramatic changes have been seen. A significant increase (beyond the increase that is expected due to population increases) in the number of cases is not expected since ISPFS provides support for breath testing in Idaho; the scientists working in this discipline have reported a significant increase in breath testing workload. Idaho also implemented a new fuel cell/IR breath-testing instrument recently that officers may be eager to use. It is likely that officers are opting to perform breath tests rather than obtain warrants, except in cases where drugs other than alcohol (i.e. inhalants) are also suspected. If any issues arise with the breath testing instruments or laws, it is likely that there will be a large increase in the number of alcohol/volatiles cases submitted.

Ethanol is not the only compound that is detectable during blood/urine alcohol testing. The laboratory also reports 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 detected after air duster inhalation; acetone and toluene are volatiles detected after canned paint inhalation.

Alcohol analysis requests span a wide range of case types: DUI, rape, accident, death investigation, and other offense cases. The alcohol result categories include: none detected/ below reportable limit (<0.02 g%), ≥0.02 g% and <0.08 g%, ≥0.08 g%, and other volatiles (acetone, DFE, toluene, etc.).

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, in addition, these are adult cases, not total cases. ISPFS processed 1373 adult samples for alcohol and inhalants during FY2019. The analysis results are tabulated below. Each sample for which alcohol analysis is requested is simultaneously tested for the presence of inhalants, however, the total 1315 samples reported in the table below does not include beverage samples, or inhalant results.

Number of Adult Samples	Result Category
23 (not included in total)	Not analyzed
306	<0.02 g%
49	≥0.02 g% and <0.08 g%
960	≥0.08 g%
1315	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%. If alcohol and toxicology testing are both requested, then a negative alcohol sample is also processed for drugs. Therefore, samples listed as none detected (or <0.1 g%) may be positive for drugs other than alcohol.

Figure 2 is a depiction of the overall adult alcohol results for FY2019; this chart includes DUIs, death investigations, auto accident fatalities, and a wide variety of other case types.

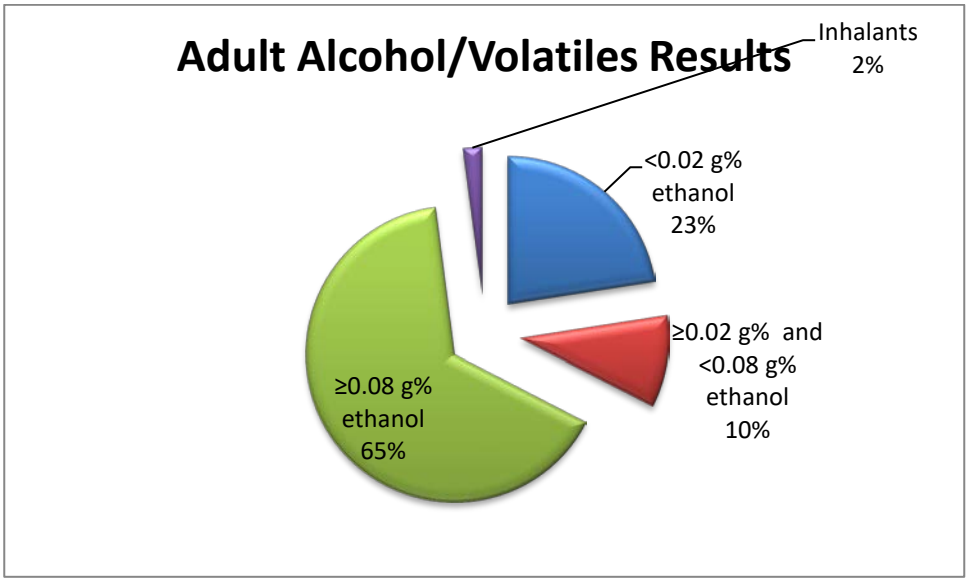

FIGURE 2- Adult Alcohol/Volatiles Levels for FY2019

Thirty-five adult samples tested positive for inhalants. In terms of significance, considering the 1373 adult alcohol samples submitted, thirty-five inhalant samples is not a significant percentage. However, it is interesting to note that for FY2018, the number of inhalants reported was only ten. This is a 250% increase! The inhalants confirmed in the 35 positive samples included: 26 samples that were positive for fluorinated hydrocarbons (air duster), four samples that were positive for acetone (nail polish remover, it is also formed in the body during ketoacidosis), 3 samples were positive for isopropanol (rubbing alcohol), and two were positive for toluene (an additive in gasoline, paint thinner, and nail products).

Adult samples submitted for pending DUI charges constituted 1100 of the total 1373 alcohol/volatiles cases (80%). Of these 1100 samples, 918 were over the per se limit of 0.08 g% (83.5%). As stated earlier, 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 which may include sexual assault or death investigations, injury to a child, or aggravated offenses.

When urine samples are submitted for inhalant testing, they also undergo simultaneous alcohol testing, as it is the same test. Urine alcohol results are of questionable value, and thus are reported by ISPFS with a disclaimer statement. The questionable value of these results is due to several reasons. First, bacteria and yeast are common in urine and as these organisms grow, they 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 should follow 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. **Figure 3** shows the BAC results for the adult auto accident fatalities. A total of 96 adult auto accident fatality case samples were submitted to ISPFS in FY2019; this is the most number of cases of this type that was submitted to the lab for the last ten years. Of the 96 cases, 75 (78%) contained <0.02 g% alcohol, five (5%) were between 0.02 and 0.08 g%, and 16 (16.7%) were at or above the legal limit of 0.08 g%. This distribution is very similar to previous years.

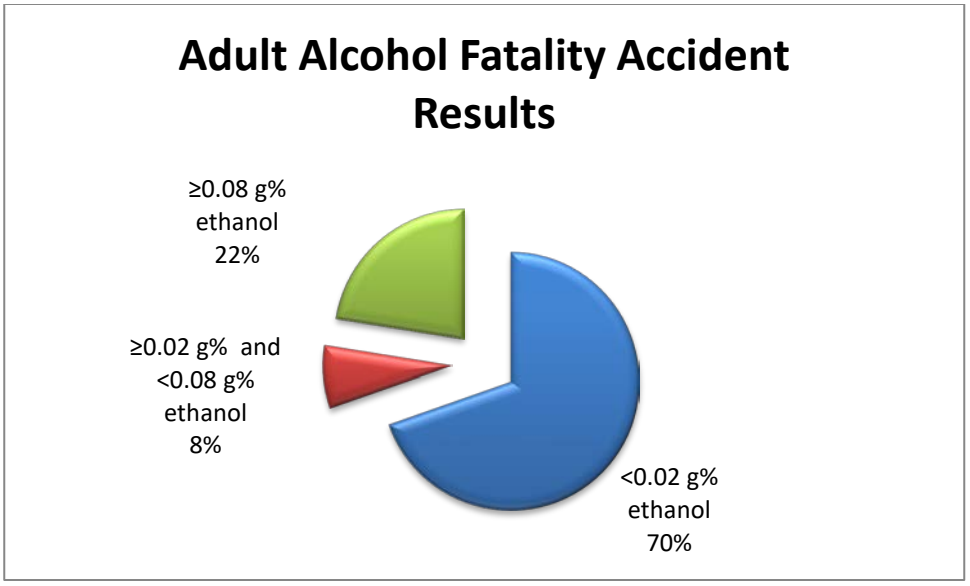

Figure 3- Results for Adult Alcohol Fatality Accidents

The ten-year trend of adult auto accident fatality cases submitted to ISPFS is depicted in **Figure 4**. Interestingly, the number of cases submitted seemed to fluctuate with about every other year being higher than the previous year (FY2015-FY2016 did not follow this trend). There was no apparent explanation for why this occurs. The number of fatality accident cases submitted for alcohol/volatiles testing in FY2019 (96 cases) was the highest seen in the last ten years. The average number of adult fatality cases submitted for the last 10 years (including FY2019) was 73 cases.

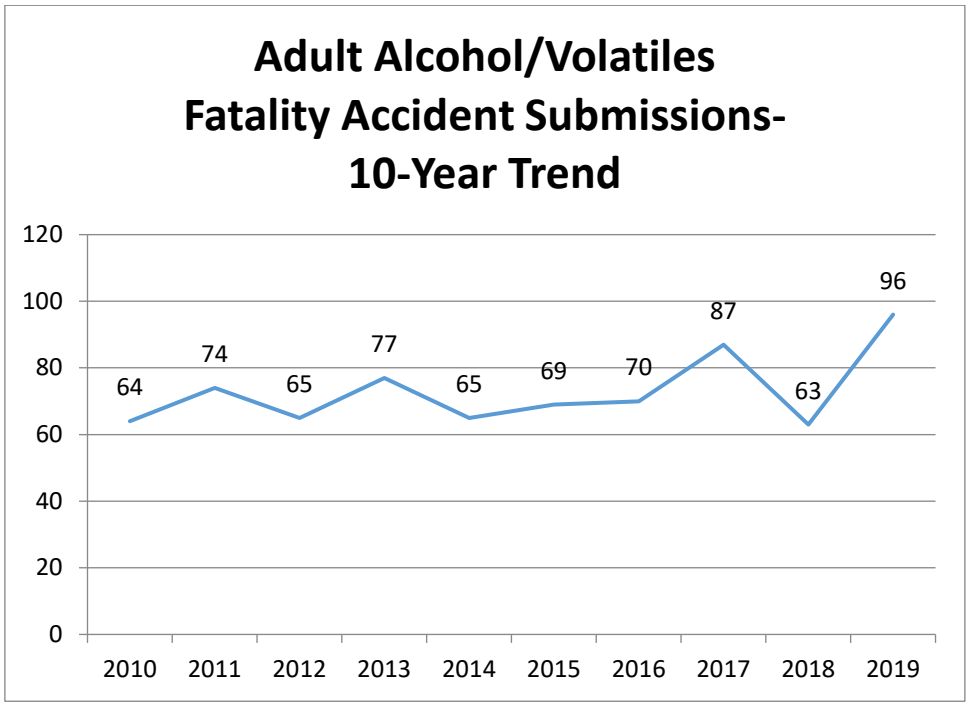

Figure 4- Ten-Year Adult Fatality Accident Trend

Juvenile Alcohol Concentrations

ISPFS processed 106 juvenile alcohol cases in FY2019. This is just one less case than what was received in FY2018. Of these samples, 58% were over the legal limit for persons under age 21 (0.02 g%). Of the 106 juvenile alcohol samples submitted to ISPFS, 69 were juvenile DUI cases; 56 of these 69 cases (81%) were over the juvenile (under age 21) legal limit of 0.02 g%. This percentage is roughly 20 percent higher than it was in FY2019, where only 62% of the juvenile DUI cases had a result of over 0.02%.

Figure 5 displays the overall juvenile case results; these results include DUIs, accident fatalities, and various other case types.

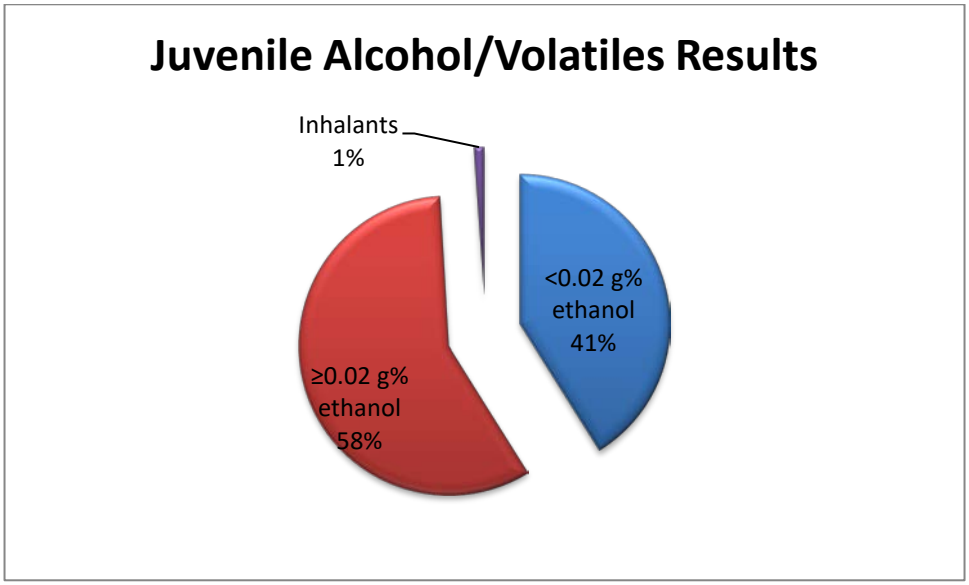

Figure 5- Juvenile Alcohol Levels for FY2019

One percent of the juvenile samples tested positive for inhalants. This number is not surprising as two percent of the juvenile samples tested positive for inhalants in FY2018 and there were no positive results for inhalants for juveniles in FY2017. Since inhalants are volatiles and evaporate easily they 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.

A significant decrease in the number of juvenile alcohol samples submitted in fatality cases was seen in FY2019 as it decreased from 17 cases in FY2018 to just 2 cases in FY2019. That is an 88% decrease! The average number of juvenile auto accident fatality cases submitted in the last ten years was 11. Over the last ten years, the lowest number of cases before this fiscal year was two cases (FY2011).

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

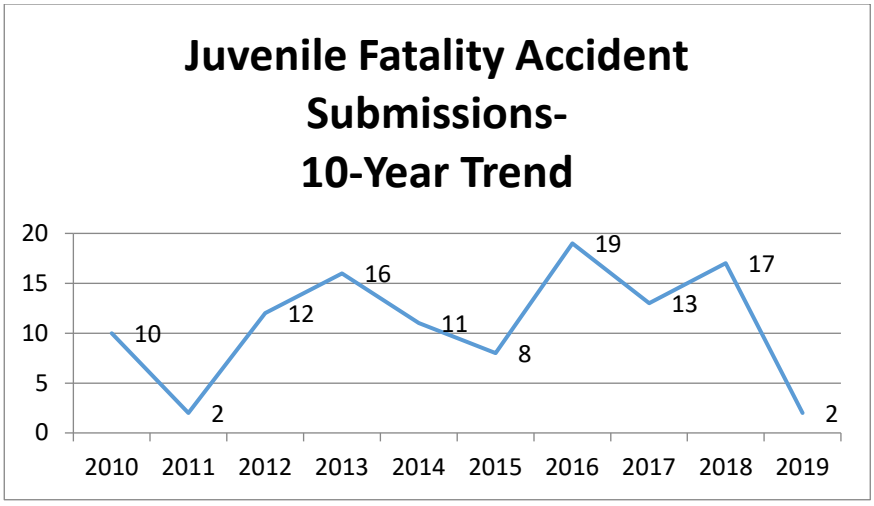

Figure 6- Ten-Year Juvenile Fatality Accident Trend

Other Offense Alcohol Concentrations

Cases submitted for alcohol analysis in FY2019 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** depict the results breakdowns for these other offenses for adults and juveniles, respectively. Death investigations (non-homicide) includes suicides, unattended deaths, or any other death that is deemed non-criminal but needs investigating. 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.

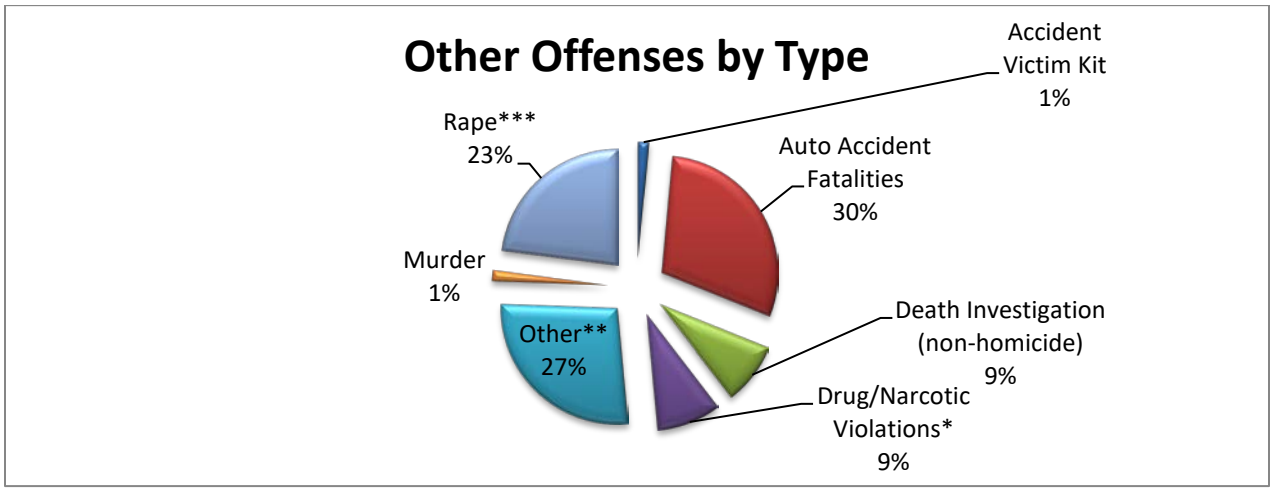

Figure 7 – Alcohol Analysis Requests by Other Offense Types

*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution; **Includes Assault/Battery (Aggravated or not), Domestic Violence, Officer Involved Shooting/Accident, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful possession of a firearm, Leaving the scene of an accident, Manslaughter, Vehicular Manslaughter, and Lewd Conduct; ***Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor, and Penetration with a Foreign Object.

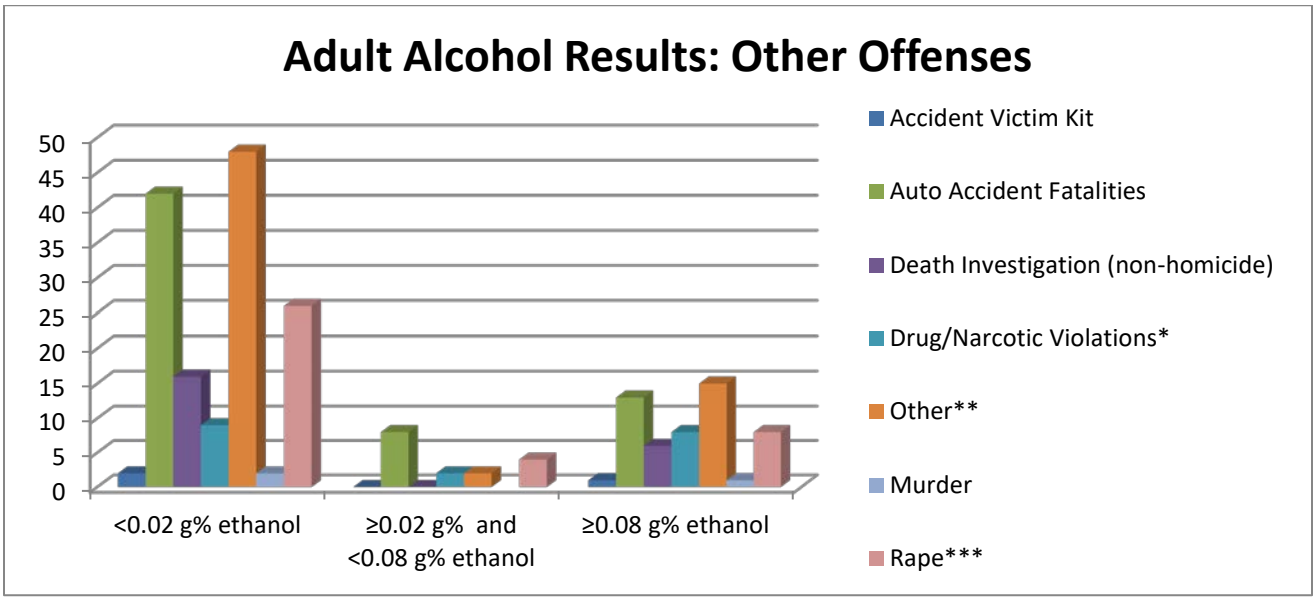

Figure 8- Adult Alcohol Results for Other Offenses

*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution; **Includes Assault/Battery (Aggravated or not), Domestic Violence, Officer Involved Shooting/Accident, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful possession of a firearm, Leaving the scene of an accident, Manslaughter, Vehicular Manslaughter, and Lewd Conduct; ***Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor, and Penetration with a Foreign Object.

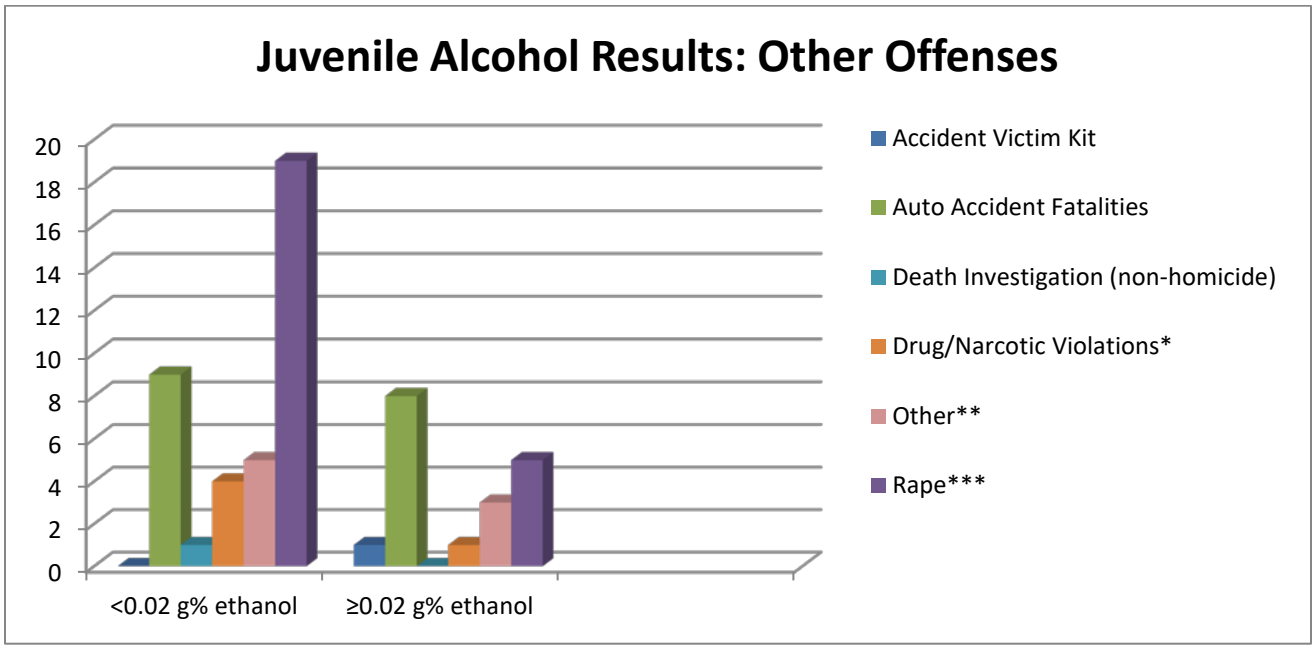

Figure 9- Juvenile Alcohol Results for Other Offenses

*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution; **Includes Assault/Battery (Aggravated or not), Domestic Violence, Officer Involved Shooting/Accident, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful possession of a firearm, Leaving the scene of an accident, Manslaughter, Vehicular Manslaughter, and Lewd Conduct; ***Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor, and Penetration with a Foreign Object.

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. THC and hydroxy-THC can be found in the blood, but are typically not found in urine.

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 after the alcohol/volatiles analysis is complete. In addition, as stated earlier, urine alcohol results can be of questionable value.

If there is a question of impairment, such as in a DUI case, blood is often the preferred sample for toxicology because it gives the best indicator for recent use and drugs that were possibly pharmacologically active at the time of collection. With sexual assault cases, samples are not usually taken for several hours (or even days) after an assault, and by that time any drugs that may have been given will typically be filtered out of the blood or at very low concentrations in the blood. The problem of low drug concentration is much less likely with urine. Since urine pools in the bladder, the drug collects there and provides a much greater drug concentration than in blood. In addition, obtaining a urine sample is not an invasive procedure, whereas blood sample collection is invasive. For these reasons, urine is typically the preferred matrix for sexual assault cases.

ISPFS accepted 1333 blood samples and 342 urine samples for toxicology testing in FY2019. This correlates to an increase of about 19% in the number of blood cases. When considering the number of blood and urine toxicology submissions for the last 10 years, it appears that there is an upward trend associated with the blood toxicology samples and a downward trend with the urine toxicology samples. This trend can easily be seen when looking at the blood and urine toxicology submission numbers in **Figure 1b**.

Please note that in all toxicology graphs below, red is used for blood, yellow for urine. Graphical representation of the "Single Drug" category refers to samples that only had a single 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 would be placed into the "Single Drug" category despite the presence of multiple drugs in the sample. For multiple drugs, only those combinations that had 20 or more cases associated with it are displayed in the graphs.

Adult

Figure 10 shows the adult blood and urine toxicology results for FY2019 by drug category. For example, hallucinogens (Hall) includes ecstasy (MDMA), phencyclidine (PCP), and others; narcotic analgesics (NA) includes drugs such as morphine or hydrocodone.

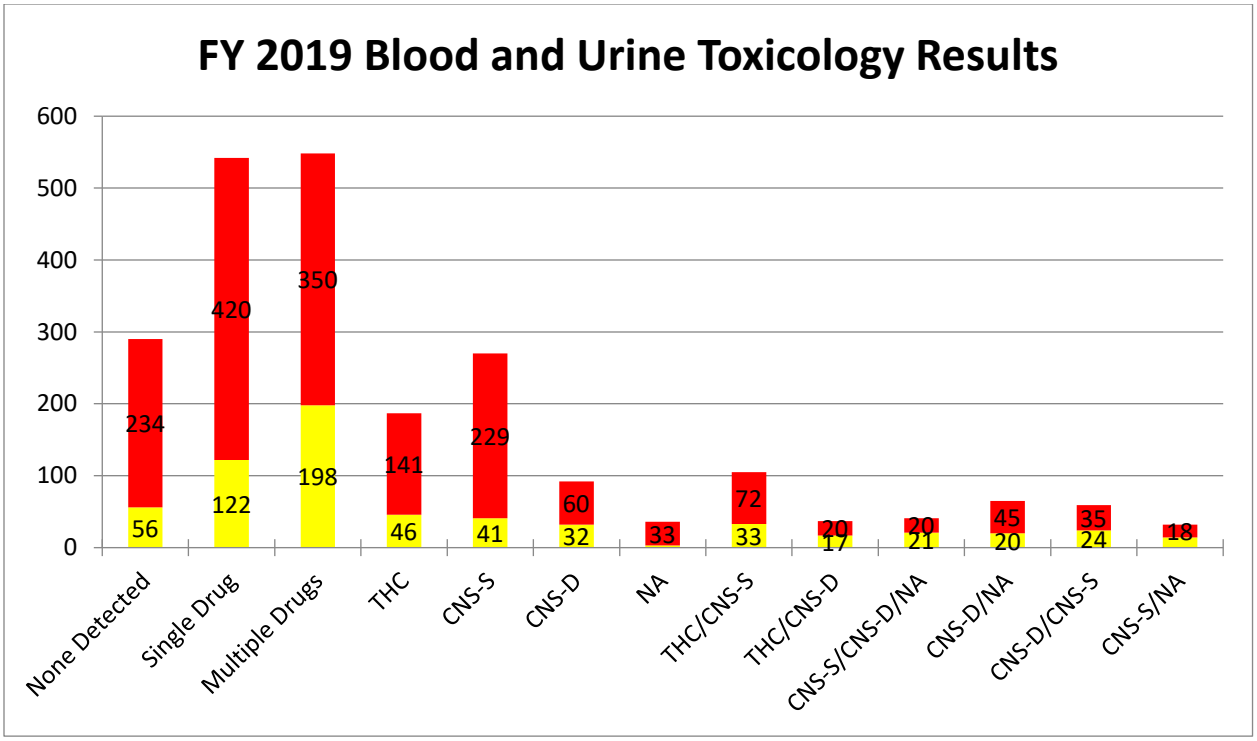

FIGURE 10 – Adult Blood and Urine Toxicology Results by Category

When reviewing blood and urine toxicology results, one thing to consider is that many of the blood samples submitted had a request for both alcohol and toxicology testing, but if the alcohol result was 0.10 g% or higher, the blood sample and urine sample (if present for the same case) was returned without toxicology testing in most cases. Therefore, there may have been many more cases that would could have been positive for drugs and been included in these categories had those samples been tested.

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. Of those single category cases, it appears that cases with CNS-S are most prevalent, followed by cannabinoids. Urine analysis shows the opposite indication. This is not surprising when you think about the fact that drugs stay in the urine much longer than in the blood, and are therefore more likely to be detected in the urine than in the blood. Of the single drug urine cases, cannabinoids, CNS-S, and CNS-D are all very close in terms of number of cases. However, there are more urine cannabinoid cases than any other drug category.

With both blood and urine cases that have drugs from multiple categories, CNS-S is present in quite a few of them. CNS-Ss include drugs like Ritalin (methylphenidate), Adderall (amphetamine), and methamphetamine. CNS-Ds can be many different drugs; examples include Valium (diazepam), Xanax (alprazolam), and Ambien (Zolpidem). Cannabinoids can be either THC, hydroxy-THC or carboxy-THC.

In terms of drug combinations, the combination of CNS-S combined with carboxy-THC is the most prevalent combination detected in urine, followed closely by the combination of CNS-S and CNS-D drugs. In blood, the most prevalent drug combinations are CNS-S and cannabinoids, and CNS-D and narcotic analgesics (NAs). In previous years, NAs were not very prevalent in blood. This is likely due to limitations of the blood toxicology methods and not the fact that there were not NAs present in the samples. Narcotic analgesics are likely more prevalent in blood for FY2019 because of the updated methods. The new blood toxicology methods that were validated are much less limited in the types and concentrations of narcotic analgesic compounds that can be detected.

Around 66 percent of blood and urine toxicology cases were associated with a DUI. As such, the results of just DUI cases shall be highlighted and discussed. Often times cases will come in to the laboratory and only one charge will be listed but several other charges are associated with the crime (for instance DUI and possession or driving without a license or insurance). For the purposes of this report, the highest charge is the one the results are associated with for the case.

Figure 11 illustrates adult drug results for both blood and urine associated with DUI. Of the 903 adult DUI toxicology cases tested in FY2019, 84% of them were positive for one or more drugs. The pattern is the same as demonstrated with overall adult toxicology (see **Figure 10**) with a single drug group being most common for blood toxicology and multiple drug groups being the most common in urine toxicology cases.

The urine toxicology adult DUI results are astonishing as less than 11% of the cases had no drugs reported. The percentage of blood toxicology DUI samples that were reported, as none detected was 16.9%. One possible explanation for this difference is the rate at which drugs are metabolized (broken down within the body). Often times, it takes several hours for blood to be collected. During this time period, any drugs that may be in the blood are being broken down by the body. This can result in the concentration of the drug in the blood being below the limits of detection. In addition, some of the cases may have been submitted for both toxicology and alcohol/volatiles analysis as a precaution if a low concentration of alcohol was found but did not necessarily match the level of impairment observed.

The trend of multiple drug categories being most prevalent for urine toxicology cases remains true when looking at only DUI cases. However, as stated earlier, single drug category is by far the most prevalent when looking at all of the blood toxicology cases. When just looking at the blood toxicology DUI cases, the number of single and multiple drug category cases is split at about 60% of the cases containing only one type of drug and 40% containing multiple types. There is a slightly larger difference between single drug category and multiple drug category cases with auto accident fatalities and the “others” submission categories at 72 and 68%, respectively.

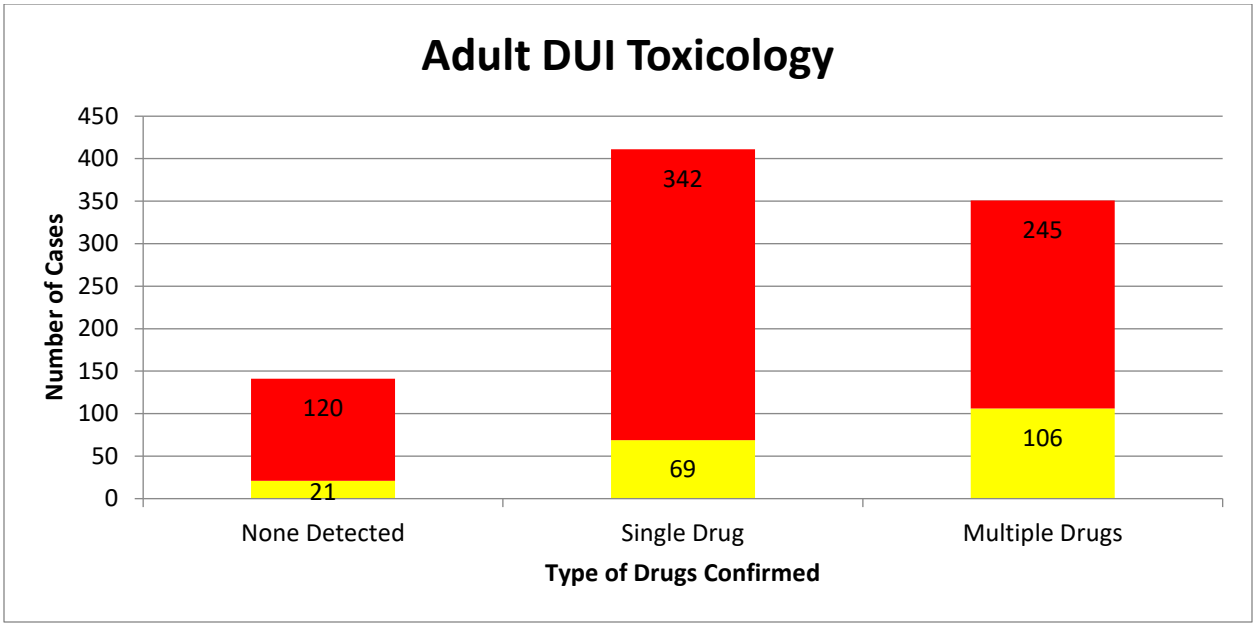

Figure 11 – Adult DUI Toxicology Results

In FY2019, there were 103 cases that were classified as auto accident fatalities. **Figure 12** shows the result categories for these cases. When compared to the number of auto accident fatality cases submitted for toxicology for FY2018, there was an increase of 27 cases (or about 26%). It should be noted that only two of the 103 samples submitted for auto accident fatalities in FY2019 were urine.

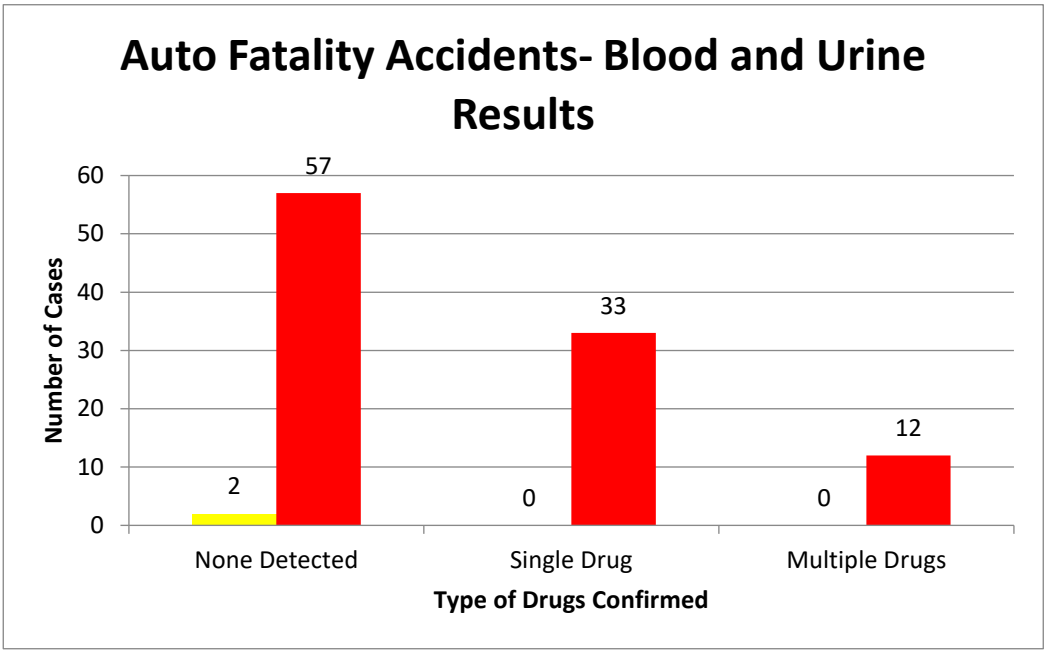

Figure 12 –Toxicology Summary for Fatality Accidents, by Category

Of the 103 cases submitted for toxicology that involved fatality accidents, 57% had no drugs confirmed. Thirty-two percent had drugs in a single category and about 12% had drugs confirmed from multiple drug categories. With the single drug fatality cases, 32% had CNS-S drugs, 28% had CNS-D drugs, 28% had narcotic analgesics, and 12% had cannabinoids (marijuana).

Juvenile

The number of juvenile toxicology cases submitted for FY2018 was down about 8% from FY2018 (60 cases versus 65). The number of juvenile toxicology cases submitted in FY2018 was about 25% lower than in FY2017. The number of juvenile toxicology cases submitted in FY2016 was fairly consistent with what was seen in previous years, so the 25% increase in FY2017 seems like somewhat of a fluke. Year after year, ISPFS reports carboxy–THC is the most commonly detected drug in those juvenile samples containing drugs, and FY2019 is no exception.

Sixty-five percent of blood and 76% of urine samples contained at least one drug. Fifty-one percent of blood cases and 42% of urine cases were positive for a single drug category. While only 14% of juvenile blood samples contained drugs from multiple drug categories, 33% of the urine samples did. This is consistent with what was seen in adult samples. In FY2019, there were 12 different drug combinations seen for the urine samples while there were 15 different drug combinations seen with the blood. FY2018 had only 2 different drug category combinations for urine and only one for blood. Both drug combination categories had cannabinoids as part of it. Sixty-eight percent of juvenile urine and 78% of the juvenile blood samples that contained drugs contained cannabinoids, either alone or in combination with other drugs. Sixty-two percent of the juvenile urine toxicology cases that contained one or more drugs were positive for a CNS-D, while only 12.5% were positive for a CNS-S. Of the juvenile blood toxicology cases, over 30% of the cases that contained one or more drugs included a CNS-S, while only 13% included a CNS-D drug. Therefore, while CNS-S is not the most prevalent in juvenile cases, as it is in the adult cases, it is still a problem. Interestingly, none of the juvenile cases tested positive for narcotic analgesics, either alone or in combination with another drug. Of the 65 juvenile toxicology cases submitted for FY2019, 24% of the urine and 34% of the blood samples were negative. The percentage of negative results may be partially due to limitations in ISPFS drug detection methods since ISPFS has limited capabilities to analyze toxicology samples for many designer drugs and/or their metabolites (i.e. spice and bath salts).

Figure 13 shows the distribution of results in the juvenile blood and urine toxicology categories.

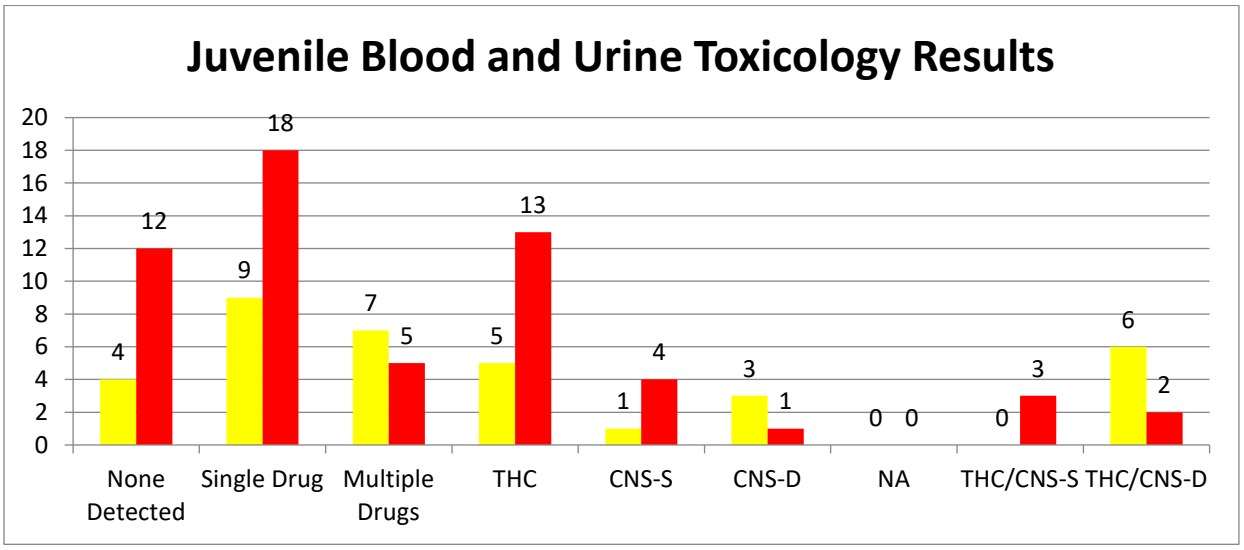

Figure 13 – Juvenile Blood and Urine Toxicology Results by Category

There was a huge increase (400%) in juvenile accident fatalities submitted for toxicology from FY2015 to FY2016 (there were 2 cases in FY2015 and 10 in FY2016). The 4 juvenile auto accident fatality cases submitted for toxicology in FY2017 was much more consistent with what was seen in years prior to FY2016. In FY2018, 5 juvenile auto accident fatality cases were submitted for toxicology analysis and for FY 2019, this number dropped down to 3 cases. This is more consistent with the average number of cases submitted over the years.

For FY2017, sixty-five percent of the juvenile cases submitted for toxicology were DUI cases. In FY2018, this number dropped drastically to only 38%. For FY2019, that number was back up again to 68%. The trend of the urine cases testing positive for multiple drug categories more often than a single drug category did not hold true when only looking at the DUI toxicology cases. The number of cases that had drugs from only one drug category was double that of the multiple drug category. Of the 13 juvenile urine toxicology DUI cases submitted, 6 of them (46%) were positive for drugs belonging to a single drug category while 39% were positive for multiple drug categories. Fifteen percent of the juvenile urine toxicology DUI cases were reported as none detected. For the juvenile blood toxicology DUI cases, 50% were positive for a single category of drugs, and 25% were positive for drugs in multiple drug categories. Of the 28 juvenile DUI cases submitted for blood toxicology, 25% were reported as none detected.

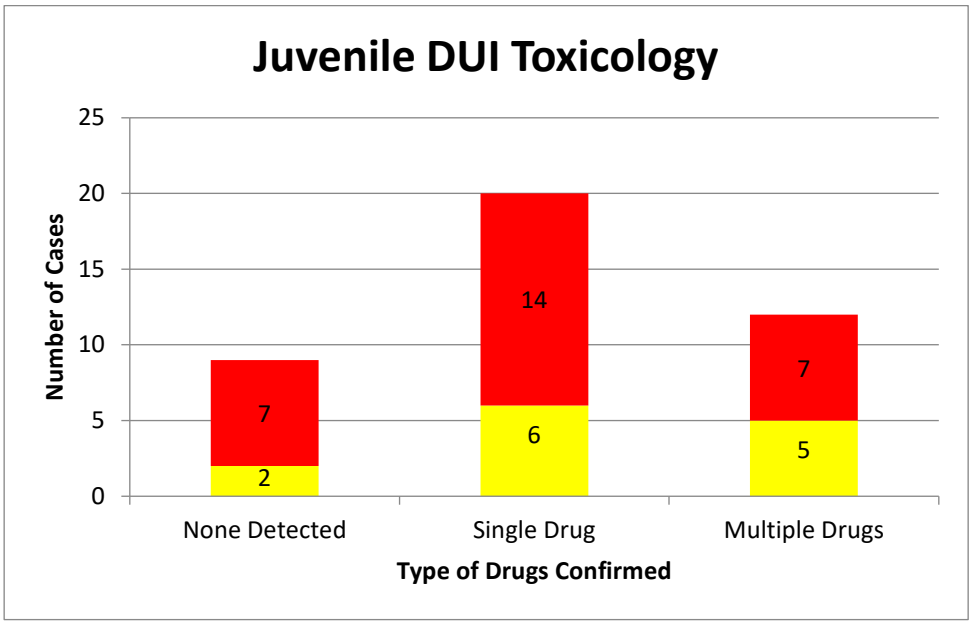

Figure 14- Juvenile DUI Toxicology Results

Other Offense Toxicology Results

While DUI cases accounted for 66.8% of the cases submitted for toxicology, the remaining 33.2% was broken down into several other offenses (shown below). Of those cases with a drug violation associated with them, roughly 93% tested positive for one or more drugs. For probation violation cases, 78% were positive. Forty-five percent of the death investigation cases submitted for toxicology were positive for one or more drugs.

For those cases classified as "other offenses," 59% of the adult cases in this category were positive for one or more drugs, and 50% of the cases in this category were positive in the juvenile cases. The category of "other offenses" includes charges such as assault and battery, burglary, injury accidents, and under the influence in public.

In FY2018, there were 126 rape cases submitted for toxicology analysis. That is almost double what it was in FY2017 (71 cases)! However, for FY2019, this number was back in line with previous years, at 78 cases. When considering the toxicology results associated with rape charges (rape, sexual abuse of a minor, etc.), there is a slightly lower percentage of positive cases. In FY2019, fifty-nine percent of the cases with a rape charge associated with it were positive for one or more drugs. Although the number of rape cases submitted in FY2018 was almost double that of FY2019 and FY2017, the percentage of positive cases was nearly identical, at 58%. With rape cases, the toxicology testing is still done even if the alcohol result is over 0.1 g%. So, in some of these cases that had negative results, it is possible that there was a high alcohol result reported. Another possible reason for the higher percentage of negative cases could be that sometimes the rape is not reported for hours (or sometimes days) after the assault, and by the time the sample is collected, the drug can be out of the system or at a level that cannot be detected with our methods. In addition, many agencies will submit blood or urine samples for assault cases even if no drugs or alcohol are suspected.

Adults:

Count	Offense	Toxicology Results
71	Rape*	• 29 Negative • 33 Positive –CNS-D and THC, or some combination containing one or both of those were the most common results by far
109	Drug Violations**	• 18 Negative • 91 Positive CNS-S and THC, or some combination containing one or both of those accounted for all of the positive cases
7	Probation Violations	• 1 Negative • 6 Positive— all positive cases except one were either CNS-S, THC, or a combination of the two. The remaining case was positive for CNS-D
130	Other Offenses**	• 42 Negative • 88 Positive— CNS-D and THC, or some combination containing one or both of those were the most common results by far
19	Death Investigations	• 10 Negative • 9 Positive— mostly CNS-D, or some combination containing a CNS-D

Juveniles:

Count	Offense	Toxicology Results
7	Rape*	• 3 Negative • 4 Positive— CNS-D, CNS-S, THC, or some combination of those
3	Drug Violations**	• 1 Negative • 2 Positive– THC
14	Other Offenses***	• 3 Negative • 11 Positive – CNS-D, CNS-S, or THC or some combination of those comprised all of the positive results

*Includes Rape, Male Rape, Sexual Abuse/Battery of Child/Minor, and Penetration with a Foreign Object.
**Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering, Possession/Distribution; ***Includes Assault/Battery (Aggravated or not), Domestic Violence, Officer Involved Shooting/Accident, Injury Accidents, Injury to Child, Under the Influence in Public, Unlawful possession of a firearm, Leaving the scene of an accident, Manslaughter, Vehicular Manslaughter, and Lewd Conduct

Top ten ISPFS reported drugs for FY2019:

1. Methamphetamine (CNS-S)
2. Amphetamine (CNS-S)*
3. Carboxy- THC (inactive marijuana metabolite)
4. THC (active component of marijuana)
5. Alprazolam (CNS-D)
6. 7-aminoclonazepam (CNS-D) (active metabolite of clonazepam)
7. Diphenhydramine (CNS-D)
8. Hydroxy-THC (active marijuana metabolite)
9. Morphine (NA)
10. Clonazepam (CNS-D)

*Amphetamine may be present as a metabolite of methamphetamine.

Of the top 10 drugs confirmed in FY2017, FY2018, and FY2019 there were very few differences (strictly in terms of compounds, not ranking). Citalopram was included in the top 10 drugs for FY2017 and FY2019 and lorazepam was absent, while in FY2018, lorazepam was present while citalopram was not. If the lists were expanded, lorazepam would be listed at spot #12 for FY2019. In terms of ranking, in FY2019 the top 4 drugs confirmed were the same as in FY2018 and FY2017. The only difference is that amphetamine was ranked at #2 for FY2018 and FY2019 and carboxy-THC was at #3, while in FY2017, those were the opposite. In FY2018, morphine rose one spot to #7, compared to #8 in FY2017. FOR FY2019, morphine dropped down to spot #9. For FY2018, 7-aminoclonazepm was ranked at #8; which up 2 spots from FY2017 when it was ranked at #10. Interestingly, for FY2019, it climbed another 2 spots from FY2018 and ended up at spot #6. Hydrocodone dropped from #6 in FY2017 to #9 in FY2018, and completely off the top 10 list for FY2019 (although if the list was expanded, it would be at spot #14. Lorazepam was not included in the top 10 in FY2017 but was ranked at #10 for FY2018. This compound is another that is not included on the list for FY2019 (it is ranked at #12). In FY2017, diphenhydramine and THC were ranked at 5 and 9 (respectively). For FY2018, diphenhydramine dropped one spot to #6 and THC jumped to #5. For FY2019, diphenhydramine dropped another spot to #7 and THC went up another spot to #4.

If the THC and metabolites (carboxy-THC and hydroxy-THC) were combined and issued one single spot on the list, and the same was done with clonazepam and 7-aminoclonazepam (since the hydroxy-THC and carboxy-THC could only come from THC, and the 7-aminoclonazepam could only come from clonazepam), then the list would also include trazodone, lorazepam, and citalopram in spots 8, 9, and 10 (respectively).

In FY2017, there were a total of 2590 times that a drug was reported. This is not the number of cases, but the number of times a drug was listed as being confirmed. Keep in mind that many cases had more than one drug listed on the report. This number increased to 3578 for FY2018, then dropped slightly to 3383 in FY2019. As ISPFS continues to add more drugs to the scope of our methods, it is suspected that this number will continue to increase.

Summary

The laboratory system received 3,119 toxicology/alcohol/volatiles cases in FY2019, which is 360 more cases than in FY2018 (this corresponds to an increase of 12.25%). ISPFS accepted 1333 blood toxicology samples, 1444 alcohol/volatiles samples and 342 urine toxicology samples for testing in FY2019. This corresponds to an increase of 212 blood toxicology cases, 216 alcohol/volatiles cases, and a decrease of 68 urine toxicology cases from FY2018. This increase is likely due to the population growth in Idaho. As the population climbs as more and more people are choosing to move here, it is likely that the number of cases submitted to the laboratory for volatiles and/or toxicological analysis will also continue to climb. In addition, as the turnaround times decrease, the number of cases submitted is also expected to increase. While the number of overall cases has increased, the number of urine toxicology cases has been slowly declining for the last ten years. It is unknown why this is happening but one possible explanation is that it is due to a decrease in the turnaround time and an increase in the scope of testing (including quantitation) for blood toxicology analysis. So more officers are choosing to collect blood where at all possible versus collecting urine. This decrease would also make sense if the process for obtaining blood draw warrants has become easier.

Adult samples submitted for pending DUI charges constituted 1100 of the total 1373 alcohol/volatiles cases (80%). Of these 1100 samples, 918 were over the per se limit of 0.08 g% (83.5%). Of the 903 adult DUI toxicology cases tested in FY2019, 84% of them were positive for one or more drugs. The urine toxicology adult DUI results are astonishing as less than 11% of the cases had no drugs reported. The percentage of blood toxicology DUI samples that were reported as none detected was 16.9%. One possible explanation for this difference is the rate at which drugs are metabolized (broken down within the body). Often times, it takes several hours for blood to be collected. During this time period, any drugs that may be in the blood are being broken down by the body. This can result in the concentration of the drug in the blood being below the limits of detection. It is suspected that being able to have the blood collected sooner would result in even more cases being reported as positive for drugs. In addition, some of the cases may have been submitted for both toxicology and alcohol/volatiles analysis as a precaution if a low concentration of alcohol was found but did not necessarily match the level of impairment observed.

A total of 96 adult auto accident fatality case samples were submitted to ISPFS in FY2019; this is the most number of cases of this type that was submitted to the lab for the last ten years. Of the 96 cases, 75 (78%) contained <0.02 g% alcohol, five (5%) were between 0.02 and 0.08 g%, and 16 (16.7%) were at or above the legal limit of 0.08 g%. This distribution is very similar to previous years.

ISPFS processed 106 juvenile alcohol cases in FY2019. This is just one less case than what was received in FY2018. Of these samples, 58% were over the legal limit for persons under age 21 (0.02 g%). Of the 106 juvenile alcohol samples submitted to ISPFS, 69 were juvenile DUI cases; 56 of these 69 cases (81%)

were over the juvenile (under age 21) legal limit of 0.02 g%. This percentage is roughly 20 percent higher than it was in FY2018, where only 62% of the juvenile DUI cases had a result of over 0.02%.

A significant decrease in the number of juvenile alcohol samples submitted in fatality cases was seen in FY2019 as it decreased from 17 cases in FY2018 to just 2 cases in FY2019. That is an 88% decrease! The average number of juvenile auto accident fatality cases submitted in the last ten years was 11. Over the last ten years, the lowest number of cases before this fiscal year was two cases (FY2011).

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. Of those single category cases, it appears that cases with CNS-S are most prevalent, followed by cannabinoids. Urine analysis shows the opposite indication. This is not surprising when you think about the fact that drugs stay in the urine much longer than in the blood, and are therefore more likely to be detected in the urine than in the blood. Of the single drug urine cases, cannabinoids, CNS-S, and CNS-D are all very close in terms of number of cases. However, there are more urine cannabinoid cases than any other drug category.

In terms of drug combinations, the combination of CNS-S combined with carboxy-THC is the most prevalent combination detected in urine, followed closely by the combination of CNS-S and CNS-D drugs. In blood, the most prevalent drug combinations are CNS-S and cannabinoids, and CNS-D and narcotic analgesics (NAs). In previous years, NAs were not very prevalent in blood. This is likely due to limitations of the blood toxicology methods and not the fact that there were not NAs present in the samples. Narcotic analgesics are likely more prevalent in blood for FY2019 because of the updated methods. The new blood toxicology methods that were validated are much less limited in the types and concentrations of narcotic analgesic compounds that can be detected.

The urine toxicology adult DUI results are astonishing as less than 11% of the cases had no drugs reported. The percentage of blood toxicology DUI samples that were reported as none detected was 16.9%. One possible explanation for this difference is the rate at which drugs are metabolized (broken down within the body). Often times, it takes several hours for blood to be collected. During this time period, any drugs that may be in the blood are being broken down by the body. This can result in the concentration of the drug in the blood being below the limits of detection. In addition, some of the cases may have been submitted for both toxicology and alcohol/volatiles analysis as a precaution if a low concentration of alcohol was found but did not necessarily match the level of impairment observed.

In FY2019, there were 103 cases that were classified as auto accident fatalities. **Figure 12** shows the result categories for these cases. When compared to the number of auto accident fatality cases submitted for toxicology for FY2018, there was an increase of 27 cases (or about 26%). It should be noted that only two of the 103 samples submitted for auto accident fatalities in FY2019 were urine. Of the 103 cases submitted for toxicology that involved fatality accidents, 57% had no drugs confirmed. Thirty-two percent had drugs in a single category and about 12% had drugs confirmed from multiple drug categories. With the single drug fatality cases, 32% had CNS-S drugs, 28% had CNS-D drugs, 28% had narcotic analgesics, and 12% had cannabinoids (marijuana).

For FY2017, sixty-five percent of the juvenile cases submitted for toxicology were DUI cases. In FY2018, this number dropped drastically to only 38%. For FY2019, that number was back up again to 68%. The trend of the urine cases testing positive for multiple drug categories more often than a single drug category did not hold true when only looking at the DUI toxicology cases. The number of cases that had drugs from only one drug category was double that of the multiple drug category. Of the 13 juvenile urine toxicology DUI cases submitted, 6 of them (46%) were positive for drugs belonging to a single drug category while 39% were positive for multiple drug categories. Fifteen percent of the juvenile urine toxicology DUI cases were reported as none detected. For the juvenile blood toxicology DUI cases, 50% were positive for a single category of drugs, and 25% were positive for drugs in multiple drug categories. Of the 28 juvenile DUI cases submitted for blood toxicology, 25% were reported as none detected.

In FY2019, the toxicology section was working on a validation to add urine as an acceptable matrix for the LCMSMS methods that were previously implemented. This would allow scientists that had not been trained on the urine methods and had previously not been able to do urine toxicology testing to be able to process urine samples. This would allow for both blood and urine to be combined in each run, which would speed up the testing process. The validation was completed and submitted for approval in mid-June 2019 and approved/implemented in late July 2019.

Two new LCMSMS instruments were received (one in the Pocatello lab and one in the Coeur d'Alene lab) in October 2018. These instruments were upgrades to our previous ones and allow multiple runs to be done at the same time without the need of the scientist changing out solvents or columns in between runs. In addition, methods that required two separate injections on the instrument were reduced down to a single injection. These changes greatly reduced instrument time and reduced the amount of solvent being used per run.

For FY2019, it continues to be essential that ISPFS get the funding, training, and personnel needed to improve ISPFS scope of drugs and ability to report quantitative values. It is anticipated that many of our current "negative" samples would test positive for designer and/or synthetic drugs that we are currently unable to detect. ISPFS frequently receives requests for analysis of designer drugs in toxicology samples. However, with ISPFS scientists working hard to reduce backlogs, continued training and method development for new designer drug methods and/or the addition of designer drugs to current methods is near impossible. Having additional personnel that can take over casework and allow the more senior scientists to focus on method development is essential for adding those types of compounds to our resting panel. In addition to allowing for method development, those scientists will also be needed to keep up with the increasing number of cases submitted as Idaho's population continues to grow. The increasing number of cases will also require additional instruments as the current ones will reach their maximum running capacity and a queue will develop for their use. Additional instruments would allow multiple scientists to process their cases simultaneously.

APPENDIX

Non Random Juvenile Drug Testing (NJDT) Please see Idaho Statutes *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 antianxiety 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
Amobarbital	Carisoprodol Meprobamate-M	Alprazolam	Amitriptyline	Chlorpromazine
Butalbital	Zolpidem	Chlordiazepoxide	Bupropion	Droperidol
Phenobarbital	Diphenhydramine Hydrochloride	Clonazepam	Citalopram	Lithium Carbonate
			Desipramine	Lithium Citrate
Secobarbital	Zolpiclone	Diazepam	Doxepin Hydrochloride	Haloperidol
			Escitalopram	
Barbital	Metoprolol	Estazolam		
	Gamma-Hydroxybutyrate (GHB)	Flunitrazepam	Fluoxetine	
		Flurazepam	Impramine	
		Lorazepam	Paroxetine	
		Oxazepam	Trazodone	
		Temazepam	Sertaline	
		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 is not 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
- Hydromorphone
- Hydrocodone
- Oxycodone

Common Synthetic Opiates

- Meperidine
- Methadone
- Fentanyl
- Buprenorphine