Colonel R. Dan Charboneau
Director

Idaho State Police

Service since 1939

Dirk Kempthorne
Governor

MEMORANDUM

TO: Ralph Powell, Major

FROM: Don Wyckoff, Laboratory Manager

DATE: August 24, 2005

SUBJECT: Toxicology Program Trends

Overview

During the mid-80s, BFS began tracking workload statistics for its laboratories. We recently uncovered some of this information and decided to review the more than 20 years of toxicology sample history to capture some information over the program's life. The caseload for twenty-one years of work in the toxicology program is graphed in Figure 1 and reflects both blood and urine sample workloads during the years 1985 to the present. (It should be noted, however, that until 1992 and the advent of the blood toxicology program, most submissions consisted of urine only.)

The spike in sample numbers that occurs in 1997 reflects the start of the DRE project within Idaho and the increase in requests to the laboratories to address juvenile sampling analysis and DUI/DUID issues, along with coroner and P&P needs. After 1997, there are a few years that sample submissions tapered off and remained at lower levels than just prior to that time. This was mainly due to the onset of probation and parole agencies screening their samples and outsourcing conformational analysis and the loss of DRE officers from the general population of LE personnel. Although casework for P&P agencies will most likely not come back, there is an upswing in the number of DRE trained officers. In the future, it is most likely that sample numbers will continue to rise as the toxicology program completes expansion into quantitative analysis to address court-related impairment issues and, currently out-sourced samples are analyzed within the system.

There have been ups and down in sample submissions over time, but overall a marked upward trend in sample volume has occurred since 1985 (nearly 300%). At the same time the number of BFS, FTEs working in toxicology has remained constant. The ability of the toxicology program to meet these demands is in part due to the acquisition of automated equipment that has occurred since 1994. Prior to that time, toxicology procedures were mostly labor-intensive.

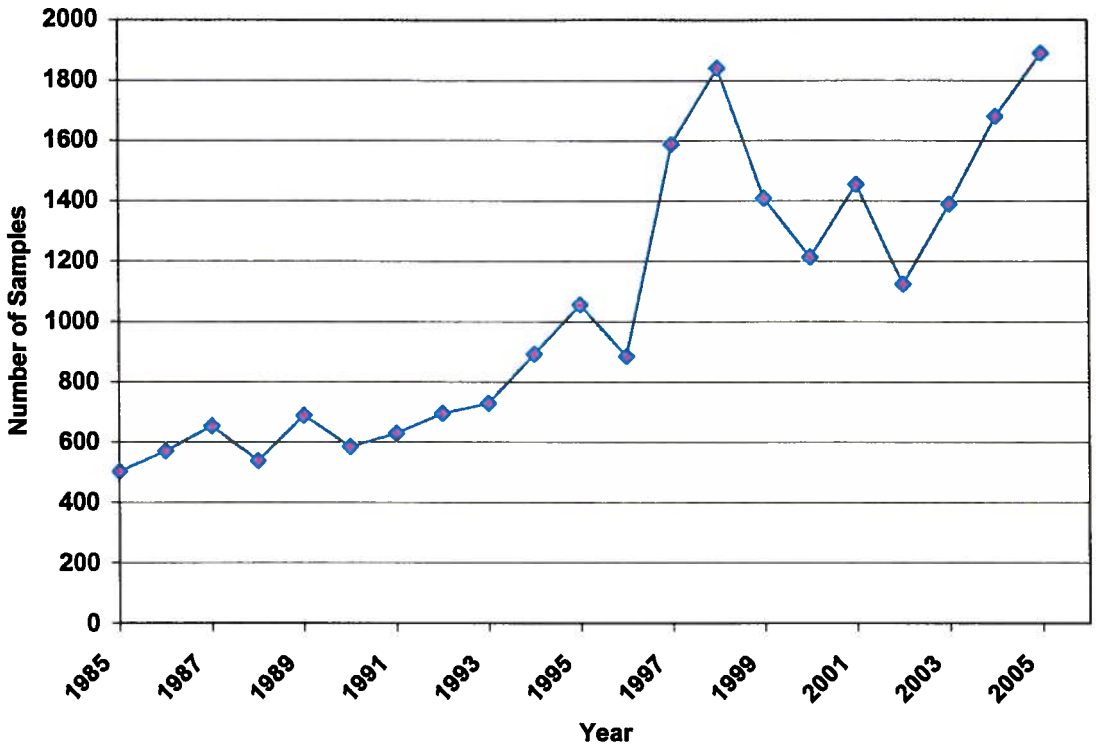

Figure 1: Trend in toxicology sample submissions since 1985.

Table 1 breaks down the sample types submitted during FY2005. There was nearly a 12% increase in sample number from FY2004. Although the number of urine samples dropped off by slightly more than nine percent, the number of blood samples was up dramatically (131%) from the previous year.

To some extent the drug/controlled substance casework analyzed by the ISP-FS laboratories should mirror toxicology submission results. Therefore, some facts on that workload, as well as national trends are integrated into this report. Approximately 70 percent of the 8163 cases submitted to Forensic Services during 2004 were related to drug/controlled substance analysis.[1] The largest quantities of drugs/controlled substances analyzed encompass just five drug categories: marijuana, stimulants (amphetamine and methamphetamine), hallucinogens (MDMA, MDEA, and mushrooms), cocaine, and heroin.[2] Adults represent 85% of the drug/controlled substance casework with juveniles representing the remaining fifteen percent.

Nationally, most drugs of abuse trends remained fairly flat during the last year. Exceptions have been the marked rise in methamphetamine, oxycodone/oxycotine, and

[1] ISP-FS annual workload information
[2] 2004 Crime in Idaho Report

benzodiazepine use, along with a slight rise in anabolic steroid use.[3] Methamphetamine has worked its way across the US during the last few years and could supplant cocaine as the drug in greatest demand in the near future, and its increased use reversed the decreasing trend that has been occurring prior to this year.[4]

Methamphetamine is still the drug in greatest demand in the western US, with cannabis and cocaine following in relative order. ISP-FS mostly analyzes methamphetamine samples, but seizures of clandestine laboratories have dropped off and with it, the corresponding clandestine laboratory casework.

Toxicology submissions made up 23 percent of ISP-FS workload with alcohol, marijuana, amphetamine/methamphetamine, cocaine, and pharmaceuticals being the most prevalent. Juveniles represent at least 17.9% of all toxicology samples and DUI/DUID represents the largest percentage (47.5 %) overall of the toxicology workload.

Sample Type	Blood samples	Urine samples	Total	Percent
DRE				
Adult	1	114	115	6.1
Juvenile	0	8	8	0.4
NJDT	0	8	8	0.4
DUI				
Adult	556	0	556	29.7
Juvenile	165	0	165	8.8
DUID				
Adult	90	242	332	17.8
Juvenile	18	79	97	5.2
Probation & Parole				
Adult	0	171	171	9.1
Juvenile	1	58	59	3.1
Other criminal	23	235	258	13.7
Non-criminal	10	0	10	0.5
Accident Victims	30	23	53	2.8
Death (non-homicide)	24	22	46	2.4
Total	**918**	**960**	**1878**	**100.0**

Table 1: Breakdown of Toxicology Samples Received by ISP-FS in FY2005.

Nationally, as in years past, approximately eight in ten toxicology submissions during this year were represented by only seven categories: alcohol-in-combination, cocaine, methamphetamine, heroin, benzodiazepines, antidepressants, and analgesics. Alcohol-in-combination with a drug and marijuana again comprised over half of all toxicology

[3] NFLIS 2004 Midyear Report
[4] DEA National Factsheet for 2004

submissions. At the same time that drug seizures and usage remains flat, there continues to be general upward trend in emergency department admissions at US hospitals.[5]

NJDT Samples

During FY2004 the Forensic Services received eight NJDT samples. This represents a seventy-two percent drop in the number of samples submitted since last year. Agencies submitting these samples were: Shoshone Bannock School District (3), Ada CSO (2), Franklin CSO (2), and Twin Falls PD (1). The NJDT samples submitted represent less than one percent of all samples submitted and more than half of these samples arise from law enforcement agencies.

All samples were positive for controlled substances (75% for THC alone and 25% for the combination of THC/CNS-S [methamphetamine]). These numbers closely reflect the types of juvenile drug submissions analyzed during the year (mostly THC, methamphetamine, hallucinogenic mushrooms, and some pharmaceuticals). Figure 2 depicts the results of NJDT testing during the fiscal year.

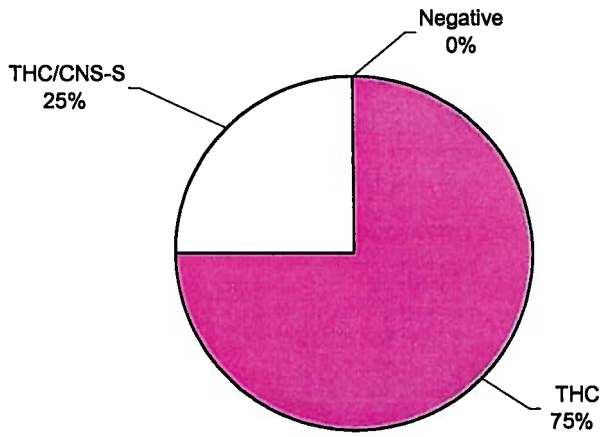

Figure 2: Results of NJDT toxicology samples during FY 2005.

According to the latest DHHS information approximately ten percent of Idaho's school age children above the age of 12 report having used any illicit substance during the last one-month period and around six percent feel that they have a drug dependence problem.[6] Yet, the total number of juvenile samples tested for drugs during this past school year represents less than 0.01 percent of this same population.

[5] DAWN Abuse Warning Network: 2002-2003
[6] DHHS Substance Abuse and Mental Health Administration Statistics

Juvenile Samples

Approximately 0.3 million of Idaho's population is juvenile and 0.09% of the population is represented in the tests analyzed by ISP-FS. Figures 3 and 4 summarize the results of urine and blood juvenile samples, respectively (including NJDT) during FY2005. Overall the number of samples submitted to the laboratory during FY2004 rose slightly (2%) from the previous year. In urine samples, marijuana alone represents the highest percentage of all samples (41%) and for drug combinations, marijuana/CNS-S represents the highest percentage in that grouping.

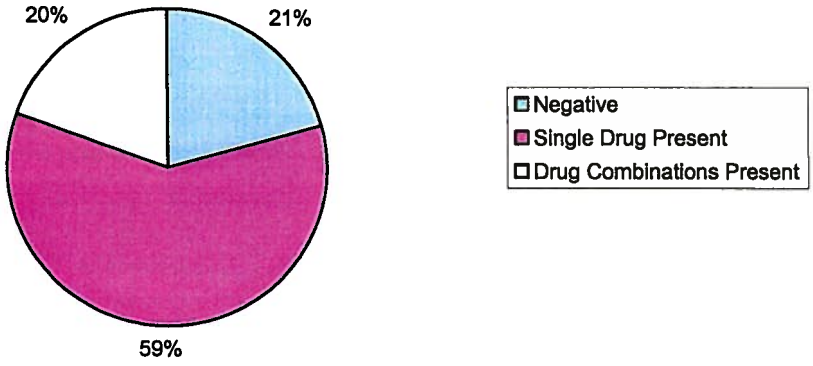

Figure 3: Juvenile urine toxicology results during FY2005.

This year represents a second consecutive year where the percentage of marijuana-positive samples increased and may represent an increase in its usage by the juvenile population. Drug combinations represent only 17% of all samples and it appears that multi-drug use continues to decline within this population.

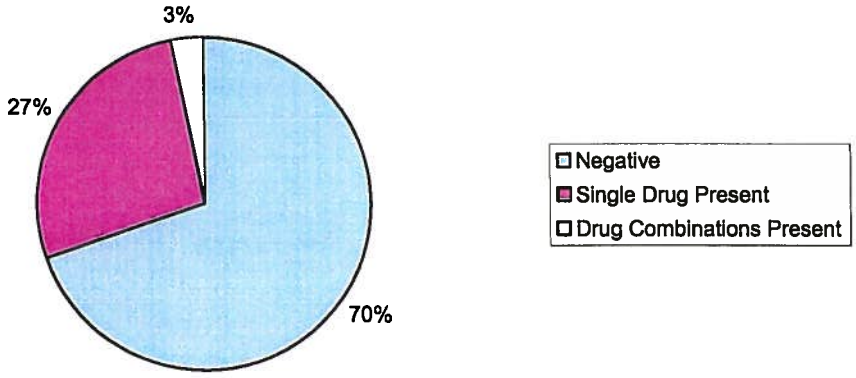

Figure 4: Juvenile blood toxicology results during FY2005.

Marijuana alone represents the highest percentage of all samples in the juvenile population where a blood sample was taken. The presence of a CNS-S, CNS-D, or the combination of the two, represents all remaining positive-testing samples. Samples positive for multiple drugs are lower this year than other years and another indication of multi-use decline within the juvenile population.

Figure 5 depicts the BAC results for all juveniles. Forty-five percent of the samples were negative, eight percent had an alcohol concentration less than 0.08%, and forty-seven percent had alcohol concentrations greater than 0.08%.

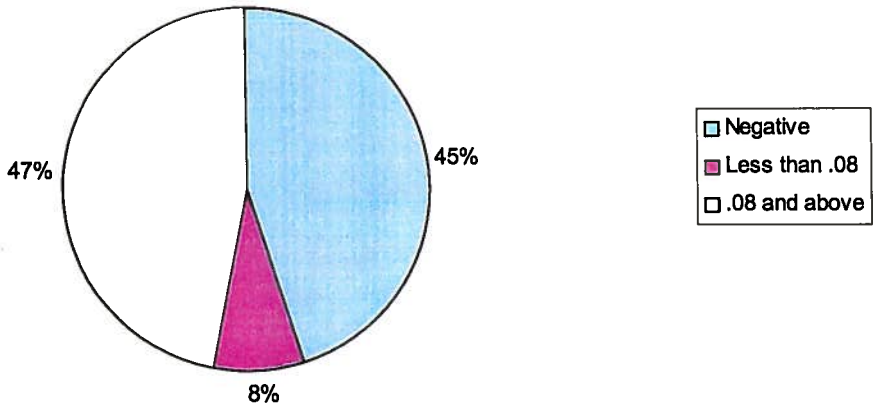

Figure 5: BAC concentration for juveniles tested during FY2005.

DRE Samples

The total DRE samples analyzed during FY2005 represents approximately 0.02% of Idaho's population that is 16 years and older and the number of samples submitted last year is down 40% from FY 2004, reflecting the continued loss of DRE-qualified officers from the workforce. Figure 6 reflects the results of DRE urine samples analyzed during FY2005.

Over one-third of all individuals having only a single drug present showed marijuana. Samples positive for a CNS-S or CNS-D were almost equally divided at 27% and a narcotic analgesic was detected in the remaining ten percent of samples within this group. Multiple drug combinations were found in 39% of the samples and nearly 50% of this group had a CNS-S on-board.

Little change was noted from last year in the relative percentages of the population distributed within the types-of-drug classes. Last year there were a number of blood

samples submitted under the DRE program; however, this year no such samples were collected.

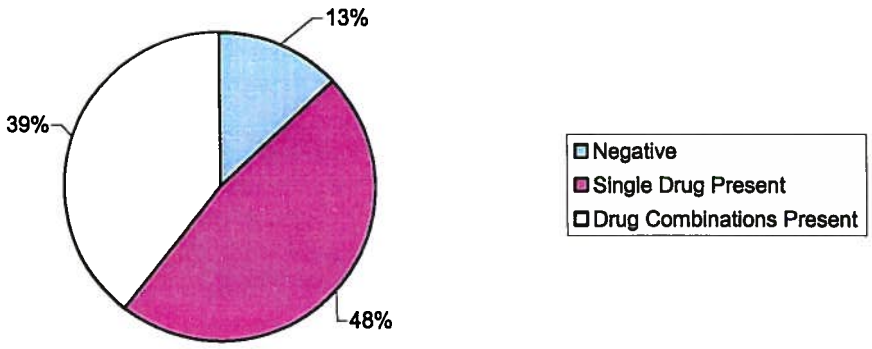

Figure 6: DRE urine toxicology results during FY 2005.

Adult Samples

The adult population in Idaho comprises approximately 0.96 million individuals and 0.08% of the population is represented by the samples analyzed during FY2005. Figures 7 and 8 depict the results of adult toxicology samples during FY2005. Numbers of samples in this category were down about 27% from a year ago, but the relative percentages within given categories were close to the previous year. CNS-S constituted the largest percentage of samples within both urine and blood samples and reflects the prevalence of methamphetamine in this population. Even CNS-S and marijuana in combination constituted a larger percentage of the population than marijuana alone, and the first time that the presence of marijuana alone has fallen this low (third) in relative abuse. This trend began last year, within this population, and appears to be a shift in the abuse pattern and not just an anomaly for the FY2004 year.

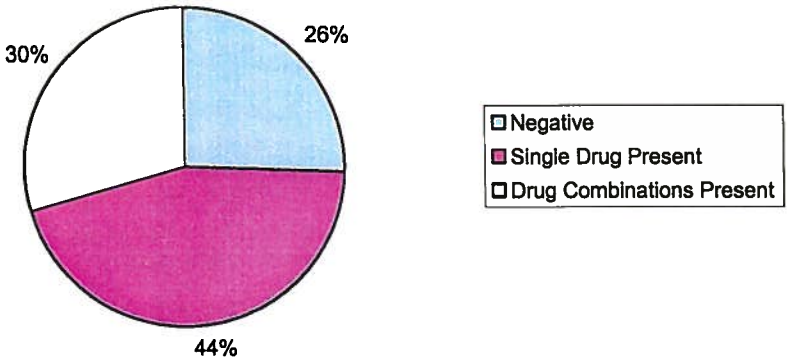

Figure 7: Adult urine toxicology results FY 2005

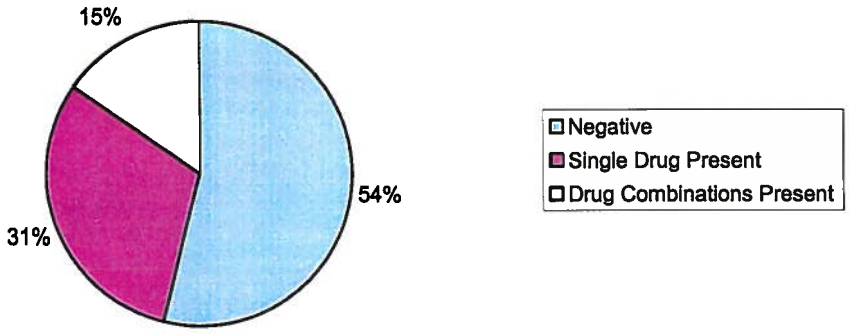

Figure 8: Adult blood toxicology results FY 2005

In FY2004, abuse of narcotic analgesics in high numbers was first noticed within the adult population. Although use is down slightly during FY2005, there is still a considerable number of the adult population using this class of drug. Drug combination use is up just slightly (1%) from last year and now represents nearly thirty percent of the adult population. This is a trend that has been steadily climbing for the last five years and appears to be tapering only slightly.

The number of negatives is relatively high within this population, but this is due to: 1) the fact that many crime victims are included within this sampling and 2) the ISP-FS policy that blood samples are not routinely analyzed for drugs if the BAC is greater than 0.12 percent. During the FY2005, a number of samples were submitted for gamma-hydroxybutyrate (GHB) analysis. No samples were found to be positive for the substance. LE officers often suspect and request analysis for GHB in sexual assault cases; however, the prevalence of the drug within Idaho's population appears to be either very small or non-existent.

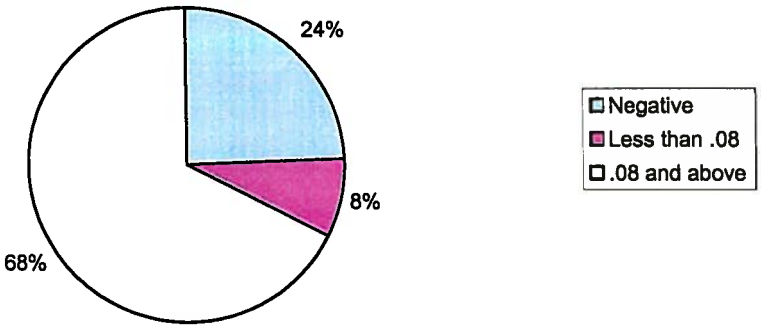

Figure 9: Adult BAC results during FY2005.

The results of blood alcohol testing are depicted in Figure 9. The total number of samples was up by 53% from FY2004 and more than three-quarters of all samples had alcohol present. Sixty-eight percent were greater than 0.08%.

Accident Victim Samples

Ninety-two accident victim samples were submitted during FY2005, which is up 30% from a year ago. Adult and juvenile sample results for urine and blood are depicted in Figures 10 through 13. The high percentage of negatives reflects other victims than just impaired drivers of vehicles and, the concentrating medium of urine also appears to impact in ease of detecting impairing substances present in accident victims.

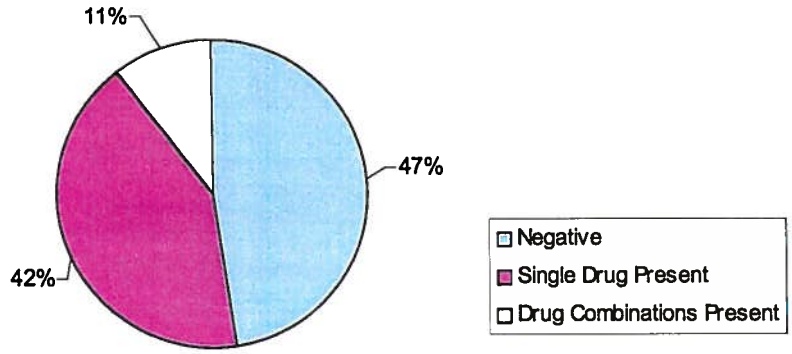

Figure 10: Adult accident victim urine toxicology results.

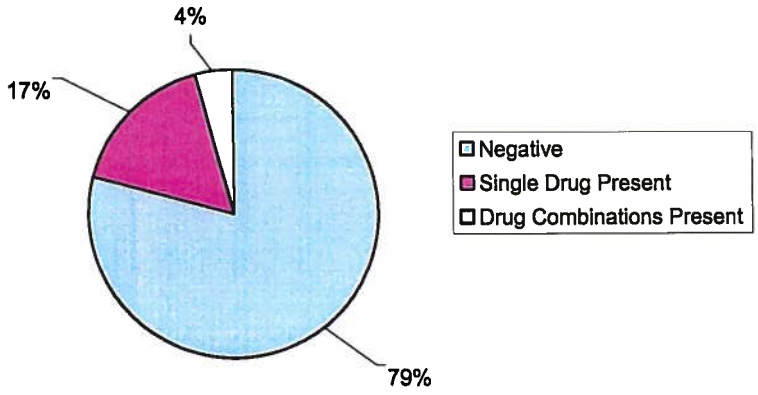

Figure 11: Adult accident victim blood toxicology results.

The greatest number of positive urine samples from the adult accident victims had either THC or a CNS-D present (37%), while the positive blood samples from the same population had a CNS-S or CNS-D present (19%). In the past these two sample groups have had greater correlation (both groups usually having high percentages of THC and CNS-S present). And in fact, no adult accident victim blood samples were found to have marijuana present.

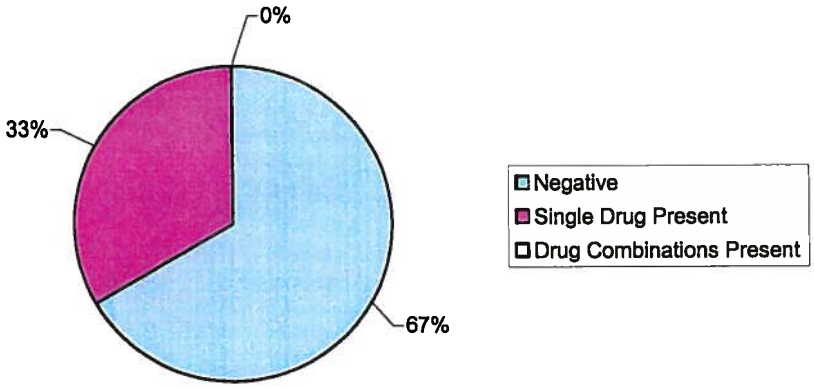

Figure 12: Juvenile accident victim urine toxicology results.

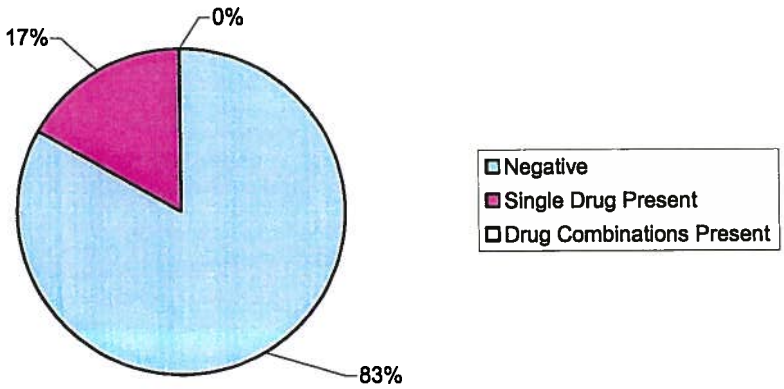

Figure 13: Juvenile accident victim blood toxicology results.

All of the positive juvenile accident victim urine samples had THC present. No other drugs were found in these samples. Meanwhile, all of the blood samples from the

juvenile accident victims had only a CNS-D present. No multi-drug samples were found in either of the juvenile sample groups, which is also different from years past.

Summary

Figures 14 and 15 depict the results of all urine and blood toxicology samples submitted to the laboratories. During FY2005, the percentages of urine negatives (24%) were much less than the five-year trend (30%). The overall higher percentage of negatives in the blood samples is due to the ISP-FS policy of not requiring further toxicology analysis if the blood alcohol concentration is greater than 0.12%. Generally, somewhere around fifty percent of the samples are positive for a single drug type and twenty percent are positive for multi-drug use.

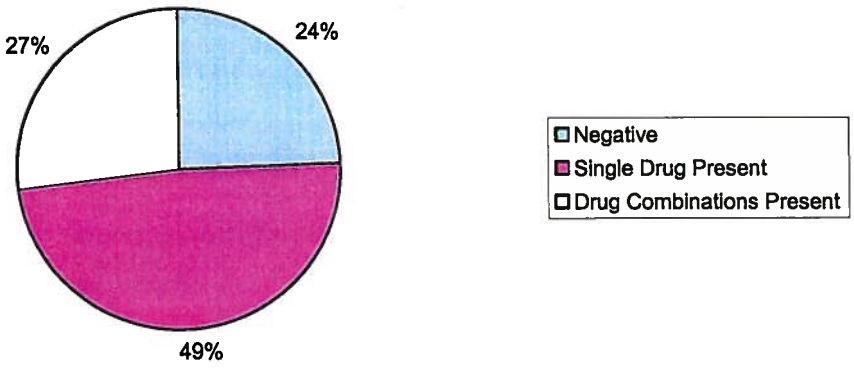

Figure 14: Results for all urine toxicology samples during FY2005.

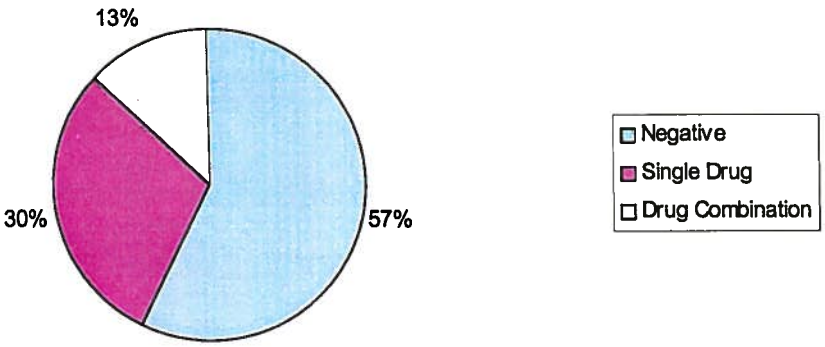

Figure 14: Results for all blood toxicology samples during FY2005.

Approximately 10,400 Idahoans were arrested for DUI during 2004. This represents approximately 0.74% of the population, of which ISP-FS analyzed about 7% of all such samples. The remaining 93% of the samples were analyzed using on-site breath testing devices. Of the adult population arrested for DUI, the FS laboratories analyzed 5% of those cases, whereas the laboratories analyzed 64% of all juvenile DUI arrests.

Nationally there has been a steady rise in certain of drugs of abuse (methamphetamine, tryptamine and phenethylamine derivatives, steroids, and some hallucinogens), which have not shown such dramatic increases within Idaho. However, benzodiazepine abuse in Idaho is growing at a similar rate to that seen across the country.

Quantitative analysis for drugs of abuse in blood and certain drugs of abuse in urine appears to be on track for completion by the end of this calendar year. At this time, most methods are in place and are going through validation studies.

If you have questions concerning this report, please feel free to contact me.