

Annual Report 2011

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ASCLD/LAB-International
accredited since
December 10, 2009

SURVEILLANCE VISIT

- The BCA Laboratory's (St. Paul and Bemidji) first annual ASCLD/LAB-International surveillance visit in May 2011 revealed no findings.

Message from the Director: A Year of Challenges

2011 has been a year of increasing submission rates and static staffing levels. As Minnesota's only full service crime lab, we push forward with careful utilization of our limited resources to provide quality forensic science services to the criminal justice community.

There was a significant rise in the submission of Criminal Sexual Conduct (CSC) cases, due in part to old cases that departments had been holding and had not submitted for analysis. Submissions of CSC cases alone are up 26% over 2010.

The legislature expanded controlled substance laws to include designer drugs commonly referred to as "bath salts" and "synthetic marijuana." Drug submissions rose 14% over 2010.

A Supreme Court ruling of an appeal of the Intoxilyzer "source code" ruling by Judge Abrams is expected in 2012. Thousands of implied consent cases are on hold until that decision is made. Many departments have opted to take a blood or urine sample instead of breath resulting in a 100% increase in the last four years.

Significant delays were experienced in the deployment of the new DataMaster breath alcohol testing instrument that will replace the

Intoxilyzer. Full deployment will now be completed in 2012.

Some Courts are refusing to issue a search warrant for known DNA samples in cases involving known suspects. They want the unknown samples tested to show a DNA profile is present before they will issue a warrant. This results in more work to process a case and a significant delay in their completion.

There were several FRYE hearings challenging the scientific validity and reliability of latent fingerprint identification, handwriting comparisons, as well as analytical techniques used to identify street drugs. Each of these challenges resulted in hundreds of hours in court preparation time.

For the most part, the Bureau of Criminal Apprehension (BCA) Laboratory has accepted evidence regardless of the severity of the crime. In addition, constraints were rarely put on the volume of evidence submitted for a particular case. The BCA Laboratory is committed to facing the challenge of dealing with caseload increases. In the current economic climate, this challenge must be achieved with current resources.

-Frank C. Dolejsi, BCA Lab Director

2011 Case Statistics Overview for the BCA Forensic Science Service Laboratories

The BCA Forensic Science Service Laboratories in St. Paul and Bemidji both experienced an overall increase in the number of cases submitted for analysis in most sections. The exception was in the Alcohol and Toxicology sections. The decrease in Alcohol and Toxicology submissions is most likely attributed to counties returning to the Intoxilyzer in DWI cases which had previously suspended use due to issues related to the source code. The table below shows the number of cases submitted to each laboratory by section in 2011 and compares the respective submissions to those of 2010.

Number of Cases Submitted to the BCA Forensic Science Service in 2011				
	St. Paul Lab		Bemidji Lab	
Section	Cases	Change from 2010	Cases	Change from 2010
Alcohol	10,587	-3585	1,038	+1,038
Crime Scene	35	+3	17	+8
Chemical Testing	172	+4	-	-
Nuclear DNA	2,613	+425	438	+82
Controlled Substance	2,980	+226	1,047	+312
Firearms and Toolmarks	376	+23	71	+11
Latent Prints	1,036	+93	291	+43
Mitochondrial DNA	54	-23	-	-
Question Documents	51	+16	-	-
Toxicology	2,166	-65	-	-
Trace	144	+2	-	-
Missing Persons*	190	-9	-	-

*The Missing Persons section was created to perform DNA analysis in human remains and was funded through a cooperative agreement with the FBI. Funding for this section ended in September 2011.

The BCA Forensic Science Service continues to prioritize cases based on case type. As can be seen in the tables on page 3 and 4, the turn-around times for crimes against persons cases remained virtually unchanged from the previous year, even though the overall number of these types of cases increased dramatically. This can be attributed to several factors, one of which was the implementation of automation in the DNA section with instrumentation purchased over the past several years using a combination of State and Federal funds. The overall decreased turn-around time in property crimes can also be attributed to increased automation as well as the formation of a group dedication to performing DNA analysis in property crime cases. These personnel are primarily staff that had worked in the Missing Persons section.

2011 Crimes Against Persons Case Statistics for the BCA Forensic Science Service

Case Type	# of Reports	Change from 2010	TAT (days)	Change from 2010 (days)
Attempted Homicide	70	-13	45	-16
Assault	468	-57	51	-12
Child Endangerment	6	+15	37	+15
Criminal Sexual Conduct	3,335	+576	38	-4
Death Investigation	367	+45	53	+8
Fatality Study	107	-42	25	-5
Homicide	317	-78	58	0
Hit and Run	30	-8	73	+28
Kidnapping	36	-15	44	+4
Robbery	251	-9	52	-22
Terroristic Threats	59	-10	54	-17
Criminal Vehicular Homicide	91	+40	33	-3
Stalking/Harassment	19	+28	90	+28
Total	5,156	+422	50	+2

2011 Property Crimes Case Statistics for the BCA Forensic Science Service

Case Type	# of Reports	Change from 2010	TAT (days)	Change from 2010 (days)
Auto Theft	209	+3	80	-25
Burglary	1,527	+16	71	-45
Fire Investigation	243	+39	64	-10
Forgery	23	-20	85	-19
Fraud	16	+5	91	+16
Theft	313	-34	70	-30
Vandalism	86	-20	76	-59
Total	2,417	-11	76	-34

2011 Drug Related Case Statistics for the BCA Forensic Science Service

Case Type	# of Reports	Change from 2010	TAT (days)	Change from 2010 (days)
Controlled Substance	4,686	+406	33	+1
Total	4,686	+406	33	+1

2011 Traffic Related Case Statistics for the BCA Forensic Science Service

Case Type	# of Reports	Change from 2010	TAT (days)	Change from 2010 (days)
Criminal Vehicular	534	-85	32	0
DWI	12,193	-2,311	20	0
Open Bottle	43	-22	9	-2
Total	12,770	-2,418	20	0

Mitochondrial DNA



Example of calcified tissue—molar

On October 1, 2011, the BCA Laboratory renewed the cooperative agreement with the Federal Bureau of Investigation (FBI) which allowed for the continued operation of the Regional Mitochondrial DNA Laboratory. This renewal offer was a direct result of eight successful years of participation in the program. The BCA began offering mitochondrial DNA (mtDNA) testing in 2005 after spending approximately one year and a half preparing the laboratory space, training, and conducting validation studies. The BCA Laboratory is now one of only two laboratories that have been invited to continue participation in this important program which offers a highly sensitive and potentially powerful DNA typing tool to law enforcement entities in

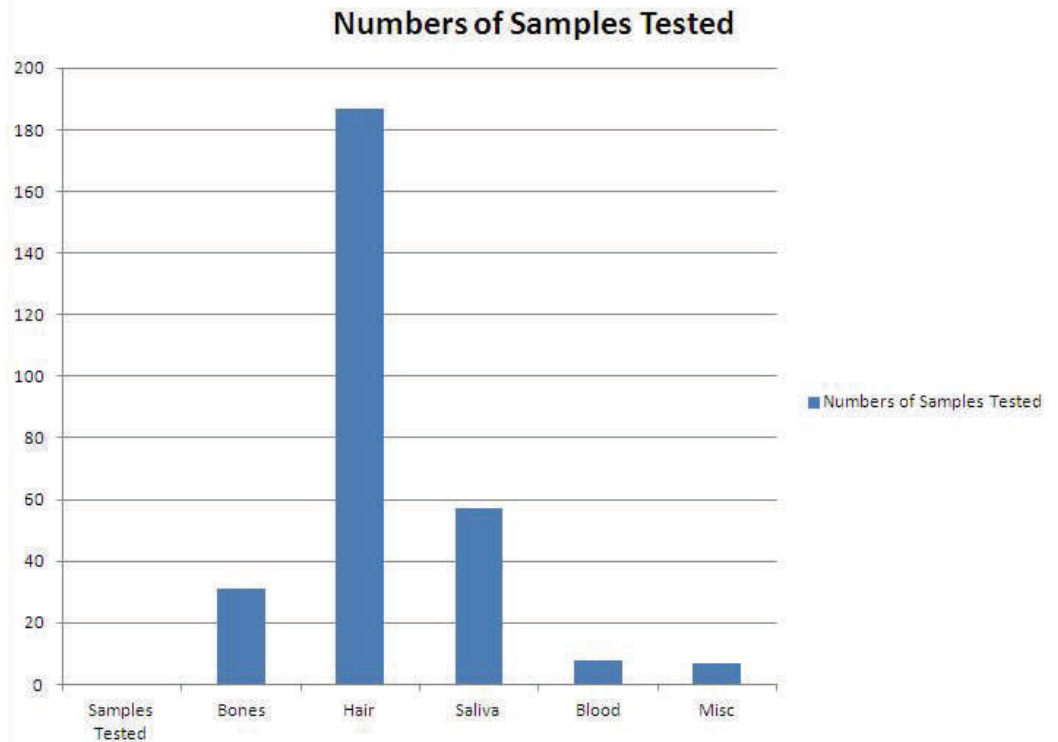
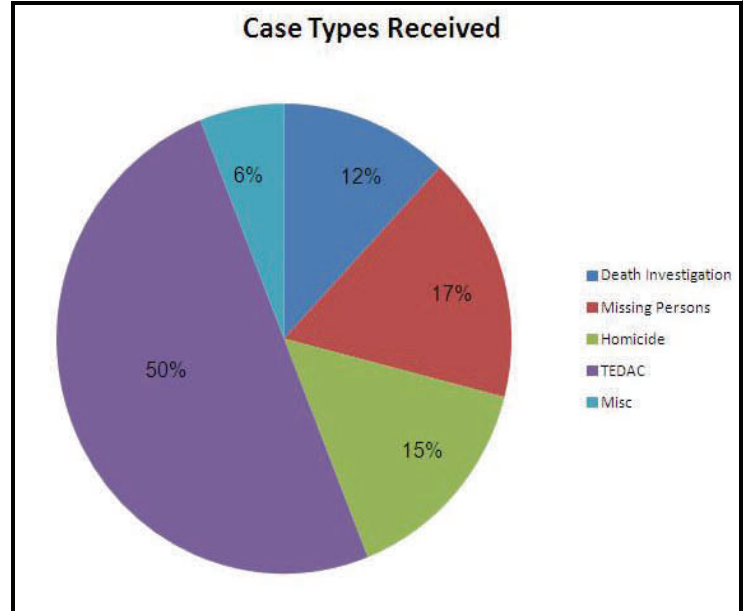
Minnesota and throughout the United States. Thus far, the BCA has conducted mtDNA testing for over 700 cases including recent and cold cases involving homicides, kidnappings, and sexual assaults. Additionally, mtDNA testing has been an integral piece of the puzzle when solving cases involving those who are missing as well as the identification of human remains. Mitochondrial DNA testing at the BCA Laboratory is most commonly needed for cases involving human hair, bones, teeth, and other biological samples that may be compromised or degraded.

mtDNA Section Stats—2011

In 2011, 99 cases were submitted for mtDNA testing. Twenty-four cases were submitted by Minnesota law enforcement agencies and 75 cases were submitted from out of state agencies. Overall, 133 mtDNA analysis reports were released in 2011.

Mitochondrial DNA profiles generated for unidentified human remains cases and those involving the missing are entered into the Combined DNA Index System or CODIS. People who are missing a family member can submit samples for mtDNA testing. The section has worked closely with the Missing Persons Section in a concerted effort to provide missing persons cases with the attention that they deserve.

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Missing Persons DNA

The BCA Laboratory continues to offer the most comprehensive DNA testing for Minnesota cases involving the missing and the unidentified.

In 2009, the BCA Laboratory entered into a cooperative agreement with the FBI to provide nuclear DNA testing for cases involving missing persons and unidentified human remains from all over the United States. The BCA was the only laboratory in the country to secure this funding. The cooperative agreement and funding that supported the BCA's effort to provide this testing for non-Minnesota cases expired at the end of September. However, due to the training, research and experience obtained during the course of the agreement, the BCA is in a unique position to continue to offer the most comprehensive DNA testing for Minnesota cases involving the missing and unidentified. Additionally, our staff is highly trained in dealing with complicated kinship statistical analysis that may be utilized in other types of cases when multiple family members are involved.

During 2011, the section received 121 submissions in addition to the over 200 cases submitted at the beginning of the agreement. The testing provided by the BCA resulted in the upload of over 350 samples and the creation of over 100 pedigrees to the Combined DNA Index System or CODIS. To date, the BCA has assisted in over 30 identifications as a result of this program.

Nuclear DNA

In 2011, the Nuclear DNA section again saw a double digit increase in the number of cases received. While dealing with a 17% increase in the number of cases, we continued to improve our case turnaround time, thanks in large part to the continued use of robotics and the willingness of dedicated scientists to put in long hours to get the job done. In addition to their lab work, section scientists testified in 122 trials/hearings in counties across the state of Minnesota.

The section continues to work on cold case homicides; using DNA technologies to reexamine evidence from unsolved cases with the hope that today's procedures can pull information from yesterday's evidence. In October 2011, in cooperation with the Investigations unit of the BCA, we began a new initiative using a grant from the National Institute of Justice to examine even more unsolved cases. This grant is in effect for 18 months, and it is hoped that the BCA will be able to assist local law enforcement in solving a number of cases.



Nuclear DNA Scientist at Workstation



DNA Extraction



Nuclear DNA case turnaround continues to improve as we continue the use of robotics and the willingness of scientists to put in long hours to get the job done .



-Nuclear DNA (continued from page 6)-

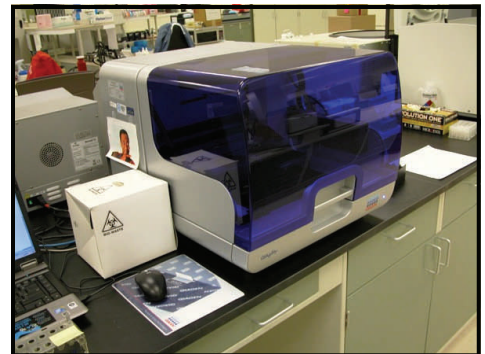
The cooperative agreement between the BCA and the Minneapolis Police Department (MPD), originally signed in 2007, continues to help both agencies. Four scientists are assigned to MPD cases, and in 2010 they issued 758 reports on 551 cases. We continue to use the Tecan EVO robot for known samples (reference samples from case principals). By using the Tecan EVO, we are able to utilize high throughput technology while separating the known samples from the casework (crime scene) samples. The Nuclear DNA unit utilizes 3 Applied Biosystems 3130 Genetic Analyzers; instruments that have increased capacity and sped up the processing of case samples. The Maxwell® 16 robotic system is now routinely used for extraction of DNA from casework samples and has greatly improved the number of cases that can be processed by a single scientist. In 2011, we added a robot called the QIAgility® made by a company called Qiagen. This has made the process by which we quantify the amount of DNA obtained from forensic specimens more efficient.



Tecan EVO Robot



ABI 3130 Genetic Analyzer



QIAgility Robot



Nuclear DNA Scientist at Workstation

Drug Chemistry

The primary responsibilities of the Drug Chemistry section include analyzing items of evidence for the presence of controlled substances and testifying in court. Evidence submitted is comprised of solids in various forms (crystalline material, powders, plant material, tablets, capsules, etc.) and liquids.

In 2011, the Drug Chemistry Section received 4,167 cases and reported on 4,151 cases- approximately 350 more cases than in 2010. There were 7,140 items reported, approximately 790 more items than 2010. The average turnaround time for a case was 26 days. Cases with court dates were expedited.

Of the over 7,000 items reported, the five most reported controlled substances were as follows:

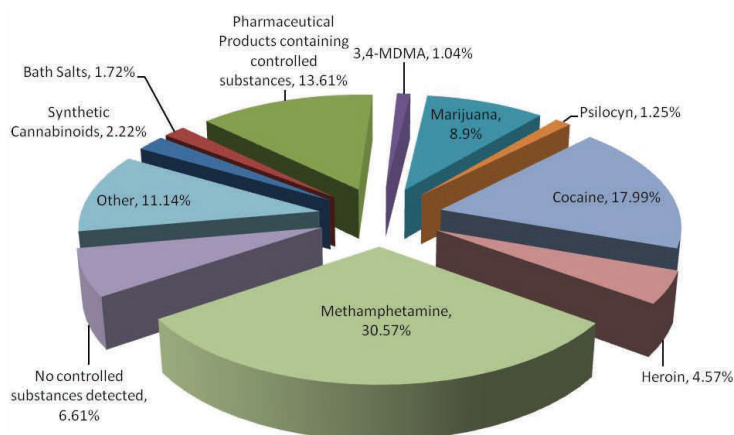
- Methamphetamine was reported in 2,194 items.

- Cocaine was reported in 1,291 items.

- Pharmaceutical products (tablets, capsules, liquids) containing controlled substances were reported in approximately 1,000 items.

- Marijuana was reported in 625 items, despite the Drug Chemistry section's policy on only analyzing suspected marijuana with a court date.

- Heroin was reported in 328 items.



Items Reported by the BCA Drug Chemistry Section in 2011

Keep in mind that in some items, more than one controlled substance was identified.

The Drug Chemistry Section noted an increase in the amount of submissions of pharmaceutical products and heroin since last year. Submissions of methamphetamine, marijuana and cocaine stayed relatively steady from last year. There were an increasing number of agencies requesting the analysis of "synthetic cannabinoids" and/or "bath salts". Although both were observed last year, this year has shown a marked increase, especially during the beginning of the year.

There was an increase in the number of agencies requesting analysis of synthetic cannabinoids and/or bath salts.



Chocolate covered mushrooms

Drug Chemistry Trends

Synthetic cannabinoids are typically marketed as herbal mixtures called "SPICE", "K2" and other varying names. There have been submissions of synthetic cannabinoids in powder form, as well. Currently, many synthetic cannabinoids are scheduled as controlled substances in Minnesota.



Examples of Synthetic Cannabinoids



THC-laced liquid

Bath Salts is a generic term that can include many different substances. The ones that have been frequently observed in the Drug Chemistry Section are 3,4-methylenedioxymethcathinone (methylone), 4-methylmethcathinone (mephedrone) and methylenedioxypyrovalerone (MDPV). Methylone and mephedrone have been found in powders, whereas MDPV has typically been found in conjunction with 5-Methoxy-N,N-diisopropyltryptamine (5-MeO-DIPT) in powders and Ecstasy mimic tablets (*pictured below*).



Ecstasy mimic tablets containing 3,4-MDPV and 5-MeO-DIPT

The Drug Chemistry Section has seen many different substrates containing controlled substances. Powders, crystalline material, paper, liquids, paper strips, tablets and capsules are most typically seen. However, there have been samples submitted that been incorporated into food products. Honey-soaked mushrooms (*pictured to the left*), chocolate covered mushrooms (*pictured on page 6*) and THC-laced candies (*pictured below*) and liquids (*pictured to the left*) have been submitted in the past year.



Examples of THC-laced Candy



Honey-soaked mushrooms

Chemical Testing

The Chemical Testing section within Trace covers two sub-disciplines: fire debris analysis and the analysis of chemical unknowns.

Fire debris analysis involves the analysis of materials from a fire to determine the presence and identification of an ignitable liquid. This is essentially a three step process: extraction of volatile compounds from the submitted material, separation and detection of those volatile compounds, and data analysis to identify those compounds and their possible source.

While most materials to be tested for ignitable liquids consist of debris from a fire, other items that can be tested include clothing from a victim or suspect, suspected liquids, soil or vegetation from around building exteriors, or empty containers suspected of carrying an ignitable liquid to the scene.

The Chemical Testing section within Trace covers two sub-disciplines: fire debris analysis and the analysis of chemical unknowns.



A broken glass jar suspected of having held an ignitable liquid.



A large number of match heads found at the scene of a suspected arson.

-Chemical Testing (continued from page 10)-

The Chemical Testing unit also performs analyses for acids and bases, bleach, tear gas, security pack dyes, fire extinguisher residues, and various organic liquids.

The analysis of chemical unknowns involves the examination of materials for identification of non-narcotic substances. This type of evidence can be encountered at a variety of crime scenes, from burglary to homicide, from vandalism to sexual assault. Evidence can be of any type – solids, liquids, mixtures, even gasses. Submissions may be for identification and/or comparison to a known sample.

Some examples of cases submitted in 2011 include the following:

- an attempted poisoning using nail polish remover to adulterate a bottle of rum
- an attempted poisoning using xylols to adulterate a bottle of vodka
- determining the presence of petroleum jelly on the clothing of a victim of sexual assault
- looking for transmission fluid on the clothing of a hit and run victim
- identifying sulfuric acid in the possession of a suspected illicit drug manufacturer

The Chemical Testing section also performs analyses for acids and bases (corrosives and caustics), bleach, tear gas, security pack dyes (such as from the exploding dye packs used to deter bank robberies), fire extinguisher residues, and various organic liquids.

This year the Chemical Testing section analyzed over 200 cases. As most chemical testing cases are investigatory in nature, the section put a lot of effort into reducing the case backlog and shortening turnaround time. Chemical Testing has for years utilized methods developed and approved by ASTM International, ensuring the highest level of quality and consistency in our work.



One of the three gas chromatograph—mass spectrometers in Chemical Testing. One of these instruments is reserved for the analysis of vegetable and other non-petroleum based oils. With the rise of biofuels in the marketplace, this will be a valuable tool in the years to come.

Trace Evidence

In addition to the cases listed in the table to the right, our hair examiners completed 15 cases for the FBI Mitochondrial DNA Regional Program.

In a year's time, the Trace Evidence section may analyze a variety of evidentiary items from air bags to tennis shoes. Trace cases can be quite complex requiring a lot of examination hours. Other times our analysis is the last to be performed in a multi-disciplinary case as we are awaiting results from different sections (e.g. DNA, Latent Prints). In 2011, the trace section completed 203 examinations. We are gaining momentum in turnaround time with several scientists finishing up training in the variety of sub-disciplines. This training increases the number of scientists who can perform examinations in all the trace sub-disciplines and subsequently provide expert testimony in court.

In addition to these cases, our hair examiners completed 15 cases for the FBI Mitochondrial DNA regional program.

Evidence Examined by BCA Trace Evidence Section in 2011

Type of Evidence (based on trace sub-discipline)	# of Cases
Hair (non-comparison)	75
Hair (comparison)	1
Shoe/Tire Impressions	44
Paint	20
Glass	9
Fibers, Ropes & Cordage, Fabric Impressions, and Fabric Damage	20
Physical Match	4
Rubber	2
Red Phosphorous/Iodine	2
Tape	2
Metal	1
Headlamp-on/off determination	2
Wood	0
Misc.	6
Total	188

2011 Trace Evidence Submissions

Shoeprint Examinations

The majority of our submissions this year consisted of shoeprint comparisons. We often rely heavily on photographs taken by the submitting agency of questioned impressions for our comparisons. It is imperative that these photographs are of high quality and taken properly.

A properly documented shoe impression speeds up our analysis time and may help reveal details in the impression that could lead to an identification. In addition to submitted photographs, casts and/or gel lifts are always welcomed.

-2011 Trace Evidence Submissions (continued from page 12)-

Paint Examinations

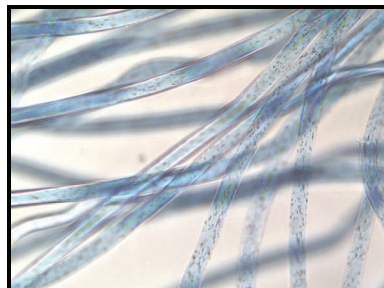
Paint evidence can be important in cases ranging from homicide to burglary. The analysis requests typically involve associating paint from the suspect (on persons or on tools) to paint from the scene or victim. However, we also have the ability to help our customers in cases where **no suspect** has been located (e.g. Hit and Runs). Since 1999 the BCA has been a partner of the Paint Data Query (PDQ), an international automotive paint database. This database gives us the ability to analyze questioned automotive paint samples and provide investigative leads as to the make/model/year of the suspected vehicle. Spread the word! When these types of cases arise, the BCA Lab may be able to help. Evidence submitted could be suspected paint collected at the scene, from the clothing of the victim(s), and/or the victims' bicycle.

The Paint Data Query international automotive paint database gives the BCA the ability to analyze questioned automotive paint and provide investigative leads.

Highly Probative Evidence Submitted Less Frequently to the Trace Section:

Fiber Examinations

Fibers are one of the most ubiquitous forms of trace evidence. Trace material such as fibers are fairly unique to an individual's environment because the choices in clothing, vehicles and home décor are based on personal preferences. Fibers transferred from an individual's personal environment can also be transferred in a crime. Associating fibers from the environment of a suspect with the environment of a victim could provide an essential link in an investigation.



Fibers

Tape Examinations

Tape left at a scene, recovered from a victim or wrapped around a tool/weapon might be submitted to the Laboratory for latent prints but a trace examination could also provide probative information. Collection of a known tape roll might yield a physical match between the ends of the questioned tape and the known tape roll. If a physical match isn't possible a comparative analysis can be performed to determine if the two tapes are associated.



Tape

Crime Scene Team

The St. Paul Crime Scene Team responded to 38 scenes in their 59 counties of responsibility across southern Minnesota, covering several hundred miles. The Team consists of 13 forensic scientists from various Laboratory sections. Of the 11 officer involved shooting scenes processed by the Team, one tragically resulted in the officer's death. Crime Scene Team members, who volunteer for this work, are a unique breed. They must work in all types of weather and deal with the tragic loss of life under very unpleasant circumstances.

The St. Paul Crime Scene Team consists of 13 forensic scientists from various Laboratory sections.

Missing person cases present very interesting circumstances. Forensic clues, if any, must be gleaned from items present and the team must determine their significance. In one case this past year, there were multiple items of forensic significance identified and collected, but no victim. A few days later, a body was discovered and the same team responded to process the crude grave site and gather more clues.

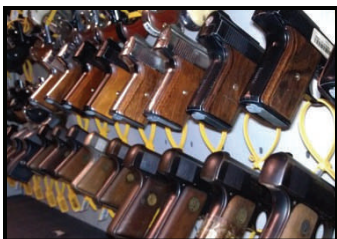
Training topics this year included bloodstain pattern analysis, documentation of shooting scene reconstructions and obtaining fingerprints from skin. In the latter case, instructors were brought to the BCA for the class. Pigskin was used as it is most like human skin and resulted in some very interesting "hands-on" practical exercises.



Firearms and Toolmarks

The FA Section completed 453 cases during 2011 while reducing their turn-around time by 16%. This was due, in part, to one examiner completing an exhausting two year training program, allowing the section to be fully staffed for the first time in several years.

One examiner was fortunate to represent the section at the annual training seminar hosted by the Association of Firearm and Toolmark Examiners. These seminars are crucial in keeping the examiners abreast of current methods and trends in the discipline. The section was also able to purchase a much needed comparison scope which has enhanced the ability of the examiners to see the fine detail in firearm and toolmark evidence.



Firearms collection

Latent Prints

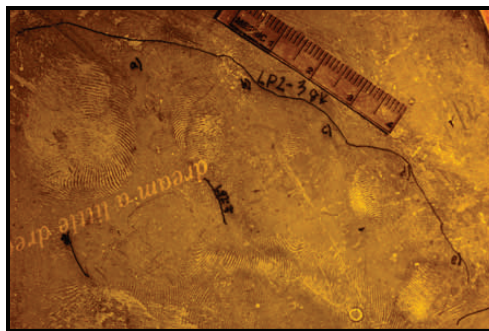
One of the interesting cases involving the Latent Prints section in 2011 involved an identification to a toe on the right foot of the suspect.

Fingerprints have been used for over 100 years to provide a solid basis for individual identification. In the past several years, the methods used to come to that conclusion have come under intense scrutiny. Examiners must stay abreast of all court challenges and be ready to address those challenges on the witness stand. One examiner in the Latent Print section has been actively involved in representing the discipline at procedural hearings and has been conducting research in an effort to counter the various challenges. He has also been involved in training other examiners nationwide and coordinated a mock trial at the annual conference of the International Association for Identification (IAI). This trial, which included an actual local judge, ex-

posed the participants to the use of a statistical model for evaluating latent prints and the ongoing research regarding the use of statistics in the latent print discipline. He also represents the BCA as a member of the Scientific Working Group on Friction Ridge Analysis, Study and Technology which crafts guidelines for the discipline addressing many of these issues.

The section completed 1,109 cases during 2011, an increase of nearly 2% over 2010. The turnaround time, however, decreased by about 20%, partly because an examiner completed her training in April allowing the section to become fully staffed. With the exception of the newer examiner, all scientists are Certified Latent Print Examiners through the IAI.

Interesting Cases Involving the Latent Prints Section in 2011:



Fourteen items were submitted for latent print processing as part of a controlled substance case. Several suitable latent prints were developed on various items but one item deserves a special footnote. A large perfume box that contained cocaine yielded multiple sole and toe prints. An identification was subsequently made to a toe on the right foot of the suspect.

In another case, several burglaries were believed to have been committed by the same individuals. Five cases were submitted, each with the same six suspects. The examiner compared the latent prints in the first case against the listed suspects but it resulted in no identifications. The prints were then searched in the Automated Fingerprint Identification System (AFIS) database and a new suspect was identified. That was all that was necessary as he was subsequently identified to all 14 of the latent prints in three of the five cases. (The remaining cases did not have suitable latent prints.)

Questioned Documents

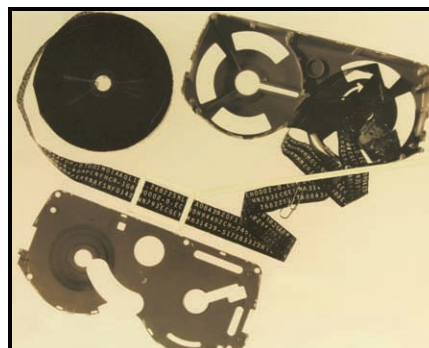
Although the section saw an increase in their caseload by 41% in 2011, they were able to reduce their turnaround time by 33%.

Forensic document examination is often overlooked but can reap tremendous benefits for the requesting law enforcement agency. Examinations consist of much more than handwriting comparisons. The two scientists in the section have the expertise to evaluate printing processes, copiers and printers, indented writing, charred documents, identify separate ink sources and examine US currency for its authenticity. Although the section saw an increase in their caseload of 41% this past year, they were able to reduce their turnaround time by 33%. In addition, one examiner assisted the Toxicology section by reviewing and approving over 3,400 cases.

In two recent cases, approximately 2,000 individual handwriting exams were conducted by one examiner regarding over 100 checks, multiple principals, with losses exceeding \$100,000.

A Basic Forensic Digital Image Processing Workshop was brought to the BCA during the fall of 2011. Many laboratory scientists attended who work with digital information. This was especially true of the Questioned Document section where more evidence is being received in a digital format. This past year, the Questioned Document section was able to update their Video Spectral Comparator (VSC) which has become an invaluable forensic tool. Using various wavelengths of light, documents can be examined in an effort to detect forgeries and alterations. The section also conducted a rare typewriter case which involved removing the ribbon and painstakingly examining the key strokes to determine the words that were typed. Other documents were examined microscopically for various marks that can aid in identifying a writer.

One of the examiners is a Certified Forensic Document Examiner through the American Board of Forensic Document Examiners. She was the Program Chair of the American Society of Questioned Document Examiner's annual conference held in August. She coordinated speakers and workshops to keep fellow document examiners abreast of new methods and trends in the discipline including courtroom challenges.



Typewriter Ribbons

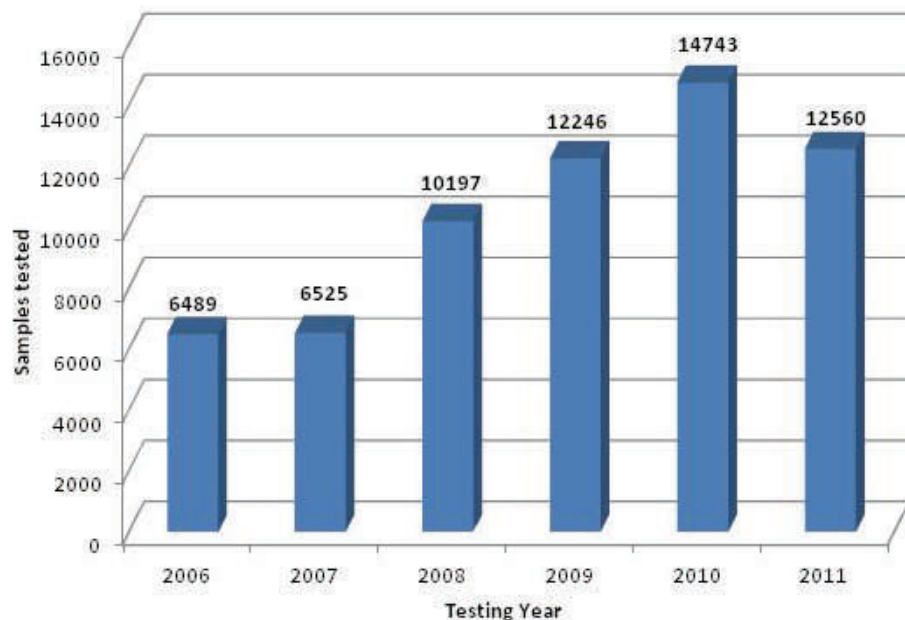
Toxicology

Blood and Urine Kits:

The use of the Intoxilyzer 5000EN throughout the state is still low and fluid sample submission remains high.

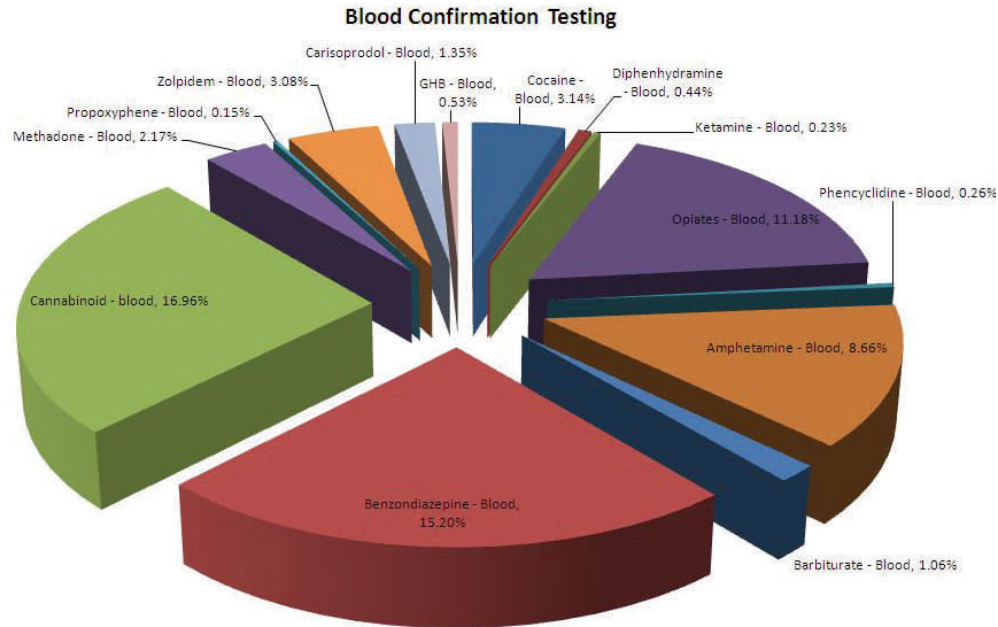
The main function of the BCA Toxicology section is to test human performance fluid samples for the presence of alcohol and other drugs of abuse. With Law Enforcement agencies still not fully utilizing the Intoxilyzer 5000EN, the amount of cases submitted to the BCA for alcohol analysis is still at a high level. To help balance the increased workload, in March of 2011 the BCA's Bemidji Laboratory opened their doors to alcohol testing for the northern half of the state. The alcohol section at the Bemidji Lab tested about 10% of the submitted samples in 2011. This has lowered the work load at the St. Paul BCA Lab and has given more local access to BCA experts in northern Minnesota for alcohol related cases.

Despite the 2011 ruling by Judge Abrams, the use of the Intoxilyzer 5000EN throughout the state is still low and fluid sample submission remains high with 12,560 samples submitted, down 15% from 2010. However, this still corresponds to a 92% increase in alcohol testing when compared to 2007. With the continued deployment of the new DataMaster DMT-G breath alcohol testing instruments, the BCA will hopefully continue to see a down turn in the submissions of fluid samples for cases involving alcohol only analysis.

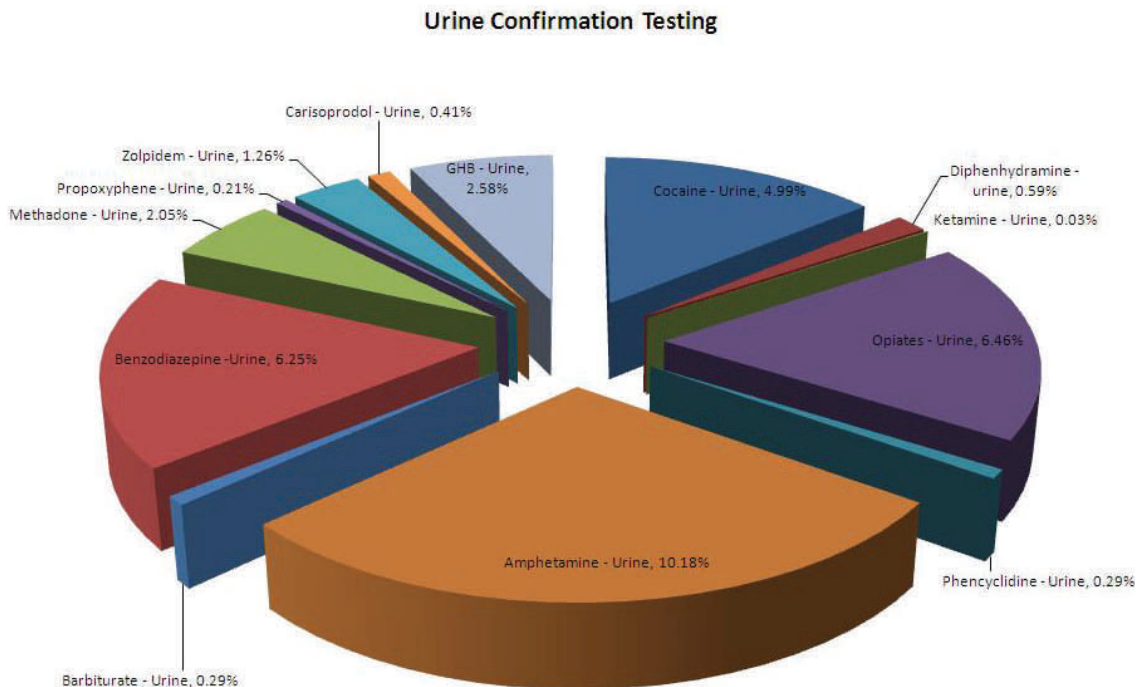


-Toxicology/Blood and Urine Kits (continued from page 17)-

The abundance of samples submitted for testing has also resulted in increased cases involving DUID. With more officers being trained as DRE's and with more awareness of drug-impaired drivers, the BCA has been getting more requests for analysis of scheduled and non-scheduled drugs. In 2011 we screened 1,440 blood samples and 1,107 urine samples for the presence of controlled substances. Those screens resulted in the need to perform 3,408 confirmation tests. All together the toxicology section completed 5,955 tests for the presence of various controlled substances.



For urine samples, the 3200 QTrap LC-MS/MS system was brought on line in March as a screening tool and has increased our sensitivity and allowed for a wider variety of drugs to be detected. The QTRAP will continue to help us expand our menu of detectable illicit drugs as we move forward.



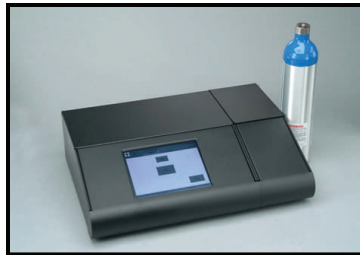
Future Toxicology Testing Advancements:

The BCA is looking to purchase a new instrument to help automate the blood-drug screening process. Currently, blood-drug screening is performed by manual dilution and pipetting of 84 samples into 12 immunoassay plates. This process is very time consuming and inefficient. By automating the process, we will be able to free up scientists time and offer our clients faster analysis times and flexibility with more specialized testing combinations.

In Minnesota, the emergence and rapid growth of the synthetic drug industry resulted in new legislation against the possession and consumption of synthetic cannabinoids (ex. Spice and K2) and Bath salts (ex. Mephedrone) and/or their metabolites. Many of these drugs and their metabolites are now schedule I controlled substances. The need to analyze human performance samples for these drugs has increased and the BCA will continue to develop a test that will properly identify these compounds.

Breath Testing

Instrument Replacement:



DataMaster DMT-G

The BCA Breath Test Enhancement and Integration (BTEI) Project is replacing the current Intoxilyzer 5000EN breath test instruments with the DataMaster DMT-G. During 2011 almost 2000 operators were trained to perform tests using the DMT and 17 instruments were deployed for field use. Approximately 200 additional DMT's will be deployed throughout Minnesota in 2012. All current operators will receive their training by the end of May 2012 and the remainder of the DMT's will be deployed by the end of September 2012. The DMT-G breath testing instruments will be integrated with the eCharging system which provides a method for law enforcement to electronically file forms to administratively revoke a person's driver's license and criminally charge a person for driving impaired.

Tests:

Approximately 15,500 breath tests were completed during 2011. Approximately 14,800 tests were run using the Intoxilyzer and 700 using the DMT. We anticipate the breath test numbers will continue to increase as more DMT's are deployed to law enforcement agencies throughout Minnesota.

Approximately 200 additional DMT's will be deployed throughout Minnesota in 2012.

Bemidji Laboratory



The most significant change to the daily business routine at the Bemidji Laboratory in 2011 was the addition of Alcohol testing as a discipline. The Bemidji Lab started to perform blood and urine alcohol testing on site in March of 2011. This was accomplished by cross training two Drug Chemists to perform testing in these cases. Cases requiring additional toxicology analysis were shipped immediately to the St. Paul Laboratory for further analysis. This change also significantly im-

pacted the work load of the Evidence Intake section as a total of 1,038 blood or urine alcohol cases were submitted to the Bemidji Laboratory.

Besides this change, all sections in the Bemidji Laboratory saw a significant increase in the number of case submissions compared to the previous year. These increases included a whopping 42% increase in the number of controlled substance cases (from 735 in 2010 to 1,047 in 2011). The increase was seen in every type of drugs case and cannot be attributed solely to the 2011 change in legislation regarding synthetic cannabinoids and bath salts. In order to absorb this increase in case submissions while dealing with the 1,038 alcohol cases, many of the controlled substance cases submitted to Bemidji were ultimately analyzed in the St. Paul Laboratory.

The Bemidji Biology section also saw a notable increase in the number of submissions. A total of 438 cases were submitted for DNA analysis in 2011, up from 356 cases in 2010, a 23% increase. The section added one piece of equipment that may increase capacity, a pipetting robot that was brought on-line in September. The section also utilized the capacity enhancing instrumentation brought on-line in previous years to help deal with the increase in caseload. The Bemidji lab added the capability to perform Y-STR testing after the completion of the training program and validation of the method by one Bemidji scientist.

Smaller but still significant increases in submissions were seen in the Latent Print and Firearms sections as well. Each of these sections saw roughly a 17% increase in the number of cases from the previous year. Much of the evidence submitted to these sections is shared with other sections of the Bemidji Laboratory, necessitating a certain amount of coordination and communication between the sections in order to assure each analysis is done without compromising the analysis of another section.

The number of crime scene responses from the Bemidji lab returned to levels seen in previous years, around 17, after a down year in 2010. Two of the 2011 responses were real "who-done-it" homicide cases with no viable suspects identified via investigative leads even days after the initial crimes scene response. The prime suspect in both of these cases was ultimately identified through laboratory testing of physical evidence collected at the scene. Forensic database searches were involved in both instances; one an AFIS hit resulting in a fingerprint identification and the other a CODIS hit resulting in a DNA match.

The Bemidji Laboratory started to perform blood and urine alcohol testing on site in March 2011.

