



Focus on Forensics



DECEMBER 2017

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SPECIAL POINTS OF INTEREST:

- Learn about the passage of Rapid DNA legislation
- Opioid Epidemic—what you need to know
- Learn how to prepare for a career as a forensic toxicologist

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The Legalization of Rapid DNA

On August 18, 2017 President Trump signed into law the Rapid DNA Act of 2017. In addition to accredited laboratories, criminal justice agencies can now use Rapid DNA instruments. But what does the law really mean for law enforcement agencies and forensic laboratories in this country?

First let's talk about what the law doesn't change. Crime scene samples must still be processed by an accredited laboratory in order to be entered into CODIS. Guidelines put forth by the FBI require tests to be performed on crime scene samples to determine how much DNA is present. This ensures that the DNA profile obtained is of the best quality possible. The Rapid DNA instruments are not capable of measuring the amount of DNA present and therefore prevent the samples from meeting this technical requirement.

There are law enforcement agencies that are using these instruments to process crime scene samples. Those working without the help of a CODIS laboratory can only rely on their local database for matches or for direct comparisons with reference standards. While others working in conjunction with a CODIS laboratory can develop a work flow that will still allow profiles to be searched against their state database. The best route for an agency that is interested in this technology for crime scene work is to contact their state CODIS laboratory for assistance.

The intent of the law is to allow these instruments to be implemented in the booking station where DNA collection becomes part of the booking process. After an arrestee is fingerprinted, an NCIC check will indicate if this individual has had their DNA on file. If no sample has been collected previously then a buccal swab will be taken. The swab will be processed by the instrument and a profile obtained to be searched in the state and national database. This option will be available only to states that have an arrestee law in place. At this time Kentucky is not one of the 31 states performing arrestee collection.

What are these little black boxes and what can they do? The concept is a swab in/profile out with results in 90 minutes. An expert system software that is integrated into the instruments gives a pass / fail flag to the operator. Since no scientific analysis is needed technicians can be trained to operate the instruments rather than qualified DNA analysts. The instruments are also made to be durable and mobile so they can be utilized in the field.

There are currently 2 companies providing Rapid DNA instruments: ANDE which makes the instrument of the same name and IntegenX which makes both the RapidHit 200 and the RapidHit ID. The ANDE instrument can process up to 5 samples and the RapidHit 200 can process up to 7 samples. The Rapid Hit ID which is marketed for booking stations processes one sample at a time. Both instruments can process a variety of sample types.

There are several applications for these instruments outside of the scope of day to day law enforcement needs.

Disaster Victim Identification - The instruments are now included in mass disaster exercises across the country for deployment to help identify victims. The instruments can be used to process family reference standards and victim samples from the scene. Those samples can be searched in a database in an effort to establish family relationships and ultimately make an identification.

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National Opioid Epidemic and the Forensic Laboratory

By now, many people have heard through the news media about the current opioid epidemic plaguing our country. Numerous print articles and evening news stories have focused on the dramatic increase in the use of heroin across the United States, the rise of fentanyl-laced heroin, and emergence of extremely potent fentanyl analogues to the drug scene, such as the elephant tranquilizer carfentanil.

In a recent press release, the American Society of Crime Laboratory Directors President Ray Wickenheiser described the threat as “unprecedented,” and noted that some of these substances, “...have formulations that are so toxic that it’s better to consider them poison.” Likewise, the Drug Enforcement Administration has sounded the alarm about the dangers of opiates to both the general public and to first responders. Finally, the President’s Commission on Combating Drug Addiction and the Opioid Crisis formally studied the issue and called for a “U.S. State of Emergency on Opioids.”

The situation in Kentucky is no different. Submissions containing heroin and/or fentanyl have risen dramatically from 2010 until today. From 2010 through 2016, heroin submissions at the KSP laboratory rose 800% and fentanyl submissions rose more than 6,000% in the same time period. Fentanyl submissions to the KSP laboratory are projected to exceed 2,000 total cases in 2017, up from just 16 in 2010. Further, whereas most fentanyl submissions in 2010 were diverted pharmaceutical products, fentanyl submissions now are often found laced in illicit heroin samples or in pure powder form.

The current opioid epidemic presents a significant safety threat to the general public, law enforcement officers, and forensic laboratory personnel due to the extreme potencies of fentanyl and fentanyl analogues. Carfentanil, which has been found in multiple counties in Kentucky, is 100 times more lethal than heroin, and 10,000 times more lethal than morphine. A mere 20 micrograms of carfentanil, about the size of one grain of salt, is reported to be lethal. In addition to humans, these substances also pose a significant hazard to canine units.

For these reasons, the laboratory strongly encourages first responders to consider the following suggestions:

- Do not handle suspected heroin, fentanyl, or unknown powder samples without gloves
- Do not attempt to field test suspected heroin, fentanyl, or unknown powder samples
- Package suspected heroin, fentanyl, or unknown powder samples in multiple layers of plastic (1 plastic bag inside another plastic bag)
- Consider making Narcan (opioid overdose antidote) available at any places where drug evidence may be handled, i.e. – officer vehicles, evidence storage rooms, etc.
- Take seriously and respond to possible exposure incidents immediately by administering Narcan if available and contacting emergency services



Lethal Dose of Carfentanil

For additional resources about fentanyl and other synthetic opioids, please visit <https://www.dea.gov/druginfo/fentanyl.shtml> or contact your nearest Kentucky State Police Laboratory Branch.

Legalization of Rapid DNA continued

Military - Because of the durability of the instruments they can be used in the field so military personnel can test items such as IED or bone fragments and search for DNA matches in their database.

Border Control- Detainees can be screened and searched against DNA watch lists.

Human Trafficking - In cases of potential human trafficking the instruments can help identify true family relationships in the hopes of preventing individuals, many of whom are children, from being put in abusive and potentially life-threatening situations.

Manufacturers are working closely with law enforcement and forensic laboratories to find the right niche for these instruments. The future of Rapid DNA remains to be seen but the technology is constantly evolving and will help shape the future of forensics.

For more information on Rapid DNA and its applications contact DNA Database Supervisor Regina.wells@ky.gov.



ANDE Rapid DNA Instrument



RapidHit ID by IntegenX



RapidHit 200 by IntegenX

Photos courtesy of the manufacturers

So You Want to Be a Forensic Toxicologist

Chemistry is like cooking, just don't lick the spoon. - Anonymous

This series is designed to highlight each of the sections of the KSP laboratory for those interested in pursuing a career in forensics here in the Commonwealth. Hopefully providing basic information about what each section is responsible for and what qualifies an individual for that position to assist them as they plan their career path. This article is devoted to the Toxicology section with input from Ryan Johnson and Brandon Standifer both toxicology supervisors.

BROADEN YOUR SCOPE

The Toxicology section is a work horse for the Kentucky State Police laboratory system. With an annual case load of over 14,000 cases per year keeping the section fully staffed is vital to its success. Toxicology is responsible for screening primarily blood to identify the presence of drugs of abuse. This includes Benzodiazepines (Xanax, Valium, etc.), Opiates (Heroin, Oxycodone, etc.), THC (the active compound in marijuana), Cocaine and any drug that might interfere with driving performance. The majority of cases received are DUI related however they also do DFSA cases or drug facilitated sexual assault, homicide and assaults. Random employee testing, pre-employment screening and cadet testing is handled by the section as well. Toxicology required for post-mortem cases is performed by the medical examiner's office. The challenge for the Toxicology section is new drugs are always coming on the market that people may choose to start abusing. For example bath salts, synthetic marijuana and powerful opiates like acetyl fentanyl force the section to adapt their process to detect these substances.

WELL-OILED MACHINE

Due to the high volume of cases the section must operate with a high-throughput capacity. This means increased efficiency and a stream-lined process. Hands-on extractions prepare the samples for testing while the instrumentation handles the screening. Because of this assembly line approach the section benefits from individuals who can work well with others as an analyst's part in the process affects all other analysts downstream. To increase performance the toxicology section has added the newest technology to the testing process which includes 2 Ultra High Performance LC-MS's. The goal is to add 2 to 3 more in the coming years for increased productivity and sensitivity in testing. Increasing turnaround time is always a goal for the section and they are currently validating a method which will allow a wide variety of testing in a single panel. The technique known as TOX BOX will help eliminate steps in the process making the section more efficient.

IT'S ALL ABOUT CHEMISTRY

In order to qualify for a position as a forensic toxicologist with the Kentucky State Police you must have a four year degree in either Chemistry or Forensic Science with an emphasis in Chemistry. An individual who already has experience with GCMS, LCMS, solid phase extraction (SPE) or supported liquid extraction (SLE) is a plus, but experience in the field is not required. Someone with a solid work history who has proven themselves to be a good worker for other employers is just as impressive. At the KSP laboratories there is an extensive training program that a new hire goes through to ensure they are prepared to perform their duties. Toxicologists are not only responsible for case work but they must present their findings in court, so the right candidate for this job should be comfortable speaking in public. Training is also provided to prepare an analyst for this task which includes a mock trial in front of your peers. Because of the time and effort put into the training process the toxicology section hopes to hire people who are prepared to make working for KSP their long-term career.

If you are interested in more information about the toxicology section contact Toxicology supervisors Ryan Johnson ryan.johnson@ky.gov or Brandon Standifer Brandon.standifer@ky.gov.

What's New at the Lab?

New Sergeant in the Laboratory System

Sgt. Ben Campbell was promoted to Sergeant of the Polygraph section and the Eastern and Southeastern Labs in August of this year. The Sergeant started his career with the Kentucky State Police in 2004. His first assignment was Post 08 Morehead, where he worked until 2008. He then transferred to Post 13 Hazard where he worked the road until being assigned to street level detective through 2012. During that time he also worked as a general detective. He transferred to DESI and was assigned to the DEA task force out of London for almost 3 years. Then in December 2015 he transferred to Executive Security remaining there until his promotion in August. Some of his hobbies include weight lifting and riding motorcycles (Harley Davidson). He has also made an unsubstantiated claim to be the Xbox champion of the world. If you need information about one of the sections under Sgt. Campbell's command you can contact him at Benjamin.campbell@ky.gov.

Evidence Receiving at the Central Laboratory

Over the past year the Central Laboratory has added three additional evidence technicians to their staff. With newly renovated space the lab is transitioning to centralized evidence receiving. Once trained the technicians will receive all evidence delivered to the laboratory. This will allow analysts to remain on task in their work areas rather than having to interrupt their workflow to receive evidence.

2017 KSP Lab Softball Team



Back row: C. Norfleet, Captain Grant, S. Barrett, J. Snodgrass, D. McCann, J. Clemens, T. Justice, A. Torgerson, L. Boggs
Front row: A. Gesso, B. Standifer, L. Tedder, L. Wickline, L. Hall, K. Zopolos, E. Fite, A. Tunstill

(photo courtesy of Charlie Moffett)

Laboratory Management

Captain Derek Grant, Central Laboratory (derek.grant@ky.gov)

Lt. Mark Mayes, Western Laboratory (mark.mayes@ky.gov)

Sgt. Benjamin Campbell, Southeastern Laboratory (Benjamin.campbell@ky.gov)

Laura Sudkamp, Laboratory System Director, Central Laboratory (laura.sudkamp@ky.gov)

Laboratory phone numbers and contact info

Western Laboratory, 270-824-7540

LaDonna Jones, Interim Laboratory Director (ladonna.jones@ky.gov)

Jefferson Laboratory, 502-426-8240

Julie Ferguson, Laboratory Director (julie.ferguson@ky.gov)

Northern Laboratory, 859-441-2220

Jeanna Oxenham, Laboratory Director (jeanna.oxenham@ky.gov)

Southeastern Laboratory, 606-877-1464

Beverly Wagoner, Laboratory Director (Beverly.wagoner@ky.gov)

Eastern Laboratory, 606-929-9142

Larry Boggs, Laboratory Director (larry.boggs@ky.gov)

Central Laboratory, 502-564-5230 or 800-326-4879

Central Laboratory Section Supervisors:

Matthew Clements, Firearms/Toolmark Supervisor (matthew.clements@ky.gov)

Whitney Collins, Supervisor (DNA/Bloodstain Pattern/Sexual Assaults/Violent Crimes) (whitney.collins@ky.gov)

Sabrina Christian, Supervisor (DNA/Property Crimes) (Sabrina.christian@ky.gov)

Sally Edwards, Serology Supervisor (sally.edwards@ky.gov)

Michael David, Administrative Laboratory Supervisor (michael.david@ky.gov)

Katrina Featherston, Quality Assurance Supervisor (katrina.featherston@ky.gov)

Ryan Johnson, Toxicology Supervisor (ryan.johnson@ky.gov)

Brandon Standifer, Toxicology Supervisor (Brandon.standifer@ky.gov)

Charles Moffett, Photo Lab Supervisor (charles.moffett@ky.gov)

Stuart Mullins, Breath Alcohol, Systems Technician Specialist IT (stuart.mullins@ky.gov)

Jack Reid, Trace Supervisor (jack.reid@ky.gov)

Jeremy Triplett, Drug Chemistry Supervisor (jeremy.triplett@ky.gov)

Regina Wells, DNA Database Supervisor (regina.wells@ky.gov)

SUGGESTIONS WELCOME!!

Please contact regina.wells@ky.gov with comments or suggestions.

QUICK LINKS

[KSP Lab website \(previous newsletters\)](#)

[Physical Evidence Collection Guide](#)

[Combined DNA Index System \(CODIS\)](#)

Scientific Working Groups...

[SWGDM \(DNA\)](#)

[SWGgun \(Firearms\)](#)