



Solving Property Crimes With DNA

While DNA analysis of biological fluids collected from crime scenes of violence has become a common practice, a few agencies are starting to collect DNA to solve property crimes. Property crime offenders often are serial offenders, and can graduate to more serious crimes. A project using DNA analysis to investigate property crimes in South Carolina is providing local law enforcement with a surprising number of suspect matches to crime scenes.

The South Carolina experience is in keeping with the findings of a study of the effectiveness of DNA forensics in the investigation of property crimes. That study, *The DNA Field Experiment: Cost Effectiveness Analysis of the Use of DNA in the Investigation of High-Volume Crimes*, found that cases with DNA evidence yielded twice as many suspects identified and arrested. (For a summary story on the study, see “Burglars Go Bust: The DNA Field Experiment,” in *TechBeat*, Summer 2008, <http://www.justnet.org/Pages/TechBeatIssue.aspx?issue=Summer+2008>.)

As part of an effort to improve accessibility of DNA testing for local law enforcement agencies, officials proposed the creation of a regional DNA laboratory to serve law enforcement agencies in the South Carolina Low Country. To help determine the workload of the proposed laboratory, the Office of Justice Programs’ National Institute of Justice (NIJ) and its National Law Enforcement and Corrections Technology Center (NLECTC)-Southeast established a program to collect and test DNA samples from property crimes. Investigators routinely collect biological fluids from crime scenes of violence. This project is designed to determine if resources should be devoted to the collection and analysis of biological fluids from property crimes as well.

NLECTC-Southeast is coordinating the project, which involves the Charleston County Sheriff’s Office, the Charleston Police Department, the North Charleston Police Department, the Mount Pleasant Police Department, the South Carolina Law Enforcement Division (SLED) and the Marshall University Forensic Science Center (MUFSC) in West Virginia. NIJ is providing funds for

processing the DNA samples at MUFSC. MUFSC is affiliated with the Forensic Technologies Center of Excellence (CoE), which is part of the NLECTC system. The CoE provides specialized technology assistance programs and other services with regard to tools and technologies intended for use by law enforcement, crime laboratories and other criminal justice agencies.

Like many other regions in the United States, South Carolina’s law enforcement agencies, which are supported by SLED, have a backlog of DNA laboratory test requests. The backlog is generally due to the number of samples submitted compared to the funding available. Ideally, sufficient funding would always be available to process all samples within a reasonable amount of time, but striking a balance between funding and the number of samples submitted can be challenging.

“If you have a pressing issue, SLED will work the case immediately, but they are overwhelmed and have to set priorities on casework,” says Judith Gordon of the Charleston Police Department Forensic Services Division. “In a recent high-profile case, SLED provided DNA test results to the Charleston Police Department within 48 hours, leading to an arrest of a sexual assault suspect.”

“Almost every state has backlogs,” adds Bill Deck, program manager at NLECTC-Southeast. “It’s fairly expensive to do a sample, which is estimated at \$1,200 start to finish to process a crime scene, including collecting, testing, shipping, evaluation and entry into CODIS [Combined DNA Index System]. States can’t afford to do DNA testing without justification for the expenses. We are lucky that Marshall agreed to do it and NIJ agreed to fund it.

“In general, most states only have certain capability for DNA testing, so property crimes really don’t come to the forefront because they’re busy dealing with the violent crime cases. Those violent crimes alone can max out the lab capability. Marshall, because of its uniqueness, has the capacity to pick up this extra workload to determine the benefit of testing samples from property crimes

and develop best evidence policies, which will minimize the oversubmission of samples by prioritization of samples based on expected success rate.”

As part of the project, DNA samples from property crimes such as burglary, motor vehicle break-ins and motor vehicle theft are collected and sent to MUFSC for processing. The results are returned to the participating agencies and submitted by SLED to CODIS, the central nationwide database of DNA profiles. CODIS uses two indexes to generate investigative leads from biological evidence recovered from crime scenes. The convicted offender index contains DNA profiles of individuals convicted of certain crimes, and the forensic index contains DNA profiles from crime scene evidence. CODIS computer software searches across these indexes for a potential match (Visit <http://www.dna.gov/uses/database/codis> for more information).

Sources of DNA include blood and saliva. Burglars and car thieves may cut themselves on glass when breaking a door or a window, drop cigarette butts or shed a stray hair on a kitchen floor or in a stolen car.

“Touch” DNA refers to the DNA left behind from skin cells or sweat when a person touches or comes into contact with an object, such as a steering wheel. The DNA Field Experiment study, which was funded by NIJ, found that blood and saliva samples are significantly more likely to yield usable profiles when compared with samples consisting of cells from items that were touched or handled.

“For example, the perpetrator uses a crowbar to break in to a house,” says Gordon. “We swab the crowbar to get a DNA profile. We have set up a number of samples of touch evidence and Marshall has been successful in recovering DNA from touch samples.”

“In perspiration there are cells that sluff off from your skin,” explains Terry Fenger, director of MUFSC. “There are very low levels of DNA in these samples. Previous technology couldn’t do much with it, but with the newer technologies, we have a better chance of developing a profile. Full profiles give us all the possible testing results.”

The Low Country project began in October 2007 and was initially slated to last just a year, but has been extended to October 2009 to allow for the collection of additional data. Initial results have been promising.

“The real success of this project thus far is the number of people that have been identified in CODIS,” says Gordon. “In the first shipment we had 15 people identified. All those CODIS hits came on blood evidence. Some of the 15 came up for more than one crime.

“One of the cases matched across jurisdictions. Two cases were from one agency but linked two crime scenes

together. There were no CODIS hits from touch evidence. But the fact that we have done this through property crime evidence is notable.”

Jason Chute, a Marshall forensic DNA analyst, adds: “Just because a touch sample doesn’t result in a CODIS match immediately doesn’t mean it won’t match down the road. There is always the possibility to match the evidence to the CODIS database.” That is, as the contents of the CODIS database expand, the probability of obtaining a match increases.

A board composed of representatives from the four police and sheriffs’ departments participating in the project decides which samples to submit based on case background and the likelihood of developing a DNA profile. Officials can submit up to 66 samples at a time to Marshall for DNA testing, and MUFSC developed full or partial genetic profiles on 78 percent of the 65 samples initially submitted. Full profiles were developed on every blood and saliva sample and partial profiles were developed on 22 percent of the touch samples. There has been only one full profile developed from touch evidence. Every time a genetic profile is developed, it builds the forensic index in CODIS.

Genetic profiles from evidence sent to Marshall in March 2008 resulted in 12 more CODIS hits, with one suspect identified in 10 cases. All CODIS matches were made on blood evidence, according to Gordon.

“The personnel in the field, when they realize their samples they collect will be tested, it adds another layer of importance and value to their work,” says Fenger. “In the past the highest priority has been given to violent crime. That is still the case, but property crimes are assuming a higher importance and can lead to a DNA profile and legal action.”

The Charleston Police Department Forensic Laboratory functions as a regional lab but does not have DNA capability. The lab is not funded or managed regionally.

“In crime scene work we have always collected cigarette butts, blood,” Gordon says. “What has changed is now there is a concentration on touch evidence. We didn’t do that before because we didn’t have a lab that could do it routinely. It did not require additional training, but the capacity to test for touch DNA has created a different mindset and perspective — investigators swab different surfaces. It caused them to look at things in a different way.”

So far, participants are pleased with the program’s progress.

“Things are progressing very nicely,” says Fenger. “We have good interaction with NLECTC-Southeast and

Charleston and the law enforcement side. It seems like we are on autopilot as far as returning the profiles.”

As for the Charleston Police Department, Gordon says, “We’re thrilled. We see it as a gift to us we didn’t have before. Fifteen cases were solved initially, which was beyond our wildest expectations. Marshall extending the work for another year is fantastic for us.

“We are really grateful to the Southeast Center for setting this all up. They brought the players together and laid the foundation. We are very grateful for their efforts to facilitate this.”

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