



# An In-Depth Look: 412 Property Crime Cases from Lowcountry Region, South Carolina

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## Abstract

The Lowcountry Region is a geographical region that includes Charleston, South Carolina and the surrounding counties. The four agencies that submitted cases for this project included: The Mount Pleasant Police Department, The Charleston Police Department, The Charleston County Sheriff's Office, and The North Charleston Police Department. The goal of this Property Crime study was to help identify what evidence to test and if the evidence tested resulted in DNA profiles.

According to South Carolina Legislature, Chapter 11- Offenses against Property<sup>1</sup>, a property crime includes arson, burglary, housebreaking, robbery, and robbery of a person operating a motor vehicle. The distinction between burglary and breaking and entering are noted.

In total, 879 questioned samples were processed and analyzed as part of this project. Three hundred and seventy eight of the questioned samples were blood, 151 were saliva, and the remaining 350 samples belonged to the category "touch." Ninety four percent of the blood samples produced DNA results. Sixty four percent of the saliva samples and 25% of the touch samples also resulted in DNA results.

Of the cases submitted, 36% of the cases were crimes against a residence, 30% of the cases were crimes involving a public building or business, and 33% of the cases were targeting a vehicle. Less than one percent of the cases submitted were committed against a person. Although all three major categories of crimes had roughly the same number of cases, the types of evidence collected (blood, saliva, and touch) differed greatly. Those samples that produced a DNA profile and/or a CODIS hit are discussed and compared in each of the three categories.

The results were surprisingly different. One may anticipate that similar percentages of blood, saliva, and touch samples would be collected at a crime against a residence, public building/business, person, and vehicle, but that does not appear to be the case. Hypotheses will be discussed as to why those differences may have occurred.

This poster will be followed with a comparison poster regarding the property crimes cases analyzed from different states. In total, the project will involve three locations and over 1,800 cases. A snapshot of an additional future study will also be noted in this poster. It will briefly address what percentage of each case resulted in a conclusion in the adjudication process.

## Introduction

The use of DNA evidence is a widely accepted standard means of evidence analysis in forensic science. It is commonly obtained from crime scenes ranging from rape to murder to its increased use at property crimes. The definition of a property crime varies by location. According to the South Carolina Legislative Council's Code of Laws, crimes against property include, but are not limited to, the following: arson, burglary, robbery, and robbery of a vehicle.

The study of property crimes is relatively novel in the United States in comparison to international research. "The DNA Field Experiment" by Roman et al.<sup>2</sup> mentions the 2000 British Home Office "DNA Expansion Programme" as well as "Pathfinder", a project completed with Lancashire Constabulary in conjunction with the Greater Manchester Police. The results of these three studies suggest an increased need for DNA collection and testing regarding property-based crimes. The use of DNA in high-volume crimes such as burglary and auto theft is emphasized by the high recidivism rates (Langan and Levin, 2002)<sup>3</sup>.

In the study reported here, a total of 412 property crime cases were collected from the Charleston Police Department, the Charleston County Sheriff's Office, the Mount Pleasant Police Department, and the North Charleston Police Department. All samples were collected according to each agency's protocols. It is important to note that the same presumptive testing was not performed across all locations or samples. For the purpose of this study, a positive result reflects a sample that resulted in three or more loci.

The samples were submitted to the Marshall University Forensic Science Center from 2007 to 2010. The samples were processed and DNA analysis was performed. All resulting profiles were then sent back to the originating agency, reviewed, and uploaded into CODIS (Combined DNA Index System). The hits were tracked and the adjudication process was followed. Sentences were delivered following this formula: X years provisional upon serving Y years, suspended upon the service of Z years probation. For the purpose of this study, X was used as the total sentence received. This was done to maintain consistency with all cases in this study, as there was no reliable way to determine Y or Z.

All samples were placed into one of nine different categories: Clothing, Beverage, Tools, Weapons, Electronics, House, Smoking Items, Vehicle, and Miscellaneous. It is important to note that if clothing was found in a vehicle, that particular piece of evidence would be included in the category "Clothing" and not in the location it was found. The category "House" includes swabs of the walls, window panes, floor, etc. as well as of large furniture items, such as a bed or dresser.

## Materials & Methods\*

- Extraction: Promega® DNA IQ™ on Beckman Coulter® Biomek® 2000
- Quantification: Applied Biosystems® Quantifiler® Human on 7500 Real-Time PCR System
- Amplification: Applied Biosystems® AmpFISTR® Identifier® on GeneAmp® PCR System 9700 Thermal Cycler
- Capillary Electrophoresis: Applied Biosystems® 3100 or 3130xl Genetic Analyzers, GeneMapper® ID

- Analytical Threshold = 100 RFUs
- Stochastic Threshold = 200 RFUs

\*According to MUFSC Procedures Manual

## Results

Figure 1: Profiles Produced

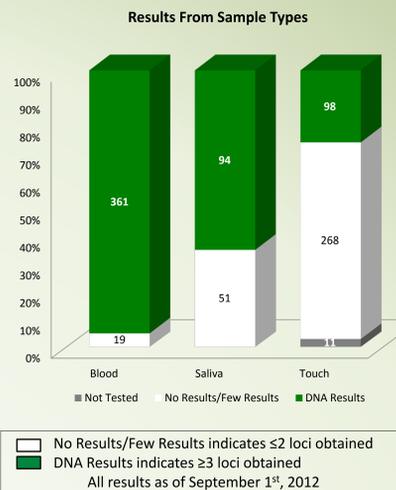
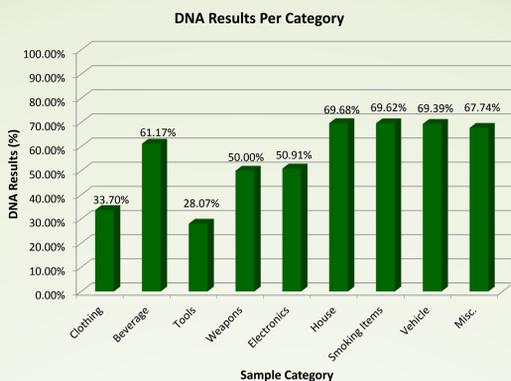
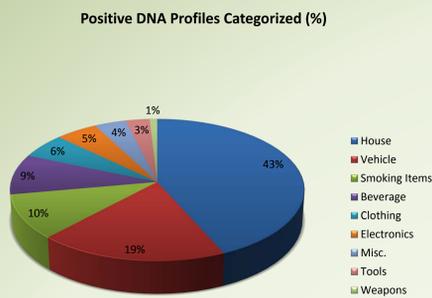


Figure 2: Sample Types Collected

| Clothing    |              |             |  |
|-------------|--------------|-------------|--|
| Sample Type | # of Samples | DNA Results |  |
| Gloves      | 46           | 13%         |  |
| Hats        | 14           | 71%         |  |
| Shirts      | 12           | 25%         |  |

| Smoking Items |              |             |  |
|---------------|--------------|-------------|--|
| Sample Type   | # of Samples | DNA Results |  |
| Cigarettes    | 73           | 77%         |  |
| Pipes         | 3            | 0%          |  |
| Lighters      | 1            | 0%          |  |

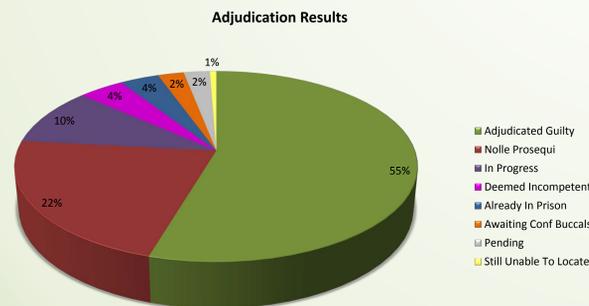
| Electronics    |              |             |  |
|----------------|--------------|-------------|--|
| Sample Type    | # of Samples | DNA Results |  |
| Cash Registers | 14           | 71%         |  |
| Computers      | 12           | 83%         |  |
| Cables         | 11           | 0%          |  |

| Beverages   |              |             |  |
|-------------|--------------|-------------|--|
| Sample Type | # of Samples | DNA Results |  |
| Bottles     | 32           | 53%         |  |
| Cans        | 22           | 64%         |  |
| Glasses     | 13           | 77%         |  |

| Tools        |              |             |  |
|--------------|--------------|-------------|--|
| Sample Type  | # of Samples | DNA Results |  |
| Screwdrivers | 14           | 21%         |  |
| Crowbars     | 7            | 43%         |  |
| Hammers      | 5            | 0%          |  |

| Miscellaneous  |              |             |  |
|----------------|--------------|-------------|--|
| Sample Type    | # of Samples | DNA Results |  |
| Swabs          | 8            | 75%         |  |
| Paper          | 6            | 83%         |  |
| Rocks & Bricks | 5            | 0%          |  |

Figure 3: Adjudication Process and Sentencing



| Adjudication Totals         |                               |
|-----------------------------|-------------------------------|
| Total # of Years Sentenced: | 431 years, 11 months, 28 days |
| Total # of Years Probation: | 121 years, 10 months          |

| Adjudication Percentage Results Per Category |            |               |
|--|------------|---------------|
| Adjudication                                 | # of Cases | Percent       |
| Pled Guilty                                  | 77         | 87.5%         |
| Pled to Another Case                         | 8          | 9.1%          |
| Convicted                                    | 2          | 2.3%          |
| Other  | 1          | 1.1%          |
| <b>Total</b>                                 | <b>88</b>  | <b>100.0%</b> |

DISCLAIMER: Although the authors acknowledge that the amplification chemistry as well as the analytical thresholds could alter the number of resultant profiles, the study was not created to compare amplification chemistries. At the Marshall University Forensic Science Center, our aim is to aid and support state and local laboratories. As a result, MUFSC uses the amplification chemistry of each site location. The circumstances in this study resulting in the use of three different amplification combinations were mere coincidence. This study does not recommend the use of one commercial product over that of another.

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## Discussion

This Lowcountry Region of South Carolina Project included 412 cases consisting of a total of 879 questioned samples. Approximately 540 samples resulted in what was considered positive DNA results (obtaining ≥3 loci). All samples were then placed into one of nine defined categories. Forty three percent of the samples belonged under the category "House", followed by nineteen percent "Vehicle" and ten percent "Smoking Items". Each category was then examined and the percent of samples with positive results was defined for each category. It is important to note that "House", "Vehicle", and "Miscellaneous" were each near 69%. This high percentage is directly linked to a large number of the evidence samples containing blood.

Each category was subcategorized into individual items. As shown in the Results section under Sample Types Collected, the top 3 items of each category are listed. Some categories such as "House" and "Vehicle" are not present because their sample types differed so greatly that a Top 3 list was not distinguishable. The "Smoking Items" category consisted of primarily cigarettes resulting in seventy seven percent positive DNA results. In the "Clothing" category, the authors expected hats and gloves would have had relatively comparable positive DNA results. Instead, there was a difference of 58% between the two categories, with 71% and 13% respectively. The category in this study that appeared produce the least results was "Tools". The authors believe this category yielded only 28% positive DNA results because it consisted of touch DNA samples. It is important to note that the protocols were not modified for low copy number samples.<sup>4,5</sup>

Figure 3 demonstrates results based on substrate types. Ninety five percent of the samples submitted with blood resulted in positive results. In addition, 64.8% of the saliva samples and 26.78% of the touch samples produced DNA results. Of all cases producing DNA results, 58% have been adjudicated guilty, whether by plea or conviction. Seven crimes were committed by the same man; he was deemed incompetent and thus no further action took place with those cases. The category "Nolle Prosequi" consisted of 22% of the cases with which there was a DNA hit. Multiple cases hit to someone who had reason or cause to be in the area and leave DNA behind. Examples of this situation include relatives, significant others, or known associates. Other cases resulting in "Nolle Prosequi" included a couple of cases in which the suspect was already in prison and will be serving a long enough term (typically greater than 10 years), and it was decided not to prosecute the property crime.

It was noted that most offenders were guilty of committing more than one property crime. As a result, many pled to one case and the other case(s) were wrapped into the plea deal. When it came to cases that resulted in prison time, 87.5% were a result of a guilty plea. To the best of the authors' knowledge, only two cases went through to court and both ended up in a conviction. In all, at the time of completion of this poster, the sentences provided resulted in 431 years, 11 months, and 28 days of imprisonment. Also, the sentences resulted in 121 years and 10 months of probation.

*Future Publications:* The Lowcountry Region was only a portion of the entire Property Crime Project. A property crime project consisting of three thousand plus samples could in no way be depicted in one single poster. Instead, this poster is to be viewed as the second, of a series of property crime posters. The next poster will discuss one of the other sites, Miami, Florida, in great depth. Discussion will occur regarding samples submitted through the adjudication process and case results.

## Acknowledgements

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