What Was Once Cold is Now Hot: Solving Cold Cases at the NYC Office of Chief Medical Examiner

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INTRODUCTION

Within the past 15-20 years, successful technological advances in forensic science have solved many cold cases. This presentation will highlight how this was done. Testing of crime scene evidence was once limited to serology testing for biological fluids, such as blood or semen. After blood or semen testing was performed, the case was completed and the resulting comparison to possible suspects was limited. Blood or semen testing did not have the power to individualize the source of the stains and did not have the ability to provide the statistical analysis needed to help gain convictions in the courtroom. Today, we can associate these biological fluids to an individual through development of a DNA profile and can provide evidence to a jury within a statistical calculation that can positively associate someone to crime scene evidence.

Touch DNA and low copy number DNA testing procedures, both new technological advances in forensic science, have ushered in a new era of DNA testing. No longer are large amounts of extracted DNA needed for DNA profile development. It is now possible to obtain a DNA profile from only a few cells. As a result, items that were merely touched by an alleged suspect can currently be examined, revealing a whole new realm of possible evidence left behind at a crime scene that can be considered for DNA testing in cold cases. In addition, previously collected DNA samples can be reassessed with modern technology. For example, evidence items such as a victim's fingernails collected at autopsy, which would not have been examined for foreign DNA in the past, can now be examined and tested due the significant advances in the sensitivity of DNA testing.

METHODS

One of the biggest obstacles confronting cold cases today is how one defines a cold case. As discussed in the National Institute of Justice's document on the **Best Practices for Implementing and Sustaining a Cold Case Investigation** [1], this definition seems to vary from agency to agency. Once this hurdle is surmounted, the next challenge for an agency is to determine how many cold cases exist based upon the definition of a cold case. This is no easy feat, since many laboratories compile numbers on current cases and backlogs associated with these new cases but not on old unsolved cases. Once these issues are addressed, one can then look further into the challenges faced when they are tasked with and agree to process a cold case using DNA testing. Legal, practical, and technical challenges need to be addressed in order to successfully solve a cold case. The increase in the number of possible items that might presently be tested as evidence in criminal matters, in general, has led to the need for

collaborative efforts among the New York City DNA Laboratory, the New York City Police Department, and the New York City District Attorney's Offices. A multiagency approach had already become necessary, in large part, due to the challenges faced in the processing of cold cases. Challenges include legal considerations, such as chain of custody issues; practical considerations, such as strained resources; and technical considerations, such as how to work with contaminated and degraded DNA samples. Funding and budgetary issues are also an issue. As a result of a multi-agency approach, a cold case checklist can be followed regarding how to process cold cases in the laboratory. This check list considers the questions that one needs to ask him or herself before processing a cold case and possible obstacles and challenges that one must think about during and after the process.

RESULTS

Modern technologies, such as touch DNA processing for skin cells and the recovery of exogenous DNA under fingernails, have made a significant impact on the ability to solve cold cases. Two such cold cases in the Bronx are examples of the use of modern technology. For one case, the use of the procedure for recovery of exogenous DNA under fingernails used at the OCME allowed for the development of a foreign male DNA profile. For the other case, the re-processing of a sexual assault kit vaginal swab, which was initially tested years prior and gave a partial foreign male DNA profile, was now able to achieve a full DNA profile eligible for the databases. This was using a newer amplification kit to obtain more DNA data. For both cases, a foreign DNA profile was obtained that could be entered into CODIS. Both cases then obtained a DNA CODIS convicted offender hit. These cases would have remained cold, had it not been for these technological advancements. The future of cold cases, however, does not stop with these advancements. Genealogy has opened a whole new world for solving cold cases. Twenty-eight cold cases have been solved in 2018 as a result of this new technology [2].

CONCLUSIONS

The cold cases solved in New York City highlight how advancements in DNA technology, as well as a multi-agency approach, have led to the successful resolution of cold cases. Countrywide, we are only at the tip of the iceberg concerning what can be done with cold cases. Adopting NIJ's definition of a cold case as one "that has remained unsolved for at least three years and has the potential to be solved through newly acquired information or advanced technologies" [1] proves a cold case does not have to be "old" to be unsolved. How many cases go unsolved and remain cold is a number that should be tracked by laboratories. DNA laboratories, police agencies, and attorney's offices can demonstrate that "What Was Once Cold is Now Hot". The hope is that this presentation will inspire laboratories and other agencies to start cold case units in their agency.

REFERENCES

[1] National Best Practices for Implementing and Sustaining a Cold Case Investigation Unit-National Institute of Justice, 2015.

[2] https://www.foxnews.com/us/dna-genetic-genealogy-made-2018-the-year-old-the-cold-case-biggest-crime-fighting-breakthrough-in-decades