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Implementing improvements in the recovery of forensic evidence from firearms-related evidence

The recovery of forensic evidence from firearms and cartridge cases has offered significant challenges. Because of ATF's unique jurisdiction and focus on firearms-related violent crime, the need to improve the ability to recover useful evidence that could link perpetrators to weapons or ammunition used in violent crimes has been a high priority. There are a variety of reasons why getting valuable evidence from firearms and fired cartridge cases (FCCs) in particular have been challenging. Studies conducted by ATF have demonstrated that even in the best of circumstances, it is difficult to recover DNA from brass ammunition due to copper's deleterious effect on DNA. In addition, the need for rapid entry into NIBIN (National Integrated Ballistics Identification System) has resulted in many investigators forgoing the processing of firearms and ammunition for DNA and fingerprints due to excessive backlogs and turnaround times in most forensic laboratories. As a result, in order to meet ATF mandates of entering ammunition and test-fires into the database within 48 hours, it has been a practical impossibility to meet both NIBIN's need for rapid lead generation and the desire to process these items for fingerprints and DNA, which could not only link a weapon or ammunition to another scene, but to a potential perpetrator. This presentation will focus on the unique challenges of our own agency's policies with respect to preserving other types of forensic evidence; finding solutions to challenging scientific problems that will work within tight time restraints; gaining buy-in of law enforcement and laboratory personnel; and the various steps and missteps on the way to implementing two new conceptually different, but related concepts.

One of the first crucial steps in improving recovery of DNA from firearms-related evidence was not only permitting, but encouraging research by scientific personnel to find solutions to these problems. ATF's DNA Technical Leader undertook a variety of research projects to discover why

DNA was so difficult to recover, and tested numerous process improvements to enhance the recovery of DNA. This managerial mindset is vital for improvement; it is too easy to get caught up in the current backlog and neglect investing time into long-term solutions. In addition to the many laboratory-based improvements that were put into practice, an essential part of the problem was determined to be what happens during the collection, packaging and transport of FCCs. In order to address this aspect, a project was undertaken to develop a device that was inexpensive, simple, easy to use, and effective in minimizing the loss of DNA between the time of collection and its processing and analysis in the laboratory. As it turned out, developing the device was the easy part. Challenges focusing on getting the device (AC3) patented, produced and into the hands of law enforcement personnel will be discussed, along with lessons learned.

The second area of improvement focused on rapid processing of firearms and ammunition to allow for their timely entry into NIBIN. This solution required a shift in mindset, using lean six sigma concepts and the standing up of a new unit that focuses solely on initial and rapid processing, but does not conduct the more complex analytical procedures. Addressing how to gain the buy-in of senior agency officials in order to onboard additional personnel; gaining the buy-in of lab personnel who are accustomed to handling all facets of their discipline's forensic work; addressing various accreditation requirements for reporting; changes to the laboratory's physical space; and the myriad small changes affecting how we conduct business, all posed challenges and required a paradigm shift for lab management and personnel. This portion of the presentation will focus on how the laboratory moved from concept to implementation and the lessons learned.

An integral part of our work as leaders in forensic science organizations is to be forward thinking, drive innovation and to ensure that our scientific capabilities are continually improving. By examining the details of the steps taken to move from idea, to research to implementation, we can recognize that the path is not always as simple and straightforward as it may initially seem. Additionally, as leaders we are obligated to share our success with our partners so they may implement innovative techniques and enjoy success in our changing world.

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