

Death Investigation

Mitigating DNA Identification Errors in Mass Fatality Response Operations through Rapid DNA Technology

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Abstract: Inherently, a mass fatality DNA identification response operation is prone to errors, such as sample switches. This is because the operation is unprompted, involves the testing of a large number of samples in a short period of time and often requires people working extended hours performing tasks they do not routinely perform.

In the initial stages of the World Trade Center DNA Identification effort, sample switches resulted in families receiving the body of an unrelated victim. Identifying and rectifying the errors was traumatic not only to the victims' family but also to the professionals involved in the DNA identification effort. Therefore, during the Louisiana Hurricane Katrina DNA identification effort, samples were collected in duplicate and processed independently by two different laboratories. Using this approach, sample switches were identified and appropriate actions were taken before identifications were reported and bodies released to the families. While this duplicate testing approach eliminated the reporting of DNA identification errors, it was expensive and time consuming.

Rapid DNA technology has the potential to eliminate errors. Rapid DNA technology was developed through a joint research and development effort of the Departments of Homeland Security, Defense, and Justice and the Intelligence Community. Potential applications for Rapid DNA include verification of human identities, validation of claimed family relationships, and processing of crime scene DNA evidence.

The Rapid DNA system integrates and automates the existing laboratory DNA processes into a single desktop system that generates and analyzes a DNA profile in the field. Because Rapid DNA is a sample in-profile out technology, the system eliminates the manual processing steps conducted by analysts; thereby reducing handling and transfer errors. Additionally, the Rapid DNA system is designed to be taken into the field where cases are being processed, mitigating potential chain of custody errors in the collection and reporting of results back to the operational entities.

The Rapid DNA system also followed a Privacy by Design concept that serves to reduce operational errors. Operators verify their identity when they log onto the system with their credentials, a biometric, or user name and password. The operator's actions and system operations are tracked and any data transfers or deletions are logged. The samples are tracked through a RFID chip built into each swab or through barcode labels and these labels are tracked throughout the system and associated with all reports from the system. Data within the system, and when exported from the system, is encrypted and associated with the specific user who authorized the data transfer. While all of these concepts were adopted to ensure privacy protections, they will also help to reduce operational errors.

This presentation will discuss the development of Rapid DNA and the potential of the technology to reduce errors in DNA testing in mass fatality response. This novel approach to minimizing errors benefits the families, and also benefits responding agencies and staff working to support the families following this most devastating type of disaster.