B116 Revisiting 9/11: Success Rate of Reference Samples for Mass Fatality Identification

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The goal of this presentation is to focus on the ability to generate usable DNA profiles from various types of reference samples that were collected during the World Trade Center disaster. The attendee will learn about the reference samples that may be collected during a mass fatality event, and specifically, which types of samples more frequently led to the identification of a World Trade Center victim.

This presentation will impact the forensic community by serving as a guide for the collection and testing prioritization of reference samples in the event of a future mass fatality event.

When DNA testing is necessary to identify the victims of a mass fatality event, reference samples for each victim must be collected. A victim can be identified with a direct match to a personal effect or through kinship analysis. Personal effects include items or samples that can be attributed to the victim, including, but not limited to, a toothbrush, hairbrush, razor or medical specimen. Kinship analysis requires samples from the victim's biological relatives including, but not limited to, the mother, father, siblings, and children. Over 10,000 reference samples were collected following the World Trade Center disaster. DNA testing was performed for both mitochondrial DNA and nuclear DNA, in the form of short tandem repeats (STRs) and single nucleotide polymorphisms (SNPs). In order to verify the profile generated from a personal effect truly represented the victim's profile, each personal effect was confirmed using duplicate testing, a second personal effect, or kinship verification. The results of these tests were compiled for the different types of reference samples and the different testing systems. The success rates for the different types of reference samples were based on whether or not a usable DNA profile was generated, and whether or not sufficient DNA information was available to identify the victim. The personal effects which yielded the best results were known blood samples, toothbrushes, and razors. Hairbrushes gave less reliable results, often mixtures or partial profiles, and therefore, were not used as often to make an identification. For identifications made by kinship analysis, the traditional trio of mother-father-victim was often not available, necessitating the use of non-trio pedigrees for analysis. In these cases, the relatedness and number of donors influenced the identification success of kinship analysis.

It is important to establish which sample types give the best results in order for agencies involved in future mass fatality events to assist families in donation of reference samples and better prioritize the testing of personal effects and kinship samples to maximize the efficiency of identifications.

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