H121 The Identification of Unidentified Remains

Katherine Cochrane, MD, Knoxville, TN 37920; Darinka Mileusnic-Polchan, MD, PhD, Knox County Regional Forensic Center, Knoxville, TN 37919*

Learning Overview: The goal of this presentation is to discuss the transnational and multidisciplinary collaboration required to improve the success of positive identification of unidentified remains using the National Unidentified and Missing Persons System (NamUs).

Impact on the Forensic Science Community: This presentation will impact the forensic science community by encouraging the diligent entry of unidentified remains cases into NamUs to facilitate an improved rate of successful identification.

Annually, there are estimated to be 4,400 unidentified remains cases, 1,000 of which remain unidentified after one year. Degradation of the remains by factors such as an extended postmortem interval, burning, or scattering results in the failure of traditional identification methods and necessitates the use of DNA profiling. When an identity is not immediately established, these cases may remain unidentified for extended periods, and a missing person database may be utilized to distribute the information to a larger audience and potentially find a match. These cases are a tremendous challenge, in part to the involvement of multiple agencies and specialists, as well as the need for transnational sharing of information. In response to an overwhelming need for a centralized reporting system, the National Institution of Justice created NamUs in 2007. Designed to be the nation's central database for missing and unidentified persons investigations, this web-based repository accessible to law enforcement, forensic scientists, medical examiners, and family members of missing persons, shares information nationwide, enhancing the potential for identifying remains.

Six cases of remains positively identified using DNA comparison analysis between 2016 and 2018 were examined. These included three sets of remains in an advanced stage of decomposition, two charred remains, and one consisting of scattered bone fragments. Five identifications were made by comparison with putative relatives, and one by cold hit through comparison with DNA profiles from missing persons. All cases were entered into NamUs; however, two families instead utilized a private laboratory for DNA comparison analysis at their own expense to shorten the identification interval. The average time for identification of the remaining four cases through NamUs was 9.5 months. The charred and two decomposed cases were presumptively identified and confirmed based on familial DNA collected by law enforcement. Coordination with out-of-state law enforcement for DNA collection was required in two cases. Anthropologic analysis was essential for the identification of the remaining two cases in building an accurate profile within NamUs. In the first case, two fragments of bone were found in the woods, which, based on the anthropologic profile, were presumptively identified to belong to a woman who had gone missing in the area one year prior. She was positively identified based on familial DNA comparison previously submitted to NamUs at the time she had gone missing. The second case was a decomposed male found floating in a lake after significant flooding. The remains were identified as a missing person from another state nearly two years after the remains were found. A cold hit was received from NamUs after family members submitted DNA 14 months after the decedent was reported missing and 11 months after the remains were found.

These cases emphasize not only the multidisciplinary approach with transnational cooperation needed for positive identification but also the early entry of anthropologic and DNA data into the database. In 2017, Tennessee passed a law requiring that medical examiners and law enforcement enter all unidentified remains or missing persons cases into NamUs after 30 days. Currently, only five other states have similar laws. Although a great resource, the long wait times suggest the need for additional laboratory options to prevent further backlog as more states introduce legislation requiring the use of NamUs. In the cold hit case, the remains were not matched for nearly two years. This case highlights the importance of medical examiners, coroners, and families utilizing the database, as this family waited over a year after the decedent went missing to submit DNA. The success of the system is heavily dependent not only on medical examiners and coroners entering unidentified remains, but also the entry of missing persons cases by law enforcement as well as relatives of the decedents submitting reference samples. In conclusion, a transnational and collaborative approach with prompt and diligent case entry nationwide is needed to facilitate positive identification.

NamUs, Unidentified Remains, DNA Analysis

*Presenting Author