



B133 Beyond Laci Peterson: Using DNA Analysis to Identify Missing Persons

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The goal of this presentation is to present to the forensic community the development and implementation of a statewide program designed to utilize DNA analysis to solve cases of missing and unidentified persons. The challenges, both technical and administrative, will be described. The need for a nationally coordinated effort will also be discussed.

This presentation will impact the forensic community and/or humanity by providing an understanding of the methodology of identifying persons using DNA, but an appreciation for the need for wider implementation of similar programs.

The identification of human remains is one of the primary duties of coroners and medical examiners, and is a critical aspect of homicide investigation when the body is not readily identified. In addition to odontology, fingerprints and anthropology, DNA analysis is a highly discriminating tool that is available to identify remains, provided that there is a corresponding reference sample available, either from biologically-related family members or from the missing person themselves (i.e., baby tooth). However, DNA analysis is expensive and body ID is a low priority for most crime labs, so this tool remains vastly underused.

The goal of this presentation is to describe the implementation of a statewide program that is successfully providing investigators with the identity of human remains through a concerted effort involving the state crime lab, the state missing person clearinghouse, coroners, medical examiners and local law enforcement. The California Missing Persons DNA Program was created in 2001 with the express purpose of using DNA databases of both unidentified human remains and reference samples for missing person (either swabs from relatives or items from the missing person) to make identifications. Model collection kits have been devised for the collection of oral swabs from family members of missing persons, and for the collection of human remains. Training, in the form of instructional videos and written publications, has been developed. Outreach has involved the identification of "high risk" missing person cases and unidentified person cases reported to the state clearinghouse, and coordination with coroners and law enforcement investigators for the collection of appropriate samples. Short Tandem Repeat DNA profiles, as well as mitochondrial DNA sequencing data are entered into local databases as well as the new "CODISmp," which has been developed specifically for use with missing and unidentified person DNA profiles. As most analyses involve comparison between remains and a relative of the missing person, kinship analysis is required for comparison of nuclear DNA profiles.

While all states participate in CODIS, the primary categories of samples entered are convicted offender and forensic unknown. Few labs routinely enter profiles from missing or unidentified persons, and fewer still have dedicated resources to this task. It is one of the goals of this presentation to provide a model for other states to consider when implementing a program for the purpose of identifying human remains. Because of the movement of individuals and families between states, a certain percentage of cases either will not be analyzed or compared after analysis. A national program of all states entering both STR and mitochondrial DNA into NDIS is required, similar to the highly successful convicted offender/forensic unknown model.

Several dozen identifications have been made to date. Technical improvements in typing human remains will be discussed. These include the following: 1) Improved methods for DNA extraction, 2) qPCR methods that simultaneously quantify the amount of both nuclear and mitochondrial DNA, and 3) the use of a duplex PCR reaction for the simultaneous amplification of both HV1 and HV2 regions of mitochondrial DNA (thereby conserving sample which contains little DNA to begin with). Finally, several successful cases will be described that highlight the issues and technologies describe above.

Missing Person, Mitochondrial DNA, Unidentified Person