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Final Report

Award No.: 2004-DN-BX-K212

The University of North Texas Center for Human Identification Project: The Anthropological, mtDNA and STR Analysis of Unidentified Human Remains and Family Reference Samples for Entry into CODIS and the Field Testing and Implementation of New Technologies to Facilitate Additional Identifications

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The University of North Texas Center for Human Identification Project: The Anthropological, mtDNA and STR Analysis of Unidentified Human Remains and Family Reference Samples for Entry into CODIS and the Field Testing and Implementation of New Technologies to Facilitate Additional Identifications

Abstract

The University of North Texas Center for Human Identification (UNTCHI) consists of the Laboratory for Molecular Identification (UNTHSC campus) and the Laboratory of Forensic Anthropology (UNT campus). The mission of the UNTCHI is to provide: 1. identification of unknown decedents through mtDNA and STR analysis of remains with the assistance of anthropological and odontological analysis; 2. a basis for the future identification of individuals reported missing through the DNA analysis of missing person samples and reference samples provided by families with a missing loved one; 3. the capacity to process large numbers of both human remains and family reference samples in a mass disaster event; and 4. educational services to the medical legal community in order to nurture improved access and utilization of the UNTCHI and other qualified DNA testing facilities, and to promote the utilization of the National Missing and Unidentified System (NamUs).

Award number 2004-DN-BX-K212 has provided UNTCHI with $3,634,782.00 over the past 3.5 years to carry out its mission. A total of 639 agencies within 45 states have submitted samples to the UNTCHI. At the close of this award UNTCHI has received approximately 3,000 family reference samples, 1,339 samples from unidentified decedents, and 145 missing person samples. UNTCHI has completed the analysis of 2,609 family reference samples, 51 missing person samples, and 1,020

unidentified human remains have been either completed or are near completion. As of April, 2008 UNTCHI has uploaded 1,980 family reference samples and 661 unidentified human remain samples into NDIS. UNTCHI has accounted for 46% of all of the family reference samples and 43% of the unidentified human remain samples in NDIS. UNTCHI had also assisted in the identification of some of the victims of Hurricane Katrina. In total UNTCHI performed the analysis of 66 unidentified decedent samples, 75 family reference samples, and 19 missing person samples which resulted in the identification of 14 human remains.

To date, funding under award 2004-DN-BX-K212 has resulted in a total of 195 confirmed identifications through DNA analysis of remains submitted from 35 states. UNTCHI has been responsible for 25 "cold hits", 19 of these were made when both the remains and the family reference sample(s) were analyzed and uploaded into CODIS by UNTCHI. However, 6 "cold hits" have been made between samples uploaded by UNTCHI and the DNA profiles submitted to NDIS by other agencies. Seventeen additional identifications have been made utilizing only anthropological and odontological methods.

Award: 2004-DN-BX-K212

The University of North Texas Center for Human Identification Project: The Anthropological, mtDNA and STR Analysis of Unidentified Human Remains and Family Reference Samples for Entry into CODIS and the Field Testing and Implementation of New Technologies to Facilitate Additional Identifications

EXECUTIVE SUMMARY

The increasing number of unidentified remains and unsolved missing persons cases has become a critical problem for our Nation. Each day in the United States there are over 100,000 active missing persons cases with approximately 45,000 of these individuals having a last know contact of greater than a year ago. Thousands of individuals, both children and adults, vanish every year under suspicious circumstances, and their cases remain unsolved. For many years there has been speculation as to the number of unidentified remains that are stored at medical examiners, coroners and law enforcement agencies. The Bureau of Justice Statistics report on the census of "Medical Examiner and Coroner's Offices, 2004" indicated that medical examiners and coroners held at least 13,500 sets of unidentified human decedents as of 2004. Jeffrey Sedgwick, Director of the BJS, and currently Acting Assistant Attorney General, Office of Justice Programs, has suggested that the true number of remains was probably far higher than the 13,500 reported. Prior estimates indicated that the number of unidentified human decedents could potentially be 40,000 or more. The census indicated that approximately 4,400 unidentified human decedents are received by medical examiners and coroners each year. After one year, approximately 1,000 decedents remained unidentified and become "cold cases". Of those that remained unidentified, approximately 600 were disposed of through burial or cremation. Legislation addressing the issues of missing persons and human remains must be

enacted throughout the United States. Medical examiners, coroners and law enforcement agencies must be prevented from disposing of the remains of human decedents who cannot be identified by conventional means, without the retention of samples. In addition, those agencies retaining samples must be required to submit them to a qualified laboratory capable of the appropriate DNA analysis and must insure their upload into the CODIS+mito National Missing Persons Database. Without the collection and submission of a sample for DNA testing or anthropological review, there can be no further molecular or physical basis for the investigation of death and the chance of identifying these remains is eliminated. The 2004 survey suggested that a large number of the unidentified decedents were most likely murder victims. If death was due to a homicide, and the remains disposed of without sample retention, there can be no accountability for the perpetrator. The identification of the decedent is often the first critical step required to begin the murder investigation. Sedgwick said "advances in DNA technology could make it possible for grieving families to have some closure and for those responsible to meet justice."

The University of North Texas Health Science Center's (UNTHSC, Fort Worth Campus) Laboratory for Molecular Identification and the University of North Texas's (UNT, Denton Campus) Laboratory of Forensic Anthropology jointly comprise the University of North Texas Center for Human Identification (UNTCHI). These two entities provide forensic analyses, identification services, advanced academic degree programs and professional training to law enforcement. The mission of the UNTCHI is to provide:

1. The identification of unknown decedents through mtDNA and STR analysis of remains with the assistance of anthropological and odontological analysis.

2. A basis for the future identification of individuals reported missing through the DNA analysis of missing person samples and reference samples provided by families with a missing loved one.

3. The capacity to process large numbers of both human remains and family reference samples in a mass disaster event.

4. Educational services to the medical legal community in order to nurture improved access and utilization of the UNTCHI and other qualified DNA testing facilities.

5. To promote the utilization of the National Missing and Unidentified System (NamUs).

Award Goals

The goals for award number 2004-DN-BX-K212 were to: perform STR and mtDNA testing of unidentified human remains, family reference samples, and direct samples from the missing person and then upload all allowable DNA profiles into the FBI's National DNA Index System; provide anthropological and odontological analysis of skeletal remains on all applicable cases when requested; educate and improve awareness of the services provided by UNTCHI for easier access and utilization; conduct field tests of new technologies designed to increase both the throughput and the amount of genetic information obtained from degraded and compromised skeletal remains.

Project Objectives

From October 1, 2004 through March 31, 2008 award number 2004-DN-BX-K212 has provided UNTCHI with $3,634,782.00 to:

1. Perform STR and mtDNA analysis on samples from 1,400 unidentified human remains (the FY04 award had a goal to analyze 150 remains; the FY05 award had a goal to analyze 750 remains; and the FY06 award had a goal to analyze 500 remains).
2. Perform STR and mtDNA analysis on 3,450 family reference samples (the FY04 award had a goal to analyze 750 family reference samples; the FY05 award had a goal to analyze 1,250 family reference samples; and the FY06 award had a goal to analyze 1,500 family reference samples).
3. Conduct forensic anthropological examinations on skeletal remains including dental comparisons and anthropological comparisons with ante-mortem radiographs (x-ray, CT, MRI) on all cases deemed appropriate or for any agency that requires this analysis. Identifications made utilizing dental and/or anthropological comparisons eliminate the need for DNA testing which ensures the most efficient use of grant funds.
4. Continue the evaluation of new technologies designed to increase the amount of genetic information obtained from degraded and compromised skeletal remains, and to increase UNTCHI's sample throughput capabilities which will ultimately lead to more identifications.
5. Provide educational support for:
    - Law enforcement agencies to increase the collection and submission of family reference and missing person samples.

- Medical examiners and coroners to increase the submissions of human remain samples to UNTCHI and other qualified DNA laboratories as well as the number of submissions to NamUs,
- Non-profit organizations, victim's groups and families with a missing loved one.

Conclusions and Metrics

Through the funding provided by award number 2004-DN-BX-K212, the UNTCHI has been able to develop the laboratory superstructure and necessary nationwide collaborative network to successfully aid in our Nations "Missing Persons Epidemic". The funding has also given us the ability to make substantial advances in the optimization of procedures and DNA typing methods specifically targeting the most challenging samples faced in forensic science. Strong collaborative efforts between laboratories, such as the UNTCHI, the Armed Forces DNA Identification Laboratory, the California Department of Justice Missing Persons Laboratory and the FBI's National Missing Persons Program, have set the stage for developing our Nation's next generation CODIS platform, directly addressing the DNA identification challenges of missing persons and family reference samples. These changes are in large part the result of the support and funding of DNA initiatives by NIJ in targeting the large number of missing persons and unidentified decedents. These funds have provided UNTCHI with the ability to educate and provide guidance and support to agencies whose states have been impacted by legislation related to missing persons and unidentified decedents.

Over the past 3 years the UNTCHI has made approximately 48 presentations to law enforcement, medical examiners, coroners and family groups at the local, State, and National level in support of our missing persons program and to increase the awareness of this national problem. With the financial support provided through our award number 2004-DN-BX-K212, the UNTCHI has been able to serve in a central role for the implementation of a system for law enforcement agencies, medical examiners and coroners to have their cases submitted, processed and entered into the National database. Two of the proposed objectives for award number 2004-DN-BX-K212, (processing 3,450 family reference samples, and 1,400 unidentified human remain samples) with mtDNA and STR analysis could not be achieved. Our inability to complete the number of proposed Family Reference Samples was primarily due to the failure of the law enforcement community to collect and submit a sufficient number of missing person cases. A total of 639 agencies across 45 states have submitted samples to the UNTCHI. At the close of this award, UNTCHI has received approximately 3,000 family reference samples, 1,339 samples from unidentified decedents, and 145 missing person samples. UNTCHI has completed the analysis of 2,609 family reference samples, 51 missing person samples, and 1,020 unidentified human remains have been either completed or are near completion. In addition UNTCHI had assisted in the identification of victims of Hurricane Katrina in the States of Louisiana and Mississippi. In total, the UNTCHI conducted DNA analysis on 66 unidentified decedent samples, 75 family reference samples, and 19 missing person samples. With the inclusion of the samples processed for Hurricane Katrina, the

UNTCHI has completed the analysis 2,684 family reference samples, 1,086 unidentified human remain samples, and 70 missing person samples.

As of April, 2008 UNTCHI has uploaded 1,980 family reference samples and 661 unidentified human remain samples into NDIS. UNTCHI has accounted for 46% of all of the family reference samples and 43% of the unidentified human remain samples in NDIS. Funding under award 2004-DN-BX-K212 has resulted in a total of 195 confirmed identifications (14 of these were associated with Hurricane Katrina) through the mtDNA and STR analysis of remains submitted from 35 states. UNTCHI has been responsible for 25 "cold hits", 19 of these were made when both the remains and the family reference sample(s) were analyzed and uploaded into CODIS by UNTCHI. However, 6 "cold hits" have been made between samples uploaded by UNTCHI and the DNA profiles submitted to NDIS by other agencies. Seventeen additional identifications have been made utilizing only anthropological and odontological methods. Several of the identifications in which UNTCHI has performed either DNA or anthropological analysis have resulted in the apprehension of the individual responsible for the death of the unidentified decedent. The identification of the victim was the critical first step ultimately leading to the successful prosecution of the perpetrator. In these few cases, there is little doubt that additional lives may have been saved. With the expanding number of State initiatives related to missing persons, the volume of unidentified remains samples and family reference samples being submitted is expected to rapidly increase. The UNTCHI is now poised to handle these increases as a result of improvements to our laboratory facilities, the optimization of DNA typing methods, and the addition of qualified personnel. All of these were made possible by our NIJ awards. The continued

outreach and collaborations with the law enforcement community, medical examiners and coroners nationwide will allow the Center's resources to be utilized most effectively, ultimately aiding in more identifications and providing families with information they have been long waiting for.

Award: 2004-DN-BX-K212

The University of North Texas Center for Human Identification Project: The Anthropological, mtDNA and STR Analysis of Unidentified Human Remains and Family Reference Samples for Entry into CODIS and the Field Testing and Implementation of New Technologies to Facilitate Additional Identifications

Introduction

The increasing number of unidentified remains and unsolved missing persons cases has become a critical problem for our Nation. Each day in the United States there are over 100,000 active missing persons cases with approximately 45,000 of these individuals having a last know contact of greater than a year ago. Thousands of individuals, both children and adults, vanish every year under suspicious circumstances, and their cases remain unsolved. For many years there has been speculation as to the number of unidentified remains that are stored at medical examiners, coroners and law enforcement agencies. These remains are from unidentified decedents that cannot be identified by conventional methodologies. The report issued by the Bureau of Justice Statistics on the census of "Medical Examiner and Coroner's Offices, 2004" indicated that medical examiners and coroners held at least 13,500 sets of unidentified human decedents as of 2004. Jeffrey Sedgwick, Director of the BJS, and currently Acting Assistant Attorney General, Office of Justice Programs, has suggested that the true number of remains was probably far higher than the 13,500 reported. Prior estimates suggested that the number of unidentified human decedents could potentially be 40,000 or more. The census indicated that approximately 4,400 unidentified human decedents are received by medical examiners and coroners each year. After one year, approximately 1,000 decedents remained unidentified and become "cold cases". This represents our best guess at the number of new unidentified decedent cases annually.

Of those that remained unidentified, approximately 600 were disposed of through burial or cremation. The Model State Legislation, proposed by the National Institute of Justice, addressing the issues of missing persons and human remains must be enacted throughout the United States. Medical Examiners, Coroners and law enforcement agencies must be prevented from disposing of human remains, from those decedents who cannot be identified by conventional means, without the retention of samples. In addition, those agencies retaining samples must be required to submit them to a qualified laboratory capable of the appropriate DNA analysis and must insure their upload into the CODIS+mito National Missing Persons Database. Without the collection and submission of a sample for DNA testing or anthropological review, there can be no further molecular or physical basis for the investigation of death and the chance of identifying these remains is eliminated. The 2004 survey suggested that a large number of the unidentified decedents were most likely murder victims. If death was due to a homicide, and the remains disposed of without sample retention, there can be no accountability for the perpetrator. The identification of the decedent is often the first critical step required to begin the murder investigation. "We owe the victims everything, but we owe the last victim more. Was there anything that could have been done to save the last victim's life?" (International Homicide Investigators Association, 2005 Annual Training Conference San Francisco, CA). Sedgwick said "advances in DNA technology could make it possible for grieving families to have some closure and for those responsible to meet justice."

The University of North Texas Health Science Center's (UNTHSC, Fort Worth Campus) Laboratory for Molecular Identification and the University of North Texas's

(UNT, Denton Campus) Laboratory of Forensic Anthropology jointly comprise the University of North Texas Center for Human Identification (UNTCHI). These two entities provide forensic analyses, identification services, advanced academic degree programs and professional training to law enforcement. The mission of the UNTCHI is to provide: 1. identification of unknown decedents through mtDNA and STR analysis of remains with the assistance of anthropological and odontological analysis; 2. a basis for the future identification of individuals reported missing through the DNA analysis of missing person samples and reference samples provided by families with a missing loved one; 3. the capacity to process large numbers of both human remains and family reference samples in a mass disaster event; and 4. educational services to the medical legal community in order to nurture improved access and utilization of the UNTCHI and other qualified DNA testing facilities, and to promote the utilization of the National Missing and Unidentified System (NamUs).

On September 21, 2004 the UNTHSC received an initial award from the Office of Justice Programs under the National Institute of Justice Continuation Awards program for $750,000 for the "DNA Testing of Unidentified Remains and Family Reference Samples". The funding from the award was to assist missing person's investigations, provide the DNA analytical tools to medical examiners, coroners and law enforcement agencies for the identification of unidentified human remains; and ultimately provide the families with a missing loved one the knowledge to hopefully obtain closure. If the identification could not be made at the time of sample analysis, the overriding objective was the entry of these genetic profiles into the CODIS National DNA databases to facilitate a future identification.

On September 7, 2005 UNTHSC was given a second award for this project of $1,484,782. The scope of this award was expanded to include the anthropological analysis of human remains for law enforcement entities, medical examiners and coroners. Throughout the US there are less than 100 board certified forensic anthropologists. As a result, many states and jurisdictions do not have access or can not afford these analytical services. Funding to UNTCHI was intended to provide both the anthropological and odontological services at no cost to submitting agencies. In addition, prior to the award on September 7, 2005 Hurricane Katrina decimated the States of Louisiana and Mississippi. Over 1,800 people lost their lives in Hurricane Katrina and in the subsequent floods. It took a significant amount of time to recover the bodies from many of the victims, and as a result facial identifications became nearly impossible. Dental records of many of the victims had been irreversibly lost. For many of the decedents, DNA analysis was required to obtain sufficient data for a positive identification. The USDOJ through the National Department of Justice offered the services of the UNTCHI to assist in the identification of the victims of Katrina. The scope of the award was expanded to allow UNTCHI to assist in cases of mass disaster.

On September 13, 2006 UNTHSC was given a third award under this project of $1,400,000. The scope of this award was further expanded to include the field testing of new technologies to enhance our ability to obtain genetic data from highly degraded human remains. The inclusion of this component under our award (2004-DN-BX-K212) allowed UNTCHI to do further testing of new technologies and methodologies which had been successfully begun under a separate award (2004-DN-BX-K214). With access to hundreds of human remain samples and the DNA samples recovered from them;

UNTCHI was in a unique position to evaluate new technologies and methodologies, many of which had been developed under research grants provided by NIJ. In total UNTHSC/UNTCHI received $3,634,782.00 from September of 2004 through March 31, 2008 to perform both anthropological analysis of unidentified human remains as well as mtDNA and STR analysis on unidentified human remains and family reference samples for entry into CODIS. The third component was to continue the field tests of new technologies and methodologies to enhance our ability to make more identifications.

Project Purpose

The purpose of this project was to aid State and local law enforcement agencies as well as medical examiners and coroners throughout the US in the investigation of missing person and unidentified human decedent cases. The funds provided under this award have enabled the UNTCHI to: offer STR and mtDNA analysis with the upload of all allowable profiles into the National CODIS+mito Missing Person databases; provide anthropological examinations; education and dissemination of information related to this national epidemic. These services were provided at no charge to the following:

- Federal, state and local law enforcement agencies
- The medical legal community (medical examiners, coroners and others assigned with the responsibility for examining human remains)
- The National Center for Missing and Exploited Children
- Other regional or specialized agencies dealing with the missing

Project Goals

The goals of this project were four-fold to:

1. perform STR and mtDNA testing of unidentified human remains, family reference samples, and direct samples from the missing person and then upload all allowable DNA profiles into the FBI's National DNA Index System.
2. provide anthropological and odontological analysis of skeletal remains on all applicable cases when requested.
3. educate and improve awareness of the services provided by UNTCHI for easier access and utilization.
4. conduct field tests of new technologies designed to increase both the throughput and the amount of genetic information obtained from degraded and compromised skeletal remains.

Project Objectives

1. To perform STR and mtDNA analysis on samples from 1,400 unidentified human remains (the FY04 award had a goal to analyze 150 remains; the FY05 award had a goal to analyze 750 remains; and the FY06 award had a goal to analyze 500 remains). These remains were to be provided by medical examiners, coroners, and law enforcement agencies throughout the United States.
2. To perform STR and mtDNA analysis on 3,450 family reference samples (the FY04 award had a goal to analyze 750 family reference samples; the FY05 award had a goal to analyze 1,250 family reference samples; and the FY06 award had a goal to analyze 1,500 family reference samples). In order to upload

the DNA profiles obtained from the family reference samples, the FBI requires that they be collected by a law enforcement agency and an appropriate chain of custody and consent from are signed and submitted for each sample. The samples collected and submitted by State or local law enforcement agencies were done using collection kits supplied by UNTCHI through funding provided by NIJ. Under a separate award (2004-DN-BX-K213), UNTHSC had been funded to develop, purchase and distribute standardized sample collection kits for the submission of samples from relatives of missing persons and unidentified human remains. UNTCHI has distributed approximately 20,000 family reference sample collection kits throughout the United States. The kit was designed to collect one family reference sample and contains: A Kit Contents Form; a Brochure: Identifying Victims Using DNA: A Guide for Families (printed in English and Spanish) and is left with the family/donor); Instructions sheet for collection and directions for completing necessary forms; a Four Part Sample Collection Form (Registration and Consent, printed in English and Spanish); One Pair Disposable Gloves; One Swab Collection Pouch; Four Sterile Collection Swabs; Four Barcode Labels For Each Collection Swab; One Metered USPS Return Envelope; and a Fax Back Sample Tracking Form. Law enforcement agents have been instructed to try and provide between 2 to 3 family reference samples per missing loved one, with at a minimum one maternal reference sample for mtDNA analysis. UNTCHI has developed and has distributed approximately 5,000 collection kits for the submission of skeletal remains from unidentified decedents. The kit contains all of the necessary forms to submit skeletal remains

for mtDNA and STR analysis as well as Forensic Anthropological analysis if requested. Originally UNTCHI was distributing 3 different size shipping cartons. Currently the kit contains only the submission and chain of custody forms and shipping labels. Cardboard shipping boxes are only provided if they are requested. The submitting agency is responsible for the cost of shipping the remains to UNTSCHI and is requested to provide an account to cover the cost of returning the remains after anthropological and DNA analysis has been completed. The submission forms for skeletal remains are also utilized for Direct Missing Person Reference samples.

3. To conduct forensic anthropological examinations on skeletal remains for any case or agency that requires the examination. Dental comparisons and anthropological comparisons with ante mortem radiographs (x-ray, CT, MRI) will be conducted on all cases deemed appropriate. To utilize dental and/or anthropological comparisons in as many cases as appropriate to make a positive identification eliminating the need for DNA testing which ensures the most efficient use of grant funds.
4. The UNTCHI would continue its evaluation of new technologies designed to increase the amount of genetic information obtained from degraded and compromised skeletal remains. These new technologies will help to increase UNTCHI's sample throughput capabilities which will ultimately lead to more identifications.
5. UNTCHI would continue to provide: information, instructions and education to law enforcement agencies for the collection of family reference samples and samples

from the missing person; educational support for NamUs, Medical Examiners, Coroners and law enforcement agencies engaged in the process of identifying missing persons as well as non-profit organizations, victim's groups and families with missing persons.

Project Design and Methods

In order to insure the quality and integrity of the DNA analysis performed on the unidentified human remain samples and family reference samples: all of the DNA analysis was performed by a team of 9 qualified DNA forensic analysts and 2 qualified DNA technologists who were dedicated to the analysis of missing person cases; all the forensic testing was performed using the appropriate national standards, policies and procedures required by the Federal Bureau of Investigation; all the evidence submitted to UNTCHI was processed and stored using appropriate standards; all paperwork was checked for accuracy and completeness; any evidence that has been potentially damaged or altered was returned to the submitting agency for verification and resubmitted; UNTCHI has encouraged submitting agencies to provide as much metadata as possible with the evidence submission paperwork relative to the missing person and unidentified human remains; once a case had been completed, the DNA profiles are immediately entered and searched against the appropriate indexes in the local DNA database; all the cases entered into the UNTCHI local database had letters generated and delivered to the submitting agency indicating time of CODIS entry; all of local DNA profiles were uploaded on a weekly basis to the State CODIS DNA Database (SDIS located at the DPS headquarters lab, Austin, TX) and subsequently uploaded by

the Texas CODIS Administrator to the National DNA Database (NDIS) on the last Tuesday of each month; all of the potential matches were researched and those deemed as possible associations have reports generated and distributed to all appropriate parties. In addition: client satisfaction surveys were continually being submitted to the agencies providing samples and monitored for potential problem areas; Laboratory and management meetings are held on a quarterly basis to improve the laboratories work flow and quality.

UNTCHI established a case/sample processing prioritization based upon the following criteria. Date of submission is also considered.

Highest	All Juvenile Samples (Less than 21 years of age); Adults with a potential identification and public safety is an Issue (e.g., Suspect in custody with a pending court date and the outcome could be affected by the identification)
High	Adults with a potential identification
Medium	Adults without a potential identification
Low	Marginal or poor quality samples with no potential identification

A case may be reclassified based upon additional information provided by law enforcement agencies or medical examiner/coroners.

In order to improve the awareness and access to the UNTCHI the staff has: given numerous presentations at both scientific meetings as well as workshops and conferences designed to inform medical examiners, coroners, and law enforcement agencies as to this national problem (Appendix 1 and 2); continued to market our program through increased media awareness (both in print and through television at the

local, State and National level); networked with non-profit organizations such as the National Center for Missing and Exploited Children; provided ongoing cooperation and technical assistance to States who have attempted to pass the model State Legislation designed to improve the process of identifying missing persons and unidentified remains such as Oregon, New Jersey and Florida. The State of Florida's Missing Person legislation goes into effect on July 1, 2008 and representatives from their states missing person clearinghouse are working with UNTCHI to help coordinate sample submissions of unidentified human remains and family reference samples; UNTCHI will continue to provide DNA collection kits for family reference samples and submission kits for unidentified human remains (funding dependant).

University of North Texas Center for Human Identification

Laboratory for Molecular Identification (UNTHSC, Fort Worth Campus)

The UNTHSC's Laboratory for Molecular Identification is directed by Arthur J. Eisenberg, Ph.D. and is accredited under the requirements of ISO 17025 and the National Standards for DNA Analysis by the Forensic Quality Services - International Division. The Laboratory for Molecular Identification offers mtDNA and STR DNA analysis (conventional STR systems as well as miniSTR systems) on unidentified human remains (UHR) samples, family reference samples (FRS) and direct reference samples from a missing person. Once a DNA profile is obtained, all appropriate data is entered into the Federal Bureau of Investigation's National Missing Person's CODIS+mito DNA Database. The profiles are searched on a routine basis at our local and State level as well as the National level. Any candidate associations are further

researched and other family reference samples may be requested in order to obtain additional genetic data to support the identification of the decedent. The UNTCHI is currently one of only eight laboratories with the capability of uploading samples into the National Missing Person's CODIS+mito DNA Database.

Personnel and Organizational Management

Funding from this continuation award has been used in large part for the salaries and training of the team of 9 qualified DNA analysts and 2 DNA technologists which have been dedicated to the analysis of missing person cases. The analysts and technologists are divided into two groups: the first group is responsible for the processing and analysis of the skeletal remains and the missing person direct reference samples; and the second is responsible for the processing and analysis of the family reference samples. In addition; there are several other individuals involved in the operation of the Laboratory for Molecular Identification that have been funded in part by this award.

Director and Associate Director:

The Director along with the Associate Director are responsible for all planning and oversight activities required for the operation of the UNTCHI as well as the field test and development projects. The Director and Associate Director have identified development projects along with coordinating the implementation of new technologies and instrumentation designed to facilitate identifications.

Technical Leader:

The Technical Leader is responsible for the daily operations of the laboratory and is responsible for insuring that the all missing person's cases are processed and analyzed in an efficient manner. It is the responsibility of this individual to see that casework is evenly distributed and, when necessary, see that positions are established and filled. The validation of new methods and equipment is coordinated through this position. Along with the Quality Assurance manager, the Technical Leader is responsible for insuring that all testing performed meets the standards set forth by the requirements of ISO 17025 and the DNA National Standards for DNA Analysis by Forensic Quality Services – International Division.

Program Coordinator:

George Adams has served in this role from the beginning of this award. He has been responsible for contacting and interacting with all outside law enforcement agencies, victim's groups and families in need of missing person and unidentified remains testing. The distribution of DNA collection kits was also overseen by George Adams. It is his responsibility to insure that the flow of remains samples and family reference samples remains constant. He has also been working very closely with NamUS and NFSTC to support the national missing person initiatives.

Quality Assurance Manager:

This individual is responsible for insuring that all testing meets required quality control polices and our ISO accreditation.

LIMS Manager

This individual has ensured the integrity of the laboratory information system as well as the security of the data entered. The LIMS manager has also been responsible for generating reports on samples submitted as well as samples processed.

CODIS Administrator and CODIS Analyst:

These individuals have ensured that only the appropriate DNA profiles are entered into CODIS. These two positions have also insured the integrity and security of the CODIS hardware, software and data. Quality Assurance checks and data verification have been performed on all profiles entered into CODIS.

Laboratory of Forensic Anthropology

The Laboratory of Forensic Anthropology is directed by a Harrell Gill-King, Ph.D., a Board Certified Forensic Anthropologist. The Laboratory of Forensic Anthropology provides numerous analytical services which support and complement the DNA analysis component of the UNTCHI. Since a significant portion of these unidentified decedent cases fall under the "suspicious death" category, the information obtained through the anthropological examination of unidentified remains can be critical for a murder investigation. The Laboratory of Forensic Anthropology has provided agencies with crucial investigative leads and in some instances pivotal information aiding in the conviction of the perpetrators of these violent crimes.

The activities of the Laboratory of Forensic Anthropology can be divided into Pre-DNA analysis and Post-DNA analysis. The Pre-DNA analysis activities of The Laboratory of Forensic Anthropology have included:

- Selection of appropriate specimens, (i.e. those most likely to yield useable DNA), from UHR cases for submission to the Database. Sampling is performed in a manner which preserves important case-related physical evidence, (e.g. perimortem injuries, unique identifying features, etc.)
- Assembles and reviews all case-related paperwork associated with "cold cases" and large case backlogs correcting or supplementing, when necessary, any inaccurate or deficient information based upon careful review of the remains.
- Preliminary processing of remains which has saved costly analytical and investigative time by eliminating non-human submissions and cases which are of no forensic interest, (e.g. archeological or historic remains). In this way it is often possible to redirect law enforcement efforts at an early stage. In many instances, the elimination of "non-cases" can be accomplished via internet by visual examination of questionable specimens. Preliminary evaluation avoids costly duplications in DNA extraction by determining the number of individuals in a submission, (NOTE: This is a challenge when large backlogs involving numerous specimens per case are being cleared, or when multiple individuals are recovered from scenes or mass death events).
- When possible, the laboratory of forensic anthropology has attempted to establish identity by conventional means, i.e. radiographic, tomographic, dental, or anatomical.

The Post-DNA analysis activities of the Laboratory of Forensic Anthropology include the following which can be used to create as well as supplement the information in the unidentified decedent's database of NamUs include the following:

- Provides a Biological Profile for each UHR case, (i.e. determines sex, ancestry, age, stature/physique), as well as unique identifiers, (e.g. old medical/surgical interventions). A dental chart, digital dental photographs and radiographs are entered into each case file. These may be shared electronically with jurisdictions across the US for comparisons with possible matches. Biological profiles and unique identifiers can be uploaded into the Next Generation of CODIS to serve as Metadata. This information becomes crucial when the DNA evidence results in a "weak association" or in "multiple associations" as a result of highly degraded specimens or less than adequate reference samples.
- When possible Determine Cause and Manner of Death. The quality and the completeness of the skeletal remains are important in these determinations.
- The Laboratory of Forensic Anthropology has provided case reports, depositions, expert testimony, and consultation to all public client agencies at no charge.

Equipment and Reagents Purchased

The money awarded for this project has been utilized by UNTCHI for the purchase and implementation of a LIMS system. UNTCHI has worked very closely with the California Department of Justice's Missing Persons Lab in the further development of the Armed Forces DNA Identification Laboratories (AFDILs) Lab Information Systems named LISA. UNTCHI has invested funds in the customization of LISA for our needs as well as has worked closely with the developers on advanced searching capability and the kinship data analysis modules of LISA. In addition, we are working to support the

inclusion of other marker systems such as Y-STRs and SNP markers. The current version of CODIS+mito does not have the appropriate kinship searching algorithms and only supports the entry of the common STR markers and mito haplotype data. The modifications that have been made to LISA will greatly facilitate future identifications.

A significant portion of the initial award received in FY2004 was used for the purchase of automated robotic systems for the extraction of DNA from buccal swab family reference samples, the automated set up of both STR and mitochondrial PCR amplification reactions, and for the set up of cycle sequencing reactions for mitochondrial DNA analysis.

Performance Metrics

Samples Submitted and Processed by the Laboratory of Forensic Anthropology

From October 1, 2004 through March 31, 2008, **170 unidentified human remain cases have been submitted for forensic anthropological analysis**. A significant portion of these cases were from complete or nearly complete skeletal remains. In 120 of these cases, in addition to conducting an anthropological analysis, the Laboratory of Forensic Anthropology prepared cuttings from the skeletal remains for submission to the Laboratory for Human Identification for DNA extraction and analysis. **Approximately 20% of the cases submitted for anthropological examination originated in laboratories outside of Texas. Since October 1, 2004, the UNTCHI Laboratory of Forensic Anthropology has made 17 identifications utilizing only anthropological and odontological methods.** These identifications have saved valuable time and monetary resources since the more time consuming and expensive DNA methods did

not have to be utilized. **Eight cases have involved the exclusion of animal remains which has also saved valuable resources.**

Samples Submitted to the Laboratory for Molecular Identification

In 2004 the UNTCHI was funded by NIJ (Award # 2004-DN-BX-K213) to develop, purchase and distribute Standardized Sample Collection Kit for Unidentified Remains and Relatives of Missing Persons. A total of 639 agencies have submitted samples to the UNTCHI. These samples have been provided by agencies across 45 states (To date we have not received samples from Connecticut, New Hampshire, Rhode Island, Vermont, and West Virginia). Of the 639 submitting agencies, 404 were agencies outside of Texas (Appendix 3). Since the UNTCHI has been operating the longest within Texas and the State had originally provided some funds to develop the Texas Missing Persons Database, a significant number of the agencies submitting samples to UNTCHI are from Texas (Appendix 4). The Medical Examiner and Coroner offices submitting samples to the UNTCHI are shown in Appendix 5.

Collection and Processing of Family Reference Samples

UNTCHI has distributed approximately 20,000 family reference sample collection kits and has received approximately 3,000 family reference samples. **At the close of this award UNTCHI has completed the analysis of 2,609 family reference samples** *(this number does not include samples processed for Louisiana and Mississippi as a result of Hurricane Katrina)*. Samples processed by UNTCHI contain both mtDNA and STR data. If multiple reference samples are submitted per missing person case, mtDNA

analysis is done on only one maternal relative. The number of family reference samples completed is less than the 3,450 samples that we had expected to process by the close of this award. At the close of this award, UNTCHI did not have a backlog of family reference samples waiting to be processed. The inability of law enforcement to provide us with family reference samples is the basis for us not completing the number of intended samples. As of April 2008 the Family Reference Sample Index of the National Missing Persons CODIS+mito contains a total of 4,286 samples. Of the total currently in CODIS, 1,980 samples were uploaded from UNTCHI. **UNTCHI accounts for 46% of all of the family reference samples in CODIS.** As a result of identifications made by UNTCHI, 224 Family Reference Samples have been removed from CODIS+mito. There are 953 missing person cases at NDIS submitted by UNTCHI that contain only a single family reference sample. Of these cases, approximately 260 contain only a sibling. Given the current search algorithms in CODIS, it would be virtually impossible to identify a missing person based upon STR results only. These cases underscore the necessity to perform mtDNA analysis on both Unidentified Human Remains and at least one maternal Family Reference sample. At each STR locus analyzed, there is a 25% chance that two full siblings will have no alleles in common. The current CODIS search algorithms are not capable of providing reliable associations only based upon the Core 13 STR loci with only siblings. The next generation of CODIS designed for Missing Persons analysis will require a minimum of two reference samples per missing individual in order to do a pedigree analysis. UNTCHI is prepared to contact each of the submitting agencies of the 953 missing person cases to determine if additional reference samples are available. With the automation and methodologies implemented

at UNTCHI, our teams of analysts and technologists responsible for the processing of these samples have excess capacity. With no further improvements, UNTCHI has the ability to complete 150 Family Reference Samples with both STRs and mtDNA analysis with CODIS upload in a 4-week period. This would provide a capacity of approximately 1,800 samples per 12 months with existing technologies.

Collection and Processing of Unidentified Decedent Samples and Direct Missing Persons Samples

UNTCHI has distributed approximately 5,000 collection kits for the submission of skeletal remains from unidentified decedents. UNTCHI has only received 1,339 samples from unidentified decedents and 145 direct missing person samples. **To date, UNTCHI has completed 872 unidentified decedent samples with both mtDNA and the STR profiles** *(this number does not include samples processed for Louisiana and Mississippi as a result of Hurricane Katrina)*. **When appropriate, miniSTRs utilizing the Applied Biosystems MiniFiler™ multiplex kit and the NCO1 and NCO2 systems were done.** Of the unidentified decedent samples and direct reference samples completed by UNTCHI, only 49 lack any STR results. An additional 148 samples were started prior to the close of this award, and results from the vast majority are expected with a 6 to 8 week period of time. **A total of 1,020 unidentified human remains have been completed or in process from samples received during the award period** *(this number does not include samples processed for Louisiana and Mississippi as a result of Hurricane Katrina)*. The number of remains completed or in process is significantly less than the projected 1,400 remain samples projected under

this award. During the period of this award (September 2004 through March 31, 2008) we revised our protocols so that STR amplifications from DNA recovered from human remains must be done in triplicate to insure the reliable upload of STR profiles into CODIS. Due to the limited amounts of nuclear DNA obtained from many skeletal remain samples; this triplicate processing is the best way to obtain the most accurate data from these highly compromised samples. The amount of time required to complete a significant number of the more highly compromised samples was initially underestimated. In addition, submissions of unidentified human remains by medical examiners, coroners, and law enforcement agencies are significantly less than what had been expected. As of April 2008, the Unidentified Human Remain Index of the CODIS+mito National Missing Persons Database currently contains profiles from 1,536 samples. It is not possible to determine what percentage of these samples contain both STR and mtDNA data. At this same time point, both mtDNA and STR profiles from 661 unidentified human remain samples from UNTCHI were in CODIS. Additional samples are awaiting upload into NDIS. From discussions with other submitting labs, the number of samples lacking a mtDNA haplotype data may be significant. **As of April 2008 UNTCHI has accounted for 43% of all the unidentified human remain samples in CODIS.** The Direct Missing Person Reference Sample Index of the CODIS+mito National Missing Persons Database currently contains 51 samples uploaded by the UNTCHI. A number of the direct reference samples submitted to UNTCHI were from hair that did not contain a root, and therefore would provide less value than a maternal reference sample from a biological mother. For each direct missing person reference sample, UNTCHI prefers to proof the identity of the reference sample with other close

family reference samples. For several of the direct reference samples a familial relationship with other family reference samples could not be confirmed, suggesting the direct reference sample did not originate from the missing person. The most favorable direct reference samples are those obtained from the neonatal screening cards collected at birth. Many states maintain these cards for significant periods of time, and if available typically provide a useable DNA sample for direct comparisons with profiles from unidentified human remains.

Samples Sent to UNTCHI as a Result of Hurricane Katrina

On the morning of August 29, 2005 Hurricane Katrina struck Southeast Louisiana and the Louisiana/Mississippi state line. The storm surge caused severe damage along the Gulf Coast, devastating the Mississippi cities of Waveland, Bay St. Louis, Pass Christian, Long Beach, Gulfport, Biloxi, D'Iberville, Ocean Springs, Gautier, Moss Point, and Pascagoula. In Louisiana, the federal flood protection system in New Orleans failed in more than fifty places. Nearly every levee in metro New Orleans breached as Hurricane Katrina passed east of the city, subsequently flooding 80% of the city and many areas of neighboring parishes for weeks. Over 1,800 people lost their lives in Hurricane Katrina and in the subsequent floods. It took a significant amount of time to recover a number of the bodies, and as a result of decomposition and bloating, facial identifications became nearly impossible. Dental records of many of the victims had been irreversibly lost in the flooding. For several hundred of the decedents, DNA analysis was required to obtain sufficient data for a positive identification. The USDOJ through the National Institute of Justice offered the services of the UNTCHI to assist in

the identification of the victims of Katrina. UNTCHI offered to perform any DNA testing required as well as provide Family Reference Collection kits immediately to help begin the identification process. Many of the families with a missing loved one had been evacuated to Texas and UNTCHI offered any assistance in collecting reference samples from any local family members. For a significant period of time both Louisiana and Mississippi declined any assistance from UNTCHI. It was their intent to develop, purchase and distribute their own collection kits and contract out the DNA analysis. After several months of very little progress, the Mississippi State Police (MSP) finally asked for the assistance of UNTCHI. In total we received 138 samples from the State of Mississippi. These samples were divided between the identification of individuals who lost their lives as a direct result of Katrina, and the identification of remains that had been disinterred as a result of Katrina. Mississippi provided a total of 14 family reference samples and 6 unidentified decedent samples. UNTCHI was able to identify each of the unknown decedents. Reference samples from two missing person cases did not match any of the unknown decedents provided. A cemetery in Mississippi provided us with the remains from 59 different individuals. In addition, the MSP provided UNTCHI with 59 reference samples from individuals with a loved one previously buried in the cemetery. UNTCHI was able to identify the remains of 8 individuals who had been disinterred by Katrina.

The Louisiana State Police (LSP) after several months following Katrina elected to send UNTCHI a total of 20 samples. UNTCHI received a sample from 1 unidentified decedent and 19 direct reference samples. The data generated from the analysis of

these 20 samples were provided to the LSP. UNTCHI was not informed if any identifications had resulted from our testing.

In total UNTCHI performed the analysis of 66 unidentified decedent samples, 75 family reference samples, and 19 direct missing person samples. UNTCHI assisted in the identification 14 unidentified decedents associated with Hurricane Katrina. The DNA profiles generated from Katrina were not uploaded into CODIS. The profiles were provided to both LSP and the MSP for their state databases. The actual amount of DNA testing performed by the Louisiana State Police and any identifications resulting from profiles we generated was not disclosed to UNTCHI.

AFDIL Collaboration

UNTCHI has developed an excellent collaboration with the Armed Forces DNA Identification Laboratory (AFDIL). During FY2006, NIJ had provided funding to AFDIL to perform mtDNA testing on 60 bone cases provided by UNTCHI. Upon completion of the mtDNA analysis, AFDIL provided UNTCHI with all of their electronic data for review. AFDIL does not currently have the ability to directly upload data into the CODIS+mito component of the National Missing Persons Database. The data submitted by AFDIL underwent a thorough review process identical to that done by our own in house analysts. NDIS policies specify the requirements for our laboratory to upload samples processed by AFDIL or any other non-CODIS participating laboratory. In accordance with our ISO Accreditation and the requirements of NDIS, UNTCHI has developed a formal policy for the "Acceptance of DNA Data from an Off-Site Agency". The UNTCHI Policy 08-028 Rev. 1 provides detailed specifications required for the acceptance of, an upload of data into CODIS+mito (Appendix 6). The UNTCHI and AFDIL have executed

a formal Memorandum of Understanding (MOU) to meet the necessary NDIS requirements (Appendix 7). Under AFDIL's FY2006 award, only mtDNA sequence analysis was performed on the unidentified human remains. AFDIL provided UNTCHI with the bone extracts in order for UNTCHI to attempt nuclear STR analysis. There have been 63 cases (samples) sent to AFDIL with virtually all completed and uploaded. The quality and integrity of the data provided by AFDIL will help insure the potential for further identifications.

Field Tests of New Methodologies and Technologies

For the past several years the UNTCHI has been evaluating new technologi es designed to increase the amount of genetic information obtained from degraded and com promised skeletal remains. These new technologies are also designed to increase our facilities sample throughput capabiliti es. UNTCHI has presented at numerous meetings over the past three years the results of its collaboration with Applied Biosystems in the development, validation and implementation of the AmpF/STR MiniFiler™ multiplex system. UNTCHI and other labs such as AFDIL have demonstrated that this Mini-STR multiplex system provides the abil ity to obtain genetic results from unidentified rem ains which were not possible by conventional STR testing methods. This work was originally funded through our field test grant (2004-DN-BX-K214). UNTCHI has continued its leadership role in promoting the utilization of miniSTR systems. Dr. John Planz (UNTCHI Associate Director), as the chairperson of the Missing Persons/Mass Disaster Committee of SWGDAM, has coordinated and analyzed the data from an interlaboratory evaluation of the kit for submittal to the NDIS Procedures Board for the CODIS acceptance of the AmpF/STR MiniFiler™ multiplex system. This acceptance is required for the upload of data into NDIS. UNTCHI and other labs can currently upload the data at our LDIS

level but cannot currently upload into NDIS. The NDIS acceptance of the AmpF/STR MiniFiler™ multiplex system is expected within the next month or two. UNTCHI has continued to test and utilize, where appropriate, other non-CODIS mini-STR systems developed through the National Institute of Standards and Technologies (NIST). UNTCHI has begun collaborating with Applied Biosystems in the development of a new multiplex system which incorporates several of the NCO loci developed by John Butler and his colleagues at NIST. These three miniSTR loci were recommended and adopted by the European community as part of their core loci. This new multiplex was designed to include additional miniSTR loci (NCO) as well as compliment the AmpF/STR MiniFiler™ system by providing the other CODIS core loci plus several others

In addition, UNTCHI has begun work on the evolution of SNP systems for the analysis of highly compromised human remains. Applied Biosystems has developed a SNP platform referred to as their GenPlex System. A significant advantage of this system is that it is designed to work on the same CE platform currently in use by the vast majority of forensic labs throughout the United States and the world. Applied Biosystems has worked with Dr. Kenneth Kidd in the development of a GenPlex assay using the initial 40 SNP panel that he developed from an award provided by NIJ. UNTCHI has recently begun utilizing this GenPlex assay with very promising results. Other SNP platforms including the Biotrove, Inc., OpenArray™ Platform utilizing the TaqMan® chemistry and the Ibis Biosciences, Inc., Electrospray Ionization Mass Spectrometry methodology for base compositional analysis will also be evaluated with the Dr. Kidd's SNP panel.

Under the direction of Rhonda K. Roby, MPH, MS, the UNTCHI has been evaluating new sequencing chemistries and procedures for the high throughput mitochondrial DNA sequence analysis of family reference specimens. These steps include the adoption of the BigDye® Terminator v.1.1 Cycle Sequencing Kits (Applied Biosystems, Foster City, CA) to replace the dRhodamine Terminator Cycle Sequencing Kits (Applied Biosystems); reduction of dye chemistry kit consumption by using a sequence enhancing and dilution buffer; and a simple

bead purification method to remove unincorporated BigDye® terminators. The goal for the new sequencing process is to implement a more automated procedure for se quencing of mtDNA, reduce costs, implement energy transfer dyes due to the po ssible discontinuance of the dRhodamine Terminator Cycle Sequencing Kit, all while maintaining or improving the current mtDNA sequence data quality. The initial validation of these new procedures and methodologies is underway.

Identifications Made by UNTCHI

UNTCHI has aided in 181 identifications since September of 2004. In addition, 14 identifications were made by UNTCHI relative to Hurricane Katrina. Funding under award 2004-DN-BX-K212 has resulted in a total of 195 confirmed identifcations to date. UNTCHI has made identifications of remains submitted from 35 states (AK, AL, AR, AZ, CO, FL, GA, HI, IA, ID, IL, IK, KS, KY, MA, MD, MI, MO, MS, NC, NE, NJ, NM, NV, NY, OH, OK, OR, SC, TN, TX, VA, WA, WI, WY). A significant portion of the identifications made were the result of what we refer to as a "warm hit". We consider a "warm hit" an identification that is made as a result of some prior knowledge obtained by the submitting agencies so that family reference samples were provided at or near the time of submission of the human remains. However, in the absence of the DNA results there would not have been sufficient scientific data for a medical examiner, coroner, or judge to substantiate the identification. UNTCHI has been responsible for 25 "cold hits". A "cold hit" is defined as one in which an identification has been made as a result a CODIS+mito association of the data from the unidentified human remain and one or more reference samples from an individual(s) with a missing loved one. The human remains would have been submitted with no prior

knowledge of the identity of the decedent, and a law enforcement agency would have independently submitted a family reference sample(s) as a result of a missing person report. These 25 "cold hits" would never have been made without the utilization of the CODIS+mito databases. Nineteen (19) of these "cold hits" were made when both the human remain sample and the family reference sample were analyzed and uploaded into CODIS by UNTCHI. However, six (6) of these "cold hits" were made with UNTCHI in conjunction with DNA profiles submitted to CODIS by other agencies. Within the past three weeks, the DNA profile from human remains found and submitted from the southern part of Texas were involved in a CODIS hit with two sexual assault samples submitted through the State of Michigan. The details of this identification have not been completely reported. The STR profiles from the unidentified human remain sample had been previously uploaded into CODIS+mito and were then ported into the unidentified remains index of CODIS 5.7.3 (the version of CODIS in use by 177 crime labs throughout the United States). The profiles at the SDIS level in Texas were then uploaded to NDIS. During a routine search at NDIS, the STR profile from the skeletal remains sample matched two sexual cases in the forensic index from Michigan. The unidentified decedent was the perpetrator of these two sexual assault cases. Although the identity of the skeletal remains is unknown, the localization in Texas of the remains may provide an investigative lead for the Michigan Police. As a result of these matches, the FBI has requested that all of the qualifying STR profiles from our unidentified remain samples be ported into CODIS 5.7.3 and searched against the allowable indices. Within a matter of days, several other high stringency matches have been reported with Offender Samples uploaded from other states. This further signifies the importance of

having a single version of CODIS that will routinely search the unidentified remains with all allowable indices.

Selected Success Stories of the UNT Center for Human Identification
Marcella "Marci" Cheri Bachman

Marcella Bachman disappeared in 1984 at the age of sixteen. Marcella was a teenage runaway who began her journey from Vancouver, Washington where she caught a ride with a long-haul driver. After an argument with the driver, she was left standing in East Missoula Montana. Marcella ended up at a bar in Missoula catching the attention of Wayne Nance, a serial killer. Wayne offered her a place to stay where she stayed busy with household chores. In late September of 1984, Marcella and Nance took a walk in

the woods stopping at a shallow grave. There, Wayne Nance shot her in the head three times and buried her in the awaiting grave.

On Christmas Eve of 1984, a nature photographer spotted decaying human remains in the Deer Creek area a couple of miles east of East Missoula. Another set of remains was found upon examination of the area. Both sets of remains could not be identified and were given the names of Debbie Deer Creek and Christie Crystal Creek. The remains were collected by the Medical Examiner's office where they remained for the next two decades.

Fast forward to the year 2004, where upon learning of the program funded through the National Institute of Justice (NIJ), Captain Greg Hintz and Under sheriff Larry Weatherman of the Missoula County Sheriff's Office submitted one of the femur's from the remains of Debbie Deer Creek to the UNT Center for Human Identification.

The following year, Detective Raphael Crenshaw of King County Sheriff's Department, located in Washington, and was investigating the serial killings of the Green River Killer, Gary Ridgway. While investigating these killings he came across the Marcella Bachman file and began working it. He was able to track down Marcella's mother, Beverly Charlton, who confirmed that Marcella was still missing. Detective Crenshaw gathered DNA samples from Charlton and submitted them to the UNT Center for Human Identification.

The samples from these two different cases were worked during the next several months and, during a routine search of the database, a "cold hit" was made. Both agencies were notified of the match in April of 2006.

Douglas Martin Prouty

Dr. Emily Craig of Louisville, Kentucky has more than 40 decedents in her care and their identities remain a mystery. Dr. Craig is one of this nation's leading forensic anthropologists, and the people in her care are in the form of unidentified human remains. These remains go back as far as 1973. Dr. Craig's knowledge and expertise proved to be critical in helping solve a 12 year-old Kentucky case of unidentified remains know as the "Madison Man." His skeletal remains were found on Thanksgiving Day of 1993 near Berea College by some holiday hikers.

This case was one of Craig's first efforts in updating a facial reconstruction and tying it into the collection of DNA samples. Once the facial reconstruction of the "Madison Man" was complete, Dr. Craig had it posted on the Internet. This is where Douglas Martin Prouty's family members saw it and, with the help of Dr. Craig and Lt.

Mark Merriman of the Kentucky State Police, began the process of having their DNA reference samples collected and submitted to the UNTCHI.

Once Dr. Craig was provided with information linking a potential family to one of her unidentified decedents, she immediately submitted a bone sample to the UNTCHI for DNA testing. The Prouty family member's reference samples were collected and submitted the following week. Over the next several months, the very difficult task of obtaining a good DNA profile out of an old bone sample was taking place at the Center. It takes highly trained and experienced forensic DNA analysts to work these older samples. Even with the most modern instruments and the most sophisticated methods, some bones remain stubborn and will not reveal their DNA secrets. Fortunately, for the Prouty family, the staff at the UNT Center was able to obtain a nuclear and mitochondrial DNA profile from the old bone sample.

In early October of 2005, the two submitting agencies were notified of a positive DNA match. Kentucky State Police officer, Lt. Mark Merriman, who began reinvestigating the "Madison Man" case three years prior to the identification said that everything that could have been done using older technology had been done when he took over the case, "We thought the case was unsolvable," Merriman said. It is through new partnerships being formed between forensic anthropologists, such as Dr. Emily Craig, and the UNTCHI that will ultimately result in more positive identifications. With this comes new hope for finding names for all of the people under Dr. Craig's care.

Tammy Vincent

When America's Most Wanted lent a hand in the investigation of a teenage Jane Doe found dead along the coast of San Francisco in the 1970s, it brought to light a way

for families of missing loved ones to help police get one step closer to solving a case. On September 26, 1979, a young female body was found on a beach in Marin County, California. The body had been stabbed 43 times with an ice pick and doused with acetone and then set on fire. The female had also been shot in the head. For over 27 years the body remained unidentified.

Tammy Vincent was 17 years old when she was reported missing from Seattle, Washington in August of 1979. Just before she went missing, she was subpoenaed to appear before an inquiry judge investigating a prostitution ring in the Seattle area. She never appeared before the judge. The last time Tammy's family heard from her was late in the summer of 1979. Tammy called her sister, Sandy Vincent, on the phone and said she wanted to come home and that she was very frightened. Sandy could tell that Tammy was in danger but the family new nothing about the prostitution investigation. The family tried to contact her periodically, but was never successful. The family began to fear that Tammy may have been killed by the Green River Killer and began contacting the King County's Green River Task Force. The Task Force added Tammy Vincent to their investigation on missing women, which begun in the 1980's.

The Marin County detectives also went back through the evidence folders associated with this case, which had moved through four evidence rooms over the years. A single intact pubic hair was found. The hair was sent to the California Department of Justice in 2005 for DNA testing. Late in 2006 the results of the testing done at the California facility were uploaded into SDIS and were then routed to NDIS. During a routine search at NDIS a cold hit was made. The hair sample matched the DNA sample provided by Tammy's sister four years earlier. The match was verified with

the submission of another family reference sample to the UNTCHI. Both agencies were notified in February of 2007.

Shawn Patrick Reilly

On a hot July 4th, 2006, in a rural part of Bastrop County, Texas, a passerby found a set of skeletal remains. Investigators were not certain who the remains belonged to or what had happened to the person. An anthropological examination conducted by the Forensic Anthropology Lab of UNTCHI provided a biological profile and a description of perimortem trauma for the remains.

In August of the same year, the Austin Police Department received a tip and passed it along to Bastrop County Investigators. The tipster indicated that Maurice Hunter, William Reily, his nephew James Reily and James Bonee had killed Shawn Patrick Reilly and that the unidentified body found in Bastrop County belonged to Shawn. After receiving the tip, the Bastrop Count Sheriff's office located members of Shawn's family and had them submit DNA reference samples to the UNTCHI. The bone sample was subsequently submitted by the Travis County Medical Examiner's office.

Over the next few months' DNA testing was performed by the Center's forensic DNA analysts. Then, in March of 2006, a positive match was made and the two submitting agencies were immediately notified. Based upon the STR and mtDNA analysis, as well as the anthropological findings, Shawn Patrick Reilly was positively identified. The identification resulted in the arrest of the four suspects who were subsequently charged with murder. Both forensic DNA analysts and a forensic anthropologist from the UNTCHI were called to the trial and provided expert testimony that according to the District Attorney was crucial to the conviction and lengthy

sentences of all four suspects. Greg Gilleland, Prosecuting Attorney, Bastrop County, TX further said: "the credit to stopping future murders by this organization goes to your agency (UNTCHI) as well. Who knows who would have been next? Business owners next to the auto repair shop where much of this conspiracy and drug trafficking occurred ... Neighbors of the home in the upscale Bastrop subdivision Tahitian Village where the mastermind and his killers lived some of the time? A nosy customer? **Undoubtedly, there would have been more murders."** The identification of Shawn Patrick Reilly ultimately could have saved lives.

Kimberly McClaskey

Kimberly McClaskey of Canton, Illinois, had been missing since 1983. Her clothing was found scattered along the Spoon River where she vanished as a seven-month pregnant 17 year-old. Skeletal remains were found five years later seven miles from the same river but, however, the identification of the remains was inconclusive.

With the help from the National Center for Missing and Exploited Children, a family reference sample and a bone sample from the Spoon River remains were sent to the UNTCHI. Over the next several months, DNA testing on these samples was performed by the Forensic DNA Analysts at the UNTCHI. A potential match was made, however, the statistics associated with the match did not provide a high degree of certainty. Tthe National Center for Missing and Exploited Children approached the McClaskey family for additional reference samples. The additional reference samples were collected from Kimberly's siblings and submitted to the UNTCHI. In September of 2006, all of the investigating agencies associated with the case were informed of the positive identification of Kimberly McClaskey.

Melody Rowe

Thirty five years after a Syracuse teenager went missing; state police have told her family that they have some answers. The body of a "Jane Doe" discovered on the southern edge of the Onondaga Indian Nation land in 1977 had been finally linked by DNA to a living relative of Melody Rowe who disappeared from Syracuse in 1972. Although investigators could not determine a cause of death, investigators termed it suspicious and indicated that the young girl was probably killed somewhere else and then concealed to prevent its discovery. At a recent press conference, the lead homicide investigator was quoted "The pictures that I've seen of the body, where the body was discovered, how the body was concealed, lead me to believe that it certainly was not a natural death."

The body of Melody Rowe had been buried as a Jane Doe for more than 20 years was exhumed in October of 2005 and subsequently sent to the UNTCHI.
A reference sample from a maternal niece of Melody Rowe was very crucial in making the identification. Sarah De Maintenon was the daughter of Melody Rowes' sister. Both Sarah's mother and her grandmother (Melody's mother) had died many years ago. Sarah was quoted as saying "My grandmother never had the peace of knowing what happened before she died, I can't imagine saying goodbye to two of your own children." Melody Rowe's identification marked the 100th identification for the University of the North Texas Center for Human Identification. The DNA match report was issued to Onondaga County Center for Forensic Sciences on May 20, 2007.

Erik Cohler and John Blevins

On March 23, 2007 an ecologist conducting a survey of a 10-acre lot in Ft. Myers, FL discovered the skeletal remains of 3 bodies and alerted authorities. Once the police began a more thorough search of the wooded area just 25 feet from Arcadia St. in Ft. Myers, they located 5 more bodies approximately 50 yards from where the original 3 were located. The 8 bodies all appeared to have been left in the woods for several years. There were no clothes or skin left on the remains, and no immediate signs of how they died. Police began the process of identifying the bodies and to determine if the wooded area in Ft. Myers was the dump site for a serial killer that worked the area years ago. The Fort Meyers police announced the discovery on Tuesday, November 22, 2007. This is the first public breakthrough since eight skeletons where found in a wooded area east of downtown Fort Meyers near Interstate 75 eight months ago.

UNTCHI used a database of DNA from the family members of missing persons and unidentified human remains to identify Erik Cohler and John Blevins of Fort Meyers. Carol Broderick did not want to answer any more questions. The announcement that her son's remains were among eight skeletons found in Fort Meyers last March has led to a deluge of media attention. Her son Erik Cohler has been missing for more than a decade. Erik was living with his grandparents in Port Charlotte around the time of his disappearance in 1995. An aunt, Karen Cohler, reported Erik missing to the Charlotte County sheriff's office in 1999. She told the deputies that he had left his grandparent's home sometime in 1995 and had not been heard from since. John Blevins was not reported missing until media reports of the skeletons came out this year. Maurice Buice, spokeswoman for the Fort Meyers police commented "If they are adults, people

can go missing if they choose." With the identification of these two individuals, investigators will now look more closely into the lives of the victims. Hopefully, this will help provide the leads providing officials with a suspect for these killings.

Future Sources of Family Reference Samples and Unidentified Decedent Samples

In addition to the training sessions and outreach programs already in place, the UNTCHI has established State Control Points in numerous states who are responsible for the distribution of collection kits and the coordination of sample submissions. Over the past four years, more and more states have begun to adopt legislation requiring the retention and submission of samples from unidentified decedents, and the collection and submission of missing person samples and family reference samples when a missing person report is made with law enforcement. George Adams, UNTCHI's Missing Persons Program Manager, has established numerous contacts with key individuals within several states to help coordinate activities and sample submissions. We have already established State Control Points in: Florida, Kentucky; Maryland; Missouri; Nevada; New Jersey; Oregon; Utah; and Washington. Thousands of family reference sample collection kits have been distributed to these states. Following the identification of Marcella Bachmann, the Attorney General for the State of Washington issued BULLETIN 2006 – 57, "UPDATE REGARDING ENTRY OF DNA PROFIILES OF MISSING PERSONS AND UNIDENTIFIED REMAINS INTO CODIS". This bulletin went out to all law enforcement agencies throughout the State of Washington. It highlighted the work of UNTCHI and the funding provided by NIJ through the Presidents DNA

Initiative and the availability of Family Reference Sample collection kits, kits for the submission of Unidentified Human Remains, and the free mtDNA and STR testing services provided. As a result of this bulletin, Washington State has submitted samples from 62 different agencies, which have included 65 unidentified human remain samples, 167 missing person cases with 255 family reference samples, and 14 direct missing person samples. The willingness of law enforcement throughout the State of Washington to actively work with the UNTCHI has resulted in numerous identifications throughout their State as well as several NDIS level "Cold Hits" with other States. Several other states have established policies and procedures for the collection and submission of samples that specify the UNTCHI as the laboratory for DNA (STR and mtDNA) analysis and upload into the CODIS+mito National Missing Persons Database. Examples of their bulletins and web pages are included in Appendix 8. UNTCHI is actively reaching out to other States to support their ongoing efforts to identify missing persons and unidentified human decedents.

Summary and Conclusions

Through the funding provided by award number 2004-DN-BX-K212, the UNTCHI has been able to develop the laboratory superstructure and necessary nationwide collaborative network to successfully aid in our Nations "Missing Persons Epidemic". The funding has also given us the ability to make substantial advances in the optimization of procedures and DNA typing methods specifically targeting the most challenging samples faced in forensic science. Strong collaborative efforts between laboratories, such as the UNTCHI, the Armed Forces DNA Identification Laboratory, the

California Department of Justice Missing Persons Laboratory and the FBI's National Missing Persons Program, have set the stage for developing our Nation's next generation CODIS platform, directly addressing the DNA identification challenges of missing persons and family reference samples. These changes are in large part the result of the support and funding of DNA initiatives by NIJ in targeting the large number of missing persons and unidentified decedents. With the financial support provided through our award number 2004-DN-BX-K212, the UNTCHI has been able to serve in a central role for the implementation of a system for law enforcement agencies, medical examiners and coroners to have their cases submitted, processed and entered into the National database. These funds have provided UNTCHI with the ability to educate and provide guidance and support to agencies whose states have been impacted by legislation related to missing persons and unidentified decedents.

Several benchmark goals proposed for award number 2004-DN-BX-K212, in terms of the number of samples processed with mtDNA and STR analysis could not be achieved. Our inability to complete the number of proposed Family Reference Samples was primarily due to the failure of the law enforcement community to collect and submit a sufficient number of missing person cases. With the expanding number of State initiatives related to missing persons, the volume of unidentified remains samples and family reference samples being submitted is expected to rapidly increase. The UNTCHI is now poised to handle these increases as a result of improvements to our laboratory facilities, the optimization of DNA typing methods, and the addition of qualified personnel. All of these made possible by our NIJ awards.

Award number 2004-DN-BX-K212 has provided UNTCHI with $3,634,782.00 over the past 3.5 years to carry out its mission. A total of 639 agencies across 45 states have submitted samples to the UNTCHI. At the close of this award, UNTCHI has received approximately 3,000 family reference samples, 1,339 samples from unidentified decedents, and 145 missing person samples. UNTCHI has completed the analysis of 2,609 family reference samples, 51 missing person samples, and 1,020 unidentified human remains have been either completed or are near completion. As of April, 2008 UNTCHI has uploaded 1,980 family reference samples and 661 unidentified human remain samples into NDIS. UNTCHI has accounted for 46% of all of the family reference samples and 43% of the unidentified human remain samples in NDIS. In addition UNTCHI has assisted in the identification of victims of Hurricane Katrina. In total, the UNTCHI conducted DNA analysis on 66 unidentified decedent samples, 75 family reference samples, and 19 missing person samples which resulted in the identification of 14 human remains.

With the inclusion of the samples processed for Hurricane Katrina, the UNTCHI has completed the analysis 2,684 family reference samples, 1,086 unidentified human remain samples, and 70 missing person samples. Funding under award 2004-DN-BX-K212 has resulted in a total of 195 confirmed identifications through DNA analysis of remains submitted from 35 states. UNTCHI has been responsible for 25 "cold hits", 19 of these were made when both the remains and the family reference sample(s) were analyzed and uploaded into CODIS by UNTCHI. However, 6 "cold hits" have been made between samples uploaded by UNTCHI and the DNA profiles submitted to NDIS

by other agencies. Seventeen additional identifications have been made utilizing only anthropological and odontological methods.

Several of the identifications in which UNTCHI has performed either DNA or anthropological analysis have resulted in the identification of the individual responsible for the death of the unidentified decedent. The identification of the victim was the critical first step ultimately leading to the successful prosecution of the perpetrator. In these few cases, there is little doubt that additional lives may have been saved. Continued outreach and collaborations with the law enforcement community, medical examiners and coroners nationwide will allow the Center's resources to be utilized most effectively, ultimately aiding in more identifications and providing families with information they have been long waiting for.

Appendix 1

Laboratory for Molecular Identification

Presentations and Training Activities April 2005 – April 2008

1. U.S. Department of Justice, First National Strategy Meeting on Identifying the Missing. Solving the Case, a New Look at Cold Cases. Philadelphia, PA., April 2005
2. Sixth Annual DNA Grantees Workshop National Institute of Justice, U.S. Department of Justice. Washington D.C., Solving Cold Cases Through the Identification of Missing Persons and Unidentified Human Remains. June 2005.
3. Annual Meeting of the International Association of Identification, Solving Cold Cases Through the Identification of Missing Persons and Unidentified Human Remains. Dallas, Texas, August 2005.
4. U.S. Department of Justice, Missing Persons Regional Training, Solving Cold Cases Through the Identification of Missing Persons and Unidentified Human Remains. Clearwater Beach, Florida, September 2005
5. International Homicide Investigators Association Annual Symposium, San Francisco, CA, September 2005
6. Promega 16th International Symposium on Human Identification, Missing Persons Workshop, Solving Cold Cases through the Identification of Missing

Persons and Unidentified Human Remains. Grapevine, Texas, September 2005.

7. U.S. Department of Justice, Missing Persons Regional Training, Solving Cold Cases Through the Identification of Missing Persons and Unidentified Human Remains. Denver, Colorado, November 2005.
8. Texas Attorney General Crime Victim's Assistance Training Conference, Austin, Texas November 2005
9. 2006 NIJ Applied Technologies and Partnerships Conference. Solving Cold Cases Through the Use of Novel Technologies for the Identification of Missing Persons and Unidentified Human Remains. Hilton Head, South Carolina. January 2006.
10. Applied Biosystems 11th Annual User Forum 58th Annual Meeting of the American Academy of Forensic Sciences. Evaluation of a Novel Mini-STR Multiplex System for the Analysis of Unidentified Human Remains, Seattle, Washington. February 2006.
11. Promega Summer Symposium Series. A National Missing Persons Program. Chicago, Illinois. June 15, 2006.
12. NIJ Seventh Annual DNA Grantees Workshop; Putting it All Together: Field Tests of Tools to Help Solve Missing Persons Cases; Washington, DC, June 2006
13. Mid-Atlantic Cold Case Homicide Investigators Training Conference - Juvenile Homicide Victims; Annapolis, MD, August 2006

14. Mid-States Homicide Investigators Association Training Conference; Wichita, KS, October 2006
15. Promega 17th International Symposium on Human Identification; Development of New Tools to Aid in the Identification of Missing Persons and Unidentified Human Remains; Nashville, TN, October 2006
16. Honolulu Police Department Criminal Investigation Division; Application of DNA Analysis for Human Identification; Honolulu, HI, November 2006
17. Texas Governor's Homeland Security Conference - Missing Persons Investigations and Amber Alert Workshops; San Antonio, TX, November 2006
18. 59th Annual Meeting of the American Academy of Forensic Science; Workshop #18: Missing Persons: Resources. Techniques, and Identification; The UNT System, Center for Human Identification: A Resource for the Identification of Human Remains and Missing Persons; San Antonio, TX, February 2007
19. Fox Valley Training Program: The Nation United in the Search for Missing Children and Adults; WI, February 2007
20. NIJ Applied Technology Conference: What Do I Do with These Bones in My Office? ; Orange County, CA, April 2007
21. NAMUS Planning Meeting; Washington, DC, April 2007
22. Maryland's Task Force for the Missing Press Conference; Baltimore, MD, June 2007

23. International Association of Coroners and Medical Examiners; Boise, ID June 2007
24. National Crime Victims Conference; Washington, DC, June 2007
25. The NIJ Conference: Using DNA Technology and a Team Approach to Solve Cold Cases and Identify Missing Persons and Unidentified Remains: Resources for the Resolution of Cold Cases With Unidentified Skeletal Remains; Arlington, VA, July 2007
26. National Missing Children's Clearinghouse Conference and Non Profit Organizations National Meeting; San Antonio, TX, August 2007
27. Webb County Medical Examiner Death Investigation School 2007: The Use of DNA Technology for the Identification of Missing Persons and Unidentified Human Remains; Laredo, TX, October 2007
28. NamUs Working Group Meeting, Largo, FL, December 2007
29. Oklahoma State Bureau of Investigation Cold Case Association Training Conference; Oklahoma City, OK, February 2008
30. NamUs Working Group Meeting, Indian Rocks Beach, FL, March 2008
31. NIJ Applied Technologies Conference: Using DNA Databases to Solve Missing Person Cases; Point Clear, AL, March 2008
32. New York State Missing Persons Conference; Albany, NY, April 2008

Appendix 2

Laboratory of Forensic Anthropology
Presentations and Training Activities May 2005 – March 2008

1. Texas Criminal Defense Lawyers Assoc. Annual Forensic Science Symposium, Dallas, TX (Presentations on the practical applications of forensic anthropology, trauma analysis, identification, and Daubert criteria) May 2005 approximately 160 person/hrs instruction
2. Jefferson County Medical Examiner / Jefferson County District Attorney, Beaumont, TX (Location and Recovery Seminar and Field School (Instruction in locating and exhuming clandestine graves with field component) June 2005 approximately 1920 person/hrs class and field instruction
3. El Paso, TX Office of the Chief Medical Examiner (Field School in location, processing, and submission of scattered human remains) August 2005 approximately 900 person/hrs instruction
4. Bureau of Alcohol, Tobacco, Firearms and Explosives, Advanced Arson and Explosives Training, Ft. A.P. Hill, Fredericksburg, VA (Training in anthropological techniques for remains recovery and sampling from blast and arson scenes. Thermobaric trauma and human factors) June 2005, approximately 1440 person/hrs instruction
5. Bureau of Alcohol, Tobacco, Firearms and Explosives, Advanced Arson and Explosives Training, Ft. A.P. Hill, Fredericksburg, VA (Training in anthropological techniques for remains recovery and sampling from blast and

arson scenes. Thermobaric trauma and human factors) August 2005 approximately 1440 person/hrs instruction

6. National Institute of Justice Multidisciplinary Forensic Science Meeting, Philadelphia, PA, (Forensic Anthropology and the DNA Database—A Shared Operations Model) February 2006 approximately 220 person/hrs instruction

7. New Mexico District Attorneys' Annual Forensic Science Symposium, El Paso, TX (Anthropology, Odontology, and DNA Science- An Introduction to the Missing Persons DNA Database) March 2006 approximately 480 person/hrs instruction

8. Texas Criminal Defense Lawyers Assoc. Annual Forensic Science Symposium, Dallas,TX (Presentations on the practical applications of forensic anthropology, trauma analysis, identification, and Daubert criteria) May 2006 approximately 160 person/hrs instruction

9. Jefferson County Medical Examiner / Jefferson County District Attorney, Beaumont, TX (Location and Recovery Seminar and Field School (Instruction in locating and exhuming clandestine graves with field component) June 2006 approximately 1920 person/hrs class and field instruction

10. Bureau of Alcohol, Tobacco, Firearms and Explosives, Advanced Arson and Explosives Training, Ft. A.P. Hill, Fredericksburg, VA (Training in anthropological techniques for remains recovery and sampling from blast and arson scenes. Thermobaric trauma and human factors) June 2006 approximately 1440 person/hrs instruction

11. Workshop in Forensic Anthropology for Odontologists / Laboratory of Forensic Anthropology, University of North Texas Dept. of Biological Sciences, July 2006 approximately 80 person/hrs instruction

12. Bureau of Alcohol, Tobacco, Firearms and Explosives, Advanced Arson and Explosives Training, Ft. A.P. Hill, Fredericksburg, VA (Training in anthropological techniques for remains recovery and sampling from blast and arson scenes. Thermobaric trauma and human factors) August 2006 approximately 1440 person/hrs instruction

13. International Association for Identification, Annual Scientific Symposium, Dallas, TX (Seminar on Forensic Anthropology, Odontology, and DNA Databasing) Oct 2006 approximately 500 person/hrs instruction

14. American Academy of Forensic Sciences, 59th Annual Meeting, San Antonio, TX (Workshop #18: Missing Persons: Resources, Techniques, and Identification) February 2007 approximately 880 person/hrs instruction

15. University of Texas San Antonio College of Dentistry Annual Seminar in Forensic Odontology, San Antonio, TX (Forensic Anthropology for Dental Practitioners) July 2007 approximately 56 person/hrs instruction

16. International Association for Identification (Texas Division) Scientific Symposium, San Antonio, TX (Forensic Anthropology in the Era of Molecular Databasing) July 2007 250 person/hrs instruction

Appendix 3
Non-Texas Agencies Submitting Samples to UNTCHI

Alaska State Troopers	Anchorage	AK
Seward Police Department	Seward	AK
Unalaska Police Dept.	Unalaska	AK
Alabama Dept. of Forensic Sciences	Montgomery	AL
Crenshaw County Sheriff's Office	Luverne	AL
Flomaton Police Dept.	Flomaton	AL
Irondale Police Department	Irondale	AL
Macon County Sheriff's Office	Tuskegee	AL
Montgomery Police Dept.	Montgomery	AL
Alma Police Department	Alma	AR
Arkansas State Crime Lab	Little Rock	AR
Johnson Co. Sheriff's Office	Clarksville	AR
Arizona Department of Public Safety	Flagstaff	AZ
Maricopa County Medical Examiner	Phoenix	AZ
National Center for Missing Adults	Phoenix	AZ
Phoenix Police Dept.	Phoenix	AZ
Tucson Police Dept.	Tucson	AZ
Yavapai County Sheriff's Office	Prescott	AZ
Burnet County Sheriff's Office	Burnet	AZ
Imperial County Sheriff's Office	Brawley	CA
Kern County Sheriff's Office	Bakersfield	CA
Kings County Sheriff's Office	Hanford	CA
Los Angles County Sheriff Office	Los Angeles	CA
Solano County Sheriff's Office	Fairfield	CA
Sonoma County Sheriff's Office	Santa Rosa	CA
Adams County Coroner's Office	Brighton	CO
Arapahoe County Sheriff's Office	Centennial	CO
Boulder County Coroner	Boulder	CO
Boulder County Sheriff's Office	Boulder	CO
Broomfield Police Dept.	Broomfield	CO
Colorado Bureau of Investigations	Denver	CO
Costilla County Sheriff's Dept.	San Luis	CO
Douglas County Coroner's Office	Castle Rock	CO
El Paso County Sheriff's Office	Colorado Springs	CO
National Park Service	Lakewood	CO
Westminster Police Dept.	Westminster	CO
Delaware State Police	Newark	DE
Dewey Beach Police Dept.	Dewey Beach	DE
Office of the Chief Medical Examiner	Wilmington	DE
4th Medical Examiner Dist. of Florida	Jacksonville	FL
Baker County Sheriff's Office	Macclenny	FL

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Baker County Sheriff's Office	Macclenny	FL
Boca Raton Police Department	Boca Raton	FL
Boynton Beach Police Dept.	Boynton Beach	FL
Broward County Sheriff's Office	Fort Lauderdale	FL
Citrus County Sheriff's Office	Inverness	FL
Citrus County Sheriff's Office	Inverness	FL
Collier County Sheriff's Office	Naples	FL
Coral Springs Police Dept.	Coral Springs	FL
Davie Police Dept.	Davie	FL
Delray Beach Police Dept.	Delray Beach	FL
District 20 Medical Examiner's Office	Naples	FL
Escambia County Sheriff's Office	Pensacola	FL
Fort Myers Police Dept.	Fort Myers	FL
Fort Pierce Police Dept.	Ft. Pierce	FL
Highlands County Sheriff's Office	Sebring	FL
Hillsborough County Sheriff's Office	Tampa	FL
Jacksonville Sheriff's Office	Jacksonville	FL
Lee County Sheriff's Office	Fort Myers	FL
Medical Examiner District 8	Gainesville	FL
Miami Police Dept.	Miami	FL
Miami Springs Police Department	Miami Springs	FL
Miami-Dade Police Dept.	Miami	FL
Palm Beach County Sheriff's Office	West Palm Beach	FL
Polk County Sheriff's Office	Bartow	FL
St. Lucie County Sheriff's Office	Ft. Pierce	FL
Volusia County Sheriff's Office	Daytona Beach	FL
West Palm Beach Police Department	West Palm Beach	FL
Bartow County Sheriff's Office	Cartersville	GA
Cherokee Sheriff's Office	Canton	GA
Effingham County Sheriff's Office	Springfield	GA
Forsyth County Sheriff's Office	Cumming	GA
Garden City Police Dept.	Garden City	GA
Georgia Bureau of Investigation	Savannah	GA
Reidsville Police Department	Reidsville	GA
Richmond County Sheriff's Office	Augusta	GA
Richmond County Sheriff's Office	Augusta	GA
Smyrna Police Dept.	Smyrna	GA
Tattnall County Sheriff's Office	Reidsville	GA
Walton County Sheriff's Office	Monroe	GA
Hawaii Police Dept.	Hilo	HI
Honolulu Medical Examiner's Dept.	Honolulu	HI
Clayton County Sheriff's Office	St. Olaf	IA
Iowa Office of the State Medical Examiner	Ankeny	IA
Bonner County Sheriff's Office	Dandpoint	ID

Coeur D' Alene Police Dept.	Coeur D' Alene	ID
Idaho State Police Forensic Services	Meridian	ID
Jerome Police Dept.	Jerome	ID
Minidoka County Sheriff's Office	Rupert	ID
Oneida County Sheriff's Office	Malad	ID
Pocatello Police Department	Pocatello	ID
Rathdrum Police Dept.	Rathdrum	ID
Aurora Police Dept.	Aurora	IL
Belleville Police Dept.	Belleville	IL
Crime Scene Services Command	Springfield	IL
Downers Grove Police Dept.	Downers Grove	IL
Dupage County Sheriff's Crime Lab	Wheaton	IL
Illinois State Police	Carbondale	IL
Kankakee County Sheriff's Office	Kankakee	IL
Lake County Coroner's Office	Waukegan	IL
Macon County Coroner	Decatur	IL
Maywood Police Department	Maywood	IL
North Chicago Police Dept.	North Chicago	IL
Ogle County Sheriff's Office	Oregon	IL
Southern Illinois Forensic Science Center	Carbondale	IL
Warren County Sheriff's Office	Monmouth	IL
Evansville Police Dept.	Evansville	IN
Gary Police Dept.	Gary	IN
Indiana State Police Dept.	Connersville	IN
Marion Police Dept.	Marion	IN
Richmond Police Dept.	Richmond	IN
St. Joseph County Metro Homicide	South Bend	IN
Kansas Bureau of Investigation	Ottawa	KS
Lawrence Kansas Police Department	Lawrence	KS
Leavenworth County Sheriff's Office	Leavenworth	KS
Linn County Sheriff's Office	Mound City	KS
Wichita Police Dept.	Wichita	KS
Bellevue Police Department	Bellevue	KY
Bellevue Police Department	Bellevue	KY
Breathitt County Coroner	Jackson	KY
Breathitt County Coroner	Jackson	KY
Greenup County Coroner's Office	Greenup	KY
Henderson Police Dept.	Henderson	KY
Kentucky Medical Examiner	Frankfort	KY
Kentucky State Police	Frankfurt	KY
Louisville Metro Police	Louisville	KY
Owensboro Police Dept.	Owensboro	KY
Paducah Police Dept.	Paducah	KY
Radcliff Police Dept.	Radcliff	KY

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US Army Deserter Info Center	Fort Knox	KY
Calcasieu Parish Sheriff's Office	Lake Charles	LA
Jefferson Parish Sheriff's Office Crime Lab	Metairie	LA
Louisiana State Police	Shreveport	LA
New Orleans Police Department	New Orleans	LA
Brigham & Women's Hospital	Boston	MA
Cambridge Police Dept.	Cambridge	MA
Leominster Police Dept.	Leominster	MA
Malden Police Dept.	Malden	MA
Massachusetts State Police	Cambridge	MA
Office of Chief Medical Examiner	Boston	MA
A. A. CO. MD State's Attorney's Office	Annapolis	MD
Baltimore Police Dept.	Baltimore	MD
Charles County Sheriff's Office	La Plata	MD
Frederick Police Dept.	Frederick	MD
Maryland State Police	Columbia	MD
Montgomery County Police Dept.	Germantown	MD
Prince George's County Police Dept.	Landover	MD
Patuxent Associates, Inc.	Dunkirk	MD
Maine State Police Crime Lab	Augusta	ME
Charlevoix Sheriff's Office	Charlevoix	MI
Clio Police Dept.	Clio	MI
Dearborn Police Dept.	Dearborn	MI
Grosse Pointe Park Police	Grosse Pointe Park	MI
Kent County Sheriff's Office	Grand Rapids	MI
Michigan State Police-Northville Lab	Northville	MI
Taylor Police Dept.	Taylor	MI
Anoka County Sheriff's Office	Anoka	MN
Champlin Police Dept.	Champlin	MN
Clearwater County Sheriff's Office	Bagley	MN
Columbia Heights Police Dept.	Columbia Heights	MN
Kansas City Police Dept.	Kansas City	MO
Kirkwood Police Dept.	Kirkwood	MO
Lincoln County Sheriff's Office	Troy	MO
Metropolitan Police Dept. of St. Louis	St. Louis	MO
Missouri Highway Patrol	Carthage	MO
Newton County Sheriff's Office	Neosho	MO
Phelps County Sheriff's Office	Rolla	MO
Poplar Bluff Police Dept.	Poplar Bluff	MO
St. Louis Metropolitan Police Dept.	St. Louis	MO
Union Police Dept.	Union	MO
McComb Police Dept.	McComb	MS
Meridian Police Dept.	Meridian	MS
Mississippi Crime Lab	Jackson	MS

Vicksburg Police Dept.	Vicksburg	MS
Yazoo County Sheriff's Office	Yazoo City	MS
Butte-Silver Bow Law Enforcement Dept.	Butte	MT
Missoula County Sheriff's Office	Missoula	MT
Pondera County Sheriff's Office	Conrad	MT
Burke County Sheriff's Office	Morganton	NC
Catawba County Sheriff's Office	Newton	NC
Craven County Sheriff's Office	New Bern	NC
Creedmoor Police Dept.	Creedmoor	NC
Cumberland County Sheriff's Office	Fayetteville	NC
Granville County Sheriff's Office	Oxford	NC
Guilford County Sheriff's Office	Greensboro	NC
Harnett County Sheriff's Office	Lillington	NC
Jacksonville Police Dept.	Jacksonville	NC
Johnson County Sheriff's Office	Smithfield	NC
Office of the Chief Medical Examiner	Chapel Hill	NC
Oxford Police Dept.	Oxford	NC
Robeson County Sheriff's Office	Lumberton	NC
Rockingham County Sherrif's Office	Wentworth	NC
Rocky Mount Police Dept.	Rocky Mount	NC
Tarboro Police Dept.	Tarboro	NC
Wilmington Police Dept.	Wilmington	NC
Winston-Salem Police Dept.	Winston-Salem	NC
Fargo Police Dept.	Fargo	ND
North Dakota Office of Attorney General	Bismarck	ND
Butler County Sheriff's Office	David City	NE
Omaha Police Dept.	Omaha	NE
Bayonne Police Dept.	Bayonne	NJ
Belmar Police Dept.	Belmar	NJ
Bergenfield Police Dept.	Bergenfield	NJ
Brick Township Police Department	Brick	NJ
Bridgewater Police Dept.	Bridgewater	NJ
Buena Boro Police Dept.	Minotola	NJ
Burlington County Prosecutor's Office	Mt. Holly	NJ
Burlington Township Police	Burlington Township	NJ
Butler Police Dept.	Butler	NJ
Hillside Police Dept.	Hillside	NJ
Holmdel Township Police Dept.	Holmdel	NJ
Howell Township Police Dept.	Howell	NJ
Human Services Police Dept.	Trenton	NJ
Jersey City Police Dept.	Jersey City	NJ
Linden Police Dept.	Linden	NJ
Manchester Police Dept.	Manchester	NJ
Mansfield Township Police Dept.	Columbus	NJ

Medford Police Dept.	Medford	NJ
Middletown Police Dept.	Middletown	NJ
Monroe Township Police Dept.	Williamstown	NJ
Morris County Prosecutor's Office	Morristown	NJ
Morris Township Police Dept.	Convent Station	NJ
Mount Laurel Police Dept.	Mt. Laurel	NJ
Neptune Township Police Dept.	Neptune	NJ
New Jersey State Police	Hamilton	NJ
North Bergen Police Dept.	North Bergen	NJ
North Plainfield Police Dept.	North Plainfield	NJ
North Wildwood Police Dept.	North Wildwood	NJ
Oakland Police Dept.	Oakland	NJ
Ocean City Police Dept.	Ocean City	NJ
Palisades Park Police Dept.	Palisades Park	NJ
Pemberton Township Police Dept.	Pemberton	NJ
Pennsauken Police Dept.	Pennsauken	NJ
Piscataway Police Dept.	Piscataway	NJ
Somerville Police Dept.	Somerville	NJ
South Amboy Police Dept.	South Amboy	NJ
South River Police Dept.	South River	NJ
Spring Lake Police Dept.	Spring Lake	NJ
Toms River Police Dept.	Toms River	NJ
Union Beach Police Dept.	Union Beach	NJ
Union City Police Dept.	Union City	NJ
Vineland NJ Police Dept.	Vineland	NJ
Vineland Police Dept.	Vineland	NJ
Warren County Prosecutor's Office	Belvidere	NJ
West New York Police Dept.	West New York	NJ
Westhampton Township Police Dept.	Westhampton	NJ
Winslow Township Police Dept.	Braddock	NJ
Woodbridge Police Dept.	Woodbridge	NJ
Las Cruces Police Dept.	Las Cruces	NM
New Mexico Northern Forensic Laboratory	Santa Fe	NM
New Mexico State Police	Roswell	NM
Las Vegas Metropolitan Police Dept.	Las Vegas	NV
North Las Vegas Police Dept.	North Las Vegas	NV
Washoe County Sheriff's Office	Reno	NV
Bedford NY Town Police	Bedford Hills	NY
Monroe County (NY) Medical Examiner	Rochester	NY
New York City Police Dept.	New York	NY
New York State Police	Herkimer	NY
Onondaga County Center for Forensic Science	Syracuse	NY
Spring Valley Police Dept.	Spring Valley	NY
Syracuse Police Dept.	Syracuse	NY

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Westchester County Forensic Laboratory	Valhalla	NY
White Plains Police Dept.	White Plains	NY
Franklin County Coroner's Office	Columbus	OH
Lorain Police Dept.	Lorain	OH
Miami Valley Regional Crime Lab	Dayton	OH
Ohio Bureau of Criminal ID & Investigation	London	OH
Wayne County Medical Examiner	Toledo	OH
Adair County Sheriff's Department	Stillwell	OK
Altus Police Dept.	Altus	OK
Ardmore Police Dept.	Armmore	OK
Bartlesville Police Dept.	Bartlesville	OK
Comanche County Sheriff's Office	Lawton	OK
Duncan Oklahoma Police	Duncan	OK
Lawton Police Dept.	Lawton	OK
Office of the Chief Medical Examiner	Oklahoma City	OK
Oklahoma City Police Dept.	Oklahoma City	OK
Oklahoma County Sheriff's Office	Oklahoma City	OK
Oklahoma State Bureau of Investigations	Oklahoma City	OK
Tulsa County Sheriff's Office	Tulsa	OK
Tulsa Police Dept.	Tulsa	OK
Clackamas County Sheriff's Office	Oregon City	OR
Clatsop County Sheriff	Astoria	OR
Corvallis Police Dept.	Corvallis	OR
Curry County Sheriff's Office	Gold Beach	OR
Deschutes County Sheriff's Office	Bend	OR
Eugene Police Dept.	Eugene	OR
Grant County Sheriff's Office	Canyon City	OR
Hillsboro Police Dept.	Hillsboro	OR
Hood River County Sheriff's Office	Hood River	OR
Independence Police Dept.	Independence	OR
Jackson County Sheriff's	Medford	OR
Josephine County Sheriff's Office	Grants Pass	OR
Junction City Police Dept.	Junction City	OR
Keizer Police Dept.	Keizer	OR
LaGrande Police Dept.	LaGrande	OR
Lake County Sheriff's Office	Eugene	OR
Lake Oswego Police Dept.	Lake Oswego	OR
Lane County Medical Examiner's Office	Eugene	OR
Linn County Sheriff's Office	Albany	OR
Medford Police Dept.	Medford	OR
Multnomah County Sheriff's Office	Portland	OR
North Bend Police Dept.	North Bend	OR
Oregon State Medical Examiner	Clackamas	OR
Portland Police Bureau	Portland	OR

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Redmond Police Dept.	Redmond	OR
Salem Police Dept.	Salem	OR
Springfield Police Dept.	Springfield	OR
Stayton City Police Dept.	Stayton	OR
Tigard Police Dept.	Tigard	OR
Tillamook County Sheriff's Office	Tillamook	OR
Umatilla County Sheriff's Office	Pendleton	OR
Bellefonte Borough Police Dept.	Bellefonte	PA
Bensalem Township Police	Bensalem	PA
Lancaster Bureau of Police	Lancaster	PA
Pennsylvania State Police	Honesdale	PA
South Greensburg PA Police Dept.	Greensburg	PA
Waynesboro Police Dept.	Waynesboro	PA
Charleston County Coroner's Office	N. Charleston	SC
Conway City Police Department	Conway City	SC
Fairfield County Sheriff's Office	Winnsboro	SC
Greenville County Sheriff's Office	Greenville	SC
North Augusta Dept. of Public Safety	North Augusta	SC
North Charleston Police Dept.	North Charleston	SC
Richland County Coroner	Columbia	SC
S.C. Law Enforcement Division	Columbia	SC
Sumter County Sheriff's Office	Sumter	SC
York County Sheriff	York	SC
FBI Field Office	Pierre	SD
Shelby County Medical Examiner's Office	Memphis	TN
Tennessee Bureau of Investigation	Kingston	TN
University of Tennessee	Knoxville	TN
Clearfield Police Dept.	Clearfield	UT
Salt Lake City Police Dept.	Salt Lake City	UT
Salt Lake County Sheriff's Office	Salt Lake City	UT
Dept. of Homeland Security-ICE SAC	Harrisonburg	Va
Fairfax County Police Dept.	Fairfax	VA
Henrico County Police	Richmond	VA
James City County Police Department	Williamsburg	VA
Lynchburg Police Dept.	Lynchburg	VA
National Center for Missing & Exploited Children	Alexandria	VA
Office of the Chief Medical Examiner	Richmond	VA
Aberdeen Police Dept.	Aberdeen	WA
Adams County Sheriff's Office	Othello	WA
Auburn Police Dept.	Auburn	WA
Bellingham Police Dept.	Bellingham	WA
Camas Police Dept.	Camas	WA
Clallam County Sheriff's Office	Port Angeles	WA
Clark County Sheriff's Office	Vancouver	WA

Colville Tribal Police Department	Nespelem	WA
Cowlitz County Sheriff's Office	Kelso	WA
Edmonds Police Dept.	Edmonds	WA
Edmonds Police Dept.	Edmonds	WA
Ephrata Police Dept.	Ephrata	WA
Everett Police Department	Everett	WA
Federal Way Police Dept.	Federal Way	WA
Grays Harbor County Sheriff's Office	Montesano	WA
Island County Coroner's Office	Coupeville	WA
Jefferson County Sheriff's Office	Port Hadlock	WA
Kennewick Police Dept.	Kennewick	WA
Kent County Sheriff's Office	Kent	WA
King County Sheriff's Office	Kent	WA
Kitsap County Sheriff's Office	Port Orchard	WA
Kittitas County Sheriff's Office	Ellensburg	WA
Kittitas Police Dept.	Kittitas	WA
Lakewood Police Dept.	Lakewood	WA
Lewis County Sheriff's Office	Chehalis	WA
Longview Police Dept.	Longview	WA
Mason County Sheriff's Office	Shelton	WA
Milton Police Dept.	Milton	WA
Mount Vernon Police Department	Mount Vernon	WA
Olympia Police Dept.	Olympia	WA
Pend Oreille County Coroner	Newport	WA
Pierce County Sherriff's Dept.	Tacoma	WA
Puyallup Police Dept.	Puyallup	WA
Seattle Police Dept.	Seattle	WA
Skagit County Coroner	Mount Vernon	WA
Skamania County Sheriff's Office	Stevenson	WA
Snohomish County Sheriff's Office	Everett	WA
Spokane County Medical Examiner	Spokane	WA
Spokane County Sheriff's Office	Spokane	WA
Stevens County Coroner	Colville	WA
Tacoma Police Dept.	Tacoma	WA
Thurston County Sheriff's Office	Olympia	WA
Toppenish Police Dept.	Toppenish	WA
Vancouver Police Dept.	Vancouver	WA
Walla Walla County Sheriff's Office	Walla Walla	WA
Walla Walla Police Dept.	Walla Walla	WA
Yakima County Sheriff's Office	Yakima	WA
Dane County Coroner	Madison	WI
Dunn County Sheriff's Office	Menomonie	WI
Eau Claire Police Dept.	Eau Claire	WI
Elm Grove Police Dept.	Elm Grove	WI

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Forest County Sheriff's Department	Crandon	WI
Green Bay Police Dept.	Green Bay	WI
Madison Police Dept.	Madison	WI
Manitowoc Sheriff's Office	Manitowoc	WI
Ozaukee County Sheriff's Office	Port Washington	WI
Wisconsin Dept. of Justice	Madison	WI
Casper Police Dept.	Casper	WY
Wyoming State Crime Lab	Cheyenne	WY
Yellowstone National Park	Park Rangers	WY

Appendix 4
Texas Agencies Submitting Samples to UNTCHI

Abilene Police Dept.	Abilene	TX
Amarillo Police Dept.	Amarillo	TX
Anderson County Sheriff's Office	Palestine	TX
Anthony Police Dept.	Anthony	TX
Aransas County Sheriff's Office	Rockport	TX
Aransas Pass Police Dept.	Aransas Pass	TX
Arlington Police Dept.	Arlington	TX
Atascosa Co. Sheriff's Department	Jourdanton	TX
Athens Police Dept.	Athens	TX
Austin Police Dept.	Austin	TX
Autopsy Services & Expert Testimony	McAllen	TX
Bastrop Co. S.O.	Bastrop	TX
Bay City Police Dept.	Bay City	TX
BCMEO/Kendall Co. S.O.	San Antonio	TX
Beaumont Texas	Beaumont	TX
Bee County Sheriff's Office	Beeville	TX
Bell County Sheriff's Office	Belton	TX
Bexar County Criminal Investigation Lab	San Antonio	TX
Bexar County Medical Examiner's Office	San Antonio	TX
Big Spring Police Dept.	Big Spring	TX
Borger Police Department	Borger	TX
Brazoria County Sheriff's Dept.	Angleton	TX
Brazos County Sheriff's Office	Bryan	TX
Breckenridge Police Dept.	Breckenridge	TX
Brenham Police Dept.	Breham	TX
Brown County Sheriff's Office	Brownwood	TX
Brownsville Police Dept.	Brownsville	TX
Brownwood Police Dept.	Brownwood	TX
Caldwell County Sheriff's Office	Lockhart	TX
Canyon Police Dept.	Canyon	TX
Carrollton Police Department	Carrollton	TX
Cass County Sheriff's Office	Linden	TX
Chambers County Sheriff's Office	Anahuac	TX
Cherokee Co. Sheriffs Office	Rusk	TX
Cibolo Police Dept.	Cibolo	TX
Cisco Police Dept	Cisco	TX
Cleburne Police Dept.	Cleburne	TX
College Station Police Dept.	College Station	TX
Collin County Sheriff's Office	McKinney	TX
Commanche County Sheriff's Office	Commanche	TX
Conroe Police Dept.	Conroe	TX
Copperas Cove Police Dept.	Copperas Cove	TX

Corpus Christi Police Dept.	Corpus Christi	TX
Corsicana Police Dept.	Corsicana	TX
Crockett County Sheriff's Office	Ozona	TX
Daingerfield Police Dept.	Daingerfield	TX
Dallas County Medical Examiner's Office	Dallas	TX
Dallas Police Dept.	Dallas	TX
Del Rio Police Dept.	Del Rio	TX
Denison Police Dept.	Denison	TX
Denton Police Dept.	Denton	TX
Desoto Police Dept.	Desoto	TX
Dimmit County Sheriff's Office	Carrizo Springs	TX
Dublin Police Dept.	Dublin	TX
Duncanville Police Dept.	Duncanville	TX
Duval County Sheriff's Office	San Diego	TX
Eagle Pass Police Dept.	Eagle Pass	TX
Eastland Police Dept.	Eastland	TX
Ector County Sheriff's Office	Ector	TX
Edwards County Sheriff's Office	Rocksprings	TX
El Paso County Sheriff's Office	El Paso	TX
El Paso Police Dept.	El Paso	TX
Ellis County Sheriff's Office	Waxahachie	TX
Ennis Police Dept.	Ennis	TX
Euless Police Dept.	Euless	TX
Falls County Sheriff's Office	Marlin	TX
Floresville Police Department	Floresville	TX
Fort Bend County Sheriff's Office	Richmond	TX
Fort Hood Resident Agency	Fort Hood	TX
Fort Worth Police Dept.	Fort Worth	TX
Freeport Police Dept.	Freeport	TX
Gaines County Sheriff's Office	Seminole	TX
Galveston Co. Medical Examiner's Office	Texas City	TX
Galveston County Sheriff's Office	Galveston	TX
Gatesville Police Dept.	Gatesville	TX
Georgetown Police Dept.	Georgetown	TX
Grand Prairie Police Dept.	Grand Prairie	TX
Grapevine Police Dept.	Grapevine	TX
Grayson County Sheriff's Office	Sherman	TX
Greenville Police Department	Greenville	TX
Gregg County Sheriff's Office	Longview	TX
Grimes County District Attorney's Office	Anderson	TX
Guadalupe County Sheriff's Office	Seguin	TX
Haltom City Police Dept.	Haltom City	TX
Hamilton County Sheriff's Office	Hamilton	TX
Harris County Medical Examiner	Houston	TX
Harris County Sheriff's Office	Houston	TX

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Harrison County Sheriff's Office	Marshall	TX
Hays County Sheriff's Dept.	San Marcos	TX
Hempstead Police Department	Hempstead	TX
Henderson County Sheriff's Department	Athens	TX
Hickory Creek Police Dept.	Hickory Creek	TX
Hidalgo County Sheriff's Office	Edinburg	TX
Highland Village Police Dept.	Highland Village	TX
Hildalgo Police Department	Hidalgo	TX
Hillsboro Police Dept.	Hillsboro	TX
Hood County Sheriff's Office	Granbury	TX
Houston County Attorney	Crockett	TX
Houston Police Dept.	Houston	TX
Humble Police Dept.	Humble	TX
Hunt County Sheriff's Office	Greenville	TX
Hurst Police Dept.	Hurst	TX
Irving Police Department	Irving	TX
Jacinto City Police Dept.	Jacinto City	TX
Jacksonville Police Dept.	Jacksonville	TX
Jasper Police Dept.	Jasper	TX
Jefferson County Morgue	Denton	TX
Jones County Sheriff's Dept.	Anson	TX
Justice of the Peace Midland County	Midland	TX
Katy Police Dept.	Katy	TX
Kendall County Sheriff's Office	Boehne	TX
Kenedy County Sheriff's Office	Sarita	TX
Keokuk Police Department	keokuk	TX
Kerr County Sheriff's Office	Kerrville	TX
Killeen Police Dept.	Killeen	TX
Lake Jackson Police Dept.	Lake Jackson	TX
Lamar County Sheriff's Office	Paris	TX
LaMarque Police Dept.	LaMarque	TX
Lampasas Police Department	Lampasas	TX
Lancaster Police Dept.	Lancaster	TX
LaPorte Police Dept.	LaPorte	TX
Laredo P.D.	Laredo	TX
League City Police Dept.	League City	TX
Leander Police Dept.	Leander	TX
Lee County Sheriff's Office	Giddings	TX
Lewisville P.D.	Lewisville	TX
Longview Police Dept.	Longview	TX
Lubbock County Medical Examiner's office	Lubbock	TX
Lubbock Police Dept.	Lubbock	TX
Lufkin Police Dept.	Lufkin	TX
Lynn Co. Sheriff's Dept.	Lynn	TX
Mabank Police Department	Mabank	TX

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Mangum Police Dept.	Mangum	TX
Marion County Sheriff's Office	Jefferson	TX
Marlin Police Dept.	Marlin	TX
Marshall Police Dept.	Marshall	TX
Matagorda County Sheriff's Office	Bay City	TX
Mc Allen Police Dept.	McAllen	TX
McLennan County Sheriff's Office	Waco	TX
Medina County Sheriff's Office	Hondo	TX
Mesquite Police Department	Mesquite	TX
Midland County Sheriff's Office	Midland	TX
Midland Police Dept.	Midland	TX
Midlothian Police Department	Midlothian	TX
Milam County Sheriff's Office	Cameron	TX
Mills Co. Sheriff's Dept.	Goldthwaite	TX
Missouri City Police	Missouri City	TX
Montgomery County Sheriff's Office	Conroe	TX
N. Richland Hills Police Department	N. Richland Hills	TX
Navarro County District Attorney's Office	Corsicana	TX
New Boston Police Department	New Boston	TX
Nolan County Sheriff's Office	Sweetwater	TX
North Richland Hills Police Dept.	North Richland Hills	TX
Nueces County Medical Examiner's Office	Corpus Christi	TX
Odessa Police Dept.	Odessa	TX
Orange County Sheriff's Office	Orange	TX
Orange Police Dept.	Orange	TX
Overland Park Police Dept.	Overland	TX
Palestine Police Dept.	Palestine	TX
Palo Pinto County Sheriff's Office	Palo Pinto	TX
Pampa Police Dept.	Pampa	TX
Paris Police Dept.	Paris	TX
Parker County Sheriff's Office	Weatherford	TX
Pasadena Police Dept.	Pasadena	TX
Pearland Police Dept.	Pearland	TX
Pilot Point Police Dept.	Pilot Point	TX
Pinehurst Police Dept.	Pinehurst	TX
Plano Police Dept.	Plano	TX
Presidio County Sheriff's Office	Alpine	TX
Richardson Police Department	Rischardson	TX
Rockdale Police Dept.	Rockdale	TX
Rogersville Police Dept.	Rogersville	TX
Rosenberg Police Dept.	Rosenberg	TX
Rusk County Sheriff's Office	Henderson	TX
Sabine County Sheriff's Office	Hemphill	TX
San Antonio Police Dept.	San Antonio	TX
San Augustine County Sheriff's Office	San Augustine	TX

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San Jacinto County Sheriff Department	Coldspring	TX
San Juan Police Department	San Juan	TX
San Marcos Police Dept.	San Marcos	TX
San Saba Police Dept.	San Saba	TX
Santa Fe Police Dept.	Santa Fe	TX
Seguin Police Dept.	Seguin	TX
Shelby County Sheriff's Office	Center	TX
Sherman Police Dept.	Sherman	TX
Silsbee Police Dept.	Silsbee	TX
Smith Co. Medical Examiner's Office	Tyler	TX
Southlake DPS	Southlake	TX
Southwestern Institute of Forensic Sciences	Dallas	TX
Starr County Sheriff's Department	Rio Grande City	TX
Stephens County Sheriff's Office	Breckenridge	TX
Stephenville Police Dept.	Stephenville	TX
Sugar Land Police Dept.	Sugarland	TX
Tarrant County Medical Examiner	Fort Worth	TX
Terrell Police Service	Terrell	TX
Texarkana Texas Police Dept	Texarkana	TX
Texas Dept. of Public Safety	Austin	TX
Texas Rangers	San Antonio	TX
Texas Tech Anthropology	Lubbock	TX
Travis County Medical Examiner's Office	Austin	TX
Travis County Sheriff's Dept.	Austin	TX
Tyler Police Dept.	Tyler	TX
Upshur County Sheriff's Office	Gilmer	TX
Victoria County Sheriff's Office	Victoria	TX
Vidor Police Dept.	Vidor	TX
Waco Police Dept.	Waco	TX
Waller County Sheriff's Office	Hempstead	TX
Weatherford Police Dept.	Weatherford	TX
Webb County Medical Examiner	Laredo	TX
Weslaco Police Department	Weslaco	TX
Wharton County Sheriff's Office	Wharton	TX
Williamson County Sheriff's Office	Georgetown	TX
Willow Park Police Dept.	Willow Park	TX
Wise County Sheriff's Office	Decatur	TX
Wood County Sheriff's Office	Quitman	TX
Zapata Co. Sheriff's Office	Zapata	TX

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Appendix 5
Medical Examiner and Coroner Offices Submitting Samples to UNTCHI

Maricopa County Medical Examiner	Phoenix	AZ
Adams County Coroner's Office	Brighton	CO
Boulder County Coroner	Boulder	CO
Douglas County Coroner's Office	Castle Rock	CO
Office of the Chief Medical Examiner	Wilmington	DE
4th Medical Examiner Dist. of Florida	Jacksonville	FL
District 20 Medical Examiner's Office	Naples	FL
Medical Examiner District 8	Gainesville	FL
Honolulu Medical Examner's Dept.	Honolulu	HI
Iowa Office of the State Medical Examiner	Ankeny	IA
Lake County Coroner's Office	Waukegan	IL
Macon County Coroner	Decatur	IL
Breathitt County Coroner	Jackson	KY
Greenup County Coroner's Office	Greenup	KY
Kentucky Medical Examiner	Frankfort	KY
Office of Chief Medical Examiner	Boston	MA
Office of the Chief Medical Examiner	Chapel Hill	NC
Monroe County Medical Examiner	Rochester	NY
Franklin County Coroner's Office	Columbus	OH
Wayne County Medical Examiner	Toledo	OH
Office of the Chief Medical Examiner	Oklahoma City	OK
Lane County Medical Examiner's Office	Eugene	OR
Oregon State Medical Examiner	Clackamas	OR
Charleston County Coroner's Office	N. Charleston	SC
Richland County Coroner	Columbia	SC
Shelby County Medical Examiner's Office	Memphis	TN
Bexar County Medical Examiner's Office	San Antonio	TX
Dallas County Medical Examiner's Office	Dallas	TX
Galveston Co. Medical Examiner's Office	Texas City	TX
Harris County Medical Examiner	Houston	TX
Lubbock County Medical Examiner's Office	Lubbock	TX
Nueces County Medical Examiner's Office	Corpus Christi	TX
Smith Co. Medical Examiner's Office	Tyler	TX
Tarrant County Medical Examiner	Fort Worth	TX
Travis County Medical Examiner's Office	Austin	TX
Webb County Medical Examiner	Laredo	TX
Office of the Chief Medical Examiner	Richmond	VA
Island County Coroner's Office	Coupeville	WA
Pend Oreille County Coroner	Newport	WA
Skagit County Coroner	Mount Vernon	WA
Spokane County Medical Examiner	Spokane	WA
Stevens County Coroner	Colville	WA

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Acceptance policy and procedure for data generated by an offsite agency for the purpose of inclusion in the Missing Persons Indices of the National DNA Index System of CODIS

This policy addresses the requirements and specifications that must be met for the UNT Center for Human Identification (UNT CHI) laboratory to take possession of data from an outside agency/laboratory for the purpose of inclusion and upload to the National DNA Index System (NDIS). The policies outlined apply to scenarios in which 1) a non-NDIS participating laboratory (public or private) processes unidentified remains and/or family reference samples for a law enforcement agency in a missing persons or homicide investigation case, and 2) a non-NDIS participating laboratory (public or private) processes unidentified remains and/or family reference samples for the UNT Center for Human Identification for backlog reduction purposes under independent Federal funding initiatives. The DNA data entered into CODIS is considered the property and responsibility of the NDIS participating laboratory that enters the data into CODIS.

Prior to accepting data from a public or private non-NDIS participating laboratory, a written request from the investigating law enforcement agency stating the nature of the case, type of DNA data available, and disposition of original samples processed must be received, reviewed and accepted by the UNT CHI Technical Leader. Each case/sample will be considered on an individual basis. Following approval, the law enforcement agency will receive case information/submission forms and instructions to their vendor regarding the data acceptability requirements outlined in this policy and contact information for the Technical Leader. Required documentation outlined in this policy must be received and approved by the UNT Center for Human Identification prior to the submission of any sample data by the participating laboratory. The law enforcement agency requesting the data submission will remain the primary and sole contact on any future communications regarding CODIS-generated associations of their case sample(s).

A public or private non-NDIS participating laboratory processing unidentified remains and/or family reference samples for the UNT Center for Human Identification must meet the same quality assurance and technical requirements as external laboratories performing services for law enforcement agencies, with the exception that the laboratory will enter into a collaborative agreement outlined in a *Memorandum of Understanding* between the laboratories. This collaboration will not be considered as a contract between the laboratories for any costs associated with meeting data acceptance requirements or sample processing. The UNT CHI laboratory is not obligated to submit any unidentified remains samples or family reference samples to any external laboratory for processing and does not directly subcontract the testing of any samples that have been submitted to the laboratory except as outlined in Quality Assurance policy 06-017. The determination of outsourcing or backlog processing needs rests with the UNT CHI laboratory management.

The certification, documentation and technical requirements associated with the acceptance of DNA data for submission to NDIS by the UNT Center for Human Identification is based on the laboratory's

compliance with the national *Quality Assurance Standards for Forensic DNA Testing Laboratories*, *ISO* 17025 certification requirements, and adherence to the National DNA Index System DNA Data Acceptance Standards mandated for participation in CODIS. Public or private non-NDIS participating laboratories wishing to submit DNA data to the UNT CHI for inclusion in NDIS who cannot or will not meet the certification, documentation and technical requirements outlined in this policy cannot be considered for data submission.

Non-NDIS participating laboratory DNA data submission and acceptance requirements

1. Certification

A. The participating laboratory must be accredited for compliance with the national *Quality Assurance Standards for Forensic DNA Testing Laboratories (QAS).*
B. The participating laboratory must be certified under *ISO* 17025.

2. Mandatory Documentation to be submitted to UNT CHI

A. Laboratory must submit certificate of accreditation from ASCLD/LAB or Forensic Quality Services (FQS) demonstrating compliance with the national *Quality Assurance Standards for Forensic DNA Testing Laboratories (QAS).*
B. Laboratory must submit certificate of accreditation under ISO 17025.
C. Laboratory must submit the most current *QAS* external audit documentation prepared by their accrediting body.
D. Laboratory must submit an electronic copy of their Quality Assurance and Procedures Manuals. Procedures Manual material may be limited to the specific procedures performed on the samples for which data is being submitted.
E. Laboratory must submit an electronic copy of validation summaries for the procedures performed on the samples for which data is being submitted, including procedures that have been modified from manufacturer's recommendations for amplification kits and instruments.
F. The laboratory must provide a log of external proficiency tests, taken within a 2 year period of when sample data was generated for each analyst involved in the testing of the sample.

A laboratory processing unidentified remains and/or family reference samples for the UNT Center for Human Identification must also submit the signed Memorandum of Understanding (MOU) with the documentation outlined above.

3. Onsite Visits

The UNT CHI may accept documentation of an onsite visit of a public or private non-NDIS participating laboratory that is being considered for submission of DNA data for NDIS inclusion that has been conducted by a NDIS participating laboratory that has contracted similar DNA testing services from the data provider. For such consideration, the non-NDIS participating

laboratory should provide a list of references for NDIS laboratories for which similar DNA testing services have been provided.

A public or private non-NDIS participating laboratory processing unidentified remains and/or family reference samples for the UNT Center for Human Identification will be visited by representatives from the UNT CHI prior to or during the period in which samples are being processed.

4. **Testing Location**

DNA data will only be considered from samples processed/tested at the participating laboratory location for which the previously described documentation has been received and approved.

5. **Chain of Custody**

The submitting laboratory must provide a complete chain of custody for the sample(s) for which DNA data is being submitted, including a notation of current disposition of any remaining sample materials.

A laboratory processing unidentified remains and/or family reference samples for the UNT CHI shall maintain a complete chain of custody for each sample submitted starting with the unique identifier on the overnight shipping label on the shipping container and ending with the unique identifier on the overnight shipping label used when returning samples and data to the UNT CHI. The laboratory must inventory the contents of the shipping container at the time it is received and compare the samples received to the manifest included with the samples. The laboratory must immediately notify the UNT CHI upon the discovery of any discrepancy.

6. **Confidentiality**

The UNT CHI will only engage in communications with the law enforcement agency that requested the data submission from a non-NDIS participating laboratory regarding CODIS-generated associations of their case sample(s), statistical evaluations of these associations and the reporting of these results. The UNT CHI will not discuss any CODIS-related information or disposition of putative associations with the non-NDIS participating laboratory that has submitted DNA data on a sample or any other "outside" entity.

No identification information about a sample other than the UNT CHI unique specimen ID number may be recorded by the laboratory processing unidentified remains and/or family reference samples for the UNT CHI. Any "outside" inquiries related to the processing of UNT CHI samples shall be immediately reported to the UNT CHI Technical Leader. No information regarding the processing of UNT CHI samples shall be provided.

7. **Sample Consumption**

A laboratory processing unidentified remains and/or family reference samples for the UNT CHI may consume entire sample provided by the UNT CHI during testing if necessary. In the event

that the entire sample needs to be consumed for testing, the laboratory must contact the UNT CHI Technical Leader for approval prior to testing. Any sample remaining at the completion of testing, including human remains samples, bone/tooth powder, family reference sample swabs/bloodstain cards, extracted DNA and corresponding reagent/substrate blanks from unidentified remains samples must be returned to the UNT CHI with the shipment of DNA data. A manifest detailing the contents of the return shipment must be included with the package. Samples being returned must be in their original primary storage containers with the UNT CHI specimen ID number clearly visible. Any secondary containers (i.e., containing bone powder, DNA extracts and any reagent/substrate blanks processed during the DNA extraction process) must be clearly labeled with the UNT CHI specimen ID number and any unique identification number utilized by the laboratory processing the sample. DNA extract and reagent/substrate blank tubes must be packaged individually in heat sealed plastic packaging. Each package must be labeled with the UNT CHI specimen ID number. Amplified PCR products are not to be returned to the UNT CHI and may be discarded.

8. Sample Identification

A laboratory submitting DNA data on behalf of a law enforcement agency must use a single unique identification number for each individual specimen for which DNA data is submitted to the UNT CHI. This number will be included in the *Comments* field of the CODIS Specimen record.

A laboratory processing unidentified remains and/or family reference samples for the UNT CHI must identify the samples throughout the testing process with the UNT CHI specimen ID number. The processing laboratory may utilize its own numbering scheme so long as that number is associated with one and only one UNT CHI specimen ID number. The UNT CHI specimen ID number must be used as the primary identifier for specimen tracking on all raw data, GeneMapper ID files, Sequencer files, tabular reporting and CMF generation.

9. Technical Requirements

The entry of DNA data into NDIS by a NDIS participating laboratory requires 100% technical review of STR and mtDNA results by a qualified forensic DNA analyst. This analyst must be proficiency tested as required by the national *Quality Assurance Standards for Forensic DNA Testing Laboratories* and be a current CODIS User. To maintain compliance with the NDIS Operational Procedures, for data to be accepted by the UNT CHI for entry into CODIS from a non-NDIS participating laboratory, the DNA data must be generated using the platform, typing kit(s), sequencing chemistry and interpretation software that is used to generate the data for which the DNA analyst performing the technical review is qualified and proficiency tested in. Additionally, the DNA data must be interpreted using interpretational guidelines for which the reviewing DNA Analyst is trained and proficiency tested in. Data from non-NDIS participating laboratory submitted to the UNT CHI for entry into NDIS must meet the technical requirements outlined below to be accepted, interpreted and entered/uploaded into CODIS by the UNT CHI CODIS Administrator. The DNA data entered into CODIS is considered the property and responsibility of the NDIS participating laboratory that enters the data into CODIS.

10. General Testing Procedures

The following general parameters must be met for DNA data to be considered for review by the UNT CHI for CODIS entry:

A. A reagent blank must be processed with each extraction or extraction batch. Reagent blank processing must be identical to that of its respective sample. If a particular reagent blank is associated with a batch of samples, it will be processed according to the most stringent and sensitive set of conditions used within the extraction batch. Reagent blanks will be amplified under identical PCR conditions (primers, template volume, and cycle number) as the respective sample(s). If preferred, reagent blanks may be amplified with maximum template volumes despite the respective sample template amount. It is not necessary to include the reagent blank for repeat amplifications if the repeat parameters are identical or less sensitive (fewer cycles and/or less template volume) than the original PCR parameters. Reagent blanks will be processed for capillary electrophoresis using the same run conditions (volume of amplified product loaded and injection time) as the associated sample(s). Reagent blanks must be sequenced in at least one direction for each primer set used in the analysis of the associated sample.

B. All unidentified remains samples must be quantified using a human specific DNA assay prior to STR DNA analysis. This data should be used to target optimum template input for downstream PCR amplifications in an effort to conserve DNA extract and minimize PCR and electrophoretic artifacts.

C. A positive and negative control must be processed with each PCR amplification. These controls must be processed for capillary electrophoresis using the same run conditions (volume of amplified product loaded and injection time) as the associated sample(s). For mtDNA analysis, these controls must also be included in subsequent cycle sequencing reactions. Positive and negative control "amplified product" must be sequenced in at least one direction for each primer set used to sequence the associated sample. HL60 DNA must be used as the positive control for all mtDNA analyses.

D. STR data must be generated using the Applied Biosystems Profiler Plus ID, Cofiler, and/or Identifiler, and/or MiniFiler typing kits. Validation summaries for any modifications to the manufacturer's recommendations for the use of these typing kits (i.e., run modules, polymers, amplification parameters, etc.) must be reviewed and accepted by the UNT CHI Technical Leader prior to submission of any sample DNA data.

E. MtDNA sequence data must be generated with the Applied Biosystems dRhodamine or Big Dye™ 1.1 sequencing chemistries. Validation summaries for any modifications to the manufacturer's recommendations for the use of these sequencing chemistries (i.e. run modules, polymers, amplification parameters, etc.) must be reviewed and accepted by the UNT CHI Technical Leader prior to submission of any sample DNA data.

F. DNA data (STR and/or mtDNA) must be generated on Applied Biosystems capillary electrophoresis instrumentation. Validation summaries for any modifications to the manufacturer's recommended operation of the instrumentation (i.e. run parameters, polymers, etc.) must be reviewed and accepted by the UNT CHI Technical Leader prior to submission of any sample DNA data. For STR data collection, an allelic ladder and associated positive control must be injected with each run (injection set of sixteen capillaries).

G. All STR data should be analyzed with GeneMapper ID v3.2 or newer. All mtDNA data should be analyzed with Sequencher v4.7 or newer.

11. Interpretational Requirements

Outlined below are minimum interpretational requirements for all genetic data submissions to UNT CHI for review and entry into CODIS.

A. All DNA data (STR and mtDNA) submitted to UNT CHI for a particular sample must be independently analyzed by two qualified Forensic DNA Analysts (as defined in the *QAS*) at the originating laboratory. This duplicate analysis should generate a final concordant profile and/or haplotype for a given sample. Upon submission to UNT CHI, all relevant sample data will be analyzed by a UNT CHI qualified Forensic DNA analyst and compared to the submitting laboratory's reported profile and/or haplotype.

B. STR profiles submitted for entry and upload to NDIS must be generated using Applied Biosystems Profiler Plus ID and Cofiler, and/or Identifiler systems. For STR submissions, all 13 of the FBI's core CODIS STR loci must be attempted for a given sample. All thirteen of these loci plus amelogenin must be submitted for Family Reference Samples; a minimum of 8 core CODIS loci plus amelogenin must be submitted for Unidentified Remains Samples. For laboratories processing remains originating from UNT CHI, it is recognized that STR data recovery is sample dependent. In the event that fewer than 8 core loci are recovered for a particular set of remains, the associated STR data will still be considered for LDIS and SDIS entry. All submissions must be single-source; any sample exhibiting a DNA mixture will not be accepted for review. Ultimate assessment of STR data quality, reliability, and acceptance for CODIS entry will be the responsibility of UNT CHI.

C. STR data for a particular sample is <u>unacceptable</u> if its associated controls (reagent blank, positive control, negative control), ILS, and/or allelic ladders do not meet the following requirements.

<u>Positive Control:</u> The complete known profile must be obtained; all alleles must meet a minimum threshold of 100rfu.

<u>Negative Control:</u> No typeable result detected above 100rfu.

<u>Reagent Blank:</u> No typeable result detected above 100rfu.

Internal lane size standards (ILS): The 75bp - 400bp peaks for Profiler Plus ID, Cofiler runs and the 75bp - 450bp peaks for Identifiler and MiniFiler runs must meet a minimum threshold of 100rfu and size correctly.

Allelic Ladder: All incorporated alleles must meet a minimum threshold of 100rfu and type correctly.

D. STR data for a particular sample must also meet the following standards of quality.

Peak Resolution: The general shape and appearance of sample and control peaks should be sharp and well defined so as to discriminate between true alleles and any artifacts related to amplification or capillary electrophoresis.

Peak Height: A minimum threshold of 100rfu is required for all reported heterozygous peaks, and a minimum threshold of 200rfu is required for all reported homozygous peaks.

Electrophoretic Artifacts: Allelic marker ranges should not contain any electrophoretic spikes, bubbles, dye blobs and spectral pull-up exceeding the interpretation threshold of 100rfu.

PCR Artifacts: Minus four stutter products must fall within the Applied Biosystems stutter filter ranges and minus A artifacts must be negligible for all pristine family reference samples. Some level of elevated minus four stutter and minus A is tolerable for unidentified remains samples and compromised family reference samples. The presence of elevated stutter must be evaluated within the context of the entire profile in order to distinguish these peaks as PCR artifacts and not minor contributor alleles within a mixed DNA sample.

E. STR data generated from low copy number or <u>increased cycle number</u> STR analysis of unidentified remains samples will be accepted for review if the laboratory presents the appropriate validation summaries for approval prior to the submission of any sample data. Only Applied Biosystems Profiler Plus ID and Cofiler data will be considered. A maximum of 32cycles will be accepted, and all samples must be amplified in triplicate for consensus profile reporting.

F. MtDNA haplotypes submitted for entry and upload to NDIS must be generated using Applied Biosystems dRhodamine and Big Dye 1.1 sequencing chemistries. The minimum required sequence range consists of Hypervariable Region I (HVI) 16024-16365 and Hypervariable Region II (HVII) 73-340. The final sequence range will consist of the most conservative overlapping regions obtained between the two independent analyses of the sequence data. The reported range must be confirmed by forward and reverse sequencing. If required, confirmation may also be obtained through same direction sequences originating from separate amplifications. All submissions must be single-source, any sample sequence demonstrating the possibility of a mixture, exhibiting more than two (2) putative heteroplasmic sites, will not be accepted for review. Ultimate assessment of

mtDNA data quality and reliability for CODIS entry will be the responsibility of UNT CHI.

G. MtDNA data for a particular sample is unacceptable if its associated controls do not meet the following requirements.

Positive Control: The known HL60 haplotype must be obtained for the region tested.

Negative Control: No interpretable sequence detected. Sequence is considered interpretable regardless of signal level if it can be distinguished from baseline noise.

Reagent Blank: No interpretable sequence detected OR sequence detected is not concordant with the associated sample sequence.

12. Data Submission Requirements

A. An individual case file containing the following documentation should be prepared for each sample and submitted to UNT CHI for review.

1. Final reported STR profile with signatures, printed names and dates of both the first and second read analysts. A GeneMapper ID allele table is an appropriate form of documentation.

2. Final reported mtDNA haplotype and sequence ranges. This may be in the form of a Sequencher variance table and must include signatures, printed names and dates of both the first and second read analysts.

3. A case log sheet that documents sample processing from beginning to end. It should include key steps of the analysis process including but not limited to: evidence examination, extraction, quantification, amplification, cycle sequencing, capillary electrophoresis and data analysis. Amplification and cycle sequencing steps should also detail which STR amplification kit or mtDNA primer(s) were employed. The date performed and initials of the technologist(s) or analyst(s) performing the work must be documented for each entry.

4. All worksheets and case notes generated during the course of sample processing. These worksheets should coincide with entries from the case log sheet. They should include lot numbers and expiration dates of critical reagents used for the procedure and document the amount of sample and/or extract consumed.

5. Quantification results, e.g., Quantifiler assay spreadsheets for nuclear DNA extraction yields and yield gel photodocumentation or Agilent print-outs for mtDNA amplifications.

6. A chain of custody or detailed record of all individuals who had contact with the sample in question from submission to evidence return. Each entry must include dates, times, signatures and cause for possession or transfer.

7. Paper copies of all evidence photodocumentation.

8. Do not include any print-outs of STR/mtDNA electropherograms or sequence analysis summaries. All of this data will be reviewed in electronic format.

B. A DVD or CD consisting of the following should be prepared and submitted to UNT CHI for review. All CD/DVD contents should be labeled in a logical and easily identifiable manner.

1. All digital photodocumentation of the evidence in question.

2. All electronic capillary electrophoresis data associated with a particular sample. The original run folders generated by the Applied Biosystems genetic analyzers must be submitted. The run folder names should contain the date of electrophoresis, and each run folder should only contain data for the sample in question and its associated controls.

3. All GeneMapper ID and Sequencher analysis projects generated from both the first and second reads of the data submitted for CODIS entry.

4. CODIS export or CMF files for the sample intended for CODIS entry.

C. The submitted materials will be used to perform an in-house analysis and technical review of the data presented for CODIS entry. These materials will become the property of UNT CHI and will not be returned to the originating laboratory.

D. Each case file and CD/DVD submitted may only contain samples and data pertaining to one missing person or one set of unidentified remains.

13. Additional Requirements for laboratories processing unidentified remains and/or family reference samples for the UNT Center for Human Identification

A. Agencies processing samples originating from the UNT Center for Human Identification must follow specific sample labeling requirements. A unique identifier or case item number is assigned to each sample received by the UNT Center for Human Identification. This item number can be found on the outer packaging of the sample and directly correlates to the item entry on all UNT CHI chain of custody and submission documentation. This same number must be incorporated into the processing laboratory's documentation and labeling system. The processing agency may also use an intra-laboratory unique identifier, but the UNT CHI item number must be contained within or as an adjunct to that number. All items of evidence including but not limited to DNA extract tubes, sample archive tubes, bone powder tubes and additional evidence packaging must be labeled with the UNT CHI item number. All worksheets, electronic sample files and analysis projects generated during case processing must also contain the respective UNT CHI item number.

B. Laboratories processing samples on behalf of UNT CHI are required to fully document samples upon examination and prior to any sample processing or alteration. This includes

written notes and digital photographs documenting each layer of packaging, adequately capturing pertinent labeling which identifies the source or nature of the contents, and recording an accurate description of the actual package contents. Digital photographs of the actual tested item should be taken both before and after sampling. After evidence sampling and examination, the tested item should be returned to its original packaging and properly sealed with evidence tape. A laboratory processing unidentified remains and/or family reference samples for the UNT CHI may consume entire sample provided by the UNT CHI during testing if necessary. In the event that the entire sample needs to be consumed for testing, the laboratory must contact the UNT CHI Technical Leader for approval prior to testing.

C. For unidentified remains samples, the laboratory should cut a sample for testing and a sample for archival. The archive sample should be of ample size for re-extraction and re-analysis. This sample should be transferred to a sterile 50ml conical polypropylene tube and packaged separately from the parent sample. Residual bone powder not consumed during the testing procedure should be transferred to a suitable sterile container (2ml screw-cap tube or 15ml conical tube) and packaged separately from the parent sample. The archive sample tube and residual bone powder tubes may be packaged together. These items should be properly sealed with evidence tape and listed on the chain of custody upon return to UNT CHI. While in the possession of the testing laboratory, archive samples and residual bone powder must be maintained at -20°C.

D. No sample, portion of sample or DNA extract obtained from a tested sample may be retained by the processing laboratory. Samples and DNA extracts may not be used for research or any other test procedure other than that which was directed by UNT CHI. Original samples, bone powder, archive cuttings, and DNA extracts must be returned to UNT CHI upon completion of testing. All items must be shipped through an overnight trackable carrier, and UNT CHI property room personnel must be notified of pending returns prior to shipment. DNA extracts are to be packaged separately from all items of evidence and shipped on frozen ice packs. DNA extracts from different sets of remains must be packaged separately. All return shipping expenses are the responsibility of the testing laboratory.

E. Case files and all documents generated during the testing of items originating from UNT CHI should be retained for a minimum of ten years. UNT CHI retains the right to archive these documents prior to their destruction. These documents cannot be destroyed without the express consent of UNT CHI. The processing laboratory retains the right to submit these case files and related notes for review in the normal course of external audit and accreditation procedures.

Revision History – Policy 08-028, Data Acceptance From Off-Site Agency

Revised By	Revision Number	Revision Date
Linda LaRose	Rev 1	5-20-08

Appendix 7

Memorandum of Understanding

DNA Data Acceptance from an Off-Site Agency

UNT Center for Human Identification
Forensic Laboratory

The UNT Center for Human Identification (UNT CHI) has developed a mechanism by which DNA data from Missing Persons cases that has been generated by reputable non-NDIS participating laboratories external to the UNT CHI can be technically reviewed, evaluated, and entered into the appropriate index within the CODIS framework under the UNT CHI's custody.

To facilitate this collaboration, the UNT CHI has developed a policy specific to this activity (Policy 08-028, attached). The certification, documentation and technical requirements associated with this policy are based on the laboratory's compliance with the national *Quality Assurance Standards for Forensic DNA Testing Laboratories*, *ISO* 17025 certification requirements, and adherence to the National DNA Index System DNA Data Acceptance Standards mandated for participation in CODIS. The policies outlined apply to scenarios in which 1) a non-NDIS participating laboratory (public or private) processes unidentified remains and/or family reference samples for a law enforcement agency in a missing persons or homicide investigation case, and 2) a non-NDIS participating laboratory (public or private) processes unidentified remains and/or family reference samples for the UNT Center for Human Identification for backlog reduction purposes under independent federal funding initiatives. This collaboration will not be considered as a contract between the laboratories for any costs associated with meeting data acceptance requirements or sample processing. The UNT CHI laboratory is not obligated to submit any unidentified remains samples or family reference samples to any external laboratory for processing and does not directly subcontract the testing of any samples that have been submitted to the laboratory.

This ***Memorandum of Understanding*** establishes documentation of an agreement by the DNA data submitting laboratory to comply with the applicable conditions outlined in UNT CHI Policy 08-028 (attached) for the purpose of submitting DNA data to the UNT CHI for evaluation and, if accepted, entry into the appropriate index within the CODIS system. Subsequent failure to adhere to the conditions outlined in UNT CHI Policy 08-028 (attached) by the DNA data submitting laboratory will result in a cessation of this agreement and may result in the rejection of future data submission requests by that laboratory.

Submitting Agency		***UNT Center for Human Identification***	
22 MAY 08		5/22/08	
Laboratory Director	Date	Laboratory Director	Date
22 May 08		5/22/08	
Technical Leader	Date	Technical Leader	Date
22 MAY 08		5/22/08	
QA Manager	Date	QA Manager	Date

C:\Documents and Settings\Lucille\Local Settings\Temporary Internet Files\OLK8\5 Policy 08-028 Memorandum of Understanding.doc
Created by John V. Planz
Created on April 9, 2008

UNT Center for Human Identification
Forensic Laboratory

Amendment of Memorandum of Understanding

DNA Data Acceptance from an Off-Site Agency

Date: May 20, 2008

From: UNT Center for Human Identification (UNT CHI)
3500 Camp Bowie, EAD-334
Fort Worth, TX 76107

To: Armed Forces DNA Identification Laboratory
2ND Floor, Bldg. 101
1413 Research Blvd.
Rockville, MD 20850

In regards to UNT CHI Policy 08-028, *Acceptance of DNA Data from an Off-Site Agency*, the following amendments have been made to the Memorandum of Understanding.

Amendment 1. **[Section 2 – A] Documentation for ISO 17025 accreditation has been waived. ISO standard 4.5.3 states that "***The laboratory (UNT CHI) is responsible to the client (National Institute of Justice -NIJ) for the subcontractor's(AFDIL) work, except in the case where the client (NIJ) or a regulatory authority (NIJ) specifies which subcontractor (AFDIL) is to be used.***" The samples sent to AFDIL by UNT CHI is at the request of NIJ.**

Amendment 2. **[Section 2 – E] The policy states that electronic copies of validation summaries shall be sent for review. At the request of UNT CHI, the only validation summaries required are for any protocols or new technologies which have been implemented within the last two years. AFDIL agrees to make available all validation summaries for on-site review if requested by UNT CHI.**

Amendment 3. **[Section 8] The policy states that the processing laboratory (AFDIL) shall use the UNT CHI specimen ID number through out the testing process. AFDIL has a unique identifier for each case processed which is assigned by their Laboratory Information Systems Applications (LISA). In order for the data to be entered into CODIS, the UNT CHI specimen ID number must be referenced on the report and electronic files. AFDIL agrees to provide individual case folders, reports and CDs with electronic data for each UNT CHI case. The case folder, report and CD will list the UNT CHI specimen ID number and the AFDIL specimen ID number.**

Amendment 4. [Section 10 – F and Section 12 – B - 2] Though it would be preferable for a positive control to be injected with every capillary electrophoresis injection, it is not always feasible. To provide a quality assurance measure for a given allelic ladder and the associated genotyping process, a positive control will be analyzed within each data folder of a GeneMapper ID® analysis project.

We hereby acknowledge the receipt of the Memorandum of Understanding and accept the amendments stated herein.

AFDIL Laboratory Director — Date: 22 MAY 08

AFDIL Technical Leader — Date: 22 May 08

AFDIL QA Manager — Date: 22 MAY 08

State of Washington Office of The Attorney General * Criminal Justice Division * HITS Unit
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BULLETIN 2006 – 57

JUNE 14, 2006

UPDATE REGARDING ENTRY OF DNA PROFILES OF MISSING PERSONS AND UNIDENTIFIED REMAINS INTO CODIS

The University of North Texas system, Center for Human Identification (UNT-CFHI) has been involved in a National Institute of Justice (NIJ)-funded program to obtain reference samples from personal effects and relatives of missing persons, and samples from unidentified human remains to produce both nuclear and mitochondrial DNA profiles for entry into the National Missing Person DNA Database (NMPDD) section of CODIS, referred to as CODIS +Mito. Additional information about the program is contained in HITS Bulletin 2005-40.

Since the inception of the program in 2002, several unidentified remains have been identified, with a case of particular note being that of Marci Bachmann, a 16-year-old female who was reported missing from Vancouver, WA in 1983. Ms. Bachmann's unidentified remains were recovered in Missoula County, Montana in 1984, a victim of serial killer Wayne Nance. The case had been brought to the attention of the Green River Task Force early on, however, for reasons unknown, her status as a missing person had been removed from NCIC. Due to the timing of her disappearance, she became a lower priority in the Green River investigation. In 2005, GRTF Detective Raphael Crenshaw, who was doing additional follow-up on unsolved missing persons cases, obtained reference samples from Bachmann's mother and submitted them to the UNT-CFHI for entry into the NMPDD. A match was made to samples from the unidentified remains entered by the Missoula County Sheriff's Office, and their identity, which had been a mystery for nearly 22 years, was revealed.

The UNT-CFHI would like to work with agencies to make Washington a "model state" for the entry of reference samples into CODIS +Mito. To that end, they are asking that all agencies make a concerted effort to obtain the necessary samples from all missing persons or their relatives, and samples from unidentified remains, so that DNA profiles can be produced and entered into CODIS +Mito.

To assist in the effort, the UNT-CFHI has developed a <u>free</u> kit for the collection of relative's samples. The kit contains all necessary items, easy to follow instructions and can simply be mailed to the UNT-CFHI upon completion. Seals, a consent form and a chain-of-custody document will be required so the results will be admissible as evidence. The kits will make the collection of the samples less time consuming and easily completed by any officer.

The primary goal of this program is the identification of unidentified remains and the location of missing people. However, there are a number of advantages to law enforcement in submitting these items. The DNA examinations, the results of which will be available for investigative purposes, will be done for free with funding from the National Institute of Justice under the President's DNA Initiative. This includes both nuclear and the very expensive mitochondrial DNA typing. Should there be a criminal investigation involved, the DNA profiles produced would be available to the submitting agency for any investigative purpose, obviously including identifying the victim, but also to compare to blood or other biological samples that might be collected during the investigation. Although the cases are prioritized and some may take several months to complete, the UNT-CFHI has indicated that any case with special circumstances, such as a pending criminal investigation or a highly probable match, will be given priority. The key will be communicating with the UNT-CFHI to articulate the special circumstances.

Initially, the sample collection kits will be available from the UNT-CFHI, Washington State Patrol Crime Labs and from the Washington State Attorney General's Office HITS Unit. The HITS Unit will attempt to keep a supply on hand for easy access. HITS Unit Investigators will also be contacting agencies within their areas to encourage them to obtain the samples and make the submissions, and to answer (or get the answer to) any questions that arise.

For anyone who wishes to contact a representative of the UNT-CFHI, they may contact George Adams, Missing Persons Program Coordinator, at (817) 735-5451 or by email at: geadams@hsc.unt.edu.

We would emphasize that the NMPDD is not a replacement for the current dental identification program through the WSP's Missing & Unidentified Persons Unit, but another tool to enhance the likelihood that unidentified remains will be identified and to further assist law enforcement in the investigation of the deaths of the individuals. We would also urge you to verify that dental records have been submitted and if not, the time when family members are contacted for DNA samples would be an excellent time to obtain their consent for the dental records as well.

There is also a new law pertaining to Missing Persons and Unidentified Remains. House Bill 2805 was passed into law this year. It outlines the need for increased coordination and the use of the latest technology in the investigation of missing persons and unidentified remains, and outlines several steps to be taken.

The general requirements are as follows. It designates the formation of a committee of interested agencies throughout the state to develop suggested protocols regarding the investigation of unidentified human remains, whether by natural causes, accident, criminal act or disaster, and to develop training in these areas within the State. It designates WASPC to create and maintain a statewide web site related to missing persons. It designates the WSP to maintain a clearinghouse for information regarding missing persons, and requires agencies receiving reports of missing persons not located within 30 days to notify the WSP of the report. HB2805 also requires agencies to initiate collection of DNA reference samples at that point, and to forward these samples for examination as soon as possible. It also reiterates the requirement for obtaining dental records.

A request is made to all agencies to submit samples from their respective cases, as the more samples that are placed into the database, the more identifications that will be made, and more investigations will benefit.

FDLE Missing Persons DNA Program

As of July 1, 2008, Florida Statute 937.021 requires "... that a law enforcement agency obtain a DNA sample after a child or adult has been missing for more than 90 days." In support of this statute, the Florida Department of Law Enforcement (FDLE) Missing Endangered Persons Information Clearinghouse (MEPIC), local law enforcement agencies, medical examiners, and the University of North Texas Center for Human Identification (CHI) are working together to solve endangered and long term missing person cases through the use of DNA technology.

DNA kits and DNA analysis are available, at no cost, to all Florida law enforcement agencies, and is funded by the President's DNA Initiative. The President's DNA Initiative is a 5 year, billion dollar initiative with a specific target goal of using DNA to solve missing and unidentified person cases. DNA can be collected from items belonging to the missing person, biologically related family members of the missing person, and unidentified human remains. These DNA profiles will be analyzed and uploaded into the CODIS+mito index of the FBI's National DNA Index System. Then, the DNA profiles for missing persons and relatives of missing persons will be continuously searched against unidentified human remains.

Family Reference Sample DNA collection kits are available at the following law enforcement agencies: List of law enforcement agencies

DNA Sample Reference Forms for Submission

Information links:

- University of North Texas Center for Human Identification (http://www.hsc.unt.edu/departments/pathology_anatomy/dna/Forensics/Initiative/Initiative.cfm)
- President's DNA Initiative (www.dna.gov)
- FDLE's Joint Initiative Missing Endangered Persons Information Clearinghouse to Identify Florida's Unidentified Deceased (http://www.fdle.state.fl.us/cjst/mec/Unidentified%20Deceased/identifyingdeceased.html)
- FDLE Missing Endangered Persons Information Clearinghouse (www.fdle.state.fl.us)

For more information regarding DNA collection and submission for missing persons, please contact the FDLE MEPIC at 1-888-356-4774 or the University of North Texas Center for Human Identification at 1-800-763-3147.

PRESIDENT'S DNA INITIATIVE

Advancing Justice Through DNA Technology

FDLE MISSING PERSONS DNA PROGRAM

Center for Human IDENTIFICATION

DNA Control Point Centers for Family Reference Sample DNA Kits

The law enforcement agencies listed below are participating in a statewide effort to facilitate the distribution of Family Reference Sample DNA kits to law enforcement agencies throughout Florida to reduce mailing costs and encourage compliance with Florida Statute 937.021 (6), which states that "law enforcement agencies will attempt to collect DNA samples for missing persons over 90 days."

From the chart below, please contact the law enforcement officer nearest you to order Family Reference Sample DNA Kits. These kits are from the University of North Texas Center for Human Identification (UNT CHI) and approved by the U.S. Department of Justice to be utilized for appropriate biological specimens for DNA processing.

- Please use one DNA kit per family member.
- The DNA Consent form must be witnessed by a law enforcement officer.
- These buccal (or cheek) swab kits are available at no cost from the UNT CHI.

County	Agency	Name Contact	Phone	E-mail Address	Address
Statewide Florida	Florida Department of Law Enforcement MEPIC	Dinah Johnson or Melissa Remy	1-888-356-4774	MEPIC@fdle.state.fl.us	2331 Phillips Rd., Tallahassee, FL 32308
Dade	Miami Dade Police Department	Major Grace O'Donnell	305-418-7206	gmodonnell@mdpd.com	7875 NW 12th St., Suite 200, Doral, FL 33126
Highlands	Highlands County SO				
Seminole	Seminole County SO				
Orange	Orange County SO	Tanya Depalmo	407-254-7381	Tanya.Depalmo@ocfl.net	2500 W. Colonial Dr., Orlando, Florida 32804
Hillsborough	Tampa Terrace PD				

OAG News

For Immediate Release:

March 19, 2008

For Further Information:

David Wald
609-292-4791
Capt. Al Della Fave
609-882-2000
ext. 6514

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Division of Criminal Justice
- Gregory A. Paw, *Director*

Missing Persons DNA Identification Project Launched -

Federally-supported NJ State Police program carries out provisions of Patricia's Law

Trenton, NJ – The New Jersey State Police has launched a DNA identification project for long-term missing and unidentified deceased persons that supports the implementation of the state's new Patricia's Law, which sets new guidelines for police to follow in missing persons' cases, including collecting DNA material and entering it into a national database.

The State Police project is designed to serve as a national model and is supported by a National Institute of Justice grant that funds a program at the University of North Texas Center for Human Identification, which runs DNA analysis for the program. The project, nationally known as the President's DNA Initiative: Advancing Justice through DNA Technology, was launched to solve long-term missing and unidentified deceased persons investigations. The State Police Missing Persons Unit is the lead agency for the DNA identification project.

Patricia's Law was signed into law by Gov. Jon S. Corzine in January. The Governor presided at a ceremonial bill signing today in Bogota to draw attention to the new legislation. Primary sponsors of Patricia's Law were State Sen. Loretta Weinberg and Assembly members Valerie Vainieri Huttle, Joan Voss and Linda Greenstein. The law was named after Patricia Marie Viola, who disappeared from her Bogota neighborhood more than seven years ago.

The State Police long-term missing and unidentified deceased persons DNA identification project has established detailed best practices protocols and investigative guidelines for law enforcement to follow when handling reports of missing persons or unidentified deceased human remains. Patricia's Law demands that all reports of missing persons shall be immediately investigated without delay.

The guidelines details a category of "high risk" missing persons, which includes children, people in need of medical attention, and mentally impaired persons.

DNA material collected from personal items of the missing person (like clothing, toothbrushes or hairbrushes) and DNA from family members is entered into a national DNA Index system known as CODIS for the Combined DNA Index System.

There are approximately 19,000 missing persons reported in NJ each year and entered into the National Crime Information Center (NCIC) computerized database. Approximately 1,500 long-term missing persons, or people missing for more than 30 days, are reported annually. In addition, there are 272 active unidentified deceased cases.

The State Police Missing Persons Unit coordinates with county prosecutors and distributes DNA collection kits and lists of all long-term missing person cases to county coordinators for dissemination to local law police departments. The project also coordinates unidentified deceased cases with the state, regional, and county medical examiner offices.

# # #

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NewsNews

Oregon Missing Person Law Using DNA as Tool to Help ID Missing Persons

04/23/2008

Susan Torris Hormann
DNA Supervisor
Portland Forensic Laboratory
Office: (971) 673-8258

Photograph links valid for 30 days - Source: Oregon State Police
http://www.flashnews.net/images/news/FS.HeatherFeaman.DNAunit.3.jpg
http://www.flashnews.net/images/news/FS.JanelleScott.DNAunit.1.jpg
http://www.flashnews.net/images/news/FS.MarlaKaplan.DNAunit.4.jpg

"**Missing**" - one of those words that definitely perks our interest, but it can be frightening when used regarding a loved one. An amendment to Oregon's Missing Person law will help families who have missing relatives by adding the tool of DNA analysis to the investigation through providing an important DNA sample that may be useful when a relative is missing, making it easier to identify a loved one's remains when they are found.

Effective January 1, 2008, Senate Bill 351 (New Missing Persons Law) provides that if a person has been reported as missing, and has not been located within 30 days after the missing person report is made, the investigating law enforcement agency shall attempt to obtain a DNA sample for the missing person.

Susan Hormann, DNA Supervisor at the Oregon State Police Portland Forensic Laboratory, noted that the DNA for a missing person investigation can be collected a couple ways. The first is to collect items that were used only by the missing person such as a tooth brush, razor, lipstick or a medical specimen preserved at a hospital. The second is to collect oral swabs from family members; a simple and painless process by swabbing the inside cheek of their mouth for about 10 – 15 seconds. A special DNA collection kit called a **Family Reference Standard Kit** (FRS) contains the swabs, gloves and paperwork needed to collect the DNA from family members. The FRS kits are supplied free from the University of North Texas Center for Human Identification (UNT CHI), and over 4,800 kits have been sent to Oregon law enforcement agencies to assist in collecting DNA samples related to missing person investigations.

The collected samples will be sent to UNT CHI where the DNA will be analyzed at a state-of-the-art facility, federally funded to offer free DNA analysis of the FRS and unidentified remains. Results are put in a National DNA database of family members of missing persons.

"The success of this law will depend on police training, public awareness and on the number of families that come forward and give FRS samples," said Hormann. "Medical examiners and forensic scientists encourage families who have missing relatives to come forward even if the person has been missing for many years because the DNA technology is able to verify remains that are very old."

When unidentified remains are found, the Oregon State Medical Examiner's Office must initially

examine them to determine if they are able to identify the person. They first use investigative processes such as dental record comparisons, patient medical history, and personal effects, to identify remains. If unidentified after these processes, the Oregon State Medical Examiner's Office will decide if the remains will be sent to UNT CHI for DNA analysis. At UNT CHI the remains will be analyzed using two types of DNA analysis and the results will be entered into the National database for unidentified remains.

When a computer program is run comparing the National database of family reference samples to the unidentified remains database, it is looking for matches indicating a genetic relationship that the relatives would share. When a match is identified, the agencies that submitted the FRS and the unidentified remains will both be notified. This program has the capabilities to identify newly recovered remains and remains that have been in storage for years at medical examiner facilities across the country.

"Theoretically, a family who is missing a relative in Oregon could find that their loved one was found in New York. The distance has been a problem when investigating these cases and never before has a resource utilizing DNA been available to assist in the closure of these cases," Hormann said.

An **April 2008 check of the Law Enforcement Data System (LEDS) showed 1,379 missing person records.** Those listed as missing include:

- 6 people missing and believed to be the victim of a disaster.
- 59 people missing of any age with a proven physical/mental disability, or who is senile, thereby subjecting himself/herself or others to immediate danger.
- 292 people of any age missing under circumstances indicating his/her physical safety may be in danger.
- 113 people of any age that is missing under circumstances indicating that the disappearance was not voluntary.
- 821 juveniles who are missing and do not qualify for entry in any other the above other categories.
- 19 people missing whose circumstances do not fit into any other category.

Since January 2008, LEDS sends out a message to police agencies with a missing person record between 30 and 60 days old as a reminder to help seek a request for a DNA sample. According to **Keith Kohan, LEDS Unit Manager**, the reminder program is helping. "When we first implemented the program back in January, the response from agencies was 100 percent positive," said Kohan. "We received many thanks from agencies who are trying to figure out how they could best comply with this new law in an organized and responsible fashion, and this new program is helping do that."

Since more than half of the missing person LEDS entries involve juveniles, the **Oregon State Police Missing Children Clearinghouse** (MCC) emphasizes to parents to be proactive by preparing an **identification kit** and keep it in their home so it could be available during the first hours a child is missing. The MCC provides free child identification kit that includes an area for a picture, fingerprints, dental records, physical information, and a DNA sample.

Funding for the kits is provided each year from the proceeds of an annual golf benefit tournament. Since 1999, the clearinghouse has been able to purchase over 125,000 ID kits that have been distributed throughout Oregon. To order a kit, please call 503-934-0188 or toll free outside Salem at 1-800-282-7155. You may also email your request to judy.hayes@state.or.us. Kits may be ordered individually or in limited quantities for community and service groups, clubs, and school. More information about the Missing Children's Clearinghouse is available on our website at http://www.oregon.gov/OSP/NCC/index.shtml.

Final Report Award: 2004-DN-BX-K212

www.oregon.gov/OSP