B85 Coordinating the Identification Efforts of the Missing From the Former Yugoslavia

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The efforts to develop an Identification Coordination Program that coordinates and integrates a large-scale DNA testing effort for the missing from the area of former Yugoslavia, and the results of this effort, will be described.

As a result of the armed conflicts in the former Yugoslavia during the 1990s, an estimated 35,000-40,000 persons remain missing with the majority of these located in Bosnia and Herzegovina (25,000-30,000). Once the various conflicts ended, local commissioners, expert teams, and the international community began the long and arduous recovery and identification process of mortal remains. At the beginning of these efforts, approximately 80% of exhumed bodies were identified via "classical" methods, i.e., those methods based upon anthropology, clothing, witness testimony, etc. However, with the passage of time these more traditional identification methods became increasingly unreliable and all parties involved in the identification efforts were faced with increasingly discouraging results. The biggest forensic puzzle in the world, the identification of the missing from Srebrenica, resulted in only 73 identifications during the three-year period from 1996–1999. This is despite the fact that over 4,500 body bags containing the remains of some of the estimated 7,500 missing from Srebrenica had been amassed during this time.

It became apparent that thousands of missing would never be able to be identified without the development of a rapid and large-scale DNA testing program. This is the reason ICMP (International Commission on Missing Persons) began in 2000 to design and implement a strategy of establishing a large-scale DNA testing capacity within the former Yugoslavia. The ultimate goal of this DNA testing program would be to help bring names back to the thousands of nameless bodies that had been, and would be, recovered. (From the beginning of recovery process in 1996 until now, more then 12,000 bodies were recovered more than 7,000 of which are still unidentified).

Paramount to the success of the DNA based identification efforts has been the establishment of the Identification Coordination Center (ICC). The primary task of ICC is the collection of blood samples from living family members who reported a missing family member(s) in order to create a Family Reference Database of DNA profile. From July, 2000 until August 1, 2002, 11 mobile teams from 7 centers located the former Yugoslavia have, collected more then 31,000 blood samples representing more than 18,000 of the missing. It is estimated that an average of three donors will be needed for each missing person. While blood samples are being collected from family members, information regarding the basic information about donor, any additional related missing persons, and contact information regarding other donors is taken. A computerized database containing all collected information is maintained at the ICC headquarters located in Tuzla, BosniaHerzegovina.

In order to avoid any charges of favoritism and to gain full support of the ethnically diverse family organizations, the ICMP has developed a bar-coding system for all blood samples. A set of four identical bar code numbers is associated with each blood sample. A barcode is placed onto bloodstained card, another on the Chain of Custody Form, another on the Donor's Form with the fourth kept in reserve. In order to be STR profiled, bloodstained cards are removed from their individual storage pouches and their barcodes scanned. This information is entered into computer controlled automated puncher which then punches the bloodstained card into a 96-well tray which then automatically adjusts to the next well. This method eliminated the need for potentially error prone human punching and tracking of samples. The entire 96-well tray is subsequently given a bar code and submitted to the DNA laboratory for DNA testing. Once the STR profiles have been obtained from the 96-well tray, those results are stored onto a computer disk and returned to the ICC where the information is downloaded into the Family Reference Database.

The ICC also receives bone samples from exhumed but still unidentified bodies from forensic experts in the region. This has permitted a standardization of bone collection and submission techniques as well as a uniform, computerized system of archiving bone samples. Once a bone sample is received, 4 digital photos are made: 1 of the original container and any markings, 1 of the bone sample on the submission container, 1 by the bone sample with its original case number and its new bar code designation, and finally 1 the bone sample in its bar coded container. All bone samples are submitted to the DNA laboratory as bar coded specimens. It is not possible for DNA analysts to determine the location or potential ethnicity of the bone samples. Once again, all DNA profiles obtained from bone samples are submitted to the ICC headquarters in Tuzla for entry into the centralized computer program.

During 2001 the ICMP developed a DNA Matching Program that compares the DNA profiles from the Family Reference Database to the DNA profiles obtained from bone samples. Since virtually all the missing has either a parent or child as a donor, the initial screening mechanism is to search for all samples which half band share with a bone specimen. To account for mutational events, the program is also capable of

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searching for samples that have a half band share except for 1 or 2 loci. Since many of the families have multiple family members missing, DNA profiles from bone samples are also compared to the DNA profiles obtained from other bone samples. Once it has been determined that a bone and blood sample exhibit half band sharing, it is determined whether other relatives are available for a blood donation. Since there have been several instances of 1 bone sample half band sharing with multiple, unrelated individuals, either extended DNA testing, i.e., additional STR loci, mitochondrial or Y-chromosome is required for all single donor 'matches' or additional related donors are profiled before a DNA match is reported. Once sufficient data has been produced, a DNA report is generated. This report includes a digital photo of the submitted bone sample and is given to the pathologist who is in charge of that particular case.

On November 16, 2001, ICMP made the first DNA assisted identification of a 15-year-old boy missing from Srebrenica. This was a "blind" match in that there was no assumption of identity, no idea who this person was, and no hope of identification without DNA testing. From the November 16, 2001, until August 1, 2002, the ICC has made more then 600 "blind" DNA Matches. The vast majority of these blind matches have occurred since the DNA laboratories began high throughput operations in March of 2002. Due to the success of this system, the ICMP is waiting with high expectations until the end of 2002, when more than a thousand DNA assisted identifications in the former Yugoslavia by the ICMP system will be revealed.

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