

REPORT OF THE INVENTORY OF THE MEMORIAL OSSUARY, NEVESINJE

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Forensic investigations concerning missing persons, including investigations concerning mass graves, other illicit burial sites and human remains they contain, are conducted under the authority of competent domestic institutions. This Summary Report presents findings and observations made by ICMP as part of the technical assistance it provides to these institutions. The competent institutions may contact ICMP for any additional information that ICMP may be able to provide. Parts of this Summary Report or its exhibits may have been redacted to protect the integrity of investigations and the privacy of persons.

List of acronyms

BIH	Bosnia and Herzegovina
DNA	Deoxyribonucleic acid
DPO	District Prosecutor's Office in Trebinje
ICMP	International Commission on Missing Persons
ICD	ICMP's Identification and Coordination Division
KIP	Krajina Identification Project, Sanski Most
MNI	Minimum number of individuals
MPI	Missing Persons Institute
NN	<i>Nomen nescio</i> (unknown person, not identified)
PIP	Podrinje Identification Project, Tuzla
POBIH	Prosecutor's Office of BIH
POs	Prosecutor's Offices
RS	Republika Srpska
SOP	Standard Operating Procedure

I. EXECUTIVE SUMMARY

1. In 2012, the Missing Persons Institute (MPI) estimated there were 3,277 cases of unidentified (NN) remains housed in 10 different mortuary facilities throughout Bosnia and Herzegovina (BIH) that may be missing from the conflict of the 1990s. Additionally 4,408 NN cases,¹ consisting mostly of ossuary material, were listed by International Commission on Missing Persons (ICMP) and stored in two more facilities, the Podrinje Identification Project, Tuzla (PIP) and the Krajina Identification Project, Sanski Most (KIP). Of all these cases, 2,567 have a DNA profile but ICMP has not been able to match these to ~9,000 DNA profiles from the blood reference samples provided by almost 27,000 relatives who claim to have persons missing from the conflict.
2. In May 2013, the BIH Chief Prosecutor issued an order that would allow for an inventory of all the facilities, following the NN working group recommendations. The objectives of the review were to determine the number of unidentified mortal remains in BIH, the status of the cases (including whether or not samples were taken for DNA testing), assess whether additional sampling was necessary for further identity testing, and to determine next steps with a view to making recommendations to the POBIH.
3. Four smaller facilities (Mostar, Nevesinje, Goražde and Travnik) were selected for a 'pilot' inventory to determine the most effective process, and assessment steps. Following the inventory at Sutina mortuary in Mostar in the period of June through August of 2013, discussions to begin the inventory of the second facility, Memorial Ossuary in Nevesinje, began on 9th September 2013 with a meeting held with the representatives of the Republika Srpska Centre for the Investigations of War, War Crimes and Searching for Missing Persons (hereunder: The RS Centre), District Prosecutor's Office (DPO) in Trebinje, MPI, and the pathologist in charge of the cases. DPO in Trebinje issued a letter subsequent to the meeting directing anthropological assessments to be undertaken on the cases, and if necessary new DNA samples to be taken. The pathologist for the cases and his forensic associate declined to participate in the review examinations.
4. Examination of paperwork provided and the initial assessment of stored cases began on 11th September, while the anthropological examination of cases began on 16th September. Complete case records were not available for all cases. DPO in Trebinje was supported by MPI, crime technicians and the ICMP anthropological team. All cases were examined and standard documentation completed for each using a systematic review process agreed by the prosecutor in charge, which included taking new samples.
5. During the inventory at Nevesinje 57 of the total of 61 body bags were thoroughly examined and reviewed. The remaining four cases were listed as previously identified through DNA. They were visually examined for inconsistencies in the final week of examinations; no inconsistencies were recorded and these cases are not included in the analyses presented in this report. The MPI and the prosecutor had been following the practice of counting one body bag as one "case." The status of each body bag was determined. 29 of 57 (50.9%) required an immediate change of case status due to the inventory review.
6. The body bags were found to contain a total of 94 distinguishable bodies and body parts. Many bags contained remains of multiple individuals. Two bags (3.5%) had not apparently been sampled before. 30 new DNA samples were taken, while 18 reserve samples previously taken by Dr. Željko Karan, the pathologist in charge of these cases, were requested to be sent for DNA analysis.

¹ The great majority of the 4,408 NN cases at PIP (3,200 cases) and KIP (33 cases) are ossuary material which cannot be linked to identified cases and needs to be permanently stored or disposed under agreement. See annex 2 for NN case distribution by facility.

7. Out of 57 examined body bags, four (7%) already have an associated DNA match report. For 15 body bags (26.3%), MPI and/or the RS Centre stated they had information on potential identities, though no documentation was reviewed that corroborated this. A further two (3.5%) had significant and specific ante-mortem characteristics which might assist with identifications; and five (8.8%) were assessed as probable historic cases not related to the recent conflict.
8. The inventory found 47 body bags (77%) and a total of 53 DNA samples which had DNA profiles obtained but had no matches with reference blood samples.
9. With DNA results, further examination is likely to result in many of the body parts being separated and/or re-associated into individuals. This initial inventory work indicates clear steps toward resolution for 39% of the cases examined. Cases that already have DNA profiles but are not matched to reference DNA samples are only likely to be resolved if further work in gathering blood reference samples and re-exhumations are undertaken, or relevance of cases to the conflict is established.
10. Some skeletal elements and body parts have had reserve samples taken already during previous examinations. DNA analysis of these additional samples should form part of the phase II work.
11. Recommendations for case resolution are included in this report. It is likely that a considerable number of new identifications and case resolutions will result from this new analysis, and incorporation of DNA results from the new sampling.
12. Recommendations have been provided to assist organization at the mortuary, and suggest requirements for phase II work. The issues recorded at the Memorial Ossuary in Nevesinje, mostly pertaining to commingling and DNA sampling techniques, have also been noted at KIP and observed in other facilities. It must be pointed out that in terms of storage shelving, cleaning, painting, utilities, and waterproofing, Memorial Ossuary in Nevesinje can serve as an example and template for other facilities in BIH. Additional funds should be made available to address the basic upkeep and maintenance of the facility and stored cases. Standard procedures are needed for consistent and well-organised case cataloguing and documentation. Cases require continual management as further steps are taken and follow up work proceeds.
13. This report recommends the establishment of uniform national standards of facility organisation, examination procedures, documentation, recording, data entry, database use and data management to ensure all cases in BIH - including those at the Memorial Ossuary in Nevesinje - can be effectively managed, monitored and closed. All facilities should be maintained and organised in the same way, within a common, appropriately staffed and funded system.
14. The focus of this initial report is to explain the physical work undertaken, how it was undertaken, and provide the summary of case statuses reached. The DPO in Trebinje, the RS Centre and the Search for Missing Persons and MPI hold copies of the case forms which provide the data for each case. This report is also intended to serve as a guide for preparations for further NN inventory work.
15. A further report covering the full impact of the new DNA sampling results will be issued when analysis is completed. However, the results as of 13th January 2014 have provided 24 profiles and no extraction failures. There is one new DNA match to a family and 7 re-associations. There are six profiles pending.

II. BACKGROUND

16. As an effort to resolve unmatched cases in BiH, ICMP and relevant local authorities agreed on instituting the NN working group, in order to review facilities housing unidentified cases exhumed during the post war period. An exchange of letters between the POBiH and ICMP set out the requirements for work and how it might be achieved. During May 2013, the POBiH ordered the case revision process to begin within four facilities housing a smaller number of unidentified cases. The facilities selected for the pilot project are Public Utility Company “Komos”, Sutina in Mostar, “Memorial Ossuary” in Nevesinje, City Cemetery “Prahulje”, Nova Bila in Travnik, and the Identification Centre in Goražde.
17. Proposed participants of the review process include the Prosecutor’s Offices (POs) that have official custody of the cases, relevant MPI Field Offices, local police crime technicians, pathologists who are on court orders for the cases, the RS, the RS Centre, staff of the companies storing cases, an ICMP anthropological team and other relevant parties as determined by the POBiH. The POBiH requested the relevant District POs to start with preparations for the review and to collate the case data and documentation needed.
18. It was agreed the DPO in Trebinje would organise the second facility for the revision - Memorial Ossuary in Nevesinje – with the DPO in Trebinje putting in place a review process. The number of reported cases was listed as 71 in a list of all NN case numbers across facilities gathered by MPI in 2012 (these are listed in columns 1 and 2 of Annex 2). The facility itself, the RS Centre and the MPI Nevesinje Field Office staff listed 61 cases at the start of the inventory.
19. A strategy and process for the inventory was developed by ICMP based on the analysis of case status and issues found at PIP and KIP facilities. This provided data on the range of case issues that may be expected to occur across all mortuaries. Analysis of these cases suggests there will be an underestimate of total cases held in some mortuaries due to the fact that many body bags will contain more than a single case of human remains. It is also likely that cases identified accurately as individuals may contain unrelated skeletal elements that have been mis-associated. Error rates identified in a sample of cases at KIP and PIP showed some 3 to 4% of cases from primary graves may be misidentified, and up to ~30% of comingled cases may have errors in body part association. This makes subsequent examinations more difficult, and identification of which bones belong to which individuals more complicated.
20. The majority of the cases re-examined at KIP and PIP have been found to be resolvable once their status has been determined. Data provided by MPI to ICMP in November, 2012, stated there are 3,277 NN cases held in ten mortuary facilities in BiH, other than PIP and KIP. At these last two facilities 4,408 NN cases were listed by ICMP in 2012, consisting mostly of ossuary material which cannot be matched to any individuals. Of all cases held nationally in the 12 facilities, 2,567 have a DNA profile but have not been matched to the ~9,000 DNA profiles generated from the blood reference samples provided by relatives who claim to have persons missing from the conflict. The NN case distribution for all the facilities is provided in Annex 2, along with unique bone profile distribution for comparison.

III. AIMS AND OBJECTIVES

21. The aims of the inventory pilot project and the review of cases at Memorial Ossuary in Nevesinje were:
 - To formulate and undertake successful procedures for NN case resolution;

- To determine the status of each unidentified case;
- To make recommendations for the requirements to resolve each case;
- To make recommendations for a national system for organising and managing all NN remains;
- To determine a realistic time period and resources needed to inventory, review and resolve NN cases.

22. Objectives of the review at the facility were:

- Collate and assess existing case documentation;
- Evaluate documents and procedures and provide recommendations to assist the local authorities to better record and monitor cases;
- Undertake anthropological examination/re-examination of stored cases;
- Review all case information and cross reference to determine status;
- List requirements to achieve closure for each NN case, and make recommendations on how to do so;
- Assess and determine organisation, storage and management of cases;
- List requirements and recommendations for case management system for the facility;
- List requirements and recommendations that may assist standards for identifications at national level;
- Assess results of case recommendations over time to look at efficiency of review system and monitor case closures;
- Sample cases where necessary.

IV. ORGANISATION

23. The NN work at Memorial Ossuary in Nevesinje began with a meeting held with the representatives of the RS Centre, DPO in Trebinje, MPI, ICMP and the pathologist in charge for the cases on 9th September 2013. An order to undertake the work, including anthropological examinations and any necessary sampling was issued by the Trebinje prosecutor. The pathologist Dr. Željko Karan and his associate declined at the meeting to take part in the review examinations. Examination of provided paperwork started on 11th September, while anthropological examination of cases began on 16th September. The case records were held at DPO in Trebinje and these could not be immediately provided. Some cases records could not be provided at all as they couldn't be located.

24. The aim was to finish examination and revision of 61 cases present at the facility within 3 weeks. This calculation was made based on the available resources, average rate of 1.5 complete cases examined per day per anthropologist, as well on the examination of NN cases at the previous facility. The timetable was found to be a close fit, as the completion of data entry and other paperwork extended into the 4th week. There were multiple sets of remains in many body bags, and the full anthropological examination did not include four DNA-identified cases. As was the case in the Sutina facility, the actual work rate when looking at complex cases averaged one body bag containing multiple body parts per day per anthropologist/osteologist. This should be taken into account for the completion of NN inventories at other facilities.

25. Work space was created so that the anthropologists could undertake examinations, check and assess cases. The review compared the cases against the known case data, and recorded all findings on a simple two page form (NN case review form, see Annex 5) that summarised all relevant information, including excavation data, known DNA samples and results, anthropological data, related evidence and effects and details of previous examinations. Data on the previous DNA sampling and findings was provided by ICMP. Data on samples previously taken as "reserve samples" was provided by the RS

Centre.

26. The process was overseen by the local MPI staff. Crime technicians took new images and recorded any additional evidence found.
27. All details of examined cases were entered into a database, so that findings could more easily be managed, analysed and updated. In all but one case, the records were lacking and needed to be created during the review. It became clear that the introduction of a dedicated data entry and case management staff, after the need for such supporting staff was recognized at the previously examined facility, vastly assisted in data entry keeping pace with examinations.
28. The cases were counted in a number of ways. Existing records counted one body bag/wooden casket as one case. On examination, however, it became apparent that some bags contained the remains of multiple persons. To assess whether the contents of body bags need to be divided into separate cases, and determine the potential number of individuals present and samples that might be taken, the total number of bodies (Bs) and body parts (BPs) within the body bags were determined and counted. The minimum number of individuals (MNI) was also assessed by counting the major bones of the body (such as cranium, mandible, left femur, right humerus etc.), and how many times they were present (see Annex 6 for MNI summary). Results from DNA sampling will provide a third assessment of the total individuals present; this is a particularly valuable assessment as it permits separate body parts or skeletal elements to be associated to the same individual.
29. A summary of the weekly findings was generated to show progress in number of cases examined, and their status and samples taken. This has been accumulated into a table (See Annex 1).

V. PROCESS

30. At a meeting held at the POBIH in May 2013, ICMP provided an outline for a suggested review process for the POBIH as starting point for organising the work and informing all NN working group parties of preparatory needs. The outline also specified data collection needs prior to examinations (see Annex 3). The process was discussed and agreed by the DPO in Trebinje prior to commencement of work at the Nevesinje memorial ossuary.

5.1. Existing case documentation and data collection

31. Only a negligible amount of documentation was provided to the NN team prior to the review, consisting of a single list of Nevesinje cases delivered to the anthropological team by the RS Centre, containing basic information on cases with the RS Centre “working” case label, reference case labels, and short summaries on DNA samples taken and previous work performed. Documentation pertaining to the cases stored at this facility was ultimately provided at the end of the examination process; on 3rd October, autopsy reports for 37 of 61 cases stored at Nevesinje Memorial Ossuary were scanned at the DPO Trebinje premises. Documentation for the remaining 24 cases could not be located in this institution. It was suggested by that office that’s case files had likely forwarded to other relevant institutions upon their request.
32. Any case-related documentation provided by the DPO Trebinje, the RS Centre and MPI was noted within the agreed ICMP NN *case review form* (the template is in Annex 5), to ensure simple, rapid and transparent capture of all relevant case data. This provided ease of access and a standard document

for each case upon which the decision on status and recommendations can be agreed by DPO Trebinje, the RS Centre, MPI, the pathologist and ICMP. Additional anthropological data was recorded on standard ICMP forms for anthropological examinations: The ICMP *body form* and *commingled bones* form.

33. The case review forms and all associated case documentation were scanned electronically. All gathered data along with the photographs taken during anthropological examinations were copied and provided to the DPO in Trebinje, the RS Centre and MPI. Custody of documents and the databases and their use needs to be further discussed and agreed between the parties.

5.2. Anthropological examination methods

34. The list of NN cases at the Memorial Ossuary in Nevesinje provided for the review was physically cross-checked with the cases present at the facility. All cases examined were entered into data spread sheets. These were used to check and communicate relevant information on bone samples and DNA results for each case with ICMP matching departments.
35. It was agreed that ICMP would create lists for cases of bone samples and their status prior to anthropological examinations, as this information played a significant role for drawing conclusions concerning overall case status. Direct communication between the NN team and ICMP's Identification and Coordination Division (ICD) also allowed resolution of specific issues concerning problematic cases during examinations.
36. 57 of 61 body bags found in the storage room of the Memorial Ossuary in Nevesinje were reviewed using standard autopsy and anthropological examination methods. The remaining four cases were previously identified through DNA and, upon the insistence of MPI and the RS Centre, were only visually examined for inconsistencies in the final week of examinations; no such inconsistencies were recorded. Following the examination, within each body bag, each body and body part was separately stored in smaller plastic bags with related DNA sample labels. Each case, body part and sampled skeletal element was labelled with indelible metal tags.
37. DNA samples were taken from previously un-sampled cases, and from body parts within cases which could not be associated. All DNA sampling followed the process set out in ICMPs *Standard Operating Procedure for Sampling Bone and Tooth Specimens from Human Remains for DNA Testing at the ICMP (ICMP.SOP.AA.136.1.doc)*, documented by all participating parties, and sent to the DNA laboratory for testing. Where possible, DNA samples previously taken as "reserve samples" by the responsible pathologists were requested to be processed, instead of taking new DNA samples; a total of 18 reserve samples were requested to be analysed.
38. Quality control measures were implemented and followed throughout the complete process. Work was regularly monitored by the senior forensic anthropologist and forensic anthropologist during examinations.
39. All examined cases were photographed by crime technicians from the Police Office Nevesinje, and all data entered into ICMP databases which tracked daily activities and summarised data.
40. Each case was documented by crime technicians from the Police Office Nevesinje under newly assigned police office case numbers, with previous case numbers recorded where possible. The crime technicians recorded all skeletal elements, personal belongings, clothing and DNA samples and their results for each case.

41. The status of each case was determined (see Annex 4 for a list of case status indicators), and a set of recommendations provided for each examined case to indicate further requirements to allow final resolution.
42. Several categories of data for cases were tracked and documented in order to report findings for the NN Working Group (see table Annex 1). This shows both progress and impact of the review in the facility over time.
43. The case review forms and all associated case documentation were scanned electronically. All gathered data along with the photographs taken during anthropological examinations were copied and provided to the DPO in Trebinje, the RS Centre and MPI. Custody of documents and the databases and their use needs to be further discussed and agreed between the parties.

VI. RESULTS

44. The Memorial Ossuary in Nevesinje, the RS Centre and MPI field office Nevesinje reported 61 cases stored at the facility. Following the initial meeting on 9th September 2013, Trebinje prosecutor ordered review and examination of all stored cases/body bags in the facility under the agreed procedures.
45. At the beginning of the revision process, the MPI notified the ICMP anthropological team of four cases at the Memorial Ossuary which were identified through DNA and requested that they do not be examined as they could not be classified as NN. These cases were only visually examined and were not included in the analysis of the results. The total number of examined cases was therefore 57.
46. The storage room of the facility was in a good condition, having been restored in 2012. Skeletal elements for each case were stored within individual body bags, which were then placed inside a custom-made wooden casket and nailed shut. Information such as case number, ordinal/storage number, DNA sample codes, etc. were printed on a label, laminated, and attached to each individual casket. A duplicate label with the same information was placed inside each body bag. In this regard, Memorial Ossuary in Nevesinje can serve as an example and template for other facilities in BiH.
47. After assessment, 30 bone samples were taken for DNA testing. Statistics and data were compiled for the cases, in order to allow assessment between facilities, simplify subsequent actions and assist case tracking. An additional 18 samples which were previously taken by Dr. Željko Karan were requested to be sent for DNA analysis.
48. The normal summary of data for each case was recorded in the case file on the *case review form* and other anthropological recording forms.
49. The following status categories for cases have been recognized as crucial to case resolution, and need to be identified, reported, monitored and continuously updated in all cases. A simple uniform database is required to achieve this, and should be used for all mortuary facilities.

6.1. DNA profiles obtained but with no DNA match made

50. Cases in which DNA profiles have been obtained but no match was found to reference blood samples form the biggest category of NN cases within the facility. The prospects for identification of these

cases are not very high unless further investigation is undertaken. Some cases are historic and not related to the recent conflict (see 6.5 below).

51. The inventory found 47 cases (77%) and a total of 53 DNA samples which have DNA profiles obtained but have no matches with reference blood samples. For each documented case with this status, specific recommendations based on the examination findings have been provided and agreed, so that final resolution of the cases can be reached.

➤ **Recommendations**

Further investigation of the background and documentation of these cases is needed. New DNA sampling results may link cases to identified cases that have already been buried. Re-exhumation and further DNA testing is required for linked cases. This will allow re-associations and determine if mis-identifications and/or misplacement of skeletal elements have occurred. Investigation of the AM records of missing persons reported should be checked, to see if further blood reference collection can be undertaken. There are 2 cases that have very specific dental statuses which might provide information to connect cases or suggest potential identities which can be investigated.

6.2. Cases with DNA reports generated

52. In a total four out of 57 examined cases already had DNA reports generated for previously taken DNA samples, but cases have not been closed. An additional four DNA identified cases are present at the Nevesinje facility and have been only visually examined during revision; these cases are pending final identifications by the families and are not included in the total number of examined cases. Certain issues which need to be addressed include the following:

- One DNA report was generated for a single partial bone which was destroyed in the process of analysis. Thus, there are no additional skeletal elements to action the closing of this case;
- Two cases which have DNA reports generated on skeletal elements also contain skeletal elements which do not have the same DNA profile;
- One DNA report has been generated for a case which was previously re-associated and buried. Additional samples taken for this case might require re-exhumation for the purpose of new re-associations. Due to the identified commingling in these cases, it is also possible that some of the buried skeletal elements were mis-associated.

➤ **Recommendations**

Results of DNA analysis for any additional samples taken from these cases may provide data to allow case re-associations. Examination of related/buried cases may be required in order to allow final identifications and/or re-associations. Re-exhumation of associated cases is needed in order to fully resolve these cases, and reach final identification.

6.3. Possible presumptive cases

53. The review determined 11 cases had potential identification information, although no actual evidence was found within these cases. Rather, the information regarding these possible identities came from the RS Centre and the local MPI staff. Additional follow up investigation may determine if this information connects cases or is of investigative use.

➤ **Recommendations**

Further investigation is needed into cases' background and documentation. Records at ICMP's ICD must be checked to determine if DNA match reports have previously been issued for the individuals in question, or if any genetic reference samples from family members have been obtained for these missing persons. If no references exist, investigations into the existence of surviving family members should be conducted. Re-exhumation and DNA testing of associated cases (to allow possible re-associations) may be required.

6.4. Cases without apparent bone samples taken

54. The examination found 2 cases from which bone samples have not apparently been previously taken. Two bone samples for DNA testing were taken from one of these cases. Both cases were probable historic (non-conflict related) cases, but two skeletal elements within one of these were determined to be possibly forensically relevant and were DNA sampled.

➤ **Recommendation**

Tracking of the results from these bone samples is needed, which are likely to lead to further examinations, re-associations, re-exhumations and identifications.

6.5. Probable historic cases unrelated to the recent conflicts

55. Historic cases were considered to be cases which had clear indications that they were not related to the recent conflict, and therefore fall outside the scope of the present review. Various indicators were used for assessment including personal belongings and clothing, background information on the exhumation site and taphonomic assessment of skeletal elements (age of the bones). Review and examination indicated five cases in this category.

➤ **Recommendations**

Further investigation on background information of exhumation sites is needed in order to reach final conclusions and resolutions. Carbon testing of bone samples from skeletal assemblages may be appropriate, with one sample per assemblage taken in order to lower costs. The DNA results for four of these five cases from which samples were previously taken should be assessed and reviewed. Institutions who have expressed wish to take on custody over some historical remains should be contacted. Instructions given by POBIH for permanent storage should be followed.

VII. CONCLUSIONS

56. The review on behalf of the NN working group and POBIH inventoried and assessed 57 out of 61 cases housed at the Memorial Ossuary in Nevesinje. All cases were reviewed with findings agreed by the DPO in Trebinje, MPI, the RS Centre, ICMP team and pathologists.

57. In total 57 cases were anthropologically examined as NN cases, and 4 DNA identified cases were only visually examined. Data was lacking for the majority of cases. Initial gathering of data for cases was slow, and delayed determination of case status.

58. Each case was reviewed, evaluated and documented using an agreed standard procedure. Data

collation and examination was followed by anthropological examination.

59. Complex issues were identified and dealt with, such as multiple individuals and body parts found in a single case, and variation in previous examination records and sampling. These issues match the complexity of case histories seen during the re-examination of cases at the KIP mortuary in Sanski Most and other assessed facilities.
60. Inconsistencies in previous DNA sampling techniques were noted and should be addressed with all parties responsible for taking of DNA samples in the past.
61. The status of each case was determined, as well as assessment of work previously undertaken as part of the identification process. Recommendations for the requirements needed to resolve each case were made.
62. With cases never apparently sampled previously, it is likely that there will be new identifications and case closures resulting from the new DNA and further anthropological analysis.
63. A total of 30 new DNA samples were taken. The results as of 13th January 2014 have provided 24 profiles and no extraction failures. There is one new DNA match to a family and 7 re-associations. There are six profiles pending.
64. The review indicates clear steps toward possible resolution for 22 cases (38.6%) examined. Other cases may be resolved with further assessment including applying the DNA results from new sampling, re-exhumations, undertaking re-associations, further case investigation and analysis, and if additional blood reference samples are collected.
65. Recommendations to assist with completion of the first phase of the NN review at other facilities are made below. Preparatory work in gathering all case documentation and preparing facilities for work is the key to achieving this.
66. Recommendations to assist with on-going identification work (phase II) as a result of the review including uniform requirements and standards for case management are made below. It is essential that once the review is undertaken in each facility, continuation of case management, tracking and organisation continues. The ability to maintain a system that continues to make identifications, close cases and prevents complex issues from developing will be highly dependent on the resources provided by state and local authorities. Dedicated case management staff, transparent database systems and adequate facilities are the keys to achieving this.
67. The NN inventory at the Memorial Ossuary in Nevesinje was completed and the objectives of the POBIH for the inventory phase of NN work at this facility have been achieved.
68. With known status, cases within the facility are ready for further work including analysis of new DNA results, investigation of documentation/case background, re-examinations and re-exhumations which will allow final case resolutions to be agreed by local authorities.
69. The results from this inventory and case review agree with findings at KIP and Nevesinje mortuaries. There are considerably more bodies and body parts within the body bags than are listed as cases. Examinations and additional sampling was both warranted and has already provided positive results. The need for continued inventory of NN cases in other facilities is further demonstrated.

VIII. RECOMMENDATIONS

8.1. Further work at the Memorial Ossuary in Nevesinje

70. A meeting to discuss the report findings should be undertaken to determine next steps, review and implement recommendations and confirm which cases may be closed immediately.
71. Further efforts should be made to locate any additional case records.
72. Further investigation from appropriate parties should be encouraged in order to pursue identification leads and recommendations for case closure generated by the NN review. With the considerable number of body bags that have non-matched sample results, it is particularly important to determine if these cases may be pre-conflict in nature. Assessment of the excavation origin may assist with this.
73. Phase II work should begin once DNA results from newly taken samples become available. This will require data analysis, re-examinations, re-associations and re-exhumations which will lead to new identifications and case closures.
74. Some skeletal elements and body parts have had reserve samples taken already during previous examinations. It is understood these are stored in Banja Luka. Requests for submission of these samples to ICMP through the normal channels have been made. Analysis of these additional samples is needed to confirm or exclude those skeletal elements from the cases under review, and to reach final conclusions for the NN cases, as part of phase II work.
75. Continuity of case management is essential. ICMP is employing an experienced case manager specifically to support the NN project to deal with cases that have been reviewed, until a recommended uniform standard and system might be put in place. The case manager is needed to control on-going cases at the Memorial Ossuary in Nevesinje.
76. Phase II work at the Memorial Ossuary in Nevesinje will need to be coordinated and scheduled in relation with on-going inventories at other facilities.

8.2. Continuation of the NN inventory

77. The next facilities to be reviewed should be strongly advised to gather all necessary documentation on cases prior to examination efforts. These facilities will benefit from lessons learned during the previous reviews, in particular regarding preparation and organisation.
78. A reconnaissance of each facility by the NN team must be made to assess specific review needs. Estimates for work completion should be determined taking into account available resources, data sources (including listed number of NN cases, total number of stored cases, and number of unique unmatched bone profiles) and experiences from previous facility reviews.
79. It is recommended that all listed cases are reviewed at each facility, not just those initially categorised as NN. Given the complexity and commingling of many cases, closing NN cases is also dependent on status and checks of identified cases, including the relevant documentation for all cases held. This is also important in view of cases having been moved between facilities.

8.3. Country-wide organisation and standards of work

80. Coordinating the case management of cases with those of other facilities is recommended. It is recommended that a team of case managers is employed to cover on-going cases across all facilities. An estimated eight case managers can maintain databases, update records and control cases for all 12 mortuaries.
81. A uniform, country-wide management and standards system is required. Common standards of work, examination, management, storage, organisation and monitoring are needed for all cases and for the 12 facilities across BIH.
82. A database system is need for all BIH cases. All cases need the same documentation, and same records entered in the database. A common database will allow quality assurance.
83. Transparent and shared monitoring of cases by Prosecutor's offices, MPI, pathologists and ICMP is needed through shared access to the database system via an on-line inquiry centre.
84. Inventory of all facilities needs to continue as quickly as possible. As the number of cases held at many facilities may be an underestimate, it is likely the NN case review phase I work will take into 2015 to be completed.
85. Once inventories are done, phase II work needs to begin once DNA results are provided by ICMP. This means that NN phase I and phase II work will need to be undertaken at the same time, with work being carried out at more than one facility at once. This needs staffing and funding.
86. A common agreed country-wide strategy and plan is needed to persuade families to allow re-exhumations to be undertaken, so that cases can be re-associated and errors rectified.
87. A common agreed country-wide strategy and plan is needed to persuade families who received traditional/presumptively identified cases in past to give DNA reference samples, if they have not previously done so. A shortage of relevant reference samples has been identified as a key limitation to resolving many unmatched DNA samples. An approach of 'give blood, help another family' is needed, or many samples from NN cases will remain unmatched.
88. The positive outcome of the NN inventory work is that a large number of cases can be resolved in 12-24 months after review, and once new DNA results are provided.
89. Additional cases may be subsequently resolved if re-exhumations can take place, and the required additional blood reference samples are collected.
90. The time estimates do not include examinations and analysis of additional cases coming to mortuaries from new excavations.

ANNEX 1: Summary table of examination results for Memorial Ossuary in Nevesinje

At Nevesinje, each body bag is counted as a case. MNI represents minimum number of individuals assessed by anthropological assessment of repeating bones, and for weekly estimates the highest repetitive number has been taken. Bs and BPs are bodies and body parts identified as possible separate cases of human remains based on anthropological assessment. Upon receipt of DNA results this number can be defined as definitive. Many body bags contain multiple cases of remains/BPs.

Week	No. of Bags examined	MNI determined	No. of cases determined (B's, BP's)	No. of new samples taken	No. of bags never apparently sampled	Identified individuals (by MNI assessment) never apparently sampled	No. of Bs and BPs never apparently sampled	No. of samples taken from previously un-sampled body bags	No. of body bags containing possible historic cases	No. of body bags (cases) with status change
11-13/09/13	0	0	0	0	0	0	0	0	0	0
16-20/09/13	19	18	24/28	9	0	8	8/8	0	0	9
23-27/09/13	23	20	28/41	14	0	13	13/17	0	2	17
30/09-04/10/13	15	23	15/25	7	2	10	2/11	2	3	3
TOTAL	57	61	67/94	30	2	31	23/36	2	5	29

ANNEX 2: Table of estimated cases against known cases and known unique bone profiles in BIH

Listed in this table are the numbers of unidentified cases estimated to be in each mortuary facility. Also listed are the numbers of unique profiles which have been generated from bone samples taken from cases, but which remain unmatched.

The cases in facilities (other than KIP and PIP) are estimated by counting body bags. So one case = one body bag. For PIP and KIP all cases have been determined by anthropological assessment and DNA review, and are separated into discreet Bs and BPs. As each facility is reviewed (as with Sutina) the actual number of bodies and body parts will be established, as well as the number of body bags, and the numbers will be added to column 3 and 4.

	Mortuary	Estimated NN Cases 2012	B/ BPs after review 2013	Total cases stored 2013	Unmatched unique DNA profiles (2012)	Unmatched bone profiles (2012)	Notes
1	Memorial Ossuary Banja Luka	357	-	-	406	477	
2	Krajina Identification Centre –KIP “Sejkovaca” Sanski Most	208	190	312	190	288	47 cases Identified but not buried. 67 re-exhumations needed
3	Memorial Ossuary for Odzak, Orasje	134	-	-	118	131	
4	Tuzla Commemorative Centre Tuzla	1042	-	-	346	Combined with PIP	
5	Podrinje Identification Centre – PIP Tuzla	4200	3852	5376	138	807	NN number includes 3200 ossuary cases. 532 cases identified but not buried. 1000 re-exhumations needed
6	City Cemetery “Prahulje”, Nova Bila, Travnik	40	-	-	107	138	
7	JKP Visoko Mortuary Visoko	1084	-	-	801	1146	
8	Memorial Ossuary “St Mark”, Miljevici, Sarajevo	254	-	-	189	215	
9	Identification Centre, Gorazde	91	-	-	87	96	
10	Sutina Mortuary, Mostar	189	395	204	125	182	50% under-sampling of 395 B/BPs
11	Memorial Ossuary, Nevesinje	58	94	61	47	54	ICMP list 71 cases for which there are bone profiles
12	Durdevak Mortuary, Modrica	15	-	-	13	15	

ANNEX 3: Suggested Process for NN facility reviews

Participants agreed that the inventory of ossuaries and resolving the issue of unidentified human remains should be undertaken as soon as possible and organised in stages:

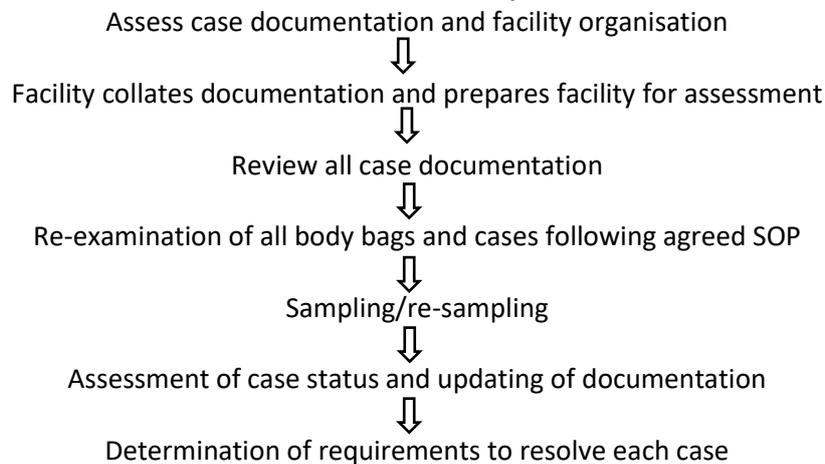
- I. Phase I: conduct inventory in mortuaries/ossuaries, i.e. establish facts and inspect all facilities used for human remains storage;
- II. Phase II: implement decisions about NN human remains following completion of inventory of mortuaries.

ICMP suggests the following procedures are followed for the review of each case during the inventory:

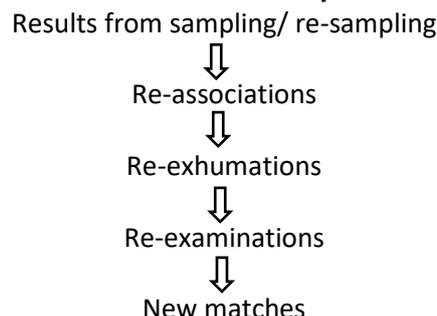
1. A request for documentation to be collated on all cases will be submitted to the facility and all participants before work commences. A checklist will be provided so the correct documentation and relevant facts can be collected for each case;
2. A complete list of all cases held in each facility will be provided, including all NN cases;
3. A list of all NN cases examined during the inventory will be kept, and compared with the list provided by the facility;
4. Assessment will be made to determine the site type the case originates from, and whether the case may be historic;
5. Documentation for each case will be reviewed before the inventory of each case is made. This includes documentation of DNA samples and reports. Any missing documentation or data including photographs will be noted;
6. List personnel who undertook field and mortuary examinations will be made
7. Photographs will be taken of the case and container;
8. Each case will be prepared for inventory and examination. Details of the storage and condition of the cases will be recorded. Any labelling will be examined and recorded. Washing and cleaning of skeletal remains, personal belongings and clothing associated to the case will be made if necessary to allow required recording;
9. The cases will be laid out in anatomical position and examined. The findings and the details observed will be compared to records. Any discrepancies will be recorded;
10. The examination will consist of the following steps (following ICMP procedures for KIP):
 - a. Assessment to determine number of cases,
 - b. Check association of Skeletal Elements,
 - c. Determination of MNI,
 - d. Designation of a Skeletal Assemblage,
 - e. Inventory,
 - f. Checking of known re-associations based on case data,
 - g. Determination of potential new re-associations and associated cases (note re-association work will be undertaken in phase II of the NN inventory),
 - h. Determination of need for issuing of additional cases numbers. Issuing of numbers as necessary by pathologists and office of the prosecutor,
 - i. Determine if additional DNA samples are needed (note these will be taken in phase II of the NN inventory),
 - j. Biological profile/Assessment of age at death, sex, stature, individual characteristics
 - k. Assessment of ante-mortem, peri-mortem and post-mortem trauma, and taphonomic indicators,
 - l. Describe and document case/s using body, body part and commingled case forms,
 - m. Check against corroborating Information;
11. Check clothing and personal effects, determine if they have been recorded (note further recording of clothing etc. will be undertaken in phase II of the NN inventory);

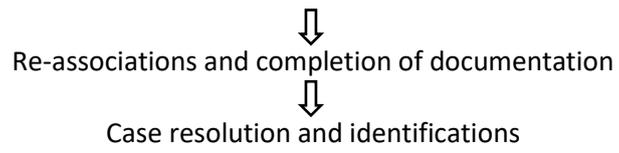
12. Check other artefacts, determine if they have been recorded (note further recording of clothing etc. will be undertaken in phase II of the NN inventory);
13. List any evidence that may assist in dating the case;
14. Determine if documentation provides any information on an ID based on presumptive methods for each case;
15. Determine if documentation provides any information on an ID based on positive methods other than DNA for each case;
16. Assess curation of documentation for the case;
17. Summarise case findings- providing context of case, description, any issues, general comments on the *Case Review Form*;
18. Review case with pathologist, case manager and others, agree and confirm case status and recommendations;
19. State the case status (after inventory);
20. State what actions need to be taken to complete the identification process for each case, including further re-examination;
21. State if new cases have been found;
22. State if new DNA samples are needed. Take new samples. All samples will be numbered and described:
 - a. First DNA sample needed,
 - b. Additional DNA sample needed;
23. Generate agreed list from database on which cases need further examination, resolution and completion;
24. Entering Case inventory details into database;
25. Generate report for facility with recommendations and statistics to assist with planning and undertaking further action to complete case identifications.

Phase I summary



Phase II summary





ANNEX 4: List of case status indicators

All cases need their status designated. Assessing status determines the steps needed to resolve the case and complete the identification process. Cases may have one or more statuses. Examples of status include:

1. No determined status;
2. Case with completed identification process;
3. Case without a DNA profile;
4. Case previously identified through presumptive methods only;
5. Case previously identified through positive methods other than DNA;
6. Case previously named through presumptive methods only;
7. Case previously named through positive methods other than DNA;
8. Case has profile but no match;
9. Case named based on DNA reports, but identification not confirmed;
10. Case awaiting re-examination;
11. Case is part of commingled bag that has not received full anthropological assessment;
12. Case is found to be from different individuals and requires further actions;
13. Case consists of re-associations undertaken pre-inventory;
14. Case found to require further DNA samples;
15. Case waiting for DNA match results from submitted samples;
16. Case has been associated with already presumptively identified and buried cases (they are out of reach for sampling);
17. Permissions to exhume related cases not received from families;
18. Families refuse to give consent for re-exhumation;
19. Loss/lack of information on location of burial plots of related cases;
20. Case is mislabelled;
21. Change in original case number determined;
22. Partial or lack of documentation for case;
23. No track of DNA samples from a case and their statuses;
24. Change in numbering of DNA samples determined;
25. Confused information on DNA samples statuses (info that there was bone to bone match and later info that DNA sample extraction has failed and vice-versa);
26. Case is non-human, or is not identifiable human tissue;
27. Case is possibly not related to the period of interest.

ANNEX 5: Case review form template

The case review form summarises all relevant case information for assessment, and presents the determination of status and recommendations for steps to achieve case completion.

CASE REVIEW FORM

Date	Case number	PO Label/Number				
Case summary (describe context, properties, issues):		Case status (see list of status types):				
Recommendations (what is needed to complete ID process?):						
Agreed by: (sign and date)						
Pathologist	Prosecutor	MPI				
ICMP						
Case status before inventory (see list of status types):		Associated case numbers before inventory (list):				
Site name:		Suspected number of missing:				
Site code:		Number of cases recovered:				
Site type:		Group identity:				
Dates of recovery:		Is it a simple or complex case? site?				
Indicators for dating of site:						
DNA samples There is no information on DNA samples <input type="checkbox"/>						
Nr.	DNA sample code	Skeletal element	Status			Pending
			Failed	No match	Name for which DNA profile was generated / Bone-bone matches	
Additional information:						
DNA samples taken during the review			If DNA match report had been issued, does the family want to take over the remains?			
	DNA sample code	Skeletal element	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not notified <input type="checkbox"/> Unknown			
			Details:			

CASE REVIEW FORM

Participants in previous examination:	Documentation provided: Exhumation report <input type="checkbox"/> Photographs <input type="checkbox"/> Autopsy report <input type="checkbox"/> Primary anthro examination <input type="checkbox"/> Identification report <input type="checkbox"/> DNA reports <input type="checkbox"/> Other: _____
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Were clothing, personal effects or other items recorded during primary exam?	NO <input type="checkbox"/> YES <input type="checkbox"/> N/A <input type="checkbox"/> :
Were clothing, personal effects or other items recorded during case review?	NO <input type="checkbox"/> YES <input type="checkbox"/> :
Does evidence need to be submitted to police?	NO <input type="checkbox"/> YES <input type="checkbox"/> N/A <input type="checkbox"/> :

Skeletal designation:	ANTHRO MNI:	DNA MNI:	Nr. of cases present:	Inventory taken: YES <input type="checkbox"/> NO <input type="checkbox"/>
Documents/forms used in inventory (attached): Body <input type="checkbox"/> Commingled case <input type="checkbox"/> Other <input type="checkbox"/> (describe): _____				Case photographs:

Biological assessment

BP	Sex M/F/I	Age range	Stature range	Comments (individual characteristics, trauma assessment, taphonomic indicators)

Comments (summary of previous examinations, discrepancies with original examination results; information on identification based on non-DNA methods, etc):

Additional case numbers required (no's & type)	Note potential re-associations (list cases):
--	--

- List Describing Case Status Types, NN Case Review 2013**
 All cases need their status designated. Assessing status determines the steps needed to resolve the case and complete the identification process. Cases may have one or more statuses. Examples of status include:
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. No determined status. 2. Case with completed identification process. 3. Case without a DNA profile. 4. Case previously identified through presumptive methods only. 5. Case previously identified through positive methods other than DNA. 6. Case previously named through presumptive methods only. 7. Case previously named through positive methods other than DNA. 8. Case has profile but no match. 9. Case named based on DNA reports, but identification not confirmed. 10. Case awaiting re-examination. 11. Case is part of commingled bag that has not received full anthropological assessment. 12. Case is found to be from different individuals and requires further actions. 13. Case consists of re-associations undertaken pre-inventory. 14. Case found to require further DNA samples. 15. Case waiting for DNA match results from submitted samples. | <ol style="list-style-type: none"> 16. Case has been associated with already presumptively identified and buried cases (they are out of reach for sampling). 17. Permissions to exhume related cases not received from families. 18. Families refuse to give consent for re-exhumation. 19. Loss/ lack of information on location of burial plots of related cases. 20. Case is mislabelled. 21. Change in original case number determined. 22. Partial or lack of documentation for case. 23. No track of DNA samples from a case and their statuses. 24. Change in numbering of DNA samples determined. 25. Confused information on DNA samples statuses (info that there was bone to bone match and later info that DNA sample extraction has failed and vice-versa). 26. Case is non human, or is not identifiable human tissue. 27. Case is possibly not related to the period of interest. |
|--|--|

Recorded by: _____ Date: _____ Checked by: _____ Date: _____

ANNEX 6: Table of estimated minimum number of individuals (MNI) present within the Nevesinje Memorial Ossuary assemblage by different skeletal elements

The MNI was assessed in each bag on a weekly basis.

The total MNI was then re-assessed at the end of the inventory to provide an estimate for the total assemblage of cases (see table below). The highest estimate of individuals present in the facility is provided by 59 femora, bilaterally. The anthropological MNI determined in this way is usually a considerable underestimate considering the significantly larger number of B and BPs, and in comparison to the number of individuals as determined by unique DNA bone profiles.

Skeletal element	Number of repeats
Left femur:	59
Right femur:	59
Left tibia:	56
Right tibia:	55
Left fibula:	53
Right fibula	52
Right radius:	49
Right humerus:	47
Right ulna:	47
Left humerus:	46
R calcaneus:	46
Left radius:	45
Left ulna:	44
L metatarsal #2:	43
Skull:	42
R metatarsal #1:	42
L metatarsal #1:	42
Mandible:	41
L talus:	40
R talus:	39
L calcaneus:	36
R metacarpal #2:	35
R metatarsal #2:	32
L metacarpal #2:	30
L metacarpal #1:	29
R metacarpal #1:	25