

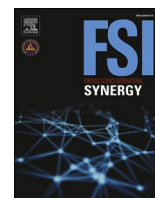
Central Lancashire Online Knowledge (CLoK)

Title	The search process: Integrating the investigation and identification of missing and unidentified persons
Type	Article
URL	https://clock.uclan.ac.uk/38586/
DOI	https://doi.org/10.1016/j.fsisyn.2021.100154
Date	2021
Citation	Salado Puerto, Mercedes, Abboud, Denise, Baraybar, Jose Pablo, Carracedo, Angel, Fonseca, Stephen, Goodwin, William H, Guyomarc'h, Pierre, Jimenez, Alejandra, Krenzer, Udo et al (2021) The search process: Integrating the investigation and identification of missing and unidentified persons. <i>Forensic Science International: Synergy</i> , 3. p. 100154. ISSN 2589-871X
Creators	Salado Puerto, Mercedes, Abboud, Denise, Baraybar, Jose Pablo, Carracedo, Angel, Fonseca, Stephen, Goodwin, William H, Guyomarc'h, Pierre, Jimenez, Alejandra, Krenzer, Udo, Morcillo Mendez, Maria Dolores, Prieto, Jose Luis, Rodriguez Gonzalez, Jacqueline, Ruiz Orozco, Yarimar, Taylor, Jane, Tennakoon, Ajith, Winter, Kristy and Finegan, Oran

It is advisable to refer to the publisher's version if you intend to cite from the work.
<https://doi.org/10.1016/j.fsisyn.2021.100154>

For information about Research at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>



The search process: Integrating the investigation and identification of missing and unidentified persons

ARTICLE INFO

Keywords

Humanitarian forensic action
Human identification
Antemortem
Postmortem
Reconciliation
Disappearance

ABSTRACT

The effective search for the missing and identification of persons, alive or dead, are core components in the prevention and in resolving the issue of Missing Persons. Despite the growing literature on this topic, there is still a lack of publications describing the Search as a process that includes different phases inherently composed of forensic investigative and identification principles for both living and deceased missing persons. This paper is the result of discussions between the Forensic Unit of the International Committee of the Red Cross (ICRC) and members of its external Forensic Advisory Board. It aims to present the Search process as an overarching concept that includes the investigation and identification phases of the missing in any state (dead or alive), in any scenario (with or without bodies), with an integrated, multidisciplinary, and multiagency approach for implementation by all actors involved in the investigation and identification phases of missing persons.

1. Introduction

Uncertainty about the *whereabouts* and *fate* of a missing relative can have a direct effect on all members of the family unit [1] and, in some cases, on an entire community [2]. Most families will continue to search for their loved one until all avenues have been explored and until they receive authoritative and reliable information on their whereabouts and/or fate.

The search generally focuses on the recovery and individual identification of remains, while the reality is much more complex, especially in migration and conflict/post-conflict scenarios, where it is not possible to assume in the first instance that the person is alive or dead and where, in the event of death, the remains are located, and for many it is likely that the remains will never be found or returned to their family. This fact needs to be emphasized, as not all missing persons are dead and not all searches result in finding a body; there is still, however, a need to carry out a process leading to the clarification of the whereabouts of the missing. By default, all missing persons cases should remain open until the person is found alive or dead, and the remains of the dead are located, identified and where possible returned to their family.

The tendency to understand the search only as a “body centred” forensic response needs to be corrected and broadened, opening its scope to a more comprehensive process aimed to provide answers about the whereabouts and fate of the missing. The effective search for the missing and the identification of persons, alive or dead, are core components in the prevention and in resolving the issue of Missing Persons [3]. The identification of persons in any context, in routine cases or large-scale events (e.g. disasters, ongoing or post-conflict, migration, femicides and other situations of violence (OSV)), is part of the **Search process** (capital “S”) and as such intrinsically linked to all the other

steps. Reliable identification is essential for legal, administrative and humanitarian reasons, including providing answers to families.

Despite the growing literature on this field in the form of guides, manuals, scientific papers, action protocols, standard operating procedures, etc., there is still a lack of documentation and publications describing the Search as a process that includes different steps inherently composed of forensic investigative principles. Understanding the Search as an overarching concept when addressing *The Missing* in the broad sense (meaning in any context and scale), eventually optimizes the chances for case resolution. In this respect, the aspect of human identification becomes an important part of a wider and more complex process.

The clarification of the whereabouts and fate of missing persons and, in case of death, their circumstances and cause, are addressed under multiple provincial/state, national and international legal provisions and normative frameworks, among which we can mention International Humanitarian Law (IHL) [4], International Human Rights Law (IHRL) and International Convention for the Protection of All Persons from Enforced Disappearance (ICPPED). Under these provisions, the Search becomes not only a right but a mandate. In this regard, there are many examples at the international level of efforts made by States, International Organizations (IO), Non-governmental organizations (NGOs) and civil society in the search for and identification of missing persons resulting from diverse and complex contexts. However, in most cases, the Search process has proven to exceed the local capacity on the one hand and, on the other, to be inadequate to ensure a coordinated, integrated, multidisciplinary, and very often multi-agency response as required.

Many of the existing International Committee of the Red Cross documents and scientific literature on forensic identification provide

<https://doi.org/10.1016/j.fsisy.2021.100154>

Received 29 March 2021; Received in revised form 27 May 2021; Accepted 27 May 2021

Available online 9 June 2021

2589-871X/© 2021 The Authors.

Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

useful information and recommendations for the location, recovery, examination and identification of human remains, including collection of antemortem and postmortem data for identification purposes and the use of certain techniques. However, little has been mentioned about the search for and identification of living missing persons, or about the search in scenarios in which there may not be bodies, thereby transcending the notion that forensics is only focused on the recovery, management and identification of human remains.

Therefore, it is necessary to revise traditional concepts, to introduce new ones and to expand the information available on the Search process to better include the investigation and identification of the missing in any state (dead or alive), in any scenario (with or without bodies), emphasizing the necessary integrated, multidisciplinary, and very often multiagency approach of the mechanisms to be implemented.

The main objectives of this document are:

- ✓ To provide clear concepts regarding the investigation and identification procedures with a focus on large-scale events involving both living and deceased individuals.
- ✓ To describe on the main requirements to ensure effective articulation, communication and coordination between different levels of response (political, organizational and operational) and involvement of concerned families, with clear roles and responsibilities.
- ✓ To provide key elements which must be integrated when clarifying the fate and whereabouts of missing persons in given contexts.

It is important to emphasize that this document does not purport to be a thorough or detailed guide, protocol or instruction manual on forensic techniques, it rather intends to be an instrument with the main purpose of unifying and clarifying key concepts, principles and recommendations to professionally manage the process of the investigation and identification of missing persons, applicable to single cases but also to complex contexts.

The document is addressed to all actors involved in the investigation and identification of missing persons irrespective of their fate (alive or dead) and their possibilities for location: forensic and health practitioners, investigators, judicial operators, law enforcement authorities, military personnel, disaster managers, decision and policy makers, administrative authorities, etc., including also international organizations, non-governmental organizations and civil society.

2. General aspects and principles

It is relevant to consider key concepts and principles regarding the processes of investigation and identification of missing persons:

- a. The Search (capital "S") is a process that combines sub-processes conducive to determining the whereabouts and specific fate of a person.
- b. The Search is therefore linked to several phases and not only to the specific early stage of the investigation. All the steps leading to clarification of the fate and whereabouts of a missing or unidentified person (alive or dead) are part of the overarching concept of Search.
- c. Fate refers to the state or condition of the person (alive or dead), while whereabouts relates to the person's journey and the circumstances that led to that state (fate) and location [5].
- d. The Search for missing persons consists of tracking and reconstructing, in retrospect, their journey to determine with a degree of certainty or confidence their fate and whereabouts.
- e. Information on the whereabouts can help to infer the fate of a missing individual. However, to determine with certainty the fate of a missing person it is necessary to identify an individual (dead or alive).
- f. However, the Search does not necessarily imply the actual finding of the body. It is possible to infer the fate of a missing person

through investigation or even technically reach with confidence their identification without physically accessing their body. Discussions around resolving cases of missing persons need to incorporate scenarios in which there may not be bodies, i.e. a **non-body centred broader forensic response** [5].

- g. Any methodological approach to search for the missing must be based on the principle that, unless there is reliable evidence, their fate is still uncertain, and therefore it should not be assumed that they are dead, but consideration given to all possible outcomes in relation to the fate. Hence, the investigation must start by considering that they could be alive or dead.
- h. The investigative component is dynamic, and its complexity depends on the context and specific characteristics of the case.
- i. The identification process is part of the overarching concept of Search and hence is directly related and dependent on clarification of the fate and whereabouts of the person (missing, disappeared, missing and presumed dead, dead, unidentified, unclaimed).
- j. It is necessary to emphasize that **identification is a process itself** rather than a result of the use of a given technique.
- k. In this sense, the act of correctly allocating a name to a person in the identification process does not completely fulfil the requirements of the right to know of their relatives. The retrospective reconstruction of the circumstances leading to the fate of a person is also an important part of the identification process. The right to know will therefore be incomplete if efforts to clarify both components, fate and whereabouts, are not properly addressed.
- l. Therefore, the identification phase of the Search process is also of an investigative nature in which the collection of information from different sources is the basis for this reconstruction and the resulting conclusions. Preliminary investigation is a fundamental aspect of the process [6]. Failure to carry it out with due diligence will adversely affect the outcome, with direct negative implications on the expectations of the families and the public's loss of confidence in the responsible authorities.
- m. The Search process must follow basic investigative and criminalistics principles in order to guarantee the reliability of the results, regardless of the main purpose of the project or mandate of a given mechanism (criminal proceedings and/or humanitarian action). In this sense, documentation and preservation of evidence, chain of custody, secure and appropriate storage, etc. are required to maintain the integrity of the evidence and information collected, and thus the quality and reliability of the results.
- n. Identification is a comparative exercise. It is not possible to reach a conclusion without comparing information coming from both the *person being searched for* (including the circumstances in which the person went missing) and the *person/body whose identity is to be confirmed* (including the circumstances of finding). The quality, quantity and variability of this information has a direct impact on the identification. For this reason, information collected from both datasets should be equivalent, without prioritizing one to the detriment of the other.
- o. Information will be compared as independent **lines of evidence**; each will include comparable data from different information sources to confirm or refute a hypothesis formulated during the identification process (see section 3.4.4.1).
- p. Even in simple cases, the identification must, where practicable, involve several lines of evidence rather than relying solely on a single technique (i.e. fingerprints, dental, DNA, etc.). The type and number of lines of evidence will depend on the context and complexity of the case. Assessing lines of evidence is a specific step in the process and has specific requirements in terms of required knowledge, background, etc.

- q. A conclusion should be reached by considering all datasets without discriminating against any; reviewing systematically not only what appears to match in similarities but also proactively seeking to find discrepancies, both explainable and unexplainable. In this sense, the process of identification requires access to and analysis of all information available on a given case.
 - r. Any decision on identification forms part of a logical and objective but also holistic and comprehensive process. In this regard, the Search process must be **multi-disciplinary, objective, integrated, holistic, exhaustive, multi-agency coordinated, and able to withstand peer review.**
 - s. Given its multidimensional nature, the Search process requires a dynamic, multifactorial and interconnected dialogue of the information collected throughout the investigation that should facilitate and contribute to decision-making.
 - t. Large-scale events [7], unlike routine death investigations, require a broad approach in which mechanisms and protocols need to be adapted to properly address them, with a strict adherence to the scientific, forensic and investigative principles of the identification process.
 - u. Forensic and legal communities have the duty to assign roles and responsibilities in accordance with legal mandates and their skill sets so that forensic experts, police investigators and legal authorities coordinate their approach in an optimal, transparent, effective and efficient manner. Coordination, communication and information sharing are key principles to ensure effective results.
 - v. Families/relatives of missing persons (and the community at large) should be adequately involved in the Search process, should be informed regularly of developments and decisions taken and their right to take informed decisions should be respected.
- b. The strategy used to approach an investigation and its feasibility also depends on the moment in which it is carried out and the most pressing interventions (e.g., priority to preserve life immediately after a missing person has been abducted versus the need to preserve a mass grave site as an objective, years after a conflict). Challenges in any investigation will be presented differently in more recent cases versus an enquiry into events that happened in the past, but may include elements such as security (of both persons related to the case and investigators); mobility of target individuals, witnesses and offenders; access to witnesses and/or missing persons' relatives; quality of the information on the missing persons and/or on non-identified bodies; political motivations; altered landscapes, revitalization or development of affected areas, possible modifications of burial sites, etc.
- c. It is important to pay attention to the legal framework in which the investigation will be carried out: *humanitarian* (centred on the location and identification of missing persons) and/or *criminal* (centred on the search for criminal accountability or a truth and reconciliation-based process), evaluating the consequences that an incorrect procedure may have in the future in terms of right to truth and access to justice for family members and individuals. The quality of the investigation and the guarantee of due process must be the same in any legal framework.
- d. Another factor that influences at the methodological level is whether investigations are carried out within the framework of an internal (national) or international investigation, as this may incorporate different governmental and non-governmental coordination components. This situation is evident, for example, in the location and identification of missing migrants where it is not only necessary to implement a national investigation system, but also imperative to develop inter-state coordination mechanisms. The same applies in mass disaster incidents such as plane crashes or natural disasters where foreigners may be included amongst the dead.
- e. Determining the scale or magnitude of the case to be investigated is fundamental to methodological planning and strategy. For this purpose, it is necessary to quantify the number of the missing and/or deceased resulting from the event/s under investigation. The challenge (and starting point) is to compile a list of names as exhaustive as possible, which is centralized, unified and coordinated among the institutions or organizations involved in the investigation.

3. The search process

Taking into account the previously presented definition of the Search as the overarching process that includes the investigation and identification of missing and unidentified persons, this section intends to develop the methodological and investigative aspects.

3.1. Methodological approach

The scale or magnitude (number of persons) of a case and its complexity vary depending on the context. Although from the scientific point of view the same techniques are used, the variation of the context will influence the methodological approach as well as the possibilities of success in locating the missing persons (including their remains in the case of death).

The methodological strategy employed in a specific operation will depend to a large extent on the scenario considered. The approach should thus be methodologically adapted to the context, the type of case, its magnitude, its complexity and the time of intervention. It is necessary to take a series of key considerations into account:

- a. One of the first points to be addressed in the investigation is the context in which the events take place, for example:
 - Routine missing persons cases (day to day cases within local communities reported to local authorities)
 - Routine death cases (day to day cases within local communities reported to local authorities)
 - Historical deaths (including cold cases)
 - Human trafficking and enforced disappearances
 - Large-scale disasters with mass fatalities
 - National and international conflicts
 - Migration
 - Other situations of violence (e.g., femicides, terrorism)
 - A combination of the above-mentioned events

In general, most national social structures are prepared to a greater or lesser extent to absorb cases on a small scale. This includes both investigative/medico-legal systems (forensic services and experts, criminalistics, police investigators, etc.) and the institutional system of public and judicial administration. The investigation of these types of cases is common and its quality will depend on the country's pre-existing performance in terms of regulations and procedures in place, trained personnel, budget, infrastructure, equipment and intra- and inter-institutional coordination, preparedness and planning.

However, few countries have the economic and structural capacity to address **large-scale** events and can be further overwhelmed by the magnitude or complexity of a case when they lack a pre-established and well-implemented contingency plan. There is often a lack of action protocols in emergencies or contingency plans at the national level, as well as a lack of knowledge of operating protocols or internationally standardized procedures (see for example INTERPOL guidelines [8] on disaster victim identification on www.interpol.int). This lack of prior preparation limits the ability to address large-scale cases even when they are predictable. In this regard, an evaluation of the local capacity to respond to large-scale events, including existing regulations, needs to be accomplished to develop a strategy to improve the system.

- f. Another factor to consider is the categorization of the type of case, i.e. the classification of the case as closed or open, which will greatly affect its complexity and the specific requirements in its

methodological approach. The concept of open/closed is generally used to classify an event based on the availability of information about the identity of the victims: i.e. if there is a list of the alleged individuals that may be related to a specific event, (closed) or if there is not such a list, (open). The classic example of a closed population event is an airplane crash, in which the list of the presumed deceased is available via the flight manifest. We are usually faced with mixed or semi-closed contexts, in which we know the identity of some but not all the individuals or there is a partial list of possible individuals or identity hypotheses. An open population event may involve single or multiple incidents whereby an unknown number of individuals are affected and for which there is no presumed list of names. Multiple incidents may occur over a short period of time or for many years (e.g. armed conflict, migration, OSV) leading to large inventories of missing persons and human remains requiring reconciliation and identification, hence the open or unknown population dynamic of those that should be included in the investigation. In some events, not all families will report their relatives missing or be registered as missing through other avenues while conversely not all dead bodies will be recovered and positively identified to be returned to families.

- g. There are other components to consider, besides those mentioned above, that add to the complexity of investigations. Among them are factors such as population displacement or dispersion (at the national and/or international level); voluntary disappearance; change of identity; biological and socio-economic diversity within the group of missing persons; the conditions in which the remains of the deceased (decomposed, commingled, incomplete and/or fragmented, or badly burnt due to several reasons, among which are the circumstances of death and postmortem alterations); events following that may have caused the alteration, relocation and/or mixture of human remains (poor search and recovery techniques, failure to respond in a timely manner to preserve the sites and prevent further damage and compromise by the environment, secondary graves, exhumation, transportation, poor mortuary management practices, lack of body security, deliberate malicious interference, etc.), access to sources of information (protection of personal information, restricted security information, military files, mobility of witnesses and relatives), poor IT infrastructure to import and manage large volumes of data, lack of institutional centralization of hardcopy and softcopy data, etc., without forgetting the role of politics in the design and implementation of search policies (the political will is often one of the key factors in this regard).
- h. When conducting search activities, the wish of those contacted must be respected: specific situations such as voluntary disappearances or changes of identity are important, and in general, respecting these decisions should be the priority. Additional documentation should include explicit authorization (or refusal) in relation to contacting the person who reported the Missing Person case, including what information should be shared with the enquirer. Evaluating the situation on a case by case basis is advisable as there are different factors that might have influenced the decision taken by the contacted person. This will allow the investigation team to assess possible risks, especially on security, and act according to the principle of **do no harm**.

Efforts are very often concentrated on the collection of any kind of data from missing and unidentified persons instead of conducting a thorough investigation. Other steps in the investigation and identification procedures that are particularly critical, such as the collection of information on the events and the individuals, as well as the recovery and examination of remains in cases of death, are often neglected. In other words, care and concern are more often shown to "postmortem analysis" while leaving other sensitive and crucial aspects in the investigation such as the collection and analysis of information on missing persons and circumstances of disappearance, and the proper recovery of

human remains (in the event of deaths) unattended. As a result, there is often a lack of information to reconstruct the whereabouts of the person as well as a lack of comparative data to support or sustain an identification in the clarification of the fate. Consequently, dead body may be returned to the wrong family while the right body remains unidentified.

If the investigation of a case and the identification of missing persons are understood as processes and not as the result of specific techniques, no stage is more important than another. The lack of relevant information or delivering poor performance at any one stage of the Search process will compromise or inhibit the full potential of other competent actors in their collective efforts to resolve the missing and identify the dead. The metaphor of a chain only being as strong as its weakest link is accurate; in this series of activities, each actor can potentially hinder, obstruct or compromise the team's collective efforts towards restoring family links.

Well-designed facilities or sophisticated equipment in medico-legal institutes or laboratories may create an attractive image, but without a comprehensive approach to the process, without an interpretative (and not only technical) capacity on the part of professionals, and without proper training of the teams responsible for the different stages of the process, the investigation will be limited, more difficult and at risk of failure.

It is necessary to highlight the importance of the involvement of families in the operation, as well as their right to be regularly informed. As part of the operations, there are several aspects that do not necessarily refer to the technical or legal fields, and the opinions or views of the families will help in the decision-making process. As already mentioned, the investigation and identification of missing persons are complex procedures requiring a vast number of professionals and may require a long-term operation over several years. Adequate involvement of families, not only as providers but also as repositories of information will be beneficial in avoiding uncertainty during the process. This will respect their right to actively contribute to the investigation and their right to know the whereabouts and fate of their loved ones.

Thus, the methodology must adopt a **holistic approach**, aiming to reconstruct the history of an individual from the beginning of their journey to the end, but also letting go of the commonly held assumption that all the missing persons are dead.

3.2. Investigative steps

After defining important concepts above, this section develops the different aspects of an investigation and context analysis, offering concrete steps to optimize the results.

3.2.1. Main considerations

We distinguish two unknown entities in the Search process:

- **Missing Persons (MP)**: identities without bodies
- **Unidentified Persons (UP)**: bodies without identity, which can be either living persons or human remains. Although in most contexts a dead body is not legally considered as a person, the term *person* is here inclusive of living and deceased individuals. Distinction between unidentified persons (UP), unidentified decedents (UD) and unidentified human remains (UHR) are found in many contexts, however, in order to simplify, the term UP will be used throughout this document regardless of the person's status.

Achieving success in the identification process means attempting, whenever possible, to match these two entities accurately. But this is only related to the clarification of the *fate* of the person. If we accept that the right to know (and thus the Search process) includes also the need to clarify the *whereabouts* of the person, we understand why the investigation has to broaden the scope to collect and interpret much more information than just the data to facilitate identification. Information intended to clarify the whereabouts will be important for the

clarification of the fate (identification) and vice versa, the clarification of the fate might contribute in certain cases to the clarification of the whereabouts of the body.

Each entity (the missing and the unidentified) holds information to be carefully collected throughout an investigation.

This document also introduces two concepts that adjust the classical scheme. Traditionally, the term *antemortem* was used to designate all the information relevant to the missing person and the term *postmortem* was used to designate all the information relevant to unidentified human remains. Such terms are restrictive and not adapted to all scenarios, and as such their generic use is not appropriate in all cases.

Not all missing persons are dead; therefore, “antemortem” (before death) is not appropriate. The term can incorrectly imply death without any evidence, and it is usually painful, even offensive, to relatives. Likewise, not all unidentified persons are dead, as there are frequent cases in which living persons require their identity to be proven (undocumented persons, infants and children stolen/separated from their families, unaccompanied children in cases of migration or mass disasters, medical illnesses and trauma (i.e. hospital patient in a coma or with amnesia, elderly person with dementia, individuals with mental health deficits), detainees in clandestine centres, etc.) Therefore, “postmortem” (after death) is also too narrow and a generic term.

Consequently, throughout the document, we will use the following, more general terms:

- **MPD (Missing Person Data)** to replace the traditional term AMD (antemortem data).
- **UPD (Unidentified Person Data)** to replace the traditional term PMD (postmortem data) when referring to individuals (alive or dead) whose identity is unknown. Postmortem data are only one part of this broader category when reliable proof of death has been confirmed.

3.2.2. Preliminary investigation

The preliminary investigation (initiated by the competent mandated authorities) is the basis for the identification task and focuses on collecting background information about events, the missing and unidentified persons. It consists in formulating a hypothesis related to the investigation of the possible persons’ identities (lists of missing and/or dead persons), the place in which they may be found (alive or dead), and the reconstruction of the events since they went missing. Any contextualization is derived from the investigation. Understanding the context at the moment of the disappearance should be inherent to any operation (e.g. political situation, security situation, groups operating in the zone in case of conflicts, migration routes, original migration purpose and destination, etc.).

Although generally regarded as the first step in forensic investigation, background research can begin at any time, although the sooner it begins, the better, and should continue until the missing person is identified and no longer missing. Outcomes of the identification process for certain cases can also contribute to the investigation of other cases.

There are many sources from where such information is collected and the type, availability and access to them depends on the context in which the events took place and authority to access that information. The protection of personal information [9] has become more important in recent years thereby requiring justification for its release to a requesting party.

Sources of background information can be grouped into several categories:

- Written sources: including personal documentation, letters, social media sites, school and employment documentation, military and police reports or files, autopsy reports, judiciary investigations, NGO reports, reports by political organizations, fingerprint data files of dead bodies and missing persons, birth, marriage and death certificates hospital admission books, morgue and cemetery registers, dead body removal forms, intelligence reports, press releases, police/

military interrogation reports, media records and reports, petitions by family members to national or international organizations (e.g. habeas corpus after an arrest), medical and dental records, etc.

- Oral sources: including statements by or interviews with witnesses, relatives, informants, fellow members of militant groups, fellow students or professional colleagues, physicians or dentists who might have assisted the missing person, hospital personnel statements, etc., made at any stage
- Audio-visual sources: including photographic, video graphic, audio, radiographic material of the missing persons and places related to the events (or the event itself) being investigated; street, aerial or satellite photography of the areas under investigation suspected or known anchor points in the missing persons routine; last known location to be seen alive, known point of abduction or place of disappearance; body dump sites; militia, police or military checkpoints; migration routes; detention centres; illegal burials; refugee camps; etc. before and after the events concerned.
- Social media and cyber-communication sources: especially important in recent years due to increased use. These tools have expanded the social circle, creating networks and georeferencing people, which constitutes a valuable tool in their traceability.

While conducting the search to locate the missing person, the efforts to reconstruct the whereabouts will also serve to provide families, communities and societies with an accurate account of the events (i.e. right to know, right to truth). The collection and recording of information should therefore be thorough, detailed, and performed by trained individuals.

3.2.3. Consolidation of the list of missing persons

One of the main variables influencing the complexity in large-scale scenarios, and one of the major difficulties at the start of any investigation of an event is to establish its scale or magnitude, that is, the number of individuals involved. A large number of individuals creates a challenging search and identification situation.

Similarly, to the regular approach used in genetic analysis, the total number of missing/deceased persons related to an event has to be estimated as accurately as possible to build the prior odds value, mandatory within the Bayesian framework on which the genetic statistics are based, in order to calculate the *posterior odds* or probability of identity. The *prior odds* adopted in a Bayesian approach should reflect the number of individuals in the event to properly define levels of identification certainty in the form of *posterior probability* [10,11].

To this end, it is desirable to estimate the likely number of individuals (missing and deceased persons), i.e. *how many are they?* Based on the various sources of information about an event(s), a list of missing persons and deceased bodies should be compiled for prioritizing activities in relation to initiating the search, i.e. *who are they?* Compiling a unified list of missing persons is one of the main challenges in the implementation of large-scale investigations anywhere.

Directly after a large-scale event, shock and uncertainty of the whereabouts of loved ones can significantly inflate the number of reported missing for several reasons, associated mostly with a failure of relatives to positively communicate with their loved ones. But the opposite can also occur when investigations are conducted years after an incident or series of events: the number of missing/dead persons is often underestimated, due to factors such as mobility, security, dispersed populations, lack of coordination among participating agencies, a non-existent or vague system for the reporting of disappearances, politicization of an event, corruption and fraudulent motivations to report higher numbers of missing and dead, etc. In contexts of enforced disappearances or migration, the fear of risk of prosecution or incarceration of the missing person may prevent relatives from contacting authorities.

In general, after any event, there are many incomplete lists of victims (missing and deceased) made by different agencies and institutions, organizations of relatives, NGOs, etc. This can cause confusion and

errors if a complete list is not centralized or collated and systematically updated. It is very important that the system of data collection precludes duplicate cases from being reported. The simple act of misspelling a name can cause the duplication of a single missing persons if reported by two different people.

The starting point (and challenge) is to create a unified list of names of those reported to be victims as exhaustive as possible, centralized and consolidated among all the institutions and organizations involved in the investigation.

This process is dynamic, and the list should be the compilation of all reported cases, including and distinguishing their status (see section 3.2.5), through competent case management. It requires verification that accurate methods of collection were conducted.

Irrespective of whether the situation is a routine missing person report or a large-scale event, every person reported as missing should be assigned a **Unique File Number (UFN)**. This is essential for quantification purposes and allows for tracking/traceability of professional management of all associated file material effective communication exchange between investigators, investigators and families, and agencies; and maintaining an established means of managing physical evidence. A UFN ensures that everybody is speaking the same language and referring the correct case and related information. Even in the case of homonyms with same date of birth, the UFN allows for separate files for each individual.

Missing person cases are best managed in a centralized registry for systematic case management procedures, linkages to other persons (missing, dead, survivors/witnesses, perpetrators, etc.) and events, and comparison against unidentified persons and dead bodies that already have been reported or are still to be reported (e.g. registries from hospitals, detention centres, refugee camps, etc.). Being aware that this centralization is highly complex to implement in most contexts, we must emphasize its importance and the benefits of its implementation (see Sections 4 and 5).

This unique number is also important to register kinship when taking biological reference samples from relatives for genetic analysis, since in addition to the problems described above, the same sample may have to be used for several missing biological relatives; therefore, the sample number will be insufficient to refer to each specific kinship. Each biological reference sample (BRS), coded with the donor's unique number, needs to be associated with the missing person through the UFN with which they have been coded, indicating their biological kinship as well.

For example, let us consider the case of a woman who donates a biological reference sample (coded as BRS 3890) for a genetic analysis to be carried out in relation to two missing biological relatives, her daughter (UFN 12345) and her sister (UFN 45678). Recording the kinships associated to that sample will be more straightforward: e.g. Sample BRS 3890: mother of UFN 12345 and sister of UFN 45678.

This will help traceability, a correct link to the individual and the confidentiality of the information when sending the sample to the genetic lab. Additionally, the UFN should be associated to the status of the person (missing, deceased, survivor, etc.) to maximize the possibilities of quantification and traceability.

Consolidation of the list of missing persons will also facilitate relevant entities to know who their relatives are, and what are their specific needs. This will also facilitate the required integrated approach throughout the investigation and identification processes and the support to families of the missing persons.

3.2.4. Collection of information on the missing person from different sources

It is necessary to gather detailed information on the missing person (MP) with the purpose of creating a **MP case file** that integrates their biological and social background and represents the minimum set of information that should be collected and archived about the MP (*Archivo Básico de la Persona Desaparecida* in Spanish). This MP case file includes the *missing person data (MPD)* collected from different (oral, audio-visual

and written) sources, and to be analysed throughout the investigation and/or (in the event of death) properly compared against the information on unidentified persons data (UPD) during the identification phase.

This collection of information will help reconstruct the physical and medical profiles, family information, lifestyle habits, relationships between and among other persons, as well as the circumstantial and contextual information related to their disappearance.

When collecting information about a missing person, it is important to recognize that it is not known what features, characteristics or secondary information will be compared during the identification process. Hence, the quality and quantity of information collected becomes crucial when evaluating potential matches to unidentified persons and dead bodies.

As part of the personal background (*who is the MP?*), it is necessary to collect as much detailed information as possible regarding the following:

- Any official or reliable identification documentation of the missing person: national identification card, passport, driver's license, birth certificate, employment security access card, death certificate (if any), etc., which will be electronically stored (after scanning or photographing) in the missing person casefile.
- Biological and physical background: biological profile (which includes sex, age, height), ethnic affiliation, distinct physical features (specific marks, complexion, morphological traits, etc.), physical activity, genealogy descriptions, medical history and dental charts. It is important to gather photographic material, medical and dental radiographs, dental casts, fingerprints, etc., which will be ideally electronically uploaded to the missing person casefile.
- Social history/lifestyle: professional, academic and political background (if any) and associations of the missing person, relationship with other potential witnesses, missing, deceased, nicknames or political aliases, recreational and sport activities, etc. Increasingly, the use of social media can heavily contribute to the understanding of the missing person's last communications and activities.

In some contexts there may be a lack of medical or dental records due to a number of factors, such as limited or no access of the population to health services, destruction of archives after a period of time, poor quality records, loss or destruction of records as a result of the incident.

In these circumstances much of this information can only be gathered from interviews of the individual's family members or close relations, appreciating the loss of accuracy and veracity that this often entails.

Interviews must include technical and investigative aspects and are of utmost importance in the search for and the identification of the missing. Therefore, the interviewer should enhance the quality and quantity aspects of the information collected.

During the interviews it is fundamental to respect the cultural and religious context of the witnesses and relatives, building to the extent possible a relationship based on trust and care for their confidentiality and security. Sadly, it is routinely witnessed that in haste to obtain information interviewers have failed to recognize that the time, place and manner of the interview can not only be inappropriate but also put in danger the interviewees' security. Furthermore, unique features and personal experiences of a sensitive nature may yield very high value but are unlikely to be shared by relatives if the level of trust and confidence in the process hasn't been met for open dialogue.

It is essential to develop adequate mechanisms to gather information, with trained staff and protection of the confidentiality and security of witnesses. In general, it is advisable to conduct interviews with several family members and close relations of the individuals, if possible, holding more than one meeting (suitable in terms of when and where), using specific standardized technical forms and staff trained and mentored in their use. Standards on data protection must be followed, and for humanitarian activities, the Handbook on data protection in humanitarian action [12] contains recommendations to process sensitive data. In practice, interviewers have the responsibility to obtain informed

consent from the interviewee after explaining clearly what the collected data will be used for, and to whom it might be shared, in accordance with the local regulations and the mandate of the collecting entity.

The collection of Biological Reference Samples (BRS, e.g. blood/saliva) from relatives for forensic genetic analysis purposes requires a clear strategy encompassing the following aspects:

- Assessing and defining the most adequate moment to start the collection of samples in line and in accordance with the process of the Search given the context (conflict, OSV, migration, etc).
- Addressing legal and ethical aspects involved with the families giving their consent to conduct genetic studies, ensuring confidentiality and restricted access to the information collected [13,14]. This include the clear understanding from the families about their data protection right (use of the sample, destruction on demand, etc.).
- Considering cultural and religious aspects regarding the collection of biological samples, including social dimensions of ascribing family kinship. Among cultural aspects, it is necessary to highlight the need to assess the concept and understanding of biological relations vs social relations in many populations, as a lack of distinction can later challenge the correct interpretation in the genetic matching.
- Ensuring technical conditions and capacities to collect, store and process samples as well as the available resources, including proper referential and statistical tools for analysis, reporting and documenting results in line with international accepted standards [15].
- Ensuring a clear policy for managing incidental findings related to discrepancies in kinship (misattributed parentage). In this sense, “... *In cases where an instance of non-paternity is discovered during the identification effort, this should not be disclosed to the family members*” [19]. In other words, a policy of non-disclosure of incidental findings is recommended [16].

More information on the collection of BRS can be found in the Good Practice Guide for the Use of Forensic Genetics in Investigations into Human Rights and International Humanitarian Law Violations [17].

3.2.5. Data collection and analysis related to the whereabouts of the missing person

This section addresses the importance of looking at the Search process of a missing person through the perspective of mobility: both in terms of space and time, but also in relation to changes in the status of the sought persons. This includes the key concept that after this investigative step there will be more information that will enable orienting the efforts towards searching for either a living person (health facilities, detention centres, refugee camps, centres of adoption, human trafficking networks, illegal immigration routes, border or immigration services interaction etc.) or a deceased person (mass fatality incident, hospitals, morgues, cemeteries, informal or clandestine graves, etc.).

Moreover, information should be gathered about the events and contexts in which the disappearances and/or deaths took place (*where are they? what happened to them?*), so as to include as much detailed data as possible on the circumstances of the disappearance and/or death, geographical-temporal location, chronological follow-up (if other events took place over time), legal, administrative or social actions undertaken by the individuals’ relatives and/or close relationships (habeas corpus, petitions on disappearances, paid press releases), etc.

The search and the identification of missing persons in any context (routine casework, conflict, post-conflict, mass disaster, migration and OSV) is a **dynamic** process. Therefore, it is important to consider two key factors: status and mobility of the missing person.

A person may change their **status** multiple times since the last time they were seen: not localized, arrested, missing, subject to enforced disappearance in clandestine conditions, voluntary absence, witness, presumed dead, known dead regardless of finding the remains, identified body but unclaimed, etc. Such variety and changes throughout the Search process make it impossible in most cases to select *a priori* a single

line of investigation, meaning it is important to consider all possibilities regarding status in the preliminary investigation stage. It is important to record this state, and any changes, throughout the investigation in the MP casefile, together with the date of update for traceability, networking and quantification.

The concept of **mobility** refers to the physical displacement of persons during the investigation, i.e. geographical-temporal or geo-temporal changes. This is fundamental in cases of abductions, human trafficking, migration, forced displacement and detention centres circuits, etc.

The combination of status and geo-temporal mobility of the missing person is of great help for follow-up and traceability purposes, rendering the investigation and identification processes more dynamic and enabling to better formulate lines of investigation, expand the comparison criteria, create hypotheses on the location of the missing person, reconstruct networks (e.g. interactions with others who disappeared), location of sites (mapping of human remains sites), and of unidentified persons. This whole issue regards the reconstruction of networks and exploiting non-explicit relationships between the sought person and other persons.

During the investigation and identification steps, in addition to properly collecting information, it is imperative to underscore the importance of information analysis; collecting information is not synonymous with analysing it. Both aspects are essential to the process.

The mapping of a missing person, as a key concept for an effective search in open population events, should not be confused with the mapping of sites potentially containing human remains. This is a broader concept referring to the follow-up and traceability of the missing person within a framework of a dynamic investigation, incorporating the analysis of the contextual information throughout the Search process.

In this sense, disciplines such as physics, mathematics, geology and engineering, are very useful as information analysis tools and can be used to generate lines of investigation and evidence, for example, in establishing hypotheses of identity, the analysis of networks (relationships between missing persons, circuits of detention centres, relation between detention centres, refugee sites and burial sites, circuits of dead bodies when recovered, transported and disposed of during or after the events, etc.), hot spots maps (key points in migration routes, places of executions, human remains deposits, etc.). Mathematical models enable predictions or prioritization of some persons more likely to be connected to specific events for identification purposes [5,18,19]. The goal is not only to reach an identification but rather a timely one that reduces the missing person’s exposure to risk of harm, while also ensuring their prompt return or communication with family to reduce their suffering and uncertainty.

The use of networks can be applied to exploit explicit and non-explicit relationships among individuals, i.e. connecting patterns that link individuals through mathematical models (e.g. places and dates of last seen, death, etc). If such patterns exist for a particular event, these models can shed light on which variables may be relevant to understand the dynamics of the case and to reconstruct a journey (*whereabouts*). That will have a weight in the identification, understanding that “context is proof”.

In many investigation contexts, incomplete information compounded by a lack of transmissibility mechanisms and coordination between governmental and non-governmental agencies or even different departments or areas at an intra-institutional level, hinders the process of information comparison and analysis. Likewise, information that is often adequately collected and registered in centralized repositories, but not comprehensively analysed, renders all efforts pointless and ultimately increases the number of missing persons.

Information analysis should be, as far as possible, multidisciplinary and coordinated. Therefore, we emphasize the importance of generating mechanisms for the collection, recording and comprehensive analysis of information in a centralized, multi-agency, multidisciplinary and

coordinated manner with appropriate data protection policy.

3.2.6. Location of unidentified persons (UP)

Revealing the location of unidentified persons (alive or dead) is also an integral part of the Search process explained above. The outcome of this process will be the documentation/mapping of sites where living people and/or human remains whose identity has not been established are located, which will allow a subsequent forensic plan to be established for the collection of information about them (examination of living persons, recovery and examination of remains). This process includes, but is not limited to, the search for unidentified persons in detention centres, hospitals, refugee camps, migrant and refugee reception and detention centres, mortuaries, human remains sites and burials.

The elaboration of a list of non-identified persons is an important starting point in the identification process and, therefore, in determining the fate of the missing persons. In some scenarios, this list will be limited in accuracy (e.g. in mass graves of commingled remains where only a minimum number of individuals or MNI can be established) and should be dynamically reassessed along the analytical process.

Similar to the procedures described above for missing persons, the goal is to create a unified list of unidentified persons (living or dead) and sites as exhaustive as possible, centralized and consolidated among all the institutions and organizations involved in the investigation, with a UFN associated, for the sake of traceability and quantification of cases.

As for missing persons, it is necessary to systematically collect, document and record (preferably centralized) information on unidentified persons, location, and human remains site mapping (in the event of death), in order to plan a subsequent forensic intervention aimed at the actual recovery and examination.

This investigation will allow to address the Search process in both directions, from the missing person to their location (hypothesis of where the missing person might be) and from the unidentified person to their identification.

Depending on the context it is important to proceed with security measures to protect the person and/or the area where human remains can be found, as a prevention of further damage.

3.3. Collection of unidentified persons data

Accurate personal identification in a forensic context is, given the humanitarian and legal (civil or criminal) implications, one of the main challenges usually faced by forensic practitioners. Personal identification commonly concerns unknown decedents. However, forensic practitioners frequently deal with the identification of living persons as in cases of illegal migration, human trafficking, child abduction or mental conditions (e.g. Alzheimer, psychological trauma, etc. The field of the identification of the living related to criminal jurisdiction through biometric will not be developed in this document).

As has been stated earlier, identification is a mechanism of comparison between information about the person being searched for against the person/remains whose identity is to be confirmed.

Accordingly, as part of the identification steps, it is necessary to gather detailed information on the unidentified person (UP) with the purpose of creating an UP Casefile that integrates their biological (resulting from the forensic examination) and background (resulting from the investigation and the recovery) information.

If the person is alive, the basic UP Casefile contains:

- Review of the circumstances that led to their status as an Unidentified Person: information collected during the investigation described above.
- Personal interview with the Unidentified Person.
- Forensic examinations and documentation: must include both physical (i.e. fingerprints, photographs, biological sampling, etc.) and psychological aspects, as well as related personal effects. It also

requires an enquiry into personal property, specifically communication and electronic devices (mobile phones, computers, etc).

If the person is not alive, the basic UP Casefile contains:

- Review of the circumstances that led to their status as an Unidentified Person: information collected during the investigation described above.
- Information on the recovery of all human remains *in situ*, including detailed information on location.
- Forensic examinations (human remains and personal effects) and documentation. Includes fingerprints if possible, photographs and collection of biological samples).
- Information on the cause, manner and circumstances of death.
- It also requires an enquiry into personal property, specifically communication and electronic devices (mobile phones, computers, etc)

In any setting, the recovery of human remains is a destructive process, and consequently is unique, irreversible and unrepeatable. Once the recovery is completed, that site is *modified forever*. Therefore, it is critical that human remains be recovered properly, and procedures and evidence documented thoroughly. This should also be well coordinated to ensure that all mandates, including criminal and humanitarian, are both respected and accommodated in a sequential set of legally admissible processes.

Forensic recovery must be done by **specially trained experts** (forensic archaeologists, anthropologists, criminalists, etc.). Proper recovery makes possible, among other things:

- The compliance with judicial frameworks, including criminal investigative evidentiary processes
- The fulfilment of humanitarian outcomes, such as determining fate and whereabouts of the missing person by accurate forensic identification of human remains
- The collection (and preservation) of all physical evidence (biological and non-biological).
- The mapping and documentation of findings.
- The interpretation of the site.
- The minimizing of commingling and postmortem damage to the evidence
- The proper labelling, securing and handling of evidence.
- The measures of quality control and quality assurance of the process.
- The traceability of the evidence, following a proper chain of custody.

An improper recovery and handling of human remains and associated evidence can result in the loss of important data and thus seriously undermine the forensic investigation and be extremely traumatic for families.

In the same way, forensic examinations **must be done by trained personnel** (forensic pathologists, anthropologists, odontologists, crime scene officers, forensic technicians, etc.) who gather information on the unidentified person and related evidence (UPD-Unidentified Person Data) and includes the following types of information:

- Physical description, including biological profile (age, sex, height, ancestry) and distinguishing features oriented to record individualizing characteristics that may contribute to the characterization of the individual (tattoos, scars, birthmarks, deformities, piercings, etc).
- Medical and dental data, especially radiographic records (fractures, diseases, surgical interventions, dental treatment, missing teeth, etc.)
- Psychological evaluation (in case of living persons).
- Assessment of trauma and mechanisms of injury.
- Cause and manner of death.

- Fingerprint information (to be considered according to the context of the case)
- Sampling for further analyses to be considered according to the context of the case (i.e. genetic analysis, toxicological analysis, etc.)
- Clothes and items found with the UP.

Here, characterization refers to the building up a possible profile of the individual based on inferences from the physical findings (clothing and personal belongings) and circumstances of finding of the unidentified individual. This allows development of hypotheses about which group of individuals the unidentified person could belong to. When available information does not permit a presumption of identity or a confirmed identification, this characterization or profiling contributes to the initial steps of the investigation and is sometimes the only starting point for the case.

The *Revised Minnesota Protocol (2016)* [20] and the *Istanbul Protocol (2004)* [21] are recommended as international standards for procedures related to recovery and forensic examination of living persons and human remains.

3.4. The identification process

3.4.1. General aspects

Unlike the investigation of a missing person's *whereabouts*, clarification of the *fate* requires the identification of a body (alive or dead).

In this regard, there are many definitions of the term identification. Most of them regard identification as an action (not as a fact) that needs to be founded or proved.

We could define identification as "*the individualization of a person to determine who they are*". This can be applied to living persons as well as human remains (in any state of preservation) when their identity is unconfirmed or unknown and implies the allocation of the correct name/identity to an unidentified person.

In the last twenty years, we have seen the development of new technologies, as well as an improvement of existing ones, that have allowed achievements in human identification that would have been impossible before.

Over the years it has been observed an evident lack of professionals and expertise in some of the forensic disciplines such as archaeology, anthropology and odontology that is contrasted to a tendency not only from the forensic community but from states, on visual recognition and forensic genetics as identification methods applicable to thousands of cases related to unidentified human remains, undermining efforts to implement a comprehensive and integrated approach to establish identities. Furthermore, forensic information management systems are weak if at all developed and implemented. This includes not only the collection and safeguarding data from missing persons but also information about the final disposition and in particular of unidentified human remains.

Nowadays, one of the lessons learned is that any forensic specialty must follow international best practices to achieve an accurate, reliable and credible identification of human remains and withstand peer review. All these aspects become even more relevant in Disaster Victim Identification (DVI)/Missing Persons Identification (MPI) scenarios that involve handling large number of bodies or human remains, samples and data, as well as several families affected.

Given the complexity of most cases in these contexts, if procedures do not follow scientific standards for the implementation, analysis and interpretation of any technique, within a legal framework, there is a high potential risk of misidentifications, bodies remaining unidentified, mis-associations of commingled body parts, remains handed over to wrong families, etc. Such consequences have a devastating impact on the families of missing persons, on the reliability of the institutions in charge and on communities and societies.

It is necessary to deconstruct the concept of identification frequently used, in a narrow sense, as synonym of the technique applied to reach

the conclusion (e.g. genetic identification, dental identification, etc.), to a broader **comprehensive, holistic, integral and multidisciplinary approach**.

3.4.2. Legal aspects

The right to an identity is enshrined in several international human rights, international humanitarian law instruments, International Disaster Response Law and in several United Nations resolutions [22]. In this regard, major human rights and international humanitarian law treaties address the obligation of the states to allocate all necessary resources to effectively investigate serious human rights violations (see for example the ICRC legal factsheet "Humanity after life: Respecting and Protecting the Dead" [23]). Compliance with this obligation involves actions directed at identifying persons with the purpose of establishing their fate and circumstances of disappearance and restoring their identity [13].

The legal framework for the investigation of deaths should ensure that identification is mandatory regardless of the cause and circumstances of death. In this way, it should be possible from a public policy perspective to guarantee that all deceased citizens are duly identified. The responsible authorities should have the necessary resources to include in the medico-legal system the structure responsible for identifying deceased persons. In the same way, the institutions and structures responsible for the identification of deceased persons may articulate in their institutional policies the dimension of the families of deceased persons to ensure that their demands will be properly attended to and managed.

In contexts of serious human rights and international humanitarian law violations involving cases of appropriation of persons and identity theft, the states' obligation includes, pursuant to international law, re-establishing the identity to the persons who have been deprived of it. In this regard, this obligation exists independently of the time passed since the identity theft took place [30]. This may require the identification of missing persons within the framework of international or national armed conflicts. This is essential to guarantee the right to know for the persons and society at large.

Forensic sciences have been considered as a useful tool to support, and in some cases to force, States meet their obligations of ensuring the effective exercise of the right to an identity in contexts of human rights and international humanitarian law violations (e.g. enforced disappearance, appropriation, and/or identity theft).

Within this international legal framework, as well as based on case-law decisions made by different national courts, States are obliged to set up mechanisms enabling the effective search for and identification of victims of enforced disappearance [24].

Some forensic investigations, especially in the frame of law enforcement agencies investigating large-scale cases, focus on ascertaining the "categorical identification" [25] of the individual, such as the ethnicity, religion, biological profile, and the cause and manner of death. Categorical identification is a necessity in any prosecution of a large-scale crime, since the prosecution need to demonstrate that a crime was committed "beyond reasonable doubt" and without detailing everyone and single individual. However, once these attributes have been established, the "individual identification" of the person should be addressed, to meet the rights of the families and the individual.

In law enforcement cases, establishing the identification of an unidentified person requires that all pertinent evidence is collected, documented, analysed and preserved in a manner that will render it admissible to a court. The management of any evidence admitted must withstand the legal test of challenge. Equally, all scientific techniques applied, and the subsequent interpretations derived, must be defensible.

Even in deaths that are not linked to criminal investigations (most deaths are not murders and the associated evidence in non-criminal deaths is not routinely presented in court), the same strict policies and practices must be adhered to ensure that the forensic identification is

reliable and the conclusion accurate. After all, identification contributes to resolution of other legal proceedings; provides clarity surrounding the death in response to community safety and security concerns, contributes to vital statistics, and, most importantly, satisfies the humanitarian needs of surviving families: their right to know the fate of a disappeared or dead loved one.

Despite the wide range of scientific and technical means available, the identification is made ultimately by persons [26] using the scientific method to analyse and interpret different aspects of the case to reach a conclusion. To this end, the reliability of each finding must be assessed and weighed to formulate a conclusion.

The final decision involving an identification is legal, for which reason it should be made by authorities with competence in the matter (**legal identification**) [27]. Whenever possible, this legal decision must be supported by a series of lines of evidence, among which are the conclusions reached at the technical or forensic level (**technical identification**). In other words, legal identifications are validated by a competent authority based on the technical opinion or technical decision of experts (technical identification). This expert opinion should be provided in the form of an *Integrated Forensic Identification Report* (see 3.4.6) or series of reports.

3.4.3. Social aspects

Identity refers to the relationship between a name and a physical body, but it also encompasses the social ties that bind a person to a place, a time, and most importantly, to other persons [28]. In this sense, in the identification process should consider not only the technical challenges, but also the political and social complexities and their meaning.

The Search and, therefore, the identification task will be affected by the political, economic and social context in which the investigation takes place. These specific circumstances and their meaning must be considered when undertaking missing persons identifications.

In establishing the identity of an unidentified person, there are several levels of recognition:

1. **Technical and legal level**, mentioned above, where the individualization and correct name of the person are attributed. This is the initial act of recognition and reattaches the individual identity to a body (alive or dead, physical or documentary).
2. **Family level**, in which the relatives accept (or reject) the evidence of identification of the missing person; *it is a subjective process whereby the family decides to accept or reject the attributed identity*.
3. **Community/social level**, i.e. the collective recognition of the missing and their identification.

It is important to highlight the need for the forensic identification to be legal, credible and legitimate to ensure acceptance at every level.

There are multiple examples internationally where accurate and reliable identifications (from the technical and legal point of view) were reached but were not accepted by the families due to the lack of credibility of the institutions in charge of the identification. In other contexts, political manipulation of the information at the social level challenged identifications already accepted at the legal and family level.

Without credibility, legality and legitimacy at all levels the identification will be seriously challenged. It is necessary to build trust and ensure the legitimacy of the operations, not only for the families themselves but also for communities and civil society as a whole [29].

3.4.4. Methodological aspects

As mentioned throughout this document, during the identification process it is necessary to compare information concerning the missing person on one hand, and the unidentified person (alive/deceased) on the other. This information will be in the form of independent data sets or lines of evidence with different weights in terms of their individualizing power.

When conducting a routine death investigation, three key

investigative elements are considered: the scene, the body and the circumstances of death. These elements will assist investigators in determining who, where, when, how and by what means a person died. The “who” refers to the legal identity of the deceased. In most cases involving recently deceased persons, this requirement is satisfied by visual recognition or in certain contexts by fingerprint, dental or DNA matching. However, not all deceased persons are in a visually recognizable condition and fingerprints are not always preserved. A multidisciplinary, scientific approach may be required to establish a scientific-based identity before a legal confirmation of identification is made. This is particularly more common in mass fatality events, in contexts such as migration, ongoing conflict and OSV where a multitude of factors can lead to large numbers of missing persons cases. It is these situations that emphasize the importance that the preliminary investigation, recovery and examination of dead bodies are completed following a holistic, integrated and multidisciplinary approach that considers all evidence and available information for comparison purposes.

The following sections include an explanation of the analysis and comparison of data —lines of evidence— allowing for the narrowing down of possible identities or reaching conclusive results in terms of either identification or exclusion. It also refers to the link between this stage of the process and the preliminary investigations/analysis of the context, and the formulation of a hypothesis of identity.

In this sense, the identification procedures will follow different stages or components, from the methodological point of view (see Fig. 1) which will be set forth in the next sections.

3.4.4.1. Lines of evidence for identification purposes. We have defined the lines of evidence as independent comparable data sets from various types of information that tend to confirm or refute a hypothesis of identity to support any conclusion (or narrow down the list of possible candidates). They refer, therefore, to any comparable data, not only dactyloscopic (fingerprints), dental, genetic or medical information, but also contextual information of the case (e.g. circumstances of disappearance/finding, geographical-temporal data, relationships with other related persons, etc.), biological profiles, personal belongings, individualizing features, etc. Each comparable data set between the person sought and the person to be identified may point to a line of evidence that can either support an identity hypothesis in case of agreement or reject it in case of unexplainable inconsistencies or discrepancies (see section 3.4.4.2).

The types of information most commonly used in human identification, which may produce comparable data that may constitute lines of evidence, include the following:

- Contextual or background information from the recent, ongoing or historical investigation (context and circumstances of disappearance/finding).
- Visual recognition
- Documentation and identification tags (often referred to in the military as “Dog Tags”)
- Fingerprints
- Radiological data
- Dental data
- Genetic data
- Biological profile and physical information
- Individualizing features (tattoos, scars, piercings, etc.)
- medical/health conditions
- personal belongings and clothing

There is a strong link between this stage of the process and the preliminary investigations/analysis of the context, and formulation of hypothesis, i.e. the comparison of data resulting from the historical investigation of the case carries specific weight (specific for each case) as

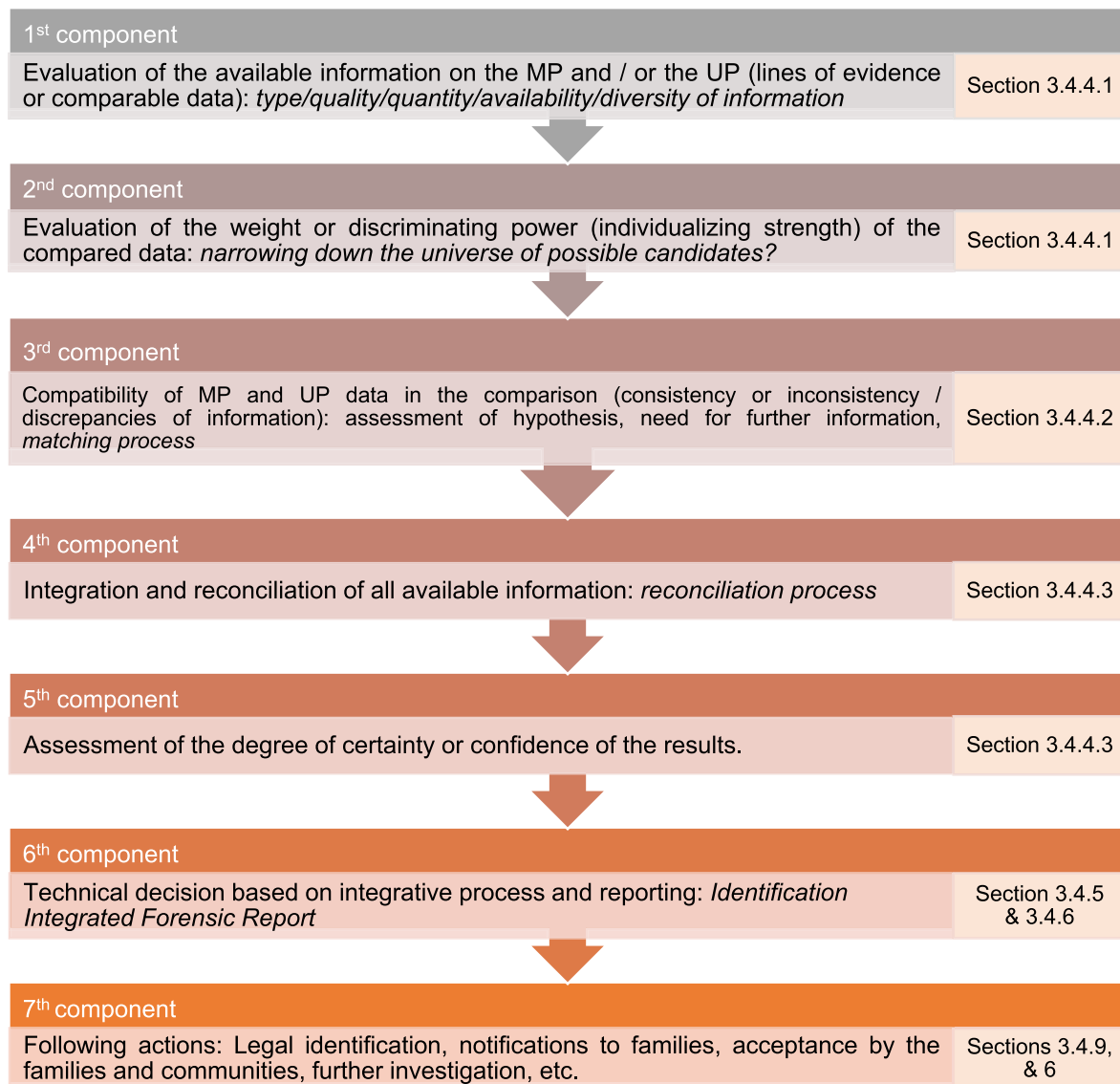


Fig. 1. Flow chart of the sequence of steps and decisions needed in the identification process.

a line of evidence to support an identification.

However, not all information has the same probative value or weight in the final decision. A match between the colour of the hair of a person sought and that of an unidentified body doesn't hold the same weight as a fingerprint or a genetic profile (characteristic versus individualistic). Therefore, it is necessary to consider a second component: the weight or power of discrimination of each line of evidence. The discrimination weight of each line of evidence is given by the individualizing capacity of that type of comparable data or information, that is, by the ability to exclude more candidates than others in the universe of the persons sought and thus reduce the amount of possible identities.

Various lines of evidence have different weight or **power of discrimination** (individualization). A line of evidence can be of enormous weight in an identification to the extent that it can correctly exclude all other possible candidates. Some techniques are highly individualizing (e.g. nuclear genetic markers, dental radiographic comparison, fingerprint comparison, etc.). Other lines of evidence, although less probative, can contribute significantly to the overall consistency of the case and to the exclusion of incompatible candidates (e.g., biological profile, geo-temporal information, medical information, etc).

The individualizing power of a comparison of fingerprints (dactyloscopy), for example, is greater than that of comparing the biological

profile or the personal belongings associated with a person to be identified. However, no specific line of evidence should be considered mandatory *a priori* before evaluating the case and deciding accordingly on the most appropriate techniques to apply. It is not uncommon to find contexts where the authorities request or order a genetic test without first investigating the type of case, whether there are reports of missing persons, the availability of comparative samples, etc. which affects the process in terms of time and resources, since not all cases require (or are solvable through) the use of a specific technique.

When it comes to forensic genetic analysis, the main challenges observed are related with the mismanagement of its statistics (e.g. estimating posterior probability when lacking contextual or anthropological data), and the lack of quality system in place that might affect sample traceability and cross-contamination. Also, new technologies are rapidly evolving in this area but their use are not always framed with a validation of the population panels in place for Missing Person Identification or informative panels (such as ancestry or phenotyping). In the scope of a comprehensive identification process in large scale events, the costs of these analyses are also a challenge.

Therefore, best practices encompass the need for an integration of scientific data and the contextual information as part of the formulation of hypotheses and statistical evaluation of the case. All forensic

specialties considered in a multidisciplinary approach should follow international best practices to achieve an accurate identification of the human remains, with a particular attention to scenarios involving a large number of samples, and usually dealing with poor quality of MPD. Given the complexity of the majority of cases in these contexts, if the standards for the implementation, analysis and interpretation are not followed, there is a significant risk of misidentifications or mis-associations of skeletal elements as has been evidenced in the past [30]. Such consequences have a devastating impact on the families of the missing persons.

It is not possible to predict in advance which or how many lines of evidence will be necessary to resolve a case (see section 3.4.4.3). The amount and type of information to be collected, as well as the techniques or laboratory tests to be used in a case, should be selected based on their relevance to the context, reliability, the type of case, its complexity, the availability of comparable information from both the missing person and the unidentified person and the feasibility of obtaining and using it, and the condition of the remains requiring future identification efforts.

An incomplete but identified body must also be assessed when deciding what lines of evidence are still required for future identification of outstanding parts. For instance, an incomplete body identified by fingerprints but missing a lower limb will require other lines of evidence to be retained for the subsequent identification and reunification of the recovered lower limb in days, weeks, months or even years later. In this case creating a DNA profile in addition to having the fingerprints of the identified body for future comparison to reported incomplete body parts would be strongly advisable prior to the body being returned to family or buried. The same applies to retention of other comparative data, such as radiography, dental records, etc. hence once again the importance of collecting and recording all Missing Persons and Unidentified Persons information for future identification purposes of incomplete remains and body parts in a centralized information management system.

Supporting the identification with multiple lines of evidence relies on investigators looking beyond the biological features to secure reliable comparative data. Collecting circumstantial information is extremely

important and must be used in combination with all other scientific lines of evidence to support a given conclusion: identification, inconclusive or exclusion (see sections 3.4.4.3 and 3.4.5). This means that the time, date, place and all factors of an incident must be gathered from the sources and included in the comparison process.

The more reliable and credible information collected, the greater the likelihood to detect administrative errors and misinterpretations made in some of the lines of evidence that could lead to a misidentification or no identification.

3.4.4.2. Analysis and comparison of information (matching process). The process of comparing information with the purpose of finding evidence that supports or excludes an identification consists of looking for homologous data pairs, e.g. data pairs of the same nature (e.g. sex, age, date the person went missing versus date an unidentified person or human remains were found, etc. see Table 1), with the aim of establishing their **compatibility (consistency) or discrepancy (inconsistency)**.

As mentioned before, these homologous data pairs or lines of evidence are contained both in the background (investigative) and technical information collected throughout the identification process.

When making such comprehensive comparisons of the information, we can reach different outcomes:

Compatibility: Compatible, matching, coincidental or consistent data.

Relative or Explainable Inconsistencies/Discrepancies: Data that is incompatible, contradictory or inconsistent, but explainable through logical thinking. These inconsistencies do not contribute to an identification decision, but do not put such decision into question either in absolute or excluding terms.

Absolute or Excluding Inconsistencies/Discrepancies: Data that is incompatible, contradictory or inconsistent and, if confirmed, are unexplainable through logical thinking and exclude any possibility of an identification.

Based on the weight of the line of evidence as well as the degree of

Table 1
Example of comparable data (lines of evidence).

	Missing Person (MP)		Unidentified Person (UP)
Lines of evidence	Place the MP was last seen alive	↔	Place the UP was found
	Date the MP was last seen alive		Date the UP was found / State of preservation of human remains
	Grave specified by witnesses to the burial		Grave with unidentified remains in the site specified
	Biological profile		Biological profile
	Dental information		Dental findings
	Fingerprints		Fingerprints
	Genetic profiles obtained from biological reference samples		Genetic profiles obtained from the UP
	Clothing and personal belongings		Clothing and personal belongings
	Health conditions		Medical findings

reliability, compared information can lead to explainable discrepancies. For example, any slight difference between the age or height that the family remembered and reported and the estimated age or height in the forensic analysis of an unidentified person could be explained in multiple ways (a distorted memory, cultural variables, a methodological error in the technical estimation, etc.) This would involve a relative inconsistency. If, however, such difference is strong (once a recording error or loss of case traceability has been ruled out), it could involve an absolute inconsistency excluding the possibility of an identification. An example would be a missing tooth that is documented absent in the dental charts and in the radiographs of the missing person but is present in the unidentified person being compared.

In some cases, an explainable inconsistency may hold less weight than the combined weight of all other consistencies and matches available through the analyses of all available lines of evidence. But in comparing multiple lines of evidence, several unexplainable discrepancies must lead to reach a conclusion of exclusion.

Therefore, during the comparison process it is necessary to consider all the information relevant to a case in a comprehensive manner. In other words, it is necessary to integrate and reconcile the different lines of evidence to increase certainty in the identification.

3.4.4.3. Integrated reconciliation process. The evaluation of evidence and interpretation of results following the comparison of lines of evidence (comparable data pairs) considering all the information relevant to a case is known as the **Integrated Reconciliation Process**. Integrating and reconciling lines of evidence means to analyse all the information relevant to a case in a holistic or joint manner (comprehensive analysis), taking into account its compatibility or discrepancy in the comparative data concerning the missing person on the one hand, and the unidentified person on the other, while also giving consideration to the weight or individualizing power of each of them (e.g. stature *versus* biological sex *versus* personal belongings) according to the investigative/technical criteria (e.g. if recovery allowed to confirm the relation between artefacts and remains; if population allele frequencies is known and allows accurate genetic statistics, etc.).

This holistic analysis or integrated reconciliation process involving all the information available that supports an identification (background information, recovery of physical evidence, forensic analyses, laboratory tests), should be based on more than one line of evidence, so that:

1. The lines of evidence show consistency or compatibility.
2. The lines of evidence lack absolute or excluding inconsistencies (or discrepancies).
3. There are individualizing diagnostic traits (unique aspects, e.g. dental or osseous features compared through antemortem and postmortem radiographs, prosthetics with reference numbers, etc.) that allow the differentiation of a candidate from all other persons: enough weight or individualizing power.

All three requirements must be fulfilled in order to reach an accurate conclusion in identification (see Fig. 2).

As already stated, the selection or combination of lines of evidence will depend on the characteristics and complexity of the case under investigation. The identification process is not a rigid workflow; it is not possible to know beforehand how many lines of evidence will be needed in a given case, nor their type (technical or otherwise). As many lines of evidence as necessary will be used to determine an identification or exclusion with certainty. In the event there is not sufficient evidence (i.e. the result is inconclusive), a more thorough search for information should be made until it is possible to accurately support the conclusion.

For example, the remains of an elderly woman were found in a house where an elderly woman lived (corroboration of identity or closed case) will demand fewer lines of investigation than remains that were found in a public space after an earthquake where thousands of individuals went missing and presumably died (open case). But even in simple cases (low number of well-preserved deceased), the identification should not rely solely on a single technique.

Identifications in the context of incidents classified as open (for example, an earthquake in a city) will require more lines of evidence (and, therefore, a larger amount of comparable data, probably including laboratory techniques) with a greater individualization power than those in the framework of incidents classified as closed (such as confirmation of identity hypotheses, plane crashes, etc.).

In the identification process it is not enough to include many compatible lines of evidence, but rather the comprehensive analysis of all of them to use as many points of concordance and unique traits to increase the degree of confidence in the match while simultaneously testing one's confidence by actively seeking unexplainable discrepancies (Fig. 3).

There is an inherent complacency and bias to find similarities to secure identifications, particularly in mass fatality incidents. It is as important to thoroughly find consistencies in the lines of evidence as it is to proactively seek out unexplainable inconsistencies to ensure objectivity in the process [31]. In other words, we must challenge the results achieved in order to ensure that we reach an accurate conclusion. This must have sufficient individualizing power to arrive at a conclusion with certainty "beyond reasonable doubt", that means there is only one possible candidate for this identification, excluding all others. In addition, there must not be any absolute or excluding inconsistency.

In summary, the approach aims at including for consideration all available lines of evidence to support or refute the conclusion of the identification of an individual, taking into account the probative value of each of them. The probative value is thus related to the potential (or power) of a particular information (scientific or not scientific) to individualize a specific person. This is given by the level of uniqueness that the particular piece of information has, so that it belongs to a given fact and there are no other possible options.

This entails a paradigm shift from the classical approach of using

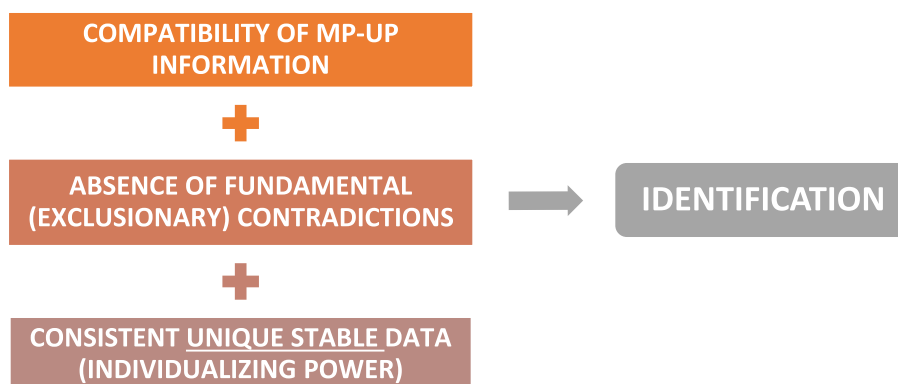


Fig. 2. Requirements in the identification following a comprehensive approach.



Fig. 3. The combination of different lines of evidence with different weight or individualizing power is necessary in the identification process with the aim of increasing certainty.

scientific techniques (fingerprints, genetic analysis, dental or medical unique features) supported by non-scientific information of another kind. In the classical approach, an emphasis was placed only on the scientific techniques and the categories of identifiers (traditionally known as primary, secondary or tertiary identifiers), whereas we argue that the emphasis needs to be on the importance of consolidating multiple lines of evidence.

The identification process usually includes both the construction of hypotheses of identity from the analysis of the information to be evaluated through different lines of evidence, and the reconciliation of the information resulting from the comparison of the missing person’s information and the unidentified person’s data. This two-way path ensures a comprehensive and multidisciplinary approach in the identification proceedings, in agreement with the evaluation of lines of evidence rather than with the combination of different techniques.

This dynamic, multifactorial, comprehensive and holistic identification process is illustrated in Fig. 4, which shows the flow of

information from the different stages, including the Search and forensic technical information. As we can see, it is not a linear but a circular diagram where all the elements converge in the integrated reconciliation process. Through this process, the steps to follow in the search and the creation of new hypotheses or lines of investigation will be evaluated, an identification will be confirmed or excluded. Moreover, the Search does not end when an identification is attained but can generate new identity hypotheses for other persons if the proper mechanisms to analyse the information are implemented.

It is worth mentioning that the use of all possible lines of evidence is also going to be important for the families to better understand the identification results and moreover to be able to refer to characteristics or features and personal belongings that were familiar to the families, thus facilitating a better connection with the case and acceptance.

3.4.5. Identification results

The final decision in the identification process must be conclusive, with a degree of certainty that could be considered “beyond reasonable doubt” in technical and legal contexts.

Such conclusion must be reflected in one the following three categories:

I. Identification: All the information relevant to the case is comprehensively coherent, and there is enough consistency in the comparison of individualizing traits (discrimination power) as well as a lack of excluding discrepancies (any inconsistency must be reasonably explained), concluding that the person sought to be identified is the expected person and excluding any other possibility at the time of the identification.

II. Exclusion: All the information relevant to the case is comprehensively incoherent or there are serious inconsistencies (absolute or unexplainable discrepancies), concluding that the person sought to be identified is not the expected person.

III. Inconclusive: The analysis of all the information relevant to the case is not sufficient to conclude with certainty in favour of one or the other possibility (identification or exclusion). In this case, it is not possible to reach a sufficiently grounded conclusion about the identity of the person and it will be necessary to expand the investigative and/or scientific information on the case.

The use of other subcategories for identification (presumptive, circumstantial, possible, probable, positive, etc.) is not advisable. A person either is (identification) or is not (exclusion), or not possible to confirm (inconclusive). The subcategories mentioned entail an incommensurate doubt from the point of view of decision theory, resulting in ambiguous and unfair outcomes for the individuals and their families.

Finally, the identification process includes the evaluation of the potential error (degree of certainty), but not necessarily its quantification. The only way to perform such evaluation is by taking into account

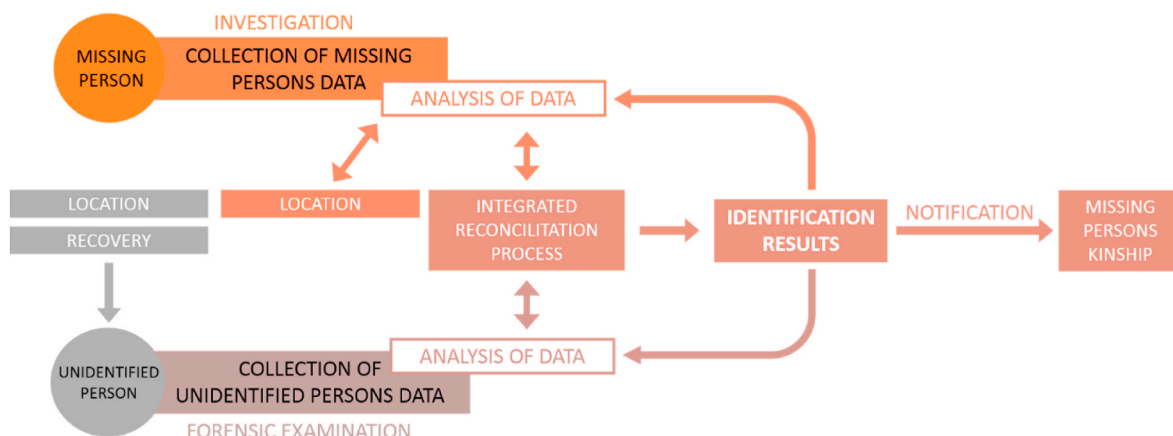


Fig. 4. Flow of information in the identification process as part of the Search.

all the information in a comprehensive manner until concluding that another possibility different than the one that opens up is highly unlikely, in other words, until concluding that the probability of error in the identification supported by the different lines of evidence evaluated is so small that it is regarded as being beyond reasonable doubt.

3.4.6. Integrated identification report

The information resulting from the different stages or techniques used in the identification process is usually submitted to the relevant legal or judicial authority in partial reports. This may lead to the submission (by uncoordinated experts) of investigative reports containing partial information and results that are very often contradictory, thus hindering the process and, in the worst case, leading to wrong conclusions.

Therefore, we recommend that the results obtained through the analysis of information and the reconciliation process be recorded in an integrated expert report. It is not a matter of compiling partial reports, but a document including and comprehensively analysing all the results of the different technical studies and the information available, so that it can be submitted to the relevant authority in a coordinated and consensual manner.

The Integrated Identification Experts Report is primarily a scientific document, in which the correlation/consistency of all the information obtained about the missing person, including circumstances of disappearance, and all the information on the unidentified person, including circumstances of finding/recovery, is explained. It contains comparison, analysis and interpretation of the different lines of evidence that all together support the identity of the person or the human remains.

The writing of the Identification Integrated Report should reflect the multidisciplinary, holistic and comprehensive aspects of the process. Depending on the context, the Identification Coordinator should be the person compiling the different reports; in many cases of mass fatalities, the Forensic Doctor responsible for the autopsy or the forensic examination of the human remains is the one in charge of compiling the different reports and includes the final decision on the identification as part of the Autopsy report (given that this is one of the objectives). Because it involves a high amount of analyses and comparisons of scientific information, forensic experts are in the best position to compile this report. Other aspects should also be considered to coordinate the writing of the report, such as the legal framework (e.g. who is mandated to defend the report in Court, what is the availability of the experts, etc.). In all cases, this Identification Integrated Report is the base for the Legal identification (See 3.4.2. Legal aspects), decision for which the Prosecutor or the Judge (or any other administrative operator, e.g. Commissioners within a Commission on Missing Persons when there is no judicial operators involved) is responsible and does not replace the scientific report.

This integrated expert report will enable the unified submission of the technical results obtained in the identification process, bringing greater cohesion and efficiency to the reporting and making it easier for the competent authority to make a final decision in the legal, judicial or administrative level. For example, a technical integrated report may be structured as such:

- I. Unique File Numbers of the Unidentified Body and Missing Person
- II. Case background
- III. Findings in the recovery/find
- IV. Findings in the examination of the body/remains or autopsy report
 - a. State of the body
 - b. Biological profile and individualizing features
 - c. Dental analysis
 - d. Trauma analysis
 - e. Others
- V. Personal effects and associated artefacts

VI. Sampling

VII. Results of complementary analyses

- a. Radiological analysis
- b. Toxicological analysis
- c. Dactyloscopy
- d. Genetic analysis
- e. (other analyses)

VIII. Interpretation of results:

- a. Reconciliation process regarding identification
- b. Medico-legal opinion on the nature of the injuries and cause and mechanism of the death (from the autopsy report)
- c. Other results relevant to the case

IX. Conclusions

- a. Identification
- b. Statement of the medical cause of death based on the autopsy report
- c. others

3.4.7. Misidentification

Misidentifications are common and not restricted to countries with limited forensic resources. Forensic practitioners need to be constantly aware of the potential for misidentifications. While some identifications are very complex, it is often basic failures in the management of the evidence from scene through the investigative steps to the return of the remains to the family, and the lack of quality control systems, that cause bodies to be misidentified or returned to the incorrect family.

Poor documentation management or insufficient collection of information accentuate the risk and variety of potential errors. For example, a simple omission of failing to properly label or incorrectly labelling a body at the scene or at the mortuary will be disastrous. Another common error seen in disasters is the commingling of body parts from two or more individuals into a single body bag. This is a serious problem that causes an array of challenges in every step of the process for future practitioners and experts.

Potential causes of misidentification:

- > Lack of rigorous procedures that ensure a comprehensive, integrated and systematic approach in the identification, which takes into consideration all available lines of scientific and circumstantial evidence.
- > A hierarchical and exclusive approach to identification.
- > Over reliance on one criteria/technique of identification only.
- > Reliance on visual recognition in isolation.
- > Acceptance of circumstantial personal information alone (e.g. clothing or personal effects, documents found with a body, etc.).
- > Use of unreliable methodologies for identification.
- > Use of unreliable information on the missing person.
- > Inadequate recovery of human remains.
- > Inadequate forensic examination of unidentified person/body.
- > Lack of, or inadequate, comprehensive interpretation and reconciliation of the information.
- > Lack of traceability (chain of custody) throughout the identification steps: incorrect labelling, record keeping and traceability system of cases.
- > Lack of appropriately qualified practitioners in each step of the process (investigation, recovery, forensic examination, further analyses, reconciliation of information).
- > Lack of quality control and quality assurance mechanisms.
- > Yielding to external pressure to complete an identification without following accepted procedures and/or reach the necessary certainty degree.

These systematic flaws are frequently observed in mass fatality incidents where the local resources are put under tremendous strain to deliver services well beyond their capacity or expertise, and political and public pressure is exerted on authorities for a timely resolution of all

cases. As most identifications in routine case work rely predominantly on visual recognition by the family, the combination of less local expertise and experience working with multiple lines of evidence compounded by poor planning and preparedness, including failure to conduct disaster victim identification training for mass fatality events, creates sometimes rudimentary errors. Unfortunately, these serious issues are not always obvious until nearly all bodies have been returned to families.

There is almost no justification for misidentifying a person, and the consequences for the family are numerous, such as psychological, religious, cultural, psychosocial, financial and legal. One misidentification can cause the public and families to lose confidence in the overall response and begin to question all other identifications that were made. That said, any misidentification must be thoroughly investigated, the accurate identification established, and the correct body returned to the family. It is strongly advisable for the technical teams and legal authorities to dedicate enough time and efforts to properly explain to the concerned families the reasons of the misidentification, and what have been the measures or actions adopted to solve and prevent this from happening to future cases. Failing to address the error and a lack of transparency will cause further complications in the system and potentially additional misidentifications.

3.4.8. No identification

Pressure to make timely identifications is generally exerted by our own compassion and empathy for the families, by the authorities facing public scrutiny, and by the families who have both humanitarian, legal and other important justifications for doing so.

Identification does not only ensure the return of a loved one, but it is also a legal requirement that should withstand peer review and the test of legal challenge.

In some cases, the available lines of evidence related to the missing person or the data representing the unidentified person are insufficient to make an identification. Confirming that identification cannot be made is a finding that is justifiable and maintains credibility and professionalism. The objective decision to refuse to make an identification must be demonstrated when the lines of evidence do not provide the level of certainty required to meet competent peer review, even where there is strong suggestion or suspicion of a match by circumstances.

3.4.9. Notification, restitution of bodies and final disposition

Notification of the death and identification of a missing person is a crucial moment that must be thoroughly prepared. It can be done by different communication means and at different stages. The details must be previously agreed with the family members. In practice, the relatives should decide how the notification will be carried out, i.e. whether it is done in private, through a focal point, with other representatives of the family, with the community present, in the presence of religious or community leaders, etc. For the families, the Search may reach an end once the death of the missing person is confirmed, and when the death certificate is officially registered. This certificate is the legal document that declares the death and legally confirms the identification of the deceased person. Once registered, the certificate allows the family members to exercise their legal and administrative rights related to death of their loved one.

Restitution of human remains after their identification should be done in accordance with the local regulations and taking into consideration the wishes of the families. Families have the right to decide on the specificities of a restitution and it should also be discussed in advance. Standards for a proper and dignified handover and final disposition of human remains should be followed, including the respect of the local culture, religion and beliefs when applicable. When transported, human remains are usually properly contained in a dedicated vessel (e.g. body bag, coffin, shroud, etc.), especially in the case of temporary burial. For more information on this subject, please refer to the annex 7 of the Management of Dead Bodies after Disasters: A Field

Manual for First Responders [32].

Depending on the magnitude of the operations, procedures should be adjusted accordingly. It is recommended that a specific area is designated as the place for the restitution of remains or handover of bodies to families. Usually the remains are stored in a morgue or a forensic facility, close to the forensic examination area; forensic staff may then be best placed to facilitate the allocation of a space for a proper and dignified handover to families. In routine cases, families may be present at different steps, and the proper handover is part of the chain of procedures performed by a funeral provider. When it comes to humanitarian operations, however, it is important that special attention is given to the moment during which the remains will be handed over, and as the results will be presented to the families.

Before a restitution of remains takes place, a **preliminary preparatory meeting** should be organized with all the participants of the handover. The relevant documents will then be reviewed, and the team will make sure that the information is exhaustive and adapted for explanations to the families: forensic experts must describe their findings in a professional, clear, and understandable manner. Ideally all experts from all disciplines should participate in the meeting, but as a minimum, one of them should represent the forensic experts. It is important to dedicate sufficient time to the meeting with the families. They may request in-depth details on the case, for example what procedures the remains underwent, the type of tests performed, etc., and why the team concluded that they belong to their relative. Such discussions can be challenging, scientific results may not be understood by non-experts (e.g. a 99% probability may leave the place for 1% of harmful doubt). Recurrent questions from relatives are also often related to the cause and manner of death, as well as circumstances. Sensitive information will have to be provided carefully and in coherence with the judicial authorities and the corresponding legal framework of the operation.

The next step for most cases will be the disposition of the human remains. They should be properly arranged (e.g. on a table, in a coffin), so that the families may see their loved ones if they wish to. The viewing may be important for the grieving process, but each family should be consulted and their wish on this aspect respected. To support the final moments and the handover operations, the investigator/identification coordinator/prosecutor in charge usually works with a staff with a background in Psychology and/or experience in psychosocial support to accompany the families.

When repatriating human remains to a different country, it is essential to follow the local regulations, procedures, and liaise with the concerned authorities (such as consulates, border authorities, etc.). To ensure a swift repatriation, the identification of the deceased is mandatory, which includes the need to produce a certificate of death, and additional documentation related to embalming and burial. Experts should be aware of the right to challenge the findings and to support the investigation of these findings transparently.

3.4.10. Final considerations

Despite all efforts, not all Missing Persons will be found, and of those who have been located, not all will be identified. Families should be sensitized on the issue of incomplete bodies and body parts. Some parts will not be found or identifiable, and others may be identified after the initial identification of a first set of human remains. A decision must then be taken on the final disposal of these remains, whether they go back to the family if identified, or brought to an ossuary for example. Unidentifiable and unidentified remains (e.g. fragments) may be memorialized if the community and families chose to.

Equally important technical considerations must be given to those cases in which there are no human remains, either because they could not be retrieved or because they have been destroyed for different reasons. In such cases, forensic analysis of available data may also constitute evidence to support legal decisions outside the scientific realm, but necessary to resolve cases and proceed with other legal administrative steps.

4. Forensic data management

To properly conduct search activities and provide support to families of missing persons, it is necessary to ensure a systematic consolidation of the relevant information. An effective, dedicated and tailored information management system is a vital component of the Search process. It is based on the premise that accurate and timely information is available.

The term **information management system (IMS)** is frequently used synonymously with **database management system (DBMS)** although it is much broader than a database. A database is a collection of structured information (or data) stored electronically, while the information management system refers to the entire system that manages the data while facilitating the storage, organization, retrieval and delivery of information contained on any medium (electronic and/or physical).

Within the scope of the Search process, we also talk about forensic data management, that covers the different aspects of an information management system (storing and managing data that is collected in a variety of formats and making it accessible to the people who need it), but also the specific analysis, quality assurance and sharing among actors (Fig. 5).

4.1. Forensic data management

There are several elements to consider before designing a strategy around forensic data management, among which we can mention.

- Type of information and items to be stored and managed: physical documents, photographs, electronic data, maps, etc.
- Storage media: manual (when documents or other physical items need to be kept in cabinets) or electronic (when records are kept in servers, cloud hosting, hard drives, etc.)
- Institution/s responsible for the information: ownership, administration, management, monitoring, agency case numbering, etc.
- Legal framework in which the operation is being implemented.
- Use of this information: access, permissions, regulations, etc.
- Information flow system.
- Data protection and confidentiality of information: restricted access and users.
- Human resources and training of personnel.
- Management of the information: capacity to follow up on cases.
- Centralization of the information: integrated and unified databases.
- Interconnection networks: intra and inter-institutional.
- Activities for ensuring quality in the processes.

The information management system, along with the archiving and filing must guarantee the following essential features:

- Accessibility and usability: by all who need to use it, including inter-connections.
- Flexibility (capability of modifications): expansion, adjustments, updates.
- Economy: in terms of cost and space (physical and electronic).
- Security: limit of access from unauthorized persons.

- Safety: protection of files from damage (e.g. fireproof containers/facilities, scanning of documents prior the storage, back-ups in case of corruption of files etc.)
- Centralization: avoid as much as possible the dispersion of information inter- and intra-institutionally.

As part of the registry of information on missing persons and unidentified persons, the design and use of a consolidated database is recommended, that is, a unified registry of information, with different components:

1. Unified registry of missing persons, each of them under a UFN (unique file number, in this case a MP number).
2. Unified registry of unidentified and unclaimed persons, each of them under a UFN (unique file number, in this case a UP number).
3. Unified registry of investigations, that can or cannot be linked to cases recorded under specific UFN in components 1 and 2. The reason for this third component lies in the fact that investigations are not always linked or, at least, not throughout the entire process with known identities (missing persons) or with unidentified bodies, making it necessary to register them in a separate component but with the possibility of linking to particular cases in components 1 and 2 when information is available.

These components should be part of a Unified Registry of Information, divided in modules, where all general information on missing persons, unidentified persons and investigations is centralized, linked by their correspondent UFN, see sections 3.2.3 and 3.3 to provide support for actions to search, locate and identify people. This UFN assigned to each case, both as missing persons and unidentified persons, is the basis for the order into which information should be indexed prior to storage and recording.

Information should be updated and available for consultation in real time, interconnected intra and inter-institutionally, with different levels of access. The personal data contained in the registry must be used exclusively for determining the fate and whereabouts of the missing person.

This Unified Registry should contain minimal information that allows the individualization of the missing person and their search. The specific information will vary depending on the strategy, the mass fatality planning, the local investigative capacity, etc. For example, regarding the missing person, information may include: full name, date and place of birth, age, sex and gender, parental information, relevant genealogy, marital status, identity record number, profession, date, time and place last seen, last known address, circumstances of the disappearance, recent photographs, detailed description of physical characteristics and individualizing characteristics, description of the personal belongings carried at the time of the disappearance.

Information about the search requestor (interviewee) may additionally include the relationship with the missing person and contact details. Information on unidentified or unclaimed persons includes the complete and detailed account of the circumstances in which they were found, the detailed description of physical and highly individualizing



Fig. 5. Aspects included in forensic data management.

characteristics, and the description of personal objects and clothing associated with the unidentified/unclaimed person.

The use of computerized tools to compare different sets of information can be a key asset in solving large-scale cases of missing persons, as part of the efforts to conduct many-to-many queries as an initial step of the identification that then leads to refining the comparisons to allow eventually for a one-to-one comparison. Although these tools should not replace a solid forensic data management strategy, they are a powerful support to case management and can improve the quality control procedures necessary to any forensic operation, including data protection and confidentiality requirements.

5. Organizational structure of the search

As mentioned in the previous sections, the Search process is complex. It is a process that requires a solid mechanism in place in order to ensure reliable results. This covers regulations, procedures and optimal working conditions for efficient and effective information gathering and management with quality control systems. Adequate involvement of affected families is also essential. Therefore, the proper setup in terms of organizational structure (i.e. hierarchy, lines of communication, units, sub-units, etc), will ensure every requirement is met and regular communication and coordination are followed.

As the identification process must consider all possible lines of evidence and information available, it seems logical to recommend that it be performed under a multidisciplinary approach. Each discipline offers the necessary expertise for a comprehensive information gathering, analysis and reconciliation process. However, it is often the case that multiple institutions or agencies are mandated for different tasks of the same Search process. Therefore, a **multiagency approach** with clear roles and responsibilities should be envisioned, in order to carry out each step of the process in an integrated manner.

Ideally there should be a leading agency (or leading agent) responsible for the overall management of the process, primarily to ensure the above-mentioned requirements are fulfilled. Normally, the medico-legal and death investigation system is responsible for the identification of missing persons. In the case of death, it is also responsible for the identification of human remains as part of the death investigation process. Fig. 6 depicts a representation of an example setup. Given the nature of human identification and the different stages or steps as explained in this document, different units or subsections would operate with specific tasks and responsibilities according to their main role. The

identification coordinator must ensure the adequate integration of the outcome of each step in the process and the analysis and reconciliation of the information.

In large scale events or contexts with high number of missing persons/non identified bodies, or in cases where the state of preservation of bodies challenges the identification process, the set up or creation of special **identification units and/or an identification committee** at a governmental or mixed (State-NGO) level has been necessary to address in a more integrated and holistic manner the resolution of cases (e.g. Special Forensic Identification Unit, part of the Chilean Medico-Legal Service, SML; Special Investigations Unit with BC Coroners Service, BCCS in Canada).

One of the fundamentals in ensuring the success of a Search project is not only the effective coordination between the different sub-units or areas in charge of every step of the process, but also the proper articulation between the operational setup and high-level executive/administrative bodies, and by extension with the concerned political entities and relevant organizations.

When setting up the organizational structure of the Search process, essential aspects such as regulations, procedures, roles and responsibilities are properly considered at early stages, and efforts should not be focused only on the equipment or innovative techniques. That way, any given mechanism, commission or unit mandated with the clarification of the fate and whereabouts of missing persons will be able to ensure a reliable and effective technical process.

If the system of a country is limited or has collapsed after a crisis or an emergency, efforts should focus on reinforcing its capacities, so the Search process can prevent the hindering of identifications. Such operations can span over a decade and therefore need a stable and sustainable system in place. This is one of the reasons to strongly recommend the creation and proper implementation of emergency preparedness and response plans that consider not only the wounded but the dead and the missing persons. The better the response is at the initial stages after the event, the higher the probabilities to identify all those who died or went missing and whose whereabouts are unknown.

Therefore, we recommend the development of mechanisms promoting an active intra- and inter-institutional coordination. A multidisciplinary approach through dedicated units or committees must include the role of a lead investigator and an identification coordinator. The diverse challenges inherent in the forensic identification of large-scale events and challenging contexts require a coordinated forensic data management strategy.

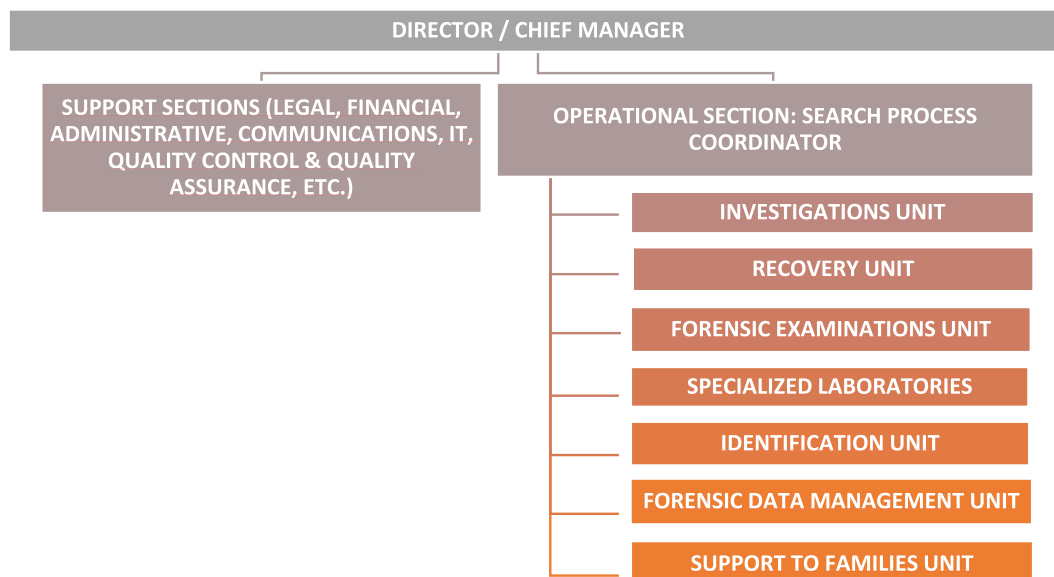


Fig. 6. Example of an organizational setup of a Search process.

The strategy to approach an investigation on missing persons and unidentified individuals, and establishing a functional structure, especially in complex contexts or large-scale scenarios, must pay attention to the following items:

- At the **legislation/regulations/procedures** level:
 - o Existing legislation and mandates and the hierarchy within the multi-agency response;
 - o Existing legislation and capacity to share information between States for cases involving other foreign nationals;
 - o Advocate for specific legislation for missing persons that allows for the unhindered and timely collection of personal and confidential information and biological samples of missing persons, and their relatives, where the health and well-being of the missing person is the primary objective of the investigation in addition to those cases involving suspicious deaths (i.e. proper and thorough investigation of accidents, suicides, undetermined disappearances).
 - o Intra- and inter-institutional coordination at the government level and between the government and non-governmental bodies (civil society organizations, including those concerned with relatives);
 - o The establishment of a coordination model that recognizes the importance of accommodating certain case sensitivities and investigation details (national security cases, homicide hold back information, ongoing or pending prosecutions, etc.) but still allows for communication and sharing of specific information pertinent to the various mandates without compromising ongoing criminal investigations;
 - o Ensure that a mass fatality plan is recognized and appropriately accommodated in the local, regional and national disaster contingency planning and preparations;
 - o Drafting and implementation of standard operating procedures for missing persons investigation and processing human remains;
 - o Clarification of the sequence in which forensic analyses is conducted especially when that test alters or destroys the evidence that is also required for examination by other experts;
 - o Develop a Quality Assurance system that assesses the strengths and weaknesses of the investigation system (including individual case management) while reporting on lessons learned and making recommendations for adjustments and remedies to improve the program;
 - o System of peer reviewed reconciliations and identification conclusions in multiple fatality or complex identification cases;
 - o Natural and unnatural hazards and risk levels;
 - o Action and contingency plans (not only in emergencies);
 - o Implementation of additional measures to contribute to the resolution of pending cases once techniques have improved or more information is available: review unresolved historical missing persons cases that may be related to human remains found in the future; recover files involving incomplete but identified human remains as well as historical unidentified human remains to be included in the centralized registry and for analyses using new forensic techniques and methods to increase the identification potential; determine the disposition of unidentified human remains related to unsolved cases and make every effort to retrieve them or trace their whereabouts (e.g. donations to learning institutions, buried, cremated, etc.).
- At the **competency and capacity**:
 - o Build competency and capacity to investigate missing persons and deaths in routine case work by adequately preparing responders and forensic practitioners for large-scale events;
 - o Build competency and capacities with local communities and in close cooperation with regional and national level engagement;
 - o Career planning for future forensic professionals and the transfer of expertise through mentoring to the future generations (sustainability of practice and knowledge);
- o Creation, training and equipping of multidisciplinary teams including judicial authorities (i.e. judges and prosecutors), forensic experts and investigators/crime scene officers in training sessions;
- o Evaluate the use of learning institutions and other non-government agencies and institutions which may be able to provide reliable and credible human resources and forensic expertise to support the establishment and investigation of missing persons and unidentified bodies cases;
- o Identify State and Non-State sponsors for the Missing Persons/Unidentified Bodies program to allow for the program to develop in a professional and systematic manner and have the funding to actively investigate cases in perpetuity.
- At the **infrastructure/equipment** level:
 - o Develop forensic laboratories, human and infrastructural capacities to absorb high throughput needed for large scale events, or identify and develop agreements with international forensic laboratories that can conduct the analyses;
 - o Availability of temporary mortuaries capable of processing high number of human remains (including storage capacity). Morgues do not necessarily need to be formal structures, but they should comply with minimum requirements for the processing of large numbers of human remains (security, protection, sufficient space, light, water, air conditioning, etc.);
 - o Identify and secure large cemetery areas for the potential of a mass fatality incident.
- At the **information management** level:
 - o Develop a formal (national) Missing Persons and Unidentified Persons Program with a Missing Persons/Unidentified Persons software tool (with dedicated multidisciplinary staff) to effectively manage routine cases but with the ability to absorb large caseloads from large scale events;
 - o Centralization of information: centralized databases ensuring different access levels, data security and confidentiality;
 - o Work with existing State systems and authorities and wherever possible avoid creating parallel data collection systems;
 - o Specialized equipment and software, particularly if it is necessary to conduct genetic analyses at a large scale.
- At the **families/communities** level:
 - o Establish accessible family support centres and mobile units for relatives, with clearly established mechanisms to report missing persons and to exchange information and collection of exhibits and biological samples;
 - o Develop a standardized practice of engaging with families of the missing so that missing persons information collected is relevant and forensically pertinent but collected in a manner that ensures that the family develops trust and confidence but also that they are considered an active participant in the investigation by supplying key identification related information. They should also receive regular updates;
 - o Establish a Families Committee to serve as representatives on an ad hoc basis towards the development of a missing persons/unidentified bodies program ensuring the buy-in from the primary beneficiaries;
 - o Produce national Missing Persons/Unidentified Bodies Program annual reports to show the development and progress of the national initiative.

6. Relations with families

Interactions with families during past investigations on missing persons and/or unidentified individuals have allowed reflections on the role and responsibilities of judicial operators, investigators and forensic practitioners regarding the support of these families in the Search process. International and non-governmental organizations have also contributed to these reflections from the perspective of the families and

communities. Multiple experiences in different contexts have enabled the experts and other actors to develop and agree on minimum standards of practice. These recommendations and principles [33], beyond addressing the needs of the families, also have a significant impact on the quality and reliability of the work.

The right of the families to know includes access to forensic information and its implications collected across the different phases, including results of identification and other potential analyses, technical details, as well as the limitations that may challenge the outcome of the Search process. Institutional difficulties should also be communicated to families transparently. Informing relatives about the work of investigators including forensic experts will provide clarity on the ongoing efforts and on operational timeframes; this directly helps mitigating wrong assumptions and expectations. Experiences of Search operations have highlighted that regular meetings between authorities, investigators, forensic experts and families drastically decreases uncertainty and alleviates anxiety as well as contributes to the acceptance of results. Regular communication is not only beneficial for families, but also for the professionals and institutions involved in the process.

Whatever the context of a disappearance, whether it is due to a natural disaster, armed conflict, migration, accident or other situations of violence, the Search must not be declined to the families. The authorities should immediately carry out the search regardless of the circumstances and must respond to the demands of the next of kin to find the missing person alive. If death is presumed, every effort must be made to ensure that the remains are searched for, recovered, identified and handed over to their loved ones. The search itself generates great anguish in families and the idea that something may have happened to their loved ones generates enormous suffering. This feeling of not knowing if their loved ones are alive or dead has been referred to by Pauline Boss as Physical Ambiguous loss [34]. It describes how the missing individual is psychologically present within the family but not physically present due to the unknown proof of death or permanent loss. It is recommended that the minimum standards of psychosocial support be integrated into public policies, legal frameworks, regulations and procedures of the institutions in charge for both experts and families [35].

When families have no news of the whereabouts of their loved ones, they may begin the search on their own. Authorities must anticipate this action and adapt the legal frameworks and institutional structures to respond to the requirements of the families. This risk can be mitigated by placing families at the centre of the operation, following international recommendations, policies and regulations. Measures must integrate the communities and highlight the respect and recognition of the rights of the families of missing persons.

During the Search process, families are expected to make decisions, requiring them to be well informed through complete and accurate information. The complexity of this information requires the forensic practitioner to transmit it directly to the relatives, which avoids misunderstandings and increases trust. Equally importantly, forensic practitioners must be conscious of the need to explain their findings in clear, simple and understandable manner. The rights of the families to justice, to memory, and to comprehensive reparation cannot be fulfilled without the clarity of the information pertaining to the circumstances of disappearance, the identification details, and in the case of death, the cause, manner and circumstances of death.

Relatives also have the right to be an active participant in the Search process beyond the provision of information and biological reference samples for genetic analysis. These are not only moral requirements but also international legal obligations [36].

The collection of information about the missing person is a crucial component of the Search, adding to the required responsibility to search, follow up and resolve the case. Some family members may require privacy and confidentiality, while others may request the inclusion of the family in the reconstruction of the biography of their loved ones and even further, if cultural customs so indicate, other members of the

community will be part of the biographical reconstruction. Additionally, family members may request the accompaniment of legal representatives, other members of family associations, or forensic experts to support them in understanding technical language. It may also be that the collection of information collection takes place in public offices, NGOs, consulates, universities or directly in the communities. Participation in the process can also mean the right of the family members not to be part of the process, including the right to withdraw previously provided information, such as biological reference samples for genetic analysis.

Throughout the identification process, in addition to the information about the missing person, it is important to collect information on the expectations and wishes of the family, and properly inform them of the possibilities and limitations involved, so as not to raise unrealistic expectations. For example, collecting a BRS can have a strong impact in a family: the act of donating their sample could provoke a sense of successful resolution of the case, or an additional phase of grieving. A sample is additional information potentially useful in the identification proceedings for the investigator, but it bears an important symbolic value for the family, which calls for understanding and respect from the experts. To further mitigate expectations and ease the exchanges with the families, it is advisable to include in the interview form a series of questions designed to gather this kind of information both with reference to general and specific aspects, depending on the context. For example:

- defining the family focal point(s) for communication purposes;
- evaluating if there are any conflicts at the family level regarding the decisions and opinion on the search and identification of the missing person;
- enquiring if there are any cultural or religious conditioning factors, etc.

This is particularly important in complex cases, such as the identification of missing persons whose remains are decomposed, mutilated, incomplete or commingled. In such cases, it is important to be informed of the family's wishes not only as to the identification of the individual, but also as to the re-association of the remains and to the wishes on the final disposition of the body, personal belongings, biological samples and/or the un-associated remains, which involves a series of methodological, legal and reporting considerations that are different from those used for less complex cases.

For complete support within a Search process, the physical and psychological care for the people that carry out the operational work needs to be included in the scope. The **wellbeing of the human resources** (i.e. judicial authorities, forensic staff, etc.) has a direct impact on the outcome of the work, on their interaction with other experts, with institutions and by extension with families. It is a concept widely considered amongst forensic teams and institutions who can address it through continuous training. The care for workers contributes to the professionalism of the staff involved and empowers them to interact with relatives in a precise and respectful manner.

The following is a list of some of the most important aspects to consider before starting search for and identification of missing persons projects in relation to families:

- Careful consideration to the role, participation and consultation of the families at different stages, as well as to maintain families informed regularly.
- Information to families includes aspects in relation to the scientific and technical process and should include limitations and challenges that exist or are being faced by the teams. Be mindful of expectations and wishes of the families.
- Religious and cultural considerations. Make the necessary adaptations to procedures during the Search process (i.e. collection of data, exhumations, restitution of bodies, etc). This is also important to

ensure the mourning process and commemorations respect the will of the families and their religious and cultural beliefs.

- Facilitate mechanisms to ensure the reliability of the scientific process (i.e. Allow the participation of independent forensic teams when the authorities are in charge of the investigation, share with families the quality assurance/control system in place, etc),
- Standard operating procedures and guidelines should include the process of handover or restitution of human remains to families and burial aspects. This will contribute to increase the trust of the families by ensuring the quality of the final steps, along with the proper and dignified interaction with relatives and the respect for the deceased.
- Data protection regulations are necessary to ensure that families are the owners of their personal information, including genetic data (i.e. DNA data banks), and that it will be use with defined purposes and under ethical standards;
- Educational strategies addressing authorities, investigators and forensic practitioners about the consequences of the disappearances in the communities and about the importance of their role to contribute in alleviating the suffering of the families;
- Ensure the issuance of certificate of death and registration procedures are in place to ease the process for concerned families.
- Assessment and support to families in needs beyond the need to know and justice, such as their legal, administrative, financial and psychological needs, need for recognition, for memorialization, etc. Evaluation of their needs through a representative consultation ensuring an integrated and holistic response.
- Interaction with other structures not directly involved in the Search process but closely linked to the support to families in their other needs (e.g. entities in charge of social policies and benefits, NGOs, associations, etc.);
- Ensure adequate psychological and psychosocial support, not only to families but to the operators and all the staff involved in the work. Coordination and permanent communication between psychological/psychosocial teams and authorities, investigators and forensic specialists will have a benefit in the well-being of the families and of the human resources.
- Communication with families and the communities/or the public. Develop communication strategies and define the role of media.

7. Conclusion

This paper has presented a revision of the traditional concept of the search for and identification of missing persons expanding the traditional notion of a “body centred” forensic response, to better reflect the investigation and identification of the missing in any state (dead or alive), in any scenario (with or without bodies), and emphasizing the necessary integrated, multidisciplinary, and very often multiagency approach of the mechanisms that need to be implemented.

As part of the discussion reframed terminologies are also introduced, including Missing Persons (MP) to signify all identities without bodies, and Unidentified Persons (UP), representing all bodies without identity inclusive of the living and deceased. We also propose the use of the more inclusive terminology of Missing Person Data (MPD) to replace the traditional antemortem data (AMD), and Unidentified Person Data (UPD) to replace the traditional term postmortem data (PMD).

All steps of this newly defined Search process incorporating the investigative and identification tasks and including the involvement of the families are presented. The main requirements to ensure effective articulation and coordination between all concerned agencies are discussed.

While not purporting to be a detailed instruction manual, it does aim to clarify key concepts, principles and recommendations and promote discussion among all actors invited in the investigation and identification of missing persons.

Author statement

Mercedes Salado Puerto: Conceptualization, Writing – original draft, Denise Abboud: Conceptualization, Writing – review & editing, Jose Pablo Barayba: Writing – review & editing, Angel Carracedo: Conceptualization, Stephen Fonseca: Conceptualization, Writing – review & editing, William Goodwin: Conceptualization, Pierre Guyomarc’h: Conceptualization, Writing – review & editing, Alejandra Jimenez: Conceptualization, Writing – review & editing, Udo Krenzer: Conceptualization, Writing – review & editing, Maria Dolores Morcillo Mendez: Conceptualization, Writing – review & editing, Jose Luis Prieto: Conceptualization, Writing – review & editing, Jacqueline Rodriguez Gonzalez: Conceptualization, Writing – review & editing, Yarimar Ruiz Orozco: Conceptualization, Writing – review & editing, Jane Taylor: Conceptualization, Writing – review & editing, Ajith Tennakoon: Conceptualization, Kristy Winter: Writing – review & editing, Oran Finegan: Conceptualization, Writing – review & editing

Declaration of competing interest

The authors have no competing interests to declare. Given their role as Editorial Board members on FSI Synergy, Oran Finegan and Angel Carracedo were not involved in the peer review of this manuscript and have no information regarding its peer review.

Acknowledgements

This paper has been supported by the International Committee of the Red Cross through the funding of workshops and a consultancy for the first author in 2018–2019.

References

- [1] International Committee of the Red Cross, *Accompanying the Families of Missing Persons: A Practical Handbook – Ref. 4110-ebook*, ICRC, Geneva, 2013.
- [2] S. Cordner, S.T.D. Ellingham, Two halves make a whole: both first responders and experts are needed for the management and identification of the dead in large disasters, *Forensic Sci. Int.* 279 (2017) 60–64, <https://doi.org/10.1016/j.forsciint.2017.07.020>.
- [3] International Committee of the Red Cross, *The Missing and Their Families ICRC/ The Missing/01.2003/EN/10 - Excerpt (Original: English)*, ICRC, Geneva, 2003.
- [4] Advisory service on international humanitarian law of the international committee of the red cross, *humanity after life: respecting and protecting the dead*. <https://www.icrc.org/en/document/humanity-after-life-respect-and-protection-dead>, 2020. (Accessed 1 March 2021).
- [5] J.P. Baraybar, I. Caridi, J. Stockwell, A Forensic perspective on the new disappeared: migration revisited, in: R. Parra, S. Zapico, D. Ubelaker (Eds.), *Forensic Science and Humanitarian Action: Interacting with the Dead and the Living*, Wiley, New Jersey, 2020.
- [6] S. Hackman, Forensic anthropology and missing persons investigations, in: S. Morewitz, C. Sturdy Colls (Eds.), *Handbook of Missing Persons*, Springer, Switzerland, 2017, pp. 415–425, https://doi.org/10.1007/978-3-319-40199-7_27.
- [7] M. Salado Puerto, H. Tuller, Large-scale forensic investigations into the missing: challenges and considerations, *Forensic Sci. Int.* 279 (2017) 219–228, <https://doi.org/10.1016/j.forsciint.2017.08.025>.
- [8] D. Sweet, INTERPOL DVI best-practice standards—an overview, *Forensic Sci. Int.* 201 (1–3) (2010) 18–21.
- [9] C. Kuner, M. Marelli (Eds.), *Handbook on Data Protection in Humanitarian Action, second ed.*, International Committee of the Red Cross, Geneva, 2020.
- [10] C.M. Vullo, M. Romero, L. Catelli, M. Sakić, V.G. Saragoni, M.J. Jimenez Pleguezuelos, C. Romanini, M.J. Anjos Porto, J. Puente Prieto, A. Bofarull Castro, A. Hernandez, M.J. Farfán, V. Prieto, D. Alvarez, G. Penacino, S. Zabalza, A. Hernández Bolaños, I.M. Manterola, L. Prieto, T. Parsons, GHEP-ISFG collaborative simulated exercise for DVI/MP: lessons learned about large-scale profile database comparisons, *Forensic Sci. Int. Genet.* 21 (2016) 45–53, <https://doi.org/10.1016/j.fsigen.2015.11.004>.
- [11] B. Budowle, J. Ge, R. Chakraborty, H. Gill-King, Use of prior odds for missing persons identifications, *Invest. Genet.* 2 (2011) 15, <https://doi.org/10.1186/2041-2223-2-15>.
- [12] C. Kuner, M. Marelli (Eds.), *Handbook on Data Protection in Humanitarian Action, second ed.*, International Committee of the Red Cross, Geneva, 2020.
- [13] Argentine MFAW, *International Committee of the Red Cross, Good Practice Guide for the Use of Forensic Genetics in Investigations into Human Rights and International Humanitarian Law Violations, second ed.*, International Committee of the Red Cross, Geneva, 2019.

- [14] Sense About Science, I.S.F.G. EuroForGen, Making Sense of Forensic Genetics, first ed., Sense about Science, London, 2017.
- [15] M. Prinz, A. Carracedo, W.R. Mayr, N. Morling, T.J. Parsons, A. Sajantila, R. Scheithauer, H. Schmitter, P.M. Schneider, DNA Commission of the International Society for Forensic Genetics (ISFG): recommendations regarding the role of forensic genetics for disaster victim identification (DVI), *Forensic Sci. Int. Genet.* 1 1 (2007) 3–12, <https://doi.org/10.1016/j.fsigen.2006.10.003>.
- [16] L.S. Parker, A.J. London, J.D. Aronson, Incidental findings in the use of DNA to identify human remains: an ethical assessment, *Forensic Sci. Int. Genet.* 7 2 (2013) 221–229, <https://doi.org/10.1016/j.fsigen.2012.10.002>.
- [17] Argentine MFAW, International Committee of the Red Cross, Good Practice Guide for the Use of Forensic Genetics in Investigations into Human Rights and International Humanitarian Law Violations, second ed., International Committee of the Red Cross, Geneva, 2019.
- [18] I. Caridi, E.E. Alvarez, C. Somigliana, M. Salado Puerto, Using already-solved cases of a mass disaster event for prioritizing the search among remaining victims: a Bayesian approach, *Nature Research* 10 (2020) 5026.
- [19] I. Caridi, C.O. Dorso, P. Gallo, C. Somigliana, A framework to approach problems of forensic anthropology using complex networks, *Physica A* 390 (2011) 1662–1676, <https://doi.org/10.1016/j.physa.2010.11.042>.
- [20] United Nations, The Minnesota protocol on the investigation of potentially unlawful death 2016: the revised united Nations manual on the effective prevention and investigation of extra-legal, arbitrary and summary executions, 2018, <https://doi.org/10.18356/0389ae17-en>. UN, New York.
- [21] UN office of the high commissioner for human rights, manual on the effective investigation and documentation of torture and other cruel, inhuman or degrading treatment or punishment ("Istanbul protocol"), HR/P/PT/8/Rev.1, available at: <https://www.refworld.org/docid/4638aca62.html>, 2004.
- [22] United Nations security council resolution 2474 S/Res/2474 (11 june 2019), available from, <http://undocs.org/s/res/2474>, 2019.
- [23] Advisory Service on International Humanitarian Law, Humanity after Life: Respecting and Protecting the Dead, International Committee of the Red Cross, Geneva, 2020.
- [24] Committee on Enforced Disappearances, Guiding principles for the search for disappeared persons, *Int. Hum. Right. Law Rev.* 8 2 (2019) 286–299, <https://doi.org/10.1163/22131035-00802004>. United Nations International Convention for the Protection of All Persons from Enforced Disappearance, GE.19-07604 (E) 260619 280619 (2019).
- [25] E. Stover, R. Shigekane, Exhumation of mass graves: balancing legal and humanitarian needs, in: *My Neighbor, My Enemy. Justice and Community in the Aftermath of Mass Atrocity*, Cambridge University Press, Cambridge, 2004, pp. 85–103.
- [26] A. Biedermann, J. Vuille, Understanding the Logic of Forensic Identification Decisions (Without Numbers), *Sui-generis*, 2018, pp. 397–413.
- [27] M. Crettol, L. Milner, A.M. La Rosa, J. Stockwell, Establishing mechanisms to clarify the fate and whereabouts of missing persons: a proposed humanitarian approach, *Int. Rev. Red Cross* 99 2 (2017) 589–618.
- [28] S. Wagner, *To Know where He Lies. DNA Technology and the Search for Srebrenica's Missing*, University of California Press, 2008.
- [29] M. Tidball-Binz, Forensic investigations into the missing. Recommendations and operational best practices, in: A. Schmitt, et al. (Eds.), *Forensic Anthropology and Medicine: Complementary Sciences from Recovery to Cause of Death*, Chapter 16, Humana Press Inc., 2006, pp. 383–407.
- [30] <https://www.cmp-cyprus.org/press-release/cmp-discovers-misidentification-2/>.
- [31] G. Adams, Utilizing forensic technologies for unidentified human remains, in: *Death Investigation Resources, Strategies, and Disconnects*, Section I, CRC Press, 2016, pp. 7–35.
- [32] <https://www.icrc.org/en/publication/0880-management-dead-bodies-after-disasters-field-manual-first-responders>.
- [33] International consensus on principles and minimum standards for psychosocial work in search processes and forensic investigations in cases of enforced disappearances, arbitrary and extrajudicial executions. http://mhps.net/?get=32/1363191281-Minimumstandards_forensicinvestigations_2011.pdf, 2011.
- [34] P. Boss, The context and process of theory development: the story of ambiguous loss, *J.Fam. Theory Rev.* 8 (2016) 269–286.
- [35] U. Hofmeister, S. Navarro, A psychosocial approach in forensic humanitarian action, the Latin American perspective, *J. Forensic Sci.* 280 (2017) 35–43.
- [36] G. Gaggioli, International Humanitarian Law: the legal framework for humanitarian forensic action, *Forensic Sci. Int.* 282 (2018) 184–194.

Mercedes Salado Puerto

Equipo Argentino de Antropología Forense, Buenos Aires, Argentina

Denise Abboud

Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Jose Pablo Baraybar
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Angel Carracedo
Institute of Forensic Science Sciences, University of Santiago de Compostela, Santiago de Compostela, Spain

Stephen Fonseca
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

William Goodwin
School of Forensic and Applied Sciences, University of Central Lancashire, UK

Pierre Guyomarc'h*
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Alejandra Jimenez
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Udo Krenzer
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Maria Dolores Morcillo Mendez
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Jose Luis Prieto
Complutense University of Madrid, Spain

Jacqueline Rodriguez Gonzalez
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Yarimar Ruiz Orozco
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Jane Taylor
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Ajith Tennakoon
Institute of Forensic Medicine and Toxicology, Colombo, Sri Lanka

Kristy Winter
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

Oran Finegan
Forensic Unit, International Committee of the Red Cross, 19 Avenue de la Paix, Geneva, Switzerland

* Corresponding author. Central Tracing Agency, Forensic Unit, International Committee of the Red Cross, 19 avenue de la Paix, 1202, Geneva, Switzerland.
E-mail address: pguyomarch@icrc.org (P. Guyomarc'h).