INTERPOL
Disaster Victim Identification Guide

INTERPOL DVI GUIDE REVIEW SCHEDULE

Content	Responsible Member	Date approved
New INTERPOL DVI Guide. Part 1 - Guide Part 2 - Annexures	A Cerritelli - Chair of Australasian Disaster Victim Identification Committee (ADVIC)	Steering Group and Standing Committee May 2014

INTERPOL - Disaster Victim Identification Guide

Part 'A'

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INTERPOL - Disaster Victim Identification Guide

Part 'B'

Contents (Annexures)

1. Foreword

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The first INTERPOL Disaster Victim Identification (DVI) Guide was published in 1984 and subsequently revised over several years. The experience gained by the past and present international community of DVI disciplines and administrators over that time, in various operations, has been taken into account in this current version.

As far as INTERPOL is concerned, one of the most important requirements for victim identification is the application of international standards, which aims to promote a consistent and widely understood approach, especially in multinational DVI operations.

This philosophy was reinforced by the INTERPOL Secretary General at an international conference in The Hague, Netherlands, where he said; *"experience had shown that field deployments are complex and require a uniform response when providing onsite support following a disaster, whether natural or man-made…"* (INTERPOL Media Release, 2013).

In order to establish, maintain and review standards as well as promote effective international cooperation and uniformity, INTERPOL calls upon each Member Country to plan and prepare for DVI operations. However, if a disaster occurs in a country that does not have its own DVI capacity, support by DVI teams from other countries can be requested through INTERPOL and its networks.

This Guide has been endorsed by the INTERPOL DVI Standing Committee and INTERPOL DVI Steering Group and is promoted as the international standard for conducting DVI operations as of the date of official publication.

2. Purpose of the INTERPOL DVI Guide

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The DVI Guide provides guidelines for use by INTERPOL Member Countries in the identification of disaster victims. It can also be used to assist in establishing DVI Teams and in the management of DVI operations by those countries that either do not currently have a DVI capacity, or have never been confronted with such operational situations.

The guide has been designed to inform two separate audiences, namely strategic managers and planners and operational practitioners. The guide should be of use to personnel from both law enforcement and forensic backgrounds. It should also be of use to national and local authorities, as well as to organisations that have responsibility for emergency contingency planning.

The Guide is designed to be neither detailed nor prescriptive. It is a document that can be utilised as an easy reference tool that can be widely applied internationally to develop baseline standards for conducting a DVI operation. The document provides broad-based standards and recommendations that can be interpreted and understood by all levels of planners and practitioners. The document also provides sufficiently flexible guidelines and structures that will accommodate differences and variations in jurisdictional legal systems, policies and practices.

Part A of this Guide contains high level reference material in respect to the conduct of DVI operations, although there is further extensive detailed information that can be accessed through linked annexures in **Part B** of the Guide. These linked annexures outline operational and procedural information designed to inform the main technical aspects of conducting a DVI operation. They can also provide standardised approaches for practitioners, although the content remains sufficiently broad enough to allow for varying international practices or circumstances.

Additionally, this guide provides assistance regarding the use of the standardised INTERPOL DVI forms. These INTERPOL forms should be used to document victim identification AM (ante-mortem) and PM (post-mortem) data. It is also possible that these forms can be used in single cases to assist practitioners to enhance familiarity. They can be used as either hard copy, PDF files downloaded from the homepage, or in electronic form in a software system.

Whilst this document has utilised certain terminology, particularly in respect to designated positions or entities, this has been done to highlight key roles, responsibilities and functions that exist in large scale disaster events. It is therefore acknowledged that the descriptors and designations relevant to each nation or jurisdiction may vary, although it is considered that regardless of the terminology used, it is important that the functions and roles are adequately catered for in any response plan.

Finally, to enable the Guide to remain contemporary, each annexure at **Part B** can be updated independently, thereby eliminating the need for a complete revision of the Guide at regular intervals.

2.1. Guiding Principles

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DVI teams work in an interdisciplinary manner, engaging the services of experts in various disciplines, as required, to work collaboratively towards the identification of victims. As a fundamental principle, the highest possible quality standards should be applied and victims are to be treated with dignity and respect. It is also essential to respond to relatives' needs with compassion, respect, and honesty, to provide answers and certainty as soon as reasonably possible.

Experience has shown that cooperation with other national DVI teams is advantageous when disaster victims of different nationalities are likely to be involved. More generally, if there are victims from other nations, the nation in charge should do its utmost to secure participation from those other nations, at least as liaison officers. This is especially important in respect to medical and dental specialists as well as police, with the latter providing access to police systems to facilitate the exchange of information (especially AM information).

The application of open communication, respect and honesty are all hallmarks of the principles that should underpin DVI operations and these principles are supported and strongly promoted by INTERPOL.

2.2. Good DVI Governance

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In our global society, disasters rarely have a singular national impact. Frequently, the victims are citizens from several countries. Consequently, the authorities of countries whose citizens have become victims of a disaster have a joint responsibility for the ethical, transparent and humane treatment of all victims. Nevertheless, it is the authorities of the country where the disaster has occurred that has chief responsibility in dealing with the victims. The independence and the applicable legal system of the disaster stricken country are internationally accepted and respected.

This basic principle also applies to the process of disaster victim identification. In order to support and assist with the identification of the deceased, DVI teams from countries which have citizens believed to be victims of the disaster are often sent to assist the country in which the disaster has occurred. In recent years there has, at times, been confusion for both the country of authority and those providing assistance regarding mutual roles and responsibilities.

Having clearly outlined principles of engagement and interoperability help synchronize political, diplomatic, law enforcement and other institutionalized components of a DVI response strategy and allow leaders of a country to understand the ultimate aim and purpose of the DVI support offered to a country immediately after a disaster.

Coordination of the following activities is therefore important for an effective disaster response. Coordination starts immediately after a disaster has occurred and the need for a DVI process needs to be identified with consideration being given to:

- Legislation, jurisdiction and National Conventions.
- INTERPOL DVI Standards.
- Command and Control arrangements.

- Information Management and Status Analysis.
- Identification of Required Personnel and Material Resources.
- Communication and Information.

Further detailed information on these critical principles can be found in Part B of this Guide at annexures 1 and 2.

2.3. The Phases of the DVI Process

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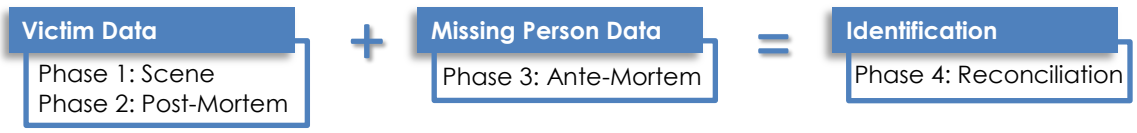
The DVI process is an internationally recognised sequence of activities that has been developed over several years. It has been tested in large scale disasters in many regions across the world and has proven to be a reliable method by which victim data in the form of post-mortem material can be matched against missing person data. The aim of this matching process is to positively identify human remains.

Whilst technology in the form of evolving software products has greatly enhanced efficiency levels during DVI operations, it should be remembered that these developments cannot replace specialist skills that are critical when dealing with victim's families and friends, or when arriving at conclusions of identity through the close analysis of relevant data. These skills should be incorporated into coordinated and cohesive teams to ensure that the following phases of the DVI process are performed effectively and efficiently:

- Phase 1: Scene (processing human remains and property at the disaster site).
- Phase 2: Post-mortem (detailed examination of human remains in mortuary).
- Phase 3: Ante-mortem (collection of missing person data from various sources).
- Phase 4: Reconciliation (matching post-mortem and ante-mortem data).

> The DVI Process



Further explanation regarding the specifics of these DVI phases will be provided later in this Guide.

2.4. Disaster Classifications

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In the context of DVI a disaster is an unexpected event causing the death of many people. Many different kinds of events can lead to disasters which may require the use of the DVI process. For example, DVI processes may be required following traffic accidents, natural disasters, technical accidents (fires, explosions), terrorist attacks or events occurring within the context of wars. It is important to distinguish between open and closed forms of disasters as the classification of such events can significantly influence the DVI response approach.

2.4.1. Open Disaster

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An open disaster is a major catastrophic event resulting in the death of a number of unknown individuals for whom no prior records or descriptive data are available. It is difficult to obtain information about the actual number of victims following such events, as there is usually no early reference point to commence a missing persons list. Therefore thorough investigation is required to obtain an accurate potential victim list in order to commence DVI procedures. A practical example of an open disaster is found in public gatherings where there is no formal list available that would highlight potential victims.

2.4.2. Closed Disaster

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A closed disaster is a major catastrophic event resulting in the death of a number of individuals belonging to a fixed, identifiable group (e.g. aircraft crash with passenger list). As a rule, comparative ante-mortem data can be obtained more quickly in the case of closed disasters because there is a reference point such as a passenger manifest or a log of attendees at an event.

Combinations of closed and open disasters are also conceivable (e.g. aircraft crash in a public area). Although an initial assessment of a scene may result in a classification being made, it is important that an open mind is applied in case early reports and information is flawed or incomplete.

3. A Cooperative Approach to Disaster Management

3.1. General

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There are many specialist agencies involved in a disaster response and it is therefore important to acknowledge and appreciate that each has a very important function and area of responsibility. DVI forms part of that emergency response and to ensure that DVI management effectively maximises the expertise, advice and available resources from such contributing agencies, effective structures, plans and liaison arrangements need to be created and implemented.

Due to uncertainty with regard to the extent of damage, disruption and lack of reliable information, there is often difficulty establishing an immediate emergency response following a disaster. However, coordination at all levels (local, regional, national and/or international) is imperative. Although disaster response plans often provide for corresponding coordination mechanisms, these may not exist immediately following a disaster. In any case, these plans are usually generic and are not ordinarily designed for the intricacies of a specific incident.

Effective coordination of a disaster response operation can only be assured if a properly functioning command and organisational structure is implemented. This is especially the case in DVI, where multiple agencies and organizations, with diverse and competing functions and responsibilities are required to work together. The implementation of clearly defined command structures and channels of communication can avoid confusion and dysfunctionality. As the DVI response forms part of the overall disaster response, the various elements of the DVI command need to be effectively incorporated into the lead authority's organisational structure. Most importantly, a mind-set of flexibility should prevail when integrating DVI operations into multidiscipline emergency responses so that confusion can be minimised and common objectives can be pursued.

3.2. Coordinating a DVI Response with Other Disciplines

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Once an initial overview and appraisal of the situation has been obtained from the site of the disaster, distinct operational units should be formed to carry out disaster response activities. These units should be clearly identifiable and assigned to specific duties and responsibilities.

The lead authority should also establish structures to promote effective communication between operational units in order to ensure that critical information is conveyed to and from appropriate recipients. During multi-national responses, early decisions on the procedures, language and structure of the response mission are critically important to enhance co-ordination.

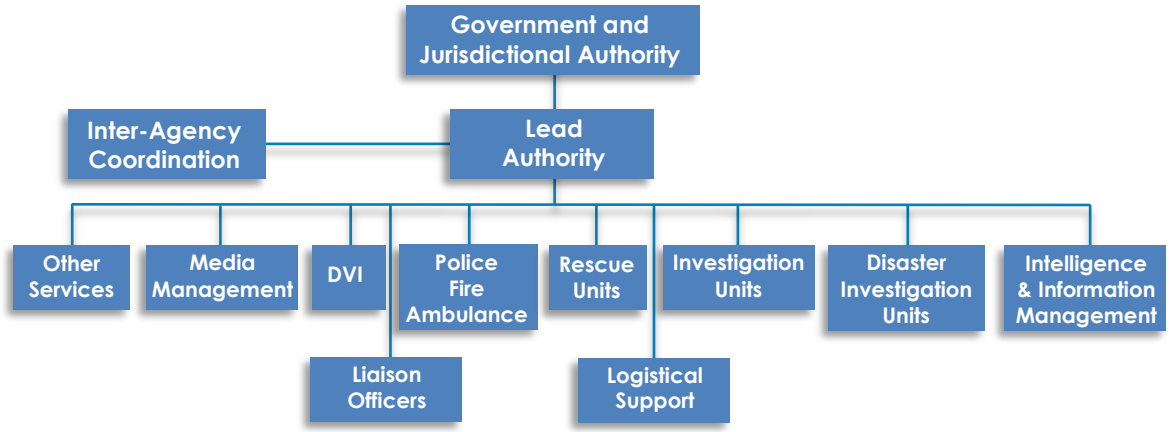
In terms of the specialist response agencies that are likely to attend the disaster site, they are initially confined to police, fire and ambulance. However, as additional resources are engaged, the following specialist services are likely to attend and operate in conjunction with DVI teams:

- Emergency response specialists (eg: Police, Fire, Ambulance).
- Rescue Units (eg: Search and Rescue).
- Investigation units (eg: Crime and Fire investigators).

- Forensic Services (eg: Scene and Post Blast examiners).
- Disaster Investigation Unit (eg: Air Safety).
- Intelligence Unit.
- Public Information Unit (eg: Media).

The following diagram is a basic example of a multidiscipline response structure to a disaster incident. Depending on the nature of the response, local procedures and the contributing agencies, the structure and reporting channels may be significantly different. However, this example highlights the need to recognise that mass casualty events may involve a broad range of agencies and authorities that DVI disciplines should recognise and work with.

> Example: Disaster Response Management Structure



In order to gain an appreciation of these specialist services, further information can be located in Part B of this Guide at annexure 3.

3.3. Initial Response by the Lead Authority

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The lead authority should assume command of the operation as a whole, in order to ensure effective coordination of personnel and resources. In most cases, the police assume command responsibility for the operation, but this may vary depending on the region and jurisdiction.

Upon relevant assets arriving at the disaster site, one of the main priorities is to obtain an overview of the scope of the incident so that a determination can be made about the resources required and the processes necessary to be implemented.

Although the first priority during the response activity involves rescuing survivors and minimising loss of life, there is a broad range of significant issues that the lead authority needs to consider and gaining a full appreciation of the scale of the disaster should therefore be undertaken through the acquisition of confirmed facts.

Once sufficient information becomes available, the lead authority that assumes command responsibility for the disaster response operation should aim to satisfy the following considerations at the earliest opportunity:

- Nature of the disaster whether natural, man-made or criminal.
- Classification, whether open or closed disaster or a combination of both.
- Scope and quantitative estimate of infrastructure damage.
- Number of casualties.
- Requirement for transportation of injured/deceased persons.
- Information about the number of missing persons.
- Extent of property damage.
- Determine the disaster response services (e.g. fire brigades, emergency rescue services, police personnel) currently at the site.

- Determine what further response services are required.
- Clarification of agency functions at the scene and how they will be contacted, controlled and directed towards common goals.
- If rescue and/or recovery measures have already been initiated, likely duration of such measures.
- Description of current and likely changes at the disaster site.
- Clarification about timings for receiving briefings from the incident site.
- Clarification on which officials need to be briefed and when.
- Clarifying communication structures to ensure all contributing parties remain informed and coordinated.
- Maintenance of a contemporaneous record of all command decisions and response plans.

3.3.1. Initial Scene Control Measures by the Lead Authority Return to Contents

Management decisions relevant to the scene can often influence how other phases of the DVI process are conducted. For example, if processes associated with the handling of human remains or property is compromised, this can create difficulties with identification and repatriation processes. In order to minimise the risk of this occurring, it is important for the DVI command to reinforce on the lead authority to employ scene control measures at the earliest opportunity. To contain the disaster site and restrict access by unauthorised personnel, the following site security activities should be performed:

- Requirement for type and scope of external barriers/cordons.
- Restriction of view of the site to unauthorized persons.
- Establishment and maintenance of a controlled common approach path to the scene of the incident with a timed record kept of everyone entering and leaving the scene.
- Maintain record of all individuals present at the site to determine purpose and authorization; recording corresponding data and removal of unauthorized persons from the secured area.
- Establishment of assembly and collection points within the secured area for coordination purposes.

3.3.2. Initial Risk and Hazard Assessments by the Lead Authority Return to Contents

Although initial responders, including DVI personnel may require early access to the incident site, occupational health, welfare and safety issues should be addressed or mitigated by the lead authority before personnel are deployed. The following activities should therefore be performed:

- Collection of information on building/structural related dangers.
- Consideration of hazardous substance detection measures.
- Preparation of a comprehensive Risk Assessment.

NB: This important consideration will be discussed in more detail later in this Guide.

3.3.3. Initial Scene Evaluation Return to Contents

Once the immediate urgency of the emergency response has subsided, it is critical that a co-ordinated scene evaluation is undertaken. This is likely to involve numerous disciplines and their scene evaluation should be overseen and co-ordinated by the lead authority.

As far as the DVI responsibility is concerned, an advance team (usually comprising a senior DVI team member, a forensic pathologist, police, and other specialists if required) should attend the scene in the first instance, to evaluate the situation and to formulate an initial scene management plan. Factors that need consideration in this plan include:

- Extent of the scene (size, hazards and any other factors that will need to be considered).
- Condition and potential number of human remains.
- Estimation of the amount of property to be processed.
- Estimation of the likely duration of the process.

- What other Medico-legal institute or personnel are needed to respond (e.g. need for special equipment or expertise at the scene).
- Methodology to remove the human remains (composition and number of teams) considered.
- Transportation of the deceased.
- Storage of the deceased and property.

3.3.4. Preliminary Planning for Scene Management

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Once sufficient information is acquired by the advance DVI team, planning should occur to facilitate a logical, organised and coordinated approach to processing the scene. In order to enhance the quality of the scene management plan, a pre-operation meeting should be convened to:

- Explain and plan the DVI objectives, general methodologies and particularly the requirements and processes involved in the recording and removal of human remains and property.
- Evaluate the likely duration of the process and the resources required to complete all tasks.
- Identification of key participants external to DVI specialists that will need to be engaged.

Planning is a crucial part of ensuring the scene is managed correctly and sufficient time should be taken to conduct it thoroughly. Furthermore, the plan needs to be communicated to all participating agencies and services to reduce confusion at the disaster site. Importantly, the lead authority must be briefed on the final scene management plan. Further advice on scene management and planning from a DVI perspective will be discussed later in this Guide.

4. DVI Command Structure and Responsibilities

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The structural command arrangements for DVI need to be established so that all phases of the process can remain coordinated, controlled and monitored. This structure requires defined reporting channels to ensure that information and directions are accurately communicated and interpreted by key positions. The structure also needs to ensure that effective liaison occurs with key members of the overall disaster response command and other participating parties such as other agencies, countries and embassies.

The DVI Command structure is capable of being expanded, depending on the size and nature of the disaster, but it is essential that the following key areas of the DVI process should be competently managed and staffed by appropriately trained and experienced staff:

Management

- DVI Commander role
- Phase 1: Scene Coordination
- Phase 2: Post-Mortem Coordination
- Phase 3: Ante-Mortem Coordination
- Phase 4: Reconciliation Coordination

Specialists

Critical to the DVI process is the engagement of trained and experienced specialists. The following are recognised as the main disciplines engaged in the technical aspects of the DVI process:

- Forensic Pathologists
- Forensic Odontologists
- Fingerprint Experts – (Friction Ridge Experts)
- Forensic Biologists / Geneticists
- Forensic Anthropologists

In addition to these key disciplines, there is a range of other services that are likely to be engaged to support the DVI process and they are:

- Photographers
- Radiologists
- Interview Teams
- Property managers
- Scene and Post-Mortem recorders
- Quality Assurance Teams – (quality control information and data)
- Evidence collection and management Teams
- Mortuary managers
- Investigators
- Logistics Officers
- Liaison Officers
- Missing Persons Officers
- Information Technology Specialists

Further information on the roles associated with these disciplines can be located in Part B of this Guide at annexures 4, 5, 6 and 7.

4.1. DVI Command Structure

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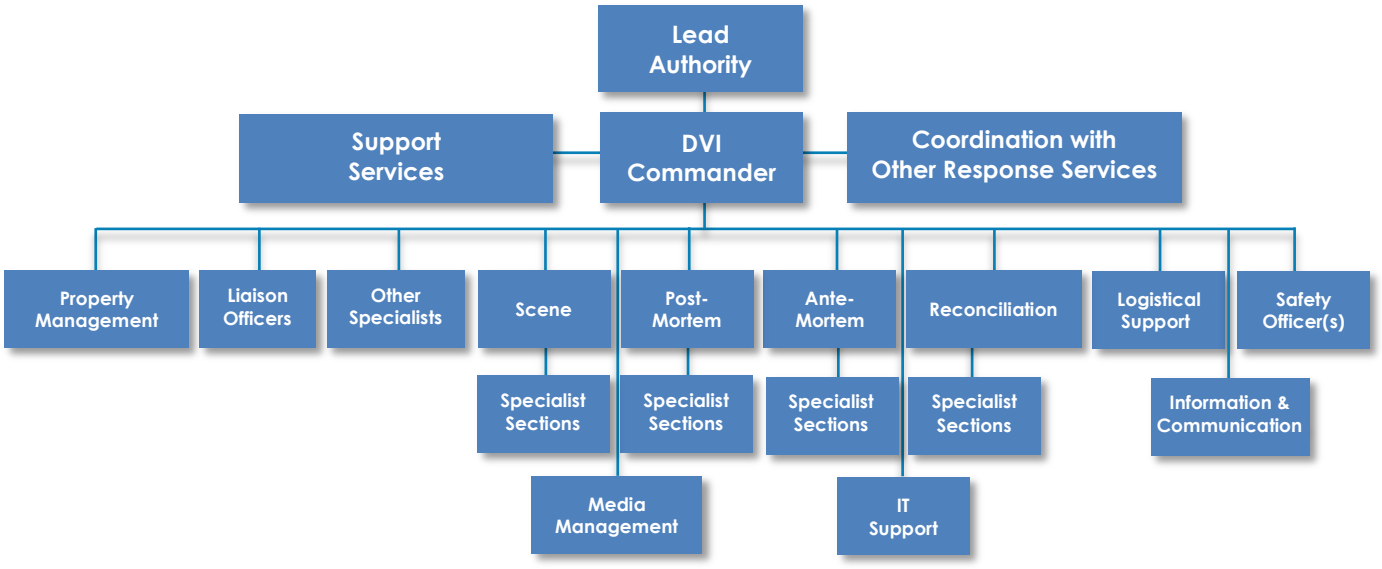
The basic organisational chart for the DVI Command Structure is depicted in the following diagram. This model forms the basis upon which the DVI process operates, but can be expanded to include additional linkages, support areas and liaison roles. Any expansion or modification is usually dictated by the nature and/or complexity of the event, or the structural, legal or procedural framework that is applied in the relevant jurisdiction or country.

> Standard DVI Command Structure



4.1.1. Identification of Key Roles Return to Contents

Personnel assigned to duties, especially at the disaster site should wear appropriate markings such as tabards, armbands or other markings to clearly identify the role they are performing and to signify that access to the site is authorised (e.g. commander, scene coordinator, pathologist, odontologist or crime scene examiner). This is particularly important when multiple agencies, whether local, national or international agencies or services are involved.

4.2. DVI Management Responsibilities Return to Contents

There are a broad range of issues that must be considered by the authorities to ensure that jurisdictional requirements are met. The following is a summary of the main key management positions within the DVI process. They should not only be exercised during the response phase to a mass casualty event, as pre-planning and training is important in order to enhance the effectiveness of the response and the overall quality of the management team and DVI outcomes.

4.2.1. DVI Commander Return to Contents

As the DVI Commander is required to assume overall responsibility for the operational response to a DVI event, the following are considered to be some of the essential functions to be performed in that role.

- Establish an appropriate DVI command and control structure to ensure all DVI activities are organised and coordinated.
- Initiate the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Appoint the DVI Phase Coordinators and other key positions as required.
- Implement clear communication channels and reporting mechanisms to facilitate the coordination and flow of information.
- Ensure that adequate capacity and capabilities, both specialist and logistical are maintained to effectively respond to the incident.
- Brief the Coroner or equivalent authority and the relevant lead authority.
- Ensure adherence to occupational health, safety and welfare requirements.

Further detailed information regarding this position and the associated responsibilities can be located in Part B of this Guide at annexure 8.

4.2.2. Phase Coordinators Return to Contents

It is important that personnel allocated to coordination roles possess the requisite knowledge and skills commensurate with the demands and responsibilities placed on those positions. Whilst it is imperative that these Coordinators have the technical skills to manage the DVI phases competently, it is also advisable for these individuals to have skills and experience in the management of staff.

As a Coordinator, there is an expectation that the occupant is able to manage staff effectively through maximising their abilities to collectively achieve DVI objectives. There is also a need for Coordinators to be able to monitor all aspects of their work area, to ensure that procedures are being applied correctly, that issues are proactively addressed and that the DVI Commander is accurately briefed on key issues. Most importantly, there is a need for Coordinators to closely monitor occupational health, welfare and safety issues and mitigate such issues when they arise.

Providing training opportunities for Coordinators in the area of management and supervision in each jurisdiction is therefore advisable, to develop and enhance skills before deployments occur. Further information on the roles of the DVI Phase Coordinators can be located in Part B of this Guide at annexure 8.

4.2.3. DVI Specialist Coordinators/Managers

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The appointment of key members to coordinate and supervise specialist disciplines is an important requirement for DVI operations. Although managers of these specialist personnel must be qualified in their respective disciplines, they should also possess the ability to coordinate the production of outputs with other disciplines, or other areas of the DVI process.

As with the DVI Phase Coordinators, managers of specialist work areas need to remain aware of all developments within their work area and be cognisant of occupational health, welfare and safety issues.

5. Summary of DVI Phases

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The following information defines the function of each of the DVI phases and the main considerations and responses that need to be applied to each of those phases. The summaries provide a brief overview of the process and further detailed information relative to each phase can be located in Part B of this Guide at annexures 4, 5, 6 and 7.

5.1. Phase 1: Scene

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As a general principle, the scene should be treated as a crime scene and all human remains, exhibits and property left in situ until the arrival of Crime Scene Examiners and DVI Specialist Teams, in accordance with jurisdictional policies and procedures.

Because the nature of a disaster may vary, the way in which scenes are processed and the order in which this is undertaken may vary. For example, in cases where a terrorist bombing occurs, it is imperative that the scene is rendered safe before scene examiners can perform their tasks. Furthermore, depending on the priorities that the lead authority sets, the acquisition of evidential material may need to be considered before any DVI activities commence. In this example, post-blast activities would be performed in consultation with crime scene examiners, and DVI practitioners may need to modify their approach to satisfy each competing priority.

Once a scene management plan is developed and agreed upon and DVI activities are able to be commenced, the processes of photographing, recording and labelling can occur with post mortem information recorded the INTERPOL DVI Recovery forms (refer to forms guide annexure 9). This processing activity needs to be coordinated with other functions carried out at the scene, such as those associated with the recovery, storage and transportation of human remains and property, as well as tasks involving evidence preservation and storage.

5.1.1. Scene Coordination Responsibilities

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The DVI Scene Coordinator is responsible for the management of activities during the scene phase of the DVI operation. Some of the main considerations and responsibilities include:

- Implement the scene phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Clearly establish the grid and numbering system to be applied.
- Implement clear communication channels to facilitate the coordination of activities at the disaster site.
- Appoint a Human Remains Holding Area Controller and confirm the location of the Human Remains Holding Area.
- Appoint property teams to manage property.
- Ensure adherence to occupational health, safety and welfare requirements.

Further detailed information regarding this role can be located in Part B of this Guide at annexure 8.

5.2. Phase 2: Post-Mortem

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All human remains recovered from the scene are to be processed, examined and stored at a mortuary which has been selected for the operation, pending formal identification and release by the Coroner or legal authority. This mortuary may be an established mortuary or one which has been constructed temporarily for the operation.

The examination processes and methods applied during this phase include photography, ridgeology (fingerprinting), radiology, odontology, DNA sampling and autopsy procedures. In addition to the examination of the human remains, property is to be meticulously examined, cleaned and stored. These property items may include jewellery, personal effects and clothing. Again, all relevant post mortem information obtained during this phase is recorded on the pink INTERPOL DVI Post-mortem forms (refer to forms and completion guide annexures 10 and 11).

On completion of the examination process, the human remains are returned to storage, pending the final formal identification to the satisfaction of the Coroner or legal authority and the subsequent release of the remains for burial or cremation.

5.2.1. Post-Mortem Coordination

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The DVI Post-Mortem Coordinator is responsible, in consultation with specialists, for the management and outcomes of activities during the post-mortem phase of the DVI operation. Some of the main considerations and responsibilities include:

- Implement the post-mortem phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Appoint the DVI Post-mortem Human Remains Team Leader.
- Appoint property teams to manage property.
- Ensure any direction from the Coroner or equivalent authority in relation to the examination of the human remains is implemented.
- Implement clear communication channels to facilitate the coordination of activities at the mortuary.
- Ensure adherence to occupational health, safety and welfare requirements.

Further detailed information regarding this role can be located in Part B of this Guide at annexure 8.

5.3. Phase 3: Ante-Mortem

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In order to collect missing person data to match against victim data, an ante-mortem collection process needs to be established. This process can involve many complex dimensions as the task involves interviewing families, relatives or friends to obtain sufficient facts on a potentially deceased loved one. In addition to this difficult and confronting task, representatives from this phase may need to closely coordinate their activities with other agencies, jurisdictions or nations, to secure ante-mortem data from remote locations.

Initially, the ante-mortem phase will focus its activities on developing a missing person list that will be created from reports of concerns communicated by families and relatives or through other mechanisms such as a passenger manifest. Following the receipt and categorisation of those missing person reports, interview and/or investigation teams will be formed. Their function will involve collecting the detailed descriptions of each missing person/potential victim, including specific details such as jewellery, clothing, or other property items as well as dental and medical records, radiographs, photographs, DNA, fingerprint and other identifying particulars. This information is recorded on the yellow INTERPOL DVI ante-mortem forms (refer to forms and completion guide annexures 10 and 11).

Once there is sufficient and reliable ante-mortem data on a particular missing person, the relevant file will be closely assessed and if the threshold required for matching against post-mortem data is met, the file is transferred to the Reconciliation Centre to progress the identification process.

5.3.1. Ante-Mortem Coordination

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The DVI Ante-Mortem Coordinator is responsible for the management of activities during the ante-mortem phase of the DVI operation. Some of the main considerations and responsibilities include:

- Implement the ante-mortem phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Establish an Ante-mortem Coordination Centre (AMCC).
- Establish interview teams and coordinate their activities to complete missing person enquiries.
- Obtain passenger manifests and other information to compile missing person lists.
- Liaise with local and international police services, INTERPOL, consulates, embassies, other law enforcement agencies as well as Government and non-government agencies in relation to the collection of dental/odontological/fingerprint and medical records, and the completion of yellow INTERPOL DVI Ante-mortem Forms.
- Ensure adherence to occupational health, safety and welfare requirements.

Further detailed information regarding this function can be located in Part B of this Guide at annexure 8.

5.4. Phase 4: Reconciliation

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The function of the Reconciliation Centre is to match post mortem data with ante-mortem data with the view to identifying the deceased. In cases where there are reliable primary identifiers available, such as dental, ridgeology (fingerprints) or DNA and those identifiers meet the requisite standards, these cases can be prepared for presentation to an identification board for determination. However, there may also be cases where a combination of identifiers may be used to support one another to produce a positive identification. For example, this type of circumstantial identification case may include a combination of a description, medical evidence, clothing, jewellery, tattoos and documentation. It must be highlighted that such identifications will need to be assessed on a case by case basis. It is also important to stress that visual identification can be very unreliable and therefore this form if identification should not be considered alone.

Once the reconciliation files are assessed and the content is considered reliable and safe to conclude positive identity, an Identification Board (IB) is convened. The results of the comparisons between the post-mortem and ante-mortem information are presented to the IB, which is convened by the local authority and presided over by a Coroner or an equivalent authority. The Coroner or equivalent, who has overall responsibility for the identification of the deceased, is informed of the results supporting the identification conclusions and provided with a comparison report and certificate of Identification for each identified human remain, including each fragmented human remain (refer to forms at annexure 10).

In the event that the local authority accepts the identification conclusions relating to a specific case, a death certificate confirming the cause of death and the identity of the deceased is issued. Once that process has concluded and an authority for the release of the deceased has been granted, arrangements are then made for the repatriation of the deceased to the respective family.

5.4.1. Reconciliation Coordination

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The DVI Reconciliation Coordinator is responsible for the management and outcomes of activities undertaken during the reconciliation phase of the DVI operation. Some of the main considerations and responsibilities include:

- Implement the Reconciliation phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Establish and manage the operations of the DVI Reconciliation Centre.
- Appoint key Team Leaders within the various units of the Reconciliation Centre.
- Establish a section to receive, log, record and file ante-mortem and post-mortem information.
- Prepare formal identification reports for approval by the DVI Commander.

- Convene the DVI Identification Board.
- Ensure adherence to occupational health, safety and welfare requirements.

Further detailed information regarding this function can be located in Part B of this Guide at annexure 8.

6. Methods of Identification (Primary and Secondary)

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In mass fatality incidents, confirmation of the identity of human remains should only be made by the Identification Board or local authority after close assessment and evaluation of relevant and reliable data is undertaken.

Victims of a large-scale disaster are identified on the basis of an assessment of multiple factors. The degree to which human remains are damaged, the time human remains have been left exposed and the associated changes in the condition of human remains will influence the nature and quality of post-mortem data. It will also influence and determine what specific methods of identification may be undertaken and are most appropriate under the circumstances.

Methods of identification used in cases of disasters should be scientifically sound, reliable, applicable under field conditions and capable of being implemented within a reasonable period of time. The primary and most reliable means of identification are friction ridge analysis, comparative dental analysis and DNA analysis. Unique serial numbers from medical implants may also be reliable identifiers in terms of proving identity.

Secondary means of identification include personal description, medical findings, tattoos, as well as property and clothing found on the body. These means of identification serve to support identification by other means and are ordinarily not sufficient as a sole means of identification (although depending on the circumstances, there may be some exceptions).

Identification based on photographs can be notoriously unreliable and should be avoided as the sole means of identification. Visual identification by a witness may provide an indication of identity but is not sufficient for positive identification of victims of a large-scale disaster, as victims can be disfigured, resulting in the visual comparison being unreliable. The psychological stress frequently involved in confrontation with the deceased, by relatives, also makes this form of identification unreliable.

All post-mortem data obtained from bodies is evaluated with reference to information obtained about missing persons. As it is impossible to know in advance what data can be obtained from bodies and what information can be obtained for comparison purposes at the victim's place of residence, all available information (both AM and PM) should be collected and documented. The quality of both AM and PM data should be of the highest standard possible, with quality processes established early in the operation.

Detailed information on Primary and Secondary methods of identification is located in Part B of this Guide at annexure 12.

7. Priority Considerations for DVI Operations

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Whilst specific procedures and plans may be developed for unique events, it is generally considered that the usual approach to emergency management fundamentally remains the same, but modified depending on the circumstances and unique issues presented.

However, there are many unique issues that need to be addressed during a DVI response to a multi-fatality event. Although many can be mitigated at the time of the response, others are far more

complex requiring the need to proactively provide solutions well in advance of a disaster occurring. Conversely, after an operation, a debrief should be conducted with responders to highlight practices or procedures that operated well or were problematic during the DVI process.

The following considerations are likely to be the main areas of concern that DVI management should be acutely aware of prior to, during and post deployment. They are not exhaustive as each DVI operation is likely to reveal issues and problems, depending on the nature, scale and environment.

7.1. Legal and Jurisdictional Requirements

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Every DVI operation should be subject to the laws and rules of the country in which the disaster occurs. This premise is fundamental to ensuring that the legal framework in which the Lead Authority operates within is supported both legally and constitutionally.

Furthermore, adherence to the laws of the nation where the DVI response occurs enables national, regional and local authorities to activate their rules and procedures in accordance with approved and agreed arrangements. A departure from this well established principle could not only undermine the legal processes operating in a particular region, but hinder the overall operation of the DVI process.

Agreements regarding the integration of international DVI teams operating in foreign countries are therefore highly beneficial, as points of legal and procedural conflict can be resolved before teams are deployed. In order to progress such agreements, it is desirable for nominated representatives to develop protocols with their counterparts from other nations.

7.2. Religious and Cultural Considerations

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Religious and cultural considerations, while important in their own right, cannot be allowed to compromise the legal processes, as local authorities and investigating agencies remain bound by relevant legislation. However, during the immediate ante-mortem response, an attempt to determine the number and type of religious and cultural groups should be made. It may then be possible to ascertain the type of assistance required for both investigators and for the families of possible victims.

Religious and cultural customs differ considerably throughout the world, and should be taken into account when planning responses to incidents involving multiple fatalities. Such planning needs to take into account the type of social group that is likely to be engaged and what specific political, social and individual issues that need to be considered. For example, some cultural practices may involve human remains being treated in a specific way, which may not fully align with the legal requirements of the jurisdiction where the death occurred. DVI personnel should therefore ensure that whilst the legal requirements of a jurisdiction must be observed, dignity and respect must prevail when interacting with the deceased's relatives. A failure to recognise these needs and cater for cultural differences can have a negative impact on how officials interact with families, which can ultimately undermine the quality of DVI services and outcomes.

It is therefore important that members of the DVI community remain individually aware of the various groups that may be encountered when dealing with a mass fatality event. As relatives and friends are likely to already be grief stricken from their loss, compounding this situation with a lack of cultural and religious understanding may add another layer of grief, which could be avoided through education, training and the appointment of appropriately skilled liaison officers.

7.3. Family/Relative Liaison and Support Arrangements

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Although the legal requirements regarding mass fatalities must always be observed, it is critical that DVI operations include specific structures and arrangements that facilitate support and on-going liaison with families and relatives of victims.

Apart from ensuring that the emotional welfare needs of families and relatives are met, there is also a requirement to acknowledge that the central feature of the DVI process is about identifying victims for the family. It can therefore be viewed that although the legal system that governs the rules regarding the identification process must be observed, the desired outcome is about repatriating victims to their homes. The practical application of this key principle involves forging cooperative relationships with grieving relatives and affording them the highest level of respect and support possible.

To enhance this approach, family assistance and public relations functions should also be integrated into the operational DVI structure from the outset, as there will be multiple parties that have an interest in developments for the life of the response.

Further information on the importance of the family liaison and assistance function will be discussed later in this document.

7.4. Planning a DVI Response

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Planning both prior to and during incidents is crucial to ensure that intended responses are focused towards meeting common objectives. From a pro-active perspective, it is recommended that jurisdictions and relevant agency plans are established so that responses can be practiced and modified prior to real-life deployments. These strategic plans may include the establishment of protocols for the activation of specialists and supporting resources. There may also be agreements established between a range of government and non-government entities that can be activated when necessary. Furthermore, as disaster events evoke different types of responses, partnerships with various service providers may be useful so that specific skills and resources can be sourced without delay.

The types of plans that should be readily available for implementation include:

- Jurisdictional activation plans that cater for local agencies to come together with a degree of interoperability to deal with incidents specific to a region or event.
- National activation plans that enable agencies across nations to work collaboratively on incidents of national significance.
- International plans that enable the deployment of specialists to another country to work on international incidents.
- Plans specific to each of the DVI phases.

Whilst established plans often address many of the demands that disasters place on authorities, on-going planning is unavoidable, as prescriptive protocols and established procedures do not always meet the unique circumstances of an event. It is for this reason that decision makers should consider engaging specialist advice throughout the duration of an operation, so that all courses of action likely to impact on the outcome of DVI activities is supported by logic and sound decision making.

7.5. Coordinating and Organising DVI Teams

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The DVI process comprises a broad range of individuals who are allocated specialist tasks within the various phases. Their roles and skills are diverse and to maximise their services effectively and efficiently, a coordinated approach needs to be adopted. This initially involves the development of an effective organisational structure that establishes clear communication lines and reporting arrangements for all individuals and groups participating in the DVI operation. These coordination and organisational arrangements should also clarify the tasks that are being performed and identifying what area is responsible for completing those tasks.

The arrangements should also depict how each area intends to interact with other work units so that all activities are aligned and focused towards the same objectives. To reinforce these arrangements, regular meetings with key decision makers is appropriate so that progress can be monitored and reviewed, instructions can be reinforced and ambiguity removed.

A failure to recognise the need to coordinate and organise DVI operations appropriately is likely to result in activities being duplicated, communication being fragmented and tasks being delayed, resulting in operational outcomes potentially being impacted upon.

7.6. Safety Audits and Risk Assessments

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The protection of life has priority over all other priorities and this principle not only applies to victims directly associated with the incident, but also to personnel assigned to disaster response operations. A proper and thorough assessment of the risks associated with all aspects of the operation should therefore be undertaken.

From a DVI perspective, a risk assessment that encapsulates all potential hazards is important. These hazards can vary from one environment to another and may also be unique to the various phases of the DVI process.

Such assessment should take into account the type of disaster, whether it is a natural, industrial or a criminal act, as each may expose victims and responders to different hazards such as fire, blast fragments, asbestos, chemical, biological, radiological or nuclear contaminants. Furthermore, unstable buildings and structures or volatile environmental conditions such as earthquakes and tsunamis should be considered and assessed and mitigated before deploying personnel.

In many parts of the world, stringent occupational health, welfare and safety legislation exists, which can impose strict legal obligations on jurisdictions to maintain safe working conditions. In a DVI context, many of the hazards may not be able to be eliminated, however accurately identifying the hazards and then mitigating the effects on responders is a priority and an organisational responsibility.

In order to competently undertake risk assessments and safety audits, consideration should be given to appointing a 'Safety Officer' during an operation. The role of this officer is to conduct audits of work areas and to then recommend proactive measures to address specific hazards. Depending on the nature of the disaster, several Safety Officers may need to be appointed. Furthermore, all safety audits and risk assessments should be undertaken with informed advice from specialists who can recommend measures that eliminate or mitigate dangers to responders.

7.7. Logistical Support for DVI Operations

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The scope and nature of a DVI response usually dictates the type and level of logistics that needs to be engaged to support the operation. The role of the logistics area is therefore an important feature of a large and/or complex DVI response and establishing this unit at the earliest opportunity can set a firm foundation upon which the entire operation can be launched.

The key roles that the logistics support area performs are twofold. Firstly, there is a need to establish facilities to conduct the various components of the operation. This involves acquiring centres to conduct operations and the sourcing of materials, including consumables and specialist equipment and to also assist in sourcing personnel. Secondly, the logistics area should maintain a comprehensive record of financial costs, including the equipment and personnel utilised during the response.

In addition to establishing the physical infrastructure and arranging the material resources for the operation, the logistics function also involves monitoring activities across all areas of the DVI process to ensure that adequate support is provisioned throughout the entirety of the operation. This requires the logistics area to forecast both long and short term requirements and predicting potential issues that need to be resolved quickly.

7.8. DVI Liaison Officers

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With all multi-faceted responses to emergency situations, coordination of activities and information sharing should be promoted. Apart from the establishment of workable structures to facilitate the free-flow of information to different units of the emergency response, there is a need to consider the appointment of liaison officers. These appointments can provide a valuable conduit between

the different phases of the DVI process. They can also be useful in establishing crucial links between the DVI operation and other entities. As a general rule, the size and complexity of the disaster response usually dictates how many liaison officers are required. Examples of liaison officers include liaison officers for families, embassies, coronial services, contributing agencies, investigators and other specialists.

Because victims of disasters may originate from many different countries, it is considered, from a proactive perspective, for countries to forge cooperative relationships with key government and non-government agencies of corresponding countries, so that rules of interoperability can be developed in advance of events.

Whilst liaison officers are important to be appointed during DVI operations, the investment in building healthy relationships prior to disasters can be measured by the degree of cooperation and coordination that occurs when operating in foreign regions. The benefits derived from developing the relationships and operating arrangements are many including:

- Clarity surrounding the legal framework in which all countries need to operate.
- Clarity regarding the processes to be followed to access DVI related information and data.
- Facilitating collection of ante-mortem information from vast and remote sources.
- Coordinating support services for families and relatives.
- Facilitating the repatriation of human remains and missing person property.

7.9. Staffing and Rostering for DVI Teams

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In order to ensure that the right people are appointed to specific positions, the application of human resource management principles is recommended. This involves selecting individuals with the right skill sets and then matching them with a position commensurate with those skills. For example, personnel need to be deployed to roles where their skills can be best utilised such as a member trained in ante-mortem collection being allocated tasks within the Ante-Mortem phase of the process. A failure to identify the skill requirements of each position or by mismatching personnel to a key position can severely undermine and slow down the DVI process.

In addition to placing the right staff in the right position, there should be a desire to create a work environment where the rotation of staff can be undertaken in a structured and predictable manner. This is particularly important where the DVI operation is likely to be lengthy. Although it can take some time for structures and staff arrangements to become settled, it is highly desirable that stable practices in the management and rotation of staff are implemented at the earliest opportunity. A suggested approach in the management of staff selections and staff rotations is through allocating a separate work unit within the DVI process to specifically attend to this function.

7.10. Communication Arrangements

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It is important that effective communication systems exist to support the DVI operation. Those systems include the provision of landline and mobile phones, email and remote communication services. These important facilities should be established early in the operation, as they enable interaction between all phases of the operation, which is critical when coordinating and synchronising activities.

In order to simplify the process of maintaining contact with key personnel within the DVI process, the development of a comprehensive contact list of staff is desirable. Apart from identifying the staff member, the lists should include the role they are performing, the discipline they are representing and their work location. Whilst such contact lists can be developed during an operation, it is suggested that comprehensive staff lists are developed for each jurisdiction as part of their planning process.

7.11. Information Technology Sevices and Support Staff

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With the ever increasing emergence and reliance on technology, opportunities continually present itself to apply these modern advances in a DVI context. Over recent years, software products have

been used in operations for data matching purposes. Additionally, operations require information technology products and supporting infrastructure to facilitate the running of the DVI operation.

It is therefore a feature of modern emergency responses that resources are allocated to establish and maintain technology systems that enable the management and ongoing monitoring of all aspects of the DVI response. Those resources include skilled staff members who are able to effectively and efficiently attend to technological demands. Furthermore, systems capable of reliably managing the requirements of the operation need to be selected, practiced and maintained.

In order to ensure that information technology systems are established for the operation and that related issues and problems are addressed, telecommunication technicians and/or IT administrators should be assigned to the DVI operation.

7.12. Security Measures (Including Information Security Arrangements)

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DVI operations present numerous security issues that should be of primary concern to authorities. These issues range from protecting areas where access should be restricted, to protecting sensitive and confidential information.

As far as physical security arrangements are concerned, adequate protections should be implemented to secure sites such as disaster scenes and mortuaries, so that unauthorised access is prevented. Apart from the concerns about scene contamination and disruption, there are health issues associated with permitting entry to such areas. They include unsafe environments that may present hazards to individuals. It is also not appropriate for onlookers to be present, especially in cases where the victims of mass casualties may still be present.

From a confidentiality perspective, robust systems need to be established so that access to work areas containing confidential information such as missing person or victim data can be protected from disclosure. The systems that are designed to protect sensitive material needs to be applied not only to locations where the information is stored, but extended to the processes associated with collecting and transmitting such material. A failure to ensure that adequate security arrangements exist can seriously undermine the integrity of DVI operations.

It is therefore incumbent upon all participating individuals operating in DVI operations to ensure that there is a disciplined observance of the DVI security arrangements and it is the responsibility of authorities to enforce strict compliance.

7.13. Human Remains Management

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The nature of the disaster can significantly influence the type of scene processing approach that is likely to be adopted. Whilst it may take time to develop and implement plans, the efficient management of the deceased should be considered as an early priority for any DVI response. In developing these plans, consultation with key specialists likely to participate in the scene processing, or involved with analysing objects or information from the scene should be consulted. Most importantly, the legal authority presiding over investigations into the deaths, such as a Coroner or equivalent authority, should be engaged at the earliest opportunity.

Depending on the number of deaths, or the amount of fragmented human remains that exist, this can usually present complex issues that need to be closely considered prior to embarking upon the scene examination process. In cases where the disaster is caused through a non-criminal event such as a flood or earthquake, decisions in respect to criminal investigations are able to be eliminated.

However, in cases involving culpable conduct such as criminal acts, the processing of human remains may not only be confined to victim identification, but complex criminal investigation activities. For example, in cases of terrorist bombings, post blast residue and other evidence may be found on victims and therefore the DVI approach to human remains processing needs to account for such complexities.

In addition to considering the complexities that various scenes may present, it is highly recommended that a recognised and standardised numbering and processing system is applied when managing human remains at the scene. Establishing an agreed system at the infancy of operations is critical, as adverse consequences can unfold later in the DVI process if the system is flawed. Further information on the INTERPOL numbering system can be located in Part B of this Guide at annexure 13.

7.14. Mortuary and Storage Facilities

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Whilst mortuary facilities exist in several forms across the world, the capacity to cater for mass casualty events may be limited for many jurisdictions. This is mainly because mortuary facilities are maintained to service the routine demands of the community, rather than for the unexpected large scale mass fatality event.

As part of the pre-planning process for DVI operations, it is suggested that authorities identify alternative facilities where autopsies can be performed and human remains can be stored. The arrangements that are decided upon can vary depending on the availability of alternative locations but may include:

- Engaging refrigerated facilities such as containers or trucks.
- Establishing temporary mortuary sites.
- Utilising several hospital facilities to conduct autopsies and store human remains.
- Utilising funeral homes to assist with storage arrangements.

Although it is highly desirable to identify local alternative solutions to address potential deficiencies in facilities, there may be locations where these arrangements are unable to be identified or provided. In such cases it is recommended that authorities consider a broader range of options in the form of facilities that can be transported to the relevant location. In these cases, partnerships with specific service and product providers may address the deficiency.

7.15. Property Management

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There are significant legal and ethical responsibilities associated with the DVI property management function that may vary from jurisdiction to jurisdiction. In order to satisfy these significant responsibilities, standardised practices in accordance with the lead authority's policy position should be applied. Additionally it is advisable that any property management system is compatible with and/or complements the jurisdictional property management system.

In terms of the Scene Phase, property located at the scene is usually in a chaotic state where ownership is often unclear and cannot be associated with a victim. Similarly, property managed in the Post-mortem Phase presents other challenges as there is a requirement to conduct autopsies and take forensic samples, whilst also managing property removed from the human remains.

In terms of the Ante-mortem Phase, collecting objects to match against victim data presents additional complexities. The sources from where the objects or property may be collected can include a victim's home, victim's family or other locations such as hotels. Finally, the Reconciliation Phase of the process may also be involved with the responsibility of managing property when returning property to a victim's family.

Appointing a Property Management Team is therefore highly advisable so that activities across all phases of the DVI process that involve property can be monitored and coordinated. This approach enhances standardisation of recording, storing, tracking and repatriating property.

7.16. Information and Records Management

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Information management is a critical feature of the DVI process as the data collected will ultimately be utilised throughout the duration of the DVI operation. The following considerations therefore need to be placed high in the order of priorities when determining what documentation/recordings need to be created:

- Identifying and recording what documentation has or is being made and in what form; e.g. electronic or hand written.
- Identifying how scenes and objects will be recorded; (e.g. photographic, video, maps or sketches) and how such recordings will be managed.
- Determining how all recordings will be stored and transferred confidentially and in a timely way to other areas and agencies requiring such recordings.

In addition to formalising the process of collecting and storing DVI information, consideration should be given to the rules surrounding the transfer of information so that information security protocols can be applied throughout the life of the DVI operation. These considerations include:

- Authorisation arrangements from the lead authority to release information to other parties.
- The extent and nature of information that has already been released to other parties (when, why and by whom).
- The nature of agreements that has been reached with other parties regarding the use of information once released to those other parties.
- Policy regarding the return of sensitive/confidential information to its original source.

7.17. Media Management

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A major event such as a mass fatality disaster will always attract media attention and therefore all DVI operations should be conducted with this in mind. Because the world has become more global through the evolving electronic media, it needs to be acknowledged that events in the form of both written and visual formats can be transmitted across the world in seconds.

Whilst the media is an important industry that can be very effective in a crisis situation, managing what is said by officials, what is released in terms of official information and statistics and what is seen in terms of disaster sites, requires the development of sound media strategies. Furthermore, ensuring that official comments and the release of official information is accurate and that misinformation is corrected, is highly important in maintaining the credibility of the emergency response.

The establishment of a media unit should therefore be viewed as a vital adjunct to an emergency operation. The role of this unit within this context includes:

- Providing the lead authority with advice on visual and audio media presentations, including appropriate talking points.
- Advising the lead authority on the public release of information and statistics.
- Maintaining close liaison with major media outlets.
- Monitoring all media sites and publications.
- Recommending media releases to authorities in response to media reports.
- Monitoring public opinion in respect to the emergency.
- Monitor official responses to ensure messages are consistent.

Whilst media management is important during a DVI operation, it is recommended that authorities establish media protocols and create healthy partnerships with the media industry in advance of disaster events. This proactive approach to media management enhances a lead authority's ability to present itself to the community in a professional and competent manner and also aids in maintaining a cooperative relationship with the media.

7.18. Quality Assurance Controls

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It is widely accepted that all DVI operations is highly reliant on the maintenance of accurate and detailed information upon which identifications can be based. Establishing and maintaining robust quality control measures is regarded as a sound foundation to set standards of high quality in respect to the collection, collation and matching of relevant identification data.

The notion of quality assurance should be viewed from two perspectives. Firstly, it is recommended that jurisdictions ensure that review and auditing processes exist within all aspects of DVI disciplines and teams and that this principle exists as a standing arrangement in preparation to operational deployments. These standing arrangements should involve:

- Monitoring competency levels for all police DVI phase operators.
- Monitoring competency levels for all specialist / forensic experts.
- Auditing of procedural arrangements.
- Auditing and monitoring occupational health, welfare and safety arrangements.
- Auditing compliance with operational equipment standards.
- Recommending matters for consideration to the DVI Commander and relevant jurisdiction.

Secondly, during operational deployments, a management review system is recommended to be formed to monitor all aspects of the DVI operation. This review system should encompass all aspects of the DVI operation. Apart from ensuring that all phases of the DVI response are executed in accordance with established plans, each technical component and forensic discipline should be afforded close monitoring. The quality assurance activities that need to be considered during operational deployments involve:

- Monitoring all DVI phases for compliance to international and jurisdictional standards.
- Auditing post-mortem and ante-mortem records for accuracy and compliance.
- Auditing reconciliation files prior to presentation to the identification board.
- Auditing and monitoring occupational health, welfare and safety arrangements.
- Auditing compliance with operational equipment standards.
- Recommending matters for consideration to the DVI Commander and relevant jurisdiction.

INTERPOL is committed to the development of DVI management systems that is in line with international standards, and which will provide DVI jurisdictions with the continuing confidence that the identification process is accurate, impartial, scientifically reliable, and will withstand legal and judicial scrutiny. Ensuring all aspects of information and data is scrutinised throughout the DVI process adds confidence in the management and outcomes of DVI operations. Accuracy in processes and data management is therefore crucial to the DVI process and close attention to these key areas should be fully embraced by DVI management. Further detailed information in regard to this important consideration can be found at Part B of this Guide at annexure 14.

7.19. Repatriation Arrangements

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The repatriation process involves the return of human remains and victim property to families, relatives and friends. The culmination of highly committed activities from all disciplines and services is likely to be judged on the quality of services provided during this sensitive repatriation process.

In order to ensure that local, national and international repatriation arrangements are met, it is suggested that jurisdictions establish proactive plans with key entities within relevant regions prior to operational deployments. These arrangements should focus on satisfying jurisdictional, procedural and coronial / legal requirements. Most importantly, the families, relatives and friends of victims need to be reassured that the human remains and property of their loved ones has been cared for in a competent, respectful and caring manner.

7.20. Operational Debriefings and Reviews

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There is always an opportunity to learn and improve on our operational approach to future DVI deployments by reviewing previous operations. The aim of this review process is to focus upon what has been done well, what could have been done better and what could be effectively applied for future operations.

There are two debriefs that are recommended for all DVI activities. The first debrief involves reviewing daily performance during live operations. This should involve a meeting with key members within the DVI process, to review current activities and assess performance against set objectives and this should be convened by the DVI Commander. This regular review process enables

all aspects of the DVI process to be kept briefed on past, current and future developments. Furthermore, in the event that new issues that may affect DVI plans arise, alterations can be made in a consultative, coordinated and informed environment.

The second type of debrief involves an overall debrief of the entire DVI operation. This encompasses a far more broader range of operational and jurisdictional issues that may extend beyond the scope of the short term activities of the DVI operation.

The objectives of this debrief should again be about what has been done well, what could have been done better and what could be effectively applied for future operations.

In order to apply a degree of objectivity to this debrief process, an adequately qualified and impartial member should be engaged to conduct this debrief.

7.21. Contracts with Private Companies

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It is acknowledged that not all contingencies can be catered for and that deficiencies in skills, goods and logistical support may not be realised until an event unfolds. However, addressing this issue can be achieved through establishing agreements with companies in advance of disasters occurring.

In the event that nations become concerned about potential jurisdictional deficiencies prior to events occurring, it is recommended that proactive audits are undertaken so that these deficiencies in skills, equipment, technical advice and logistical support can be addressed in an orderly and planned manner.

Furthermore, it is important that the integrity of jurisdictional and private company arrangements is transparent and auditable through credible and defendable business practices. In order to satisfy these high ethical standards, as a minimum, it is important to disclose:

- The full scope of the financial arrangements that is determined through the provision of services or goods.
- Any actual or perceived conflict of interest by the company providing any goods or services.
- Any business, group or personal affiliation between any entities associated with the lead authority and the company providing the goods or services.

When entering into such arrangements, jurisdictions should be mindful of the contractual issues that may arise and that qualified advice should be obtained before agreements, contracts or partnerships are secured. This is considered important as the engagement of private services can inflate costs and impose unforeseen obligations on jurisdictions.

7.22. Reference Materials

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There are a significant number of sources of information regarding DVI on the internet, including published documents by specialists from across the world. Whilst many of these publications are credible, INTERPOL encourages member countries to refer to the INTERPOL website as there is an area devoted to DVI which can be located at http://www.INTERPOL.int/Public/DisasterVictim/Forms/Default.asp

The site contains this INTERPOL DVI Guide (Parts A and B), as well as the INTERPOL DVI Post-Mortem (PM) and Ante-Morten (AM) forms, scene recovery documents and Comparison Reports.

8. Occupational Health, Welfare and Safety

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8.1. General

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As mentioned earlier in this Guide, the provision of a safe work environment is of paramount importance and is a responsibility imposed upon all members involved in DVI operations. This responsibility is not only confined to addressing hazardous environments, as there is a need to proactively apply organised work practices, especially during prolonged operations. All personnel assigned to DVI duties should also have access to a comprehensive program of medical and

psychological care. Such support should be provided in all team disciplines before, during and after the operational response.

To proactively manage both physical and mental stressors, the following are offered as examples of the types of factors that should be embedded into routine practice and formalised in protocols:

- Where practicable, all DVI personnel should work defined shifts with appropriate rest periods.
- Due to the potential occurrence of high levels of stress, the mental and physical health of all personnel should be closely monitored.
- Individual DVI personnel have a responsibility to advise their Phase Coordinator/Team Leader of any difficulties they or other personnel are experiencing in performing their duties.
- All DVI personnel are to use appropriate personal protection equipment and that adequate supplies are made available.
- All DVI personnel have a responsibility to advise their Phase Coordinator/Team Leader of the failure of any personal protection equipment.
- All injuries to DVI personnel must be immediately brought to the attention of the respective Phase Coordinator/Team Leader and recorded, and appropriately treated.

8.1.1. Medical

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All personnel who are at risk of contact with contaminated material are to be provided with appropriate inoculations. These inoculations should be administered during the preparation phase in advance of disaster operations. There should also be an awareness of the time taken for some inoculations to become effective, as well as how long some inoculations may last. This is important for long term operations.

Additionally, consideration should be given to medically examine responders prior to operational deployments. This is particularly important as decision makers need to be comfortable that staff are healthy and physically capable of performing DVI tasks in often difficult and trying conditions. Furthermore, at the conclusion of operations, consideration should be given to examining responders so that any injuries or adverse physical reactions can be identified and remedied at the earliest opportunity.

8.1.2. Psychological

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The psychological burden imposed on personnel can increase with the duration, intensity and nature of a DVI operation. Whilst work practices can be implemented to minimise the physical stressors on individuals, care must also be afforded to the mental and psychological stressors that DVI events evoke.

A number of factors can contribute to an individual's psychological reaction to a critical incident. Generally speaking, these factors are related to the nature of the scene, the personal relevance of the incident, or a combination of the two. An emotional or physical reaction to such situations is not a sign of inadequacy or mental imbalance, rather it is an indication that, for that particular person, the incident was out of the ordinary and should be dealt with by qualified professionals. Critical incident stress may manifest itself in a number of ways, whether they are behavioural, emotional, cognitive or physical.

It is also important to highlight that all individuals will not react to incidents and environments in the same way. Adequate support arrangements in the form of counsellors and mental health professionals should therefore be available, not only during operations, but post deployment, as some symptoms may not present until well after the operational response.

9. Support Services for Families and Relatives

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Humanitarian considerations alone imply the need to provide support and assistance for families and relatives of victims of a disaster. However, liaising with families and relatives of deceased loved ones is an extremely challenging function that involves a range of complex issues that requires close consideration.

These issues range from the initial notification that a loved one is deceased, followed by the expected outpour of grief and then navigating the myriad of complex issues to ensure that a healthy relationship can be formed with the family to assist in the identification process itself. Whilst this balancing of tasks is difficult during the DVI operation, responders must be mindful that families and relatives may require on-going support and assistance well beyond the DVI operation. The reason for this is that there is likely to be a series of events that will reignite emotions such as the repatriation of human remains, the return of personal belongings, the funeral, legal requirements such as coronial inquests and anniversary dates of the disaster.

Providing an effective assistance network in the form of family support services can promote cooperation on the part of grieving relatives, especially in the collection of ante-mortem data, thus potentially enhancing the quality and speed of identification. This type of support role is traditionally played by a Family Liaison Unit, often in conjunction with Ante-mortem Interview Teams. The role performed by services such as a Family Liaison Unit is therefore critical to ensure the needs of the family and relatives are being catered for in the best possible way, whilst providing a nexus to DVI responders who are responsible for the identification process.

In many parts of the world, family support mechanisms and specialists exist in both government and non-government forms. It is therefore highly recommended that jurisdictions actively engage with these organisations on a regular basis so that access to key specialists can be made easier when disaster events occur. By forming these partnerships well before a disaster occurs, a number of benefits can be derived, such as:

- Creating a coordinated response between family and relative support agencies and the DVI teams
- Establishing key contact points that can be engaged by the family and relatives to obtain information and advice about the complexities of the DVI process.
- Contributing to the portrayal of a professional and committed approach to the DVI function that is underpinned by courtesy, respect, compassion, credibility and transparency.
- Ensuring that contact can be made with authorities by families and relatives to obtain updated information on the development of DVI operations.
- Providing families and relatives with a contact point to gain referrals to other support services.

There are several sources of information and research material available that can enlighten DVI responders to the issues faced by families and relatives in these circumstances. Further information on guidance and information for relatives can be located in Part B of this Guide at annexure 15.

10. Training and Equipment

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10.1. Training

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In order to maintain appropriate competency standards in contemporary DVI practices, protocols and procedures, jurisdictions should consider the maintenance of training regimes that encompass all aspects and disciplines of DVI. It is also highly recommended that any training materials and activities should be aligned to the DVI process and functions identified in this INTERPOL DVI Guide.

Apart from enhancing competency levels across a particular jurisdiction's DVI disciplines, standardisation of practices can be achieved, which can result in operational deployments being undertaken in accordance with internationally recognised practices. This is especially important when operating with external agencies or jurisdictions, or performing duties in foreign environments. In such cases, if all jurisdictions embrace and train their personnel in these

international practices, they are more likely to be able to operate more effectively with other agencies. For example, in a multi-national/multi-jurisdictional DVI response, where common practices are embraced by those participating entities across all DVI phases, this can lead to teams operating more cooperatively and inter-operatively.

There have been several international events where nations have come together to perform the DVI role and the application of standardised practices has proven to be invaluable in terms of enhanced cooperative relationships, increased professionalism and most importantly, better identification outcomes. By developing and implementing standardised training regimes within each jurisdiction that follow international practices, operational deployments, especially with other agencies are likely to be undertaken with less confusion and misunderstanding.

In addition to embracing international DVI procedures and protocols, training and qualification tests to determine adequacy of preparedness for deployment for each DVI team member should be considered as a standard operating procedure. Regular proficiency testing of each member over the course of their DVI career should be considered to ensure preparedness in terms of not only technical and procedural competency, but physical and psychological requirements.

10.2. Equipment

Return to Contents

The provision of contemporary, reliable and officially validated equipment is critical to enable DVI practitioners to perform their primary functions. Apart from maintaining adequate supplies of equipment that supports the demands of each functional area of the DVI process, there is also a need for each DVI member to maintain their competency in the use of such equipment. Such equipment ranges from personal protection equipment, to specialist equipment that is unique to each phase of the DVI process.

From both a management and occupational health and safety perspective, it is considered extremely important that DVI practitioners are provisioned with the necessary equipment that enables them to maintain their protection from hazards and assists them to perform their primary tasks competently.

10.2.1. Personal Protection Equipment (PPE)

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The primary purpose of personal safety equipment is to protect DVI personnel against direct contact with human remains, associated contaminants and other hazards including environmental or man-made hazards. In addition to standard safety clothing such as surgical clothing, protective gloves, rubber boots, aprons and oral masks etc, there are other forms of protective equipment that extend beyond the immediate scope of dealing directly with human remains that must be considered. These protective measures usually require the use of items such as overalls, helmets, safety boots, goggles, rainwear and reflective safety vests. However, depending on the environment, risk factors and potential hazards, the equipment requirements may vary. Therefore, from a management and supervisory perspective, flexibility in terms of addressing or mitigating operational hazards is regarded as a high priority.

In order to proactively identify and address hazardous issues that may impact upon DVI personnel, it is recommended that jurisdictions maintain an awareness of emerging hazardous issues and then undertake actions to assist in formulating specific strategies to either address or mitigate those hazards.

Although many hazardous issues may be addressed or mitigated within each jurisdiction or international environment, other challenges may be beyond the expertise of staff, thereby requiring the engagement of external professionals to deal with specific issues. Also, overcoming the issue of sourcing supplies of PPE during an operation is important through maintaining adequate supplies or engaging standing contractual arrangements that can facilitate the provision of equipment immediately from local suppliers.

10.2.2. Specialised Equipment Return to Contents

In addition to providing consumables in the form of PPE for staff, there are other standard equipment items that should always be readily available such as the equipment required to process scenes, human remains and property, or enable the completion of tasks across all other phases of the DVI process.

However, there is also likely to be other equipment that may need to be acquired for specialist personnel and tasks, which may vary depending on the nature or circumstances of a disaster. The breadth of this equipment can be wide ranging and identifying those requirements proactively should include close consultation with specialist staff. Hence, specialist equipment may be required for unique tasks performed by pathologists, odontologists, biologists, anthropologists or other specialists, depending on the technical demands of the DVI response.

In order to identify potential specialised equipment gaps, jurisdictions are advised to undertake regular audits of their specialist capability resources and equipment. This can usually be achieved by examining a jurisdiction's technical strengths, weaknesses, possible research and development opportunities and potential risks. Although informing this audit can be achieved through local specialist knowledge and experience, jurisdictions are also encouraged to utilise INTERPOL networks to explore the worldwide body of professional knowledge and expertise across a vast array of DVI related disciplines.

Annexure 1:

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Principles of Good DVI Governance

Source: *INTERPOL Website article linked to Guide in 2014*

Annexure 1: - Principles of Good DVI Governance

Return to Contents

INTERPOL Disaster Victim Identification – Principals of Good DVI Governance

1. Issue

Return to Contents

In our present-day global society, disasters rarely have a singular national impact. Frequently, the victims are
citizens from several countries.
Consequently, the authorities of countries whose citizens have become victims of a disaster have a joint responsibility for the ethical, transparent and humane treatment of all victims. Nevertheless, it is the authorities of the country where the disaster has occurred who have chief responsibility in dealing with the victims. The independence and the applicable legal system of the disaster stricken country are internationally
accepted and respected.

This basic principle also applies to the process of disaster victim identification (DVI). In order to support and assist with the identification of the deceased, DVI teams from countries which have citizens believed to be victims of the disaster are often sent to assist the country in which the disaster has occurred. In recent years, because there have been no clearly defined guidelines and international principles, there has, at times, been confusion for both the country of authority and those providing assistance regarding mutual roles and responsibilities.

This document establishes and outlines a basis for the coordination of tasks, responsibilities and authorities within the DVI process.

2. Purpose

Return to Contents

Having clearly outlined principles help synchronize political, diplomatic, law enforcement and other institutionalized components of a strategy, by allowing leaders of a country to understand the ultimate aim and purpose of the DVI support offered to a country immediately after a disaster occurred.

3. Basic Principles

Return to Contents

3.1 Coordination

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The principles are designed to assist, on a universal basis, any DVI process in a disaster stricken area and to prevent the inadvertent escalation of a situation that may lead to conflict or non-cooperation between stakeholders. These guidelines strive to follow general precepts of law.

3.2 Commitment

Return to Contents

The Interpol DVI GUIDE and the use of the Interpol DVI forms are the universally accepted standards for the process of identification.

3.3 Case Independent

Return to Contents

Challenges pertaining to the principles vary according to each disaster scenario or situation. Although they are not fail-safe, respecting these principles will help to ensure that proper international standards are maintained in the DVI scenario.

4. The Principles of Good DVI Governance *Return to Contents*

Coordination of the following activities is of crucial importance and indispensable for effective disaster response. Coordination starts immediately after a disaster has occurred and the need for a DVI process has been identified.

4.1 Law, Legislation and National Conventions Return to Contents

All processes are governed by the laws, legislation and conventions of the affected country. In addition, in certain cases there may be rules, specified by governments and/or command authorities which govern the circumstances in which the DVI process must operate and to what degree.

4.2 Interpol DVI Standards Return to Contents

The basis for all actions must respect the internationally accepted standards as outlined by Interpol DVI. This includes the entire DVI process from the working methods employed to the documents to be used. Departure from these standards can only be justified in special circumstances. All persons who will be involved in the DVI process are encouraged to familiarize themselves with the information contained on the Interpol DVI website at www.interpol.int and to seek guidance and assistance from those who are familiar with the DVI standards. INTERPOL Lyon is always prepared to assist with (international) coordination, assessment and communication requirements that may surface.

4.3 Command and Control Return to Contents

Coordination of a disaster response can be ensured only on the basis of a properly functioning command structure. In most cases, a number of different agencies and organizations with different functions and responsibilities are required to work together. Chaos can be avoided by implementing a clearly defined command structure such as, for example, the gold, silver and bronze standard. The command authorities of the nation in charge of the DVI operation must put in place a clear command and control system and standard channels of communication as soon as possible.

4.4 Information Management and Status Analysis Return to Contents

Due to the uncertainty regarding the extent of damage caused by the disaster, and possibly, the lack of reliable information, initial emergency responses following a disaster are often difficult to set up. Coordination at all levels is urgently needed to obtain a correct analysis of the situation.

4.5 Identification of Required Personnel and Material Resources Return to Contents

An estimate of the support needed must be made as soon as possible and must take into account the working conditions, the available infrastructure, the potential number of victims and their nationalities, and finally, the condition of the bodies.
In addition to the required number of personnel and subject matter experts required, an estimate of support must include the materials required, both for assisting the DVI teams and experts, and for supporting logistics, such as refrigeration systems for the bodies.

4.6 Communication/Information Return to Contents

Accurate information regarding the identification of missing victims to their families and local authorities must be provided through standard channels of communication in accordance with agreements made within the Strategic Staff.

5. Operational Procedures *Return to Contents*

5.1 Operational Standard Return to Contents

The standards for the DVI process must be based on Interpol DVI Standards which can be obtained at www.interpol.int

5.2 Command and Control Return to Contents

Organise the command and control structure on the basis of the identification process In addition to the strategic, tactical and operational command standards,(such as gold, silver and bronze standards), ensure there is sufficient support and that information management centres are properly staffed.

5.3 Command on Scene Return to Contents

Coordination of incident site operations is critical and is accomplished through a unified on-scene commander. Roles and responsibilities of responding agencies should be determined and communicated by Command Staff before deployment. If the incident involves mass fatalities, the relevant Authority should establish the operational protocol between the Search, Rescue and Recovery (SRR) teams and the DVI response. During the initial stages of the response, an early, efficient management of the corpses is critical.

5.4 Assessment Return to Contents

Assessment subject matter experts in the DVI process should carry out an assessment to determine what qualitative and quantitative deployment is required as well as, what logistical and financial challenges need to be addressed.

5.5 Identification of Required Human and Material Resources Return to Contents

After the assessment has been completed, determine the human and logistical resources to be requested, taking into consideration, the condition and number of bodies, the number of nationalities potentially involved, and the continuity of the DVI process.

5.6 Reconciliation, Release and Repatriation and of the Bodies Return to Contents

After the minimum standards of identification have been satisfied, consultation with the official representatives from the nations involved concerning the formal processes of reconciliation, release and repatriation of the identified bodies must occur as soon as possible.

5.7 Information management Return to Contents

Information Management Accurate information regarding the identification of victims to families, local authorities and official foreign representatives must be provided Pay special attention to the collection of valid ante-mortem (AM) data from all contributors by establishing a proper communication process ensuring the accurate collection of the required data.

5.8 Financial Reporting Return to Contents

Financial Process Throughout the entire process of dealing with a disaster, unforeseen expenses will be incurred by many. To ensure accurate financial reporting, a financial process which is clear to all involved parties must be established. The person responsible for the finances must also have financial authority over the DVI process.

5.9 Evaluation Return to Contents

Evaluation upon termination of the DVI process, a review and evaluation should take place. Not only will a permanent audit team be able to suggest implementation improvements and identify best practices, but an evaluation process that is set up early can also save a great deal of time and energy in the final, concluding phases of the disaster response operation

Annexure 2:

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White Paper - DVI

(Target Group: Authorities/Diplomats)

Source: *INTERPOL Website article linked to Guide in 2014*

Annexure 2: White Paper – DVI

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Introduction

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Disasters and serious incidents, whether or not caused by human intervention, often lead to large numbers of casualties and fatalities. Following incidents such as these many public and private bodies set out to alleviate the suffering of the injured victims and surviving relatives as much as possible.

Victim identification forms part of this process. The return of an identified body to the surviving relatives not only enables them to pay their last respects to their loved ones in a fitting way, but can also aid their own grieving process.

In today's global society it is unusual for disasters to have no more than national impact: it is often the case that people from several nations are involved. The governments of the countries whose citizens have fallen victim to a disaster share the responsibility for ensuring that the victims are treated with dignity through a transparent process. Authorities and diplomats can play a vital role in this process. This can be achieved not only by facilitating the identification process and providing support, but also by communicating honestly and effectively regarding the DVI process and how it is expected to progress. Communication particularly the methods of identification and providing realistic time frames can make an important contribution to help alleviate the suffering of surviving relatives.

This paper was written to give authorities and (relevant) diplomats in particular a general insight into the identification process and the operational difficulties it entails. Some practical recommendations have been added as well.

General impression

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When a mass fatality incident occurs, identifying the bodies is an intensive and, in some cases, time-consuming process, which is often perceived as taking too long by the surviving relatives. In most cases it is not the recovery of the bodies and recording their description that takes so long. It can often take much more time to obtain and collect the ante mortem information needed to identify the victim, especially if that information has to come from abroad.

A lack of understanding of the international procedures used to identify victims and the time the identification process, can often lead to dissatisfaction amongst surviving relatives and the relevant authorities regarding the speed of the identification process.

Following a mass fatality incident partnership between the countries is of paramount importance. The identification process can be expedited by prompt consultation between the representatives of the countries involved, with consideration to the magnitude of the disaster and an understanding of the DVI process itself.

Local authorities, also the relevant diplomats of the affected countries can play a vital role in alleviating the suffering of surviving relatives by communicating clearly and specifically regarding the situation and events, as well as the progress of the investigation.

Outline of the identification process *Return to Contents*

Identification process Return to Contents

Details of the internationally agreed INTERPOL Disaster Victim Identification Standards are covered in the INTERPOL Guide which can be viewed on the INTERPOL website.
(www.interpol.int)

Basis Return to Contents

The Standard is based on the following key principles:
• Victims have a right to identity after their death
• All victims are treated equally in the identification process; there is no discrimination on any basis whatsoever.
• The victims are identified on the basis of the set standards
• A single error can seriously damage the integrity of the entire process and any future processes.

Process Return to Contents

Three sub-processes can be distinguished in the identification process:
a. the Post Mortem (PM) data collection process
This is the process in which the victim's body is described as fully as possible.
b. the Ante Mortem (AM) data collection process
This is the process in which as much information as possible about the missing person and any specific identifying features are collected.
c. the Reconciliation Investigation process
This is the process in which the AM and PM information is assessed, matched and the authority in charge identifies the victim on that basis to the agreed standard.

Identification criteria Return to Contents

The actual identification of the victim is based on the INTERPOL criteria.

Methods of identification used in cases of disaster must be scientifically sound, reliable, applicable under field conditions and capable of being implemented within a reasonable period of time.

The primary and most reliable means of identification are fingerprint analysis, comparative dental analysis and DNA analysis.

Secondary means of identification include personal description, medical findings as well as evidence and clothing found on the body. These means of identification serve to support identification by other means and are not sufficient as a sole means of identification.

• So identification is based wherever possible on at least one match for one of the primary identifiers:
• Dental records (Odontology)
• Fingerprints
• DNA
The established identification match is a result of comparison between reliable ante mortem data and post mortem data and is carried out by a suitably qualified specialist in Odontology, Fingerprints or DNA

2. Identification based on unique and/or personal features (secondary identifiers).
Those identifiers include unique features such as tattoos or scars, or unique personal effect. Other supporting information (such as sex, clothing, documents and jewellery) can also contribute to evidence of identification. These means of identification serve to support identification by other means and are not sufficient as a sole means of identification

3. Identification based on combined information
Even where a strong primary identification standard has been achieved it is good practice to record other evidence that supports identification.

Based on these INTERPOL criteria, a victim can never be identified solely by means of visual recognition!!

Time Scales *Return to Contents*

As mentioned above, the collection of AM information, especially for foreign victims, can be a time-consuming process. The authorities and diplomats involved can make a valuable contribution by using their contacts and information channels to expedite fast and valid information gathering.

Jurisdiction *Return to Contents*

There have been situations where Disaster Victim Identification (DVI) operatives have obtained AM data by direct contact with relatives of the victim, without any reference to the appropriate authorities of the victim's home country. Such practice causes difficulties when the home jurisdiction has a duty to investigate the death at home and confirm that a correct identification has been made.

This practice is therefore declared contrary to Interpol DVI guidance. Local authorities and diplomats from the affected countries must prevent such situations occurring.

Evidence of how the identification of a deceased disaster victim has been achieved will be made available to the official representative of the home country of the victim; this includes copies of both AM and PM documentation used in the process.

The legal standard of identification can differ from country to country, therefore the details of which specific features were found to match in order to identify the body will always be provided to the receiving country.

Identification conclusions and documents, including photographic evidence, will be passed on to the official representatives. They should be allowed to arrange further examination of the victim's body if they request it.

Documentation *Return to Contents*

All the Interpol Forms and the DVI Guide are available to be downloaded from the INTERPOL website

Repatriation *Return to Contents*

Many funeral directors are experienced in the legal requirements relating to the transportation of victims' bodies across international boundaries and by air.

Effective coordination between transport providers and the responsible authorities in the country of dispatch and receipt can considerably speed up the process of repatriation of the identified body back to the family.

Contact with the people involved/operational DVI teams/experts
Establish contact with the person in charge of the DVI team involved or the DVI experts in your country as soon as possible. They will be able to advise you on the situation. It will also be possible for you to use your diplomatic and other contacts to facilitate the flow of information needed for the identification process.

Contact with the DVI team of your home country
Always contact the DVI experts / representatives in your home country. They will also be able to provide you with help and advice regarding necessary activity in this situation.

Contact with diplomats and authorities in other affected countries
Arrange for effective and regular contact with other authorities and diplomats involved. Coordinate your actions and communication processes with them. This will prevent the affected country or other countries involved from perceiving that the deployment of assisting DVI teams is intended only to give the country's "own" victims preferential treatment.

Identification standards
Do not approve an identification that has not been based on the INTERPOL criteria.

Communication
Do not say anything about the identification process itself or give any time indications without consulting the local DVI managers.
Do not make any promises to surviving relatives that have not been discussed with the DVI managers.

Repatriation
Make agreements with the people in charge in the home country (in some cases private facilities) regarding the repatriation method, the times and procedures for the arrival of victims in the home country and the persons responsible for communicating information on this subject.

Annexure 3:

Return to Contents

Summary of Emergency Responders

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 3: Summary of Emergency Responders

3.1. Emergency Responders

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There are many specialist agencies involved in a disaster response and it is therefore important to acknowledge and appreciate that each has a very important function and area of responsibility. DVI forms part of that emergency response and to ensure that DVI management effectively maximises the expertise, advice and available resources from such contributing agencies, effective structures, plans and liaison arrangements need to be created and implemented.

In terms of the specialist response agencies that are likely to attend the disaster site, they are initially confined to police, fire and ambulance. However, as additional resources are engaged, the following specialist services are likely to attend and operate in conjunction with DVI teams:

- Emergency response specialists (eg: Police, Fire, Ambulance)
- Rescue Units (eg: Search and Rescue)
- Investigation units (eg: Crime and Fire investigators)
- Forensic Services (eg: Scene examiners)
- Disaster Investigation Unit (eg: Air Safety)
- Intelligence Unit
- Public Information Unit (eg: Media).

The major functions that some of the initial responders perform are summarised under the following headings.

3.1.1. Emergency Rescue Units

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Initial reports to emergency rescue units rarely provide accurate detailed information or a clear indication of the scope of the disaster, including the number of victims. Therefore, emergency rescue units should obtain an overview of the actual situation in cooperation with other responders at the site and then initiate the following measures:

- Rescue and immediate medical treatment of survivors.
- Identification and recognition of all medical personnel.
- Establishment of emergency stand-by readiness at local hospitals (crisis plans).
- Establishment of a first-aid station/field hospital staffed with physicians and medical assistants as a transit station for all survivors as needed (Survivor Reception Centre).
- Determination of hospital admission capacities; coordination of the transportation of injured victims from the disaster site.
- Establishment of provisional medical treatment stations in the vicinity of the disaster site as needed. Determination of the number of victims having left the site in shock, panic, or for some other reason.
- Provision of information to injured victim collection points, hospitals and outpatient clinics.
- Preparation of documentation on the number, condition and identities of injured persons (this forms the baseline for continuous reporting to the disaster operation command).
- Recognition of change from rescue priority to investigation and DVI priority when all survivors have been removed from the disaster site.
- Recording of any disturbance of human remains during rescue operations, including listing names of rescue staff responsible for such disturbance, maintenance of personal effects and other potentially identifying evidence with remains and notation of persons certifying death.
- Preparation of the list of missing persons requires knowledge of the destination of all survivors who have been removed.

3.2. Investigation Units *Return to Contents*

In order to ensure that the disaster site is preserved and controlled to enable the commencement of investigations, the following functions and responsibilities need to be observed:

- Containment of the disaster site/area - as complete security is essential in order to ensure optimum progress of emergency rescue operations, to protect evidence and the public.
- Ensuring safety prior to access to the disaster site.
- Securing the disaster site to prevent access by unauthorized persons (fences, barriers, if necessary guards).
- Removal of individuals without need or authorization to be present at the disaster site.
- Preparation of a survey of the disaster site/area as needed (GPS, laser survey, photographic documentation, photogram-metric survey).
- Procurement of wide-area photographs, maps and/or layouts of the disaster site (numbered building floor plans).
- Preparation of grids for outdoor disasters (aircraft crashes, railroad accidents and similar), in order to ensure more complete and effective processing of the resulting sectors. The arrangement of sectors in a chessboard pattern will substantially facilitate the subsequent search for evidence and recovery of bodies and body parts.
- Establishment of controlled common approach paths with specific entrance and exit points wherever possible. Conducting and recording identity checks and times of individuals entering or exiting at these points.
- Assignment of specific responsibilities to civilian volunteers as appropriate with safety/risk assessments having been conducted.
- Procurement of personal contact information from possible witnesses.
- Establishment of transport control stations, parking areas, entry and exit routes, helicopter landing pads, etc.

3.3. Disaster Investigation Units *Return to Contents*

The investigation into the cause of a disaster is one of the last critical functions in the disaster response operation. This follows the completion of evidence collection and scene-of-crime work, emergency rescue measures and the identification of victims.

As a general rule, the nature of the disaster will usually dictate the types of specialists that need to be engaged to assist in the investigation process. Examples of the types of specialists required include:

- Air crash investigators for plane crashes
- Post-blast experts for explosive related terrorist attacks
- Ballistic experts for mass shooting incidents
- Medical and / or forensic experts for chemical, biological, radiological and nuclear related incidents

Importantly, it should be remembered that the investigation into the cause of a disaster is an official and usually statutory responsibility. The findings of the investigation will not normally have a direct impact on the overall disaster response process, but the outcome may have an influence on:

- potential criminal prosecutions;
- conclusions and recommendations made during a coronial inquest; and
- how agencies go about preventing and responding to similar incidents in the future.

Annexure 4:

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Phase 1 > Scene

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 4: Phase 1 - Scene

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As a rule, the search for the human remains of victims of a disaster cannot begin until all survivors have been rescued. The emergency rescue units that arrive at the disaster site ahead of the recovery teams should be informed that, while life-preserving rescue measures and medical management take precedence, care should be taken during these emergency measures to ensure that as many human remains as possible (including other evidence, personnel effects, etc.) are left untouched.

In most cases these operations are initially chaotic and disorganised but it should be remembered that the recovery of human remains and the preservation of evidence/personal effects represent the first crucial steps in the victim identification process. This is often made more difficult by the large number of very different organizational units that are frequently involved in this process, together with the related communication and coordination functions that are not fully established at that time.

In order to overcome this initial chaos as best as possible, a structured search and discovery plan should be prepared as soon as possible, through collaboration of the Evidence Collection Team, Disaster Investigation Team, and the Access Control and Security Teams. This plan includes the search for, and collection of, human remains, property and evidence (all of which may also be used in the subsequent investigation into the causes of the disaster).

In cases of disasters with large numbers of victims, the establishment of an Operational Section for recovery and evidence collection is an absolute necessity. This Operational Section is responsible for:

- Recovery of all bodies and body parts at the disaster site.
- Collection and preservation of property found at the disaster site that does not correspond directly to the recovery of human remains.
- Collection and preservation of other personal effects of disaster victims found in the extended surroundings of the disaster area (e.g. personal belongings of victims in hotels).

Wherever possible, responsibility for recovery and evidence collection operations should be placed in the hands of the police who may, in turn, call on various specialists, such as odontologists, anthropologists and pathologists, who are trained to recognize human from nonhuman remains as required.

4.1. Searching / Recording / Securing

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Prior to the commencement of operations, all operational personnel should be briefed on the overall situation. This briefing process will also include the assignment of responsibilities and tasks to be completed. Subordinate external helpers and the provision of required sketches and maps of the disaster area should be considered to assist this process.

The disaster site should be searched and processed methodically on a sector-by-sector basis. Each individual team should be assigned a specific sector of the disaster area which is defined by the Sector Operations Commander. Before entering the disaster area, operational personnel should be equipped with appropriate safety equipment and clothing (e.g. helmets, overalls, boots, rubber gloves, masks) and appropriate recovery equipment and documentation, sufficient for each human remain and item of evidence. This latter equipment/documentation should be provided through the Recovery Command Centre.

These teams are responsible for ensuring that a thorough search of the assigned sector is conducted.

Personnel tasked with processing a disaster scene require accurate and detailed recordings of the disaster area to enable them to thoroughly search and record their findings accurately. For a wide disaster area, aerial photographs can greatly assist in preparing maps or plans, while for buildings, consecutively numbered floor plans may suffice.

The DVI Scene Controller is responsible for ensuring that the scene to be processed is gridded appropriately and sectors allocated for searching. These sectors need to be prioritised accordingly, having considered possible competing priorities with other expert examination teams, such as Bomb Scene Examiners (BSE). Thus, it is important that there is a combined approach taken to establishing search sectors based on agreed priorities in line with forensic investigations.

For locations such as airport runways, fields and other areas where the site is relatively contained, a grid is recommended. This, briefly, consists of a base line selected from or between fixed and recognizable points on the ground, and parallel lines marked out with tape at intervals, such as 10-metre intervals, to form squares in which to search methodically. It is important that the grid must cover the whole of the disaster site.

When using the 10 metre grid approach to define search sectors, the scene controller may allocate multiple grids to a sector depending on the amount of potential evidence yielded in each grid. Thus, in the example of a plane crash, the search grids surrounding the area behind the aircraft may be designated as one sector due to the low volume of debris. Whereas the main fuselage of the aircraft may be divided into multiple sectors due to the high volume of evidence present.

To assist a search/recovery team in processing a sector where there is a high volume of evidence present, the team leader may choose to adopt a 'sub-gridding' approach within their given sector. This will assist in their ability to process and record their given sector. This 'sub-gridding' approach follows the same principles as for the main grid.

If the incident occurs in rough terrain, experience has shown that a grid, with its regular squares, is often not the most useful system. The better option in such cases is to obtain aerial photographs and maps, or accurately sketch the ground to be covered, and then divide it into sectors based on natural or man-made features such as river banks, hedges, fields, roads, cliffs or buildings. These sectors may then have to be further subdivided into smaller, more manageable areas.

A chart corresponding to each sector is then prepared, clearly indicating the grid or the major fixed points, and an appropriate number of copies is made. The other search and recovery operations will be conducted in a similar methodical way, following the body recovery procedures, to ensure that every part of the site is properly searched and that all relevant finds are precisely recorded.

It is essential that an entry and egress route is established to clearly define the path responders take when accessing the scene. This must be established as a priority, thus this route may be the first sector that is processed to clear it for access to other sectors. The scene controller needs to consider ease of access within the scene for responders so that human remains recovery and the removal and securing of property and other evidence can be made.

An example of a basic grid layout for a disaster scene is attached to this annexure at Fig. 1.

In order to ensure thorough search and photographic documentation, recovery and victim identification teams require accurate maps of the disaster area. As far as possible, the disaster site should be overlaid with a grid in order to facilitate search operations. This method has proven particularly effective for relatively large disaster areas. The grid consists of a baseline that proceeds

from or runs between identifiable fixed points on the ground as well as parallel lines drawn at intervals of 10 m for instance (but depending on the situation). This process forms square sections in which methodical searches can be conducted. Wherever possible, the grid should cover the entire disaster area. Recovered human remains, personal effects, data, etc. can be catalogued according to the grid area in which it is found, with the completed Victim Recovery documentation.

The Recovery and Evidence Collection Team performs the following tasks relating to the recovery of bodies:

- Identify and record the location of all human remains - (using the Victim Recovery booklet)
- Exposure, uncovering and retrieval of the human remains, (if necessary with the aid of appropriate support personnel and suitable equipment).
- Marking of human remains with an evidence plate or numbered post on which the recovery number is clearly readable and cannot be erased.
- Assignment of a separate, unique number for each human remain.
- Documentation of the discovery site (description, photos, sketch or survey of the position of the human remains with the aid of GPS and/or crime scene surveying instrument).
- Photographic documentation of the human remains for recovery files and forensic medical examination.
- Attachment of the recovery number to the human remains. This number is used as the body reference number and remains affixed to the human remains during the entire identification process.
- Completion of the INTERPOL DVI Victim Recovery documents, with reference to the recovery number.
- Placement of the human remains in a body bag; attachment of the recovery number to the outside of the body bag and sealing of the body bag.
- Removal of the human remains and transport to the Recovery Command Centre/Mortuary.
- Preparation and compilation of recovery documents and submission of documentation to the Recovery Command Centre/Mortuary; procurement of new recovery documents as needed.

In order to perform the tasks in an appropriate manner, the following principles should be observed:

- The matching of separate human remains should be performed only by authorized forensic medical experts, and not by recovery personnel. More generally, it has to be avoided and each body part should be labelled. Medical (including anthropologists) and dental experts may be needed at the scene to assist the police in collecting human remains, including bones and teeth.
- During recovery operations, personnel should not search for evidence of identity or remove objects from victims' clothing or place such objects in victims' clothing.
- Should it become evident during the recovery operation that the condition of human remains may change rapidly due to external influences (e.g. weather); a DNA sample should be obtained by a suitably qualified person from the victims prior to commencement of the recovery operation. (The Commander of the Recovery and Evidence Collection Team should issue a corresponding order). All necessary evidence collection, labelling, transportation and storage precautions should be used.

General methodology when removing the human remains:

- Use a search plan that is adapted to the area.
- Controlled access (remains and belongings not removed or disturbed) until adequately documented.
- Adequate stocks of stakes, body bags and tags should be available.

- Grid and identify exact location of bodies and fragments (especially burned and fragmented remains according to the position of other remains or evidence).
- Remains and belongings directly connected placed in the same bag.
- Parts of remains in separate bags.
- Utilise photographs and written documents (INTERPOL DVI Forms) to record human remains and property.
- Remains and body bag should be labelled with the same number.

Always remember that any property may be crucial evidence that may assist the investigation. The following tasks should be performed with respect to property and personal effects.

- Identification and recording of the location of property at the disaster site as well as of personal effects within the extended area of the disaster.
- Marking and documenting the area in which property is found.
- Completion of the evidence list in the recovery documentation, including entry of the body recovery number.
- Labelling and packaging property; evidence-preserving packaging of large objects (e.g. luggage items) is not required. Evidence tags can be used to identify such objects.
- Once objects have been documented and prepared as evidence, property should be transferred without delay to the Evidence/Property Collection Centre, accompanied by the corresponding evidence list. If the Evidence/Property Collection Centre is not located in the immediate vicinity of the site, a site evidence administrator should be appointed and tasked with collecting and forwarding property/personal effects to the Evidence/Property Collection Centre.
- Personal effects of victims in the extended surroundings of the disaster site (e.g. hotel rooms) should also be localized and collected and managed in the same way as mentioned earlier. These items should also be listed in an evidence list provided with the recovery documents.
- The receipt/transfer of personal effects is recorded in a receipt/transfer record signed by the receiving and transferring parties (preservation of the “chain of custody”).
- Received personal effects are also forwarded to the Evidence/Property Collection Centre, accompanied by the evidence list and the receipt/transfer record.

4.4. Collection Centres *Return to Contents*

In consultation with the Operations Sector Commander, the Recovery Command Centre is to be set up in the immediate vicinity of the disaster site. It may serve as a temporary morgue station/mortuary – in any case it serves as a collection centre (site) for human remains delivered by the Recovery and Evidence Collection Teams. The Command Centre ensures proper temporary storage of human remains and maintains victim recovery lists on the basis of data obtained from recovery reports.

The Recovery Command Centre also provides for the issue of recovery documents/equipment to the Recovery and Evidence Collection Teams such as:

- Recovery report (INTERPOL DVI Victim Recovery/Post-Mortem Form - pink)
- Evidence lists
- Number plates
- Body bags
- Seals.

The recovery documents are reviewed by the Recovery Command Centre to ensure completeness/accuracy both at issue and on return.

The Evidence/Property Collection Centre should also be established in the vicinity of the disaster site in consultation with the Commander of the Recovery and Evidence Collection Team. Evidence/property found at the disaster site is collected at the Collection Centre along with personal effects of disaster victims.

On the basis of the large number of evidence lists reviewed for completeness and correctness by the Collection Centre, a master evidence list of all found and registered objects is prepared. Collection Centre staff are responsible for deciding which incoming objects are relevant and suitable for identification purposes and which should be handled as items of property.

Objects of relevance to identification are identified and listed accordingly. Information relating to personal identification derived from these objects is forwarded to the Victim Identification Team.

The Evidence/Property Collection Centre also performs the following functions:

- Assurance of proper packaging and storage of collected objects
- Preparation of hand-over records for items of evidence that should undergo further examination for purposes of identification or forensic analysis before completion of scene-of-crime operations
- Examination of property items for information of relevance to identification and classification as evidence, as required (e.g. items of value/personal documents) Separate storage of objects identified as property and notation as “property” in the “Remarks” section of the evidence list
- Preparation of photographs of items of property as required for purposes of identification/matching
- Arrangement for return of property to owners/entitled recipients.

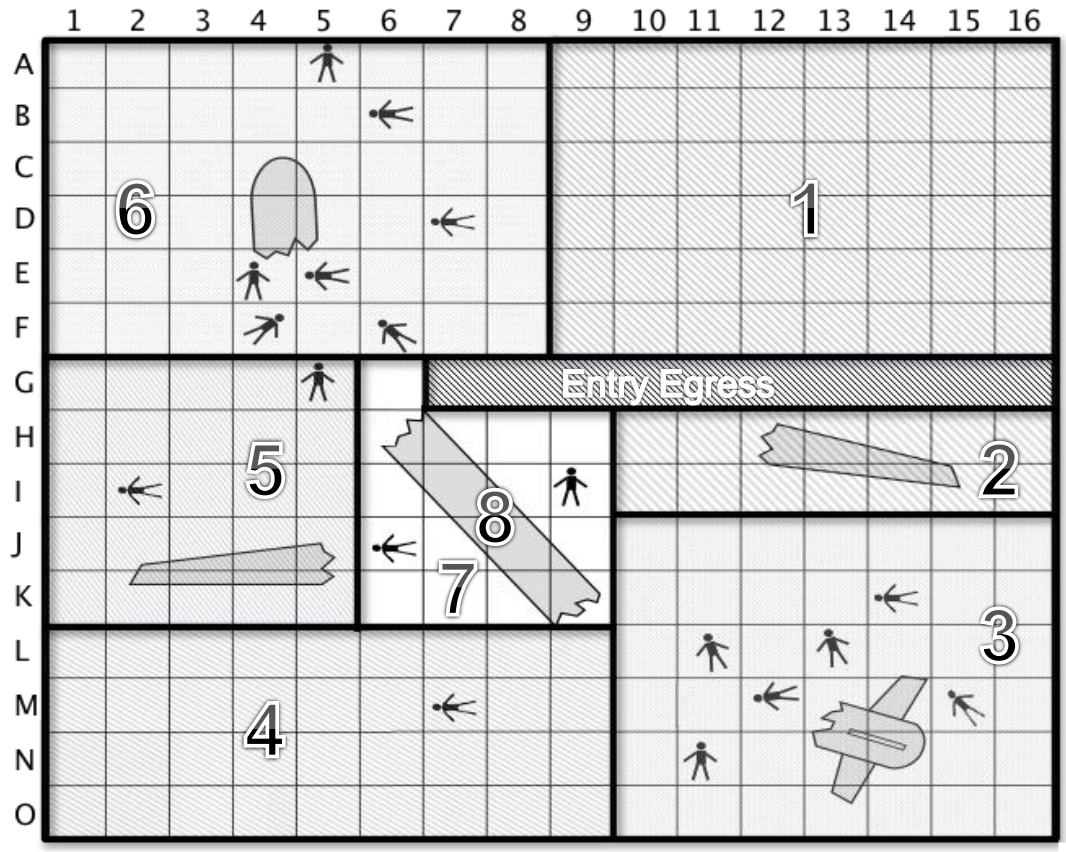
Scene gridding is used to record where human remains, property and items of evidence are located at a scene. Each grid is referenced by using horizontal and vertical co-ordinates. For example, all horizontal co-ordinates could be marked with alphabetical letters and all vertical co-ordinates could be marked with numerical values. In the diagram depicted below (Fig. 1), grid references have been marked as Grid A1 through to Grid O16. These grid references should be recorded on scene recovery documentation and these recordings can include GPS co-ordinates as an additional reference source.

DVI phase 1 teams are allocated specific grids to examine, record, process and clear. The Scene Controller should maintain a detailed record of the specialist teams allocated to each grid. The record should also identify the number of grids processed and the exact details of human remains, property and other evidence located in each grid.

It must be remembered that each disaster scene will be different due to a range of factors such as location, topography, environmental elements, the nature of the disaster, safety issues and the complexity involved in the management of human remains, property and other evidence. It is because of these factors that grids may not all be the same uniform size. Furthermore, the order in which the scene is processed will largely depend on priorities. For example, there may be several disciplines that need to be involved in the scene processing such as post blast examiners, crime scene examiners and those requiring intelligence for investigative purposes. Communication and co-operation between those key entities processing the scene is therefore vital to ensure that the scene is appropriately managed.

The following example (Fig. 1) is provided as a general guide only, in order to highlight the need to sectorise and maintain an accurate overview and recording of where human remains, property and other evidence was located. It must also be remembered that each jurisdiction may apply variations to this example.

Fig. 1



Annexure 5:

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Phase 2 > Post-Mortem

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 5: Phase 2 - Post-Mortem

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Wherever possible, the morgue station should be established in consultation with the head of the Victim Identification Unit. It may be necessary to set up a security service to protect operational personnel, the facility and human remains against access and or disturbance by unauthorized persons.

The morgue station performs the following functions:

- Reception of human remains from the Recovery Command Centre; issues a receipt to the Recovery Command Centre (chain of custody)
- Storage and proper cooling of human remains as appropriate
- Organization and transport of human remains for forensic examination in consultation with cooperating morticians and/or body transport teams
- Registration of human remains for the purpose of documenting the site of discovery and the location of each remain at any given time for tracking purposes
- Organization of the return transport for human remains
- Quality assurance check of identified human remains prior to release to a mortician
- Workflow documentation.

A receiving point that is set up at the morgue station is responsible for all incoming/outgoing human remains and reviewing accompanying documents (e.g. recovery records) for correctness and completeness.

5.1. Purpose of the Post-Mortem Process

Return to Contents

The objectives of an autopsy are to:

- Satisfy legal requirements of the respective country.
- Establish cause, manner and mechanism of death.
- Determine survival time leading to death.
- Collect data for Identification purposes.
- Document key information including injuries and evidence for investigation purposes.

5.2. Transporting Human Remains

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In the event that morticians are unavailable to transport the remains, a transport team should be designated and assigned responsibility for the movement of the remains to and from the morgue station. Human remains should be transported in vehicles or on gurneys or tables. Records of all movements should be kept.

5.3. Mortuary Facilities

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Wherever possible, existing facilities should be used for examination of human remains. If such facilities are unavailable then the site selected should meet certain minimum requirements, i.e. availability of running water, drainage or collection and removal of water waste, and electricity as well as compliance with all health and safety regulations. Separate stations should be set up for the following operations:

- Reception of human remains.
- Forensic examination of human remains - (autopsy)
- Dental examination
- Radiography (including whole body scan if possible)
- Fingerprinting, friction ridge examination
- DNA collection

- Evidence processing
- Quality control
- Release of examined human remains.

Separate areas should also be set up for the following functions in the vicinity of the body examination station:

- Dressing rooms
- Refrigeration storage rooms for human remains
- Storage rooms for logistical and other equipment and supplies
- Decontamination rooms
- Toilets, washing facilities
- Break rooms and dining areas.

An example of a Mortuary layout and Human Remains Processing layout are attached to this annexure at Fig. 1 and Fig. 2.

5.4. Numbering System for Human Remains *Return to Contents*

A single unique number is assigned to each body or body part. If several international DVI teams are working together in a given response, and if a pre-numbering scheme for the bodies is not established, the international telephone country code of the team that finds and recovers the body should be included as part of the number (e.g. for a team from Germany, the number would commence with 'PM49', or Australia 'PM61', followed by the next available unique number and possibly a scene number, if deemed appropriate by the Victim Identification Unit).

5.5. Cooling Human Remains *Return to Contents*

The influence of the post-mortem interval, exposure of the human remains to the elements, time and climatic factors (high humidity, high temperatures) on human remains accelerate the process of decomposition. As decomposition progresses, important identification features may be adversely affected, destroyed or lost.

In many cases, the storage capacities available at a major forensic medical institute or mortuary will be sufficient. Morticians and traditional body recovery/transport personnel, as well as large local cemeteries and crematoriums, also have cooling facilities.

It may also be necessary to develop appropriate solutions in consultation with local authorities (e.g. temporary mortuary suppliers, ice skating rinks, decommissioned refrigeration facilities, underground parking garages, vacant factory buildings, refrigerated transport containers and/or refrigerated vehicles, portable air conditioning systems).

Bodies should be cooled at 4-6°C. Only when long-term storage is foreseen, human remains should be kept at sub-zero temperatures (-14°C) and allowed to warm to 4-6°C before examination. A list of bodies placed in each cooling container is to be affixed to the outside of the container and also maintained in a central registry. This list should be regularly maintained and updated as the DVI process progresses to ensure continuing accuracy.

Dry ice causes skin burns and thus should not be placed in direct contact with human remains. A low wall approximately 0.5 m high can be built around, for example, approximately 20 bodies and covered with a tarpaulin or tent. Approximately 10 kg of dry ice is required per body per day. However, this provides only a temporary cooling facility and body deterioration will continue, albeit at a reduced rate.

No attempt should be made to cool human remains with ice (frozen water), as ice and water from melted ice may damage both the bodies themselves and personal effects, including identity documents. It may also become an occupational hazard for examining personnel especially in the presence of slippery surfaces.

5.6. Examination of Human Remains *Return to Contents*

During PM examination of human remains, it is essential to ensure that only unavoidable changes are made to those remains examined. In the event that there are reasons to depart from accepted examination practices, the governing authority for the DVI operation should be notified.

The methodology used during the autopsy is determined on several grounds:

- Complete autopsy is often needed in cases of homicide, unknown cause of death, flight crew members, and unidentified remains.
- Description of external injuries including the position of injuries or burns relative to the body position.
- Description of the arrangement of trauma, fractures, internal bleeding, upper respiratory tract changes (e.g. trauma, soot from fires in lungs).
- Old surgical procedures and internal implants: bone, breast, heart, uterine IUD.
- Recording of anatomical peculiarities.
- Collecting or harvesting samples for toxicology and DNA.
- In the case of decomposed bodies, it can be valuable to de-flesh parts of the body such as the pubic symphyses, medial ends of clavicles, femur, and skull, in order to assess ethnicity, age, sex and stature. However, the use of radiology, especially CT scanning, may obviate the need for this process.

5.7. Key Personnel and Functions *Return to Contents*

PM Co-ordinator

The PM Team Leader ensures that sufficient personnel are available for examination of human resources, supervises PM activities and checks for compliance with occupational health and safety requirements.

Human PM Remains Registrar

The human remains registrar assigns PM numbers. If the PM number has not already been assigned, the photographer should be requested to photograph the human remains to record what has been received. PM numbers should then be allocated on the PM forms.

Friction Ridge Specialists

Depending upon the condition of the human remains, friction ridge specialists will determine the best method of collection to be used. If possible, fingerprints, palm prints and footprints should be taken from all victims, especially babies and young children (e.g. barefoot latents could be developed as AM data in the bathrooms, kitchens etc. for the homes of victims).

Photographers

General principles for the photographing of human remains:

- Photographs (digital wherever possible) should be made of each human remains.
- Every photograph should bear the PM number and, if possible, a reference scale (e.g. for tattoos, scars, small effects).
- The subject of the photograph should fill the entire frame, if possible.
- Human remains should be photographed both clothed and unclothed.

The following photographs are required:

- All markings, labels and numbers on body bags.
- Full-length photographs of the body / human remains.
- Two overlapping photographs showing the upper and lower halves of the body, respectively.
- A full-frame front view of the head (portrait view).
- An overhead view taken at 90-degrees to the body / human remains.
- Images of all unique features, such as scars, tattoos, amputations, piercings, etc.
- All articles of clothing and personal effects, initially in-situ, then cleaned and photographed with a macroscopic lens in front of a non-reflective background in order to display details, such as inscriptions/engravings on rings, wristwatches, etc.
- All individualising features, such as clothing labels and credit card numbers.

- Views of the teeth: front view with teeth closed and lips retracted; upper jaw showing biting/chewing edges of teeth; lower jaw showing biting/chewing edges of teeth; and lateral right and left views with teeth closed and lips retracted. The dentist should be consulted with regard to the specific dental photographs required, such as close-up photos of specific dental treatments or unusual findings that are useful for identification purposes.
- If the body is skeletonised, then views of the skull from all directions, and overall of the skeleton, should be included. Also, the anthropologist should be consulted with regard to specific photographs required that are useful for identification such as close-ups of the pubic symphyses and any ante-mortem injuries etc.
- Specific diseases and abnormalities at the request of the forensic pathologists.

All photographs of human remains are to be stored on permanent media (CD) that is labelled with the PM number from that body and stored in the PM file. These photographs should also be backed up in a secure reliable digital repository (e.g. external hard drive, server or equivalent).

Radiologists

Radiographs (x-rays), and other types of PM images, such as CT-scans are important for the whole body as well as the teeth for finding clues to the cause (e.g. in the case of bombings) in order to provide clues for the cause of death and to screen for foreign bodies such as pacemakers, implants, and fracture sequelae to assist the identification process. Additionally, radiological imaging can provide invaluable information to record identifying features that can be reliably compared with known ante-mortem data. If forensic radiology specialists are deployed, they work under the responsibility of forensic pathology. The objectives include establishing the cause and manner of death and victim identification. A systematic radiological examination of the human remains (especially using CT scanning technology) is conducted to:

- Record potential identifying features, including internal observations, such as certain medical conditions and the presence of some organs whose retention may be useful (viz excluding someone who has a history of appendix, gall bladder or uterus removal).
- Find specific injury, disease or abnormality.
- Search for teeth and bones or bone fragments.
- Search for foreign objects (metallic items, explosives devices, firearm projectile, and jewellery).

- Evaluation of injuries (cause and manner of death).
- Estimation of age at the time of death.
- Depict and record treatments in teeth (and bones) useful for identification.
- AM/PM radiological comparisons.
- Conform with established search guidelines for the bodies of flight crews (examination of head and feet).
- Collaborate with forensic anthropologist to provide radiological views, and interpretation of them, to produce a biological profile, including estimated age, sex, ethnic affiliation, stature and depict unique features for comparison purposes.

Forensic Pathologists

The forensic pathologist performs the external and, where necessary, the internal examination of the body and enters appropriate data in the fields provided in the PM record. As a rule, it is not necessary to open the cranium for identification purposes. In many circumstances a complete autopsy is not required. The forensic pathologist usually takes samples for DNA analysis. A forensic anthropologist can provide critical information for a biological profile of a given deceased person, e.g. age, sex, ethnic affiliation, stature and individual identifying features. These parameters can be assessed on the basis of analyses of body structure and body size. The forensic pathologist decides on a case-by-case basis whether an anthropologist should be consulted.

Pathology Assistant

The pathology assistant assists the forensic pathologist in the external and internal examination of bodies. The assistant performs the following tasks in consultation with the forensic pathologist:

- Cleaning of instruments.
- Assisting in positioning the human remains on the autopsy table.
- Assistance in the external examination of the human remains (lifting limbs, turning the body, cleaning specific parts of the body or body parts).
- Assistance in the internal examination of the human remains.
- Assistance in the collection of DNA samples.
- Exposure or recovery of important identifying features with some left in-situ for photographic documentation (e.g. artificial hips, heart pacemakers, implants).
- Reconstruction of the body after autopsy to a condition acceptable for presentation to the family.

Autopsy Recorder

The autopsy recorder guides the forensic pathologist through the PM recording process and asks for information for each data field in the form. The recorder follows a step-by-step procedure in order to avoid overlooking important information. The autopsy recorder completes the PM report in accordance with the instructions provided. The recorder should ensure that all entries are legible, all pages and fields are completed and all entries are made in the relevant columns. The recorder ensures that the photographer records the identifying features as indicated by the forensic pathologist. Upon completion of the autopsy, it is important that all relevant signatures are obtained from the various disciplines and are clearly legible on the relevant PM documentation.

Property / Evidence Processors

The evidence or property processor fills out the pages of the PM record and lists all articles of clothing, jewellery and other effects. A second evidence processor cleans the objects and displays them so that they can be photographed. They then place the objects in appropriate evidence bags, label the bags with the unique PM number from the human remains and store them with the human remains, or accordance with local DVI response protocols/Standing Operating Procedures.

Personnel for Odontology

As a rule, two or three odontologists cooperate in the recording of the PM dental status of the body and in producing the radiographic and photographic record. One is the forensic odontologist examiner and the others are the forensic odontologist recorder and/or forensic odontology radiographic assistant. After the data is collected, this team rotates positions and then repeats the examination to ensure precise and accurate data through a double-check quality control system, while closely observing each other's examination and checking of data entries.

Forensic Odontology Examiner

The odontologist examiner is the dentist who accesses the oral cavity using the necessary procedures, including but not limited to: incising soft tissues as required; cleaning the teeth and jaws; examining the structures; and assessing the dental status of the body.

With respect to accessing the oral cavity for PM examinations, forensic odontologists should, in cases of identification, be free to suggest the methods to secure optimal conditions for the examination. But the procedure chosen for examination, should be in accordance with the decision of the country responsible for the identification.

As a general principle, the jaw should not be removed from the body. Removal of the jaw may be undertaken only when necessary and justified through prior notification to the legal or controlling authority involved in the DVI response and/or jurisdiction. In cases where surgical access is approved, removal of the upper jaw should be avoided if at all possible. When a jaw is removed, it should be kept with the body at all times. The jaw should be repositioned in or on the body so that the family members can appropriately view the repatriated body.

Radiographs of the teeth are produced as follows:

- Molars on both sides with jaws together (bitewings).
- Upper and lower molars, and possibly premolars and incisors on both sides (periapicals).
- Teeth with special features, such as root canals, crowns, etc.
- Others radiographs as required (e.g. occlusals, lateral oblique mandible).
- Orthopantomograms (OPG).

CT scan images can be adjusted to recreate many additional views such as OPGs.

These radiographs are evaluated for quality (exposure, density, sharpness) and are then studied by the odontologist recorder (see below) to ensure all data from them are included on the PM pages. The odontologist examiner also supervises and directs the production of an adequate photographic record of the teeth, jaws, related oral structures and individualising dental traits/characteristics.

Forensic Odontology Recorder

The odontologist recorder is the dentist who assists the odontologist examiner to record the victim's dental status. The odontologist recorder prepares and completes the relevant post-mortem forms and records the dental data as dictated by the odontologist examiner; checks the post-mortem record for quality (accuracy, legibility, clarity); signs the record and ensures that the odontology examiner and odontologist radiographic assistant also signs the record.

Forensic Odontology Radiographic Assistant

The odontologist radiographic assistant assists the odontologist examiner and odontologist recorder in preparing, exposing and developing radiographs of the teeth and takes joint responsibility for the quality of the post-mortem radiographs with the other odontology team members.

Quality Control Officer

Prior to the movement of any records, all documentation should be closely examined and assessed to ensure that the data has been accurately recorded.

5.8. Examination Procedures *Return to Contents*

Following receipt of the human remains and the recovery record, the remains are placed on an autopsy table and the following examination procedures undertaken.

- The body registrar issues PM numbers (if not already issued) and records it on a blank PM form. If a specific recovery number has been assigned, this number is recorded on the PM form.
- The body registrar gives the PM record to the autopsy recorder.
- The body registrar enters the PM number on the recovery report and gives any existing effects, sealed in evidence bags, to the property processor.
- The body registrar directs the photographer to document the body to record what has been received.
- The photographer photographs the clothed body / human remains.
- A property/evidence processor, assisted by the autopsy assistant, removes the clothing from the body / human remains and cleans clothing and other items of evidence (NB: cleaning should not occur until all specialists have completed their evidence collection procedures). The evidence processor should also document the locations where each item of evidence was found.
- The photographer photographs the unclothed body / human remains plus the items of clothing and other evidence.
- The external and internal examination of the body is performed and DNA samples are collected (forensic pathologist, autopsy assistant and autopsy recorder) directs the photographer to photograph important identifying features.
- To assess dental status, the forensic odontologist, odontologist record and odontologist radiographic assistant examine the body and record data following instruction. The forensic odontologist directs the photographer to photograph identifying features.
- Collection of fingerprints, palm prints and footprints is completed by the friction ridge specialist.
- Documentation of clothing, jewellery and other effects is completed by the evidence processor and photographer. At this point, evidence is placed in separate evidence bags (e.g. objects found in wallets), labelled with the body's PM number and stored with the body or according to local DVI protocols/SOPs.
- Once the examination of clothing is completed, clothing is placed in a clear bag and inserted into the body bag. Items of identification, objects of value and jewellery are taken to an evidence storage room appropriately labelled and tagged for continuity to allow later re-association of these valuables with the identified body for release and repatriation.
- Performance of quality control measures.

5.9. Special Considerations for Primary Identification Methods *Return to Contents*

PM Friction Ridge Impression

Transparent slides (clear acetate sheets) should be used instead of fingerprint sheets. These should be labelled in advance and then placed face down over a translucent original on a table.

In preparation for fingerprinting, the fingers and hands are cleaned with water or a soap emulsion and dried with a cloth or cellulose towel (being careful to avoid fibres or contaminants from the drying material being embedded into the ridges). Cleaning the hands with alcohol first will result in

much better prints. The alcohol softens the skin and makes the skin more pliable. Wipe with alcohol and then hold in front of a small fan to dry quickly.

Depending upon the condition of the hands, different procedures will be needed. The fingers (if the surface skin is still attached), the separated surface skin (pulled over the specialist's finger) or the dermis (after dabbing with acetone) are dusted with fingerprint powder using a brush (zephyr, fairy hair or cosmetic). Then the protective backing is removed from a white Herma adhesive label (size 32 mm x 40 mm) and the label is laid in a body pan with the smooth side down, so that the adhesive side faces upward. The individual prints are then taken with the body pan, checked for viability and then adhered from right to left (thumb on the right, little finger on the left) to a prepared transparent slide. Finally, the slide is reversed. The result is a set of normal friction ridge impressions (positive and colour-accurate) on a white background.

Palm Prints

If the surface skin has separated, the area of the palm is cleanly cut out, cleaned, spread over a dry cloth and stretched. Following drying with alcohol wipes, apply fingerprint powder, then the adhesive side of a white adhesive label (cut to size in advance) is pressed against the palm, beginning on one side and then carefully proceeding toward the opposite side. The adhesive effect is to prevent slipping. Then the label is affixed to a new transparent slide. Avoid excessive pressure and consider a "second" adhesive label being applied as the first attempt may clean away more debris and equalize the powder distribution, making the second attempt a better result.

When the slide is reversed, normal palm papillary images appear.

If the surface skin is destroyed or unsuitable for impressions, the dermis is cleaned, dabbed with acetone and processed with fingerprint powder. To obtain a palm print with the aid of a Herma adhesive label, an assistant should hold the hand so that the other specialist can extend the label carefully, beginning with the carpus, into the hollow of the palm with a cloth or his own fingers. The label is then carefully removed and affixed to a prepared transparent slide.

Depending upon the condition of the skin, footprints are collected in the same manner as palm prints.

Improving Hand Condition when Skin Surface Separated

The first step is to wash the hands with alcohol. The hands are then immersed for approx. 10 seconds (depending upon their condition) in a basin of hot water (boiled immediately beforehand). After the hands are removed from the water, a significant change in the hand or skin is already evident. However, because the hand curls inward as a result of the "boiling" process, it should be restored to an extended position by stretching. The finger pads and palms are now much more rounded; the skin has refilled (rehydrated) and is soft and expandable; the wrinkles caused by desiccation disappear and the papillary lines are visible once again. The skin is then treated with acetone and with fingerprint powder. Prints are taken with adhesive labels (adhesive side). The resulting prints are better than those obtained from the dermis without the boiling method, as they exhibit stronger contrasts.

This method is of limited use when the dermis exhibits various injuries. NB: The boiling process causes the skin to rupture if left more than 10 seconds in the water, and the "boiled" tissue beneath the skin swells to the surface.

Photographs document the "hand boiling" procedure and show two examples of fingerprints taken after "boiling"		
		

Condition of the hand after boiling: Skin is filled out, double-rowed papillaries are now visible	Thumb and index finger prints (right hand) following boiling, dying with soot powder, fingerprinting with adhesive labels and affixing to a transparent slide.
	

PM DNA Samples

Decisions regarding procedures to be used in sample collection as well as the scope and purpose of sampling measures should be made as early as possible.

The success rate for DNA typing depend on how quickly samples are obtained and preserved. A reduced post-mortem interval is advantageous. Sample collection at the disaster site should be only performed in accordance with the collection of forensic crime-scene evidence and should provide for documentation, proper labelling and preservation of the chain of custody. During sample collection, a forensic biologist or forensic pathologist with basic knowledge of forensic DNA methods should be present to provide guidance for sample collection.

Depending upon the condition of the body, different types of tissue are collected (See: *Table 1*). In many cases, the forensic pathologist requires advice on specific issues.

Whole blood from the core of the body, deep muscle tissues, bones or teeth are the most reliable sources of DNA especially where considerable time has elapsed since death and where the weather conditions have been unfavourable. However, other resilient samples such as nail bed tissue or internal samples like swabs of the bladder lining may also prove effective sources of DNA. It might also be advisable to separate the collection of DNA samples from the rest of the post-mortem examination (dental, fingerprint and physical examination) if that will result in better (less decomposed) samples and a more convenient sample collection procedure (e.g. blood on FTA card). It is important, however, that all samples are properly labelled according to given standards and that the chain of custody is not broken.

Bone material from the spongiosa can be rich in DNA, although it may be difficult to preserve reliably. Consequently, dense cortical material may be the better choice, preferably from the long leg bones and ribs. When collecting samples from bones, it is important not to remove them from anthropological measurement points, articulated edges or fracture edges.

In the case of severely decomposed remains, it is important to ensure that the samples taken are of especially good quality. Bone or tooth samples should be taken in all such cases. Even though the success rate is lower, simpler sample collection methods may justify a certain percentage of unsuccessful attempts. This should be weighed carefully against the additional burden of sample matching/verification and the necessity of marking unsuccessful samples for repeat processing. This is a complex issue that requires careful planning and quality control procedures.

Note that if tooth samples are to be taken for DNA analysis, this should only be done after consultation with the forensic odontologist and preferably only after the odontological examination has been completed.

For cases involving intact, fresh or undecomposed bodies, it may be worthwhile to consider collecting samples that are easier to obtain (e.g. smears on FTA) in addition to bone samples. In any event, it is advisable to collect multiple samples from the outset in order to avoid the time consuming work of collecting and labelling new samples at a later point in time. In view of the possibility that victim identification may take considerable time, the issue of preservation of remains during storage arises.

Complete documentation of each DNA sub-sample and the body parts from which they are taken is also of crucial importance for quality control of the matching of remains. It is therefore recommended that morgues be equipped with collection containers for post-mortem samples.

Preservatives can be used to conserve soft tissue at room temperature. The use of preservatives in provisional morgue stations with limited cooling capacities is recommended. Please note: Samples should not be preserved in formalin, as formalin will destroy DNA. A recommendation is to preserve soft tissue in ethanol (ethyl alcohol, grain alcohol, drinking alcohol).

Even when a victim has been identified on the basis of other methods, a DNA sample should be taken for the purpose of matching or ruling out matches between body parts and to facilitate the identification of other missing persons within the DNA database.

The numbering system used for post-mortem samples may be based on internally applied standard procedures. Regardless of the specific scenario, this number should be unique and traceable. If an internal numbering system is used for DNA (or any other laboratory procedure), there should be rigorous adherence to matching this numbering system to the general PM numbering system. This allows the use of the laboratory results in the general DVI reconciliation process.

In cases of a disaster with large numbers of dead and mutilated bodies, the forensic pathologist should specify procedural criteria for examinations, including such things as whether the examinations should be restricted to anatomically recognizable remains, and/or a minimum size should be set for soft tissue fragments that are to be identified and repatriated. It is important to ensure in this context that mutilated remains are recovered separately and assigned individual numbers without reference to presumed matches.

With respect to the problem of mutilated remains, a mixing of body parts may impair the integrity of samples. Mixing in this sense is defined as the transfer of blood or tissue from given body parts to other remains in the aftermath of a large-scale disaster or possible contamination with other human or animal substances, which could result in false DNA matches. It is therefore recommended that multiple methods be used for each identification.

The possibility of cross-contamination between remains should be taken into account both at the disaster site and at the autopsy station - this is why every individual body or body part should be assigned a separate number. Remains should not be matched or placed together with other remains simply on the basis of external appearance.

Samples selected for DNA analysis should be taken from human remains that have been matched definitively with the other remains. It is essential not to regard individual tissue or bone fragments as representative samples. Another problem that arises when dealing with fragmented remains is the possibility of cross-contamination from remains of animal origin. Pre-sorting and exclusion of samples that do not originate from a human source are the responsibility of an appropriately trained forensic anthropologist or forensic pathologist.

Samples should be sent for analysis as soon as possible. Most importantly, samples should be kept cool, and shaded from daylight from the time of collection until receipt for analysis.

Table 1: Collection of Post-Mortem Samples

Condition of body	Recommended sample
Complete, non-decomposed corpse	• Blood (on FTA paper or swab), and saliva (Buccal, oral) smears
Mutilated, non-decomposed corpse	• If available: blood and deep-seated red muscle tissue (~1.0g)
Complete, decomposed corpse or mutilated remains	• Sample from long, compact bones (4-6 cm sections, window section, without shaft separation), or • Healthy teeth (preferably molars), or • Any other available bone (~10g, if possible; preferably cortical bones with dense tissue)
Severely burnt corpses	• All samples listed above and impacted teeth or tooth roots if present, or • Smears from the bladder.

NB: It is advisable to collect more than one sample to provide a range of testing options.

PM Dental Examinations

During the assessment of dental status, FDI nomenclature should be used for national and international DVI operations. Internationally harmonized terms, codes, abbreviations, and nomenclature are to be used on INTERPOL DVI forms for international DVI operations. This data is recorded on INTERPOL DVI forms to standardize the national identification response.

When dealing with conventional radiography (film-based x-ray images), exposed films are to be labelled and numbered individually and then placed in numbered envelopes or bags. After development and adequate fixation, the radiographs are to be checked for quality, labelled, mounted, numbered and sorted into numbered sealable or self-sealing bags. It may be necessary to obtain additional radiographs of specific features discovered during the dental examination.

A quality control system should be followed to ensure adequacy of the post-mortem radiographic images. It is important to ensure that the case data (e.g. numbers) from the label is exported with the images so the data is available at the time of reconciliation.

The victim's upper and lower jaws should be left in place and should not be removed since this is a destructive procedure that further mutilates the victim's body. Many family members wish to exercise their right to view even badly decomposed bodies of loved ones. The disarticulations that are typically completed in chaotic DVI situations tend to be carried out with crude instrumentation and techniques that lead to fracturing of facial bones adjacent to the upper jaw.

Consideration might be given to removal of the jaw or jaws in very exceptional circumstances. Adequate justification for this should be presented by the odontology examiner to the supervising dental manager at the PM site before any action is taken. When the supervising dental manager agrees with the proposal, authority to conduct the procedure should still be sought and obtained from the DVI Commander according to established local and cultural practices. If authority is obtained to remove the lower jaw, every attempt should be made to minimize the extent of surgical intervention and to replace the jaw and associated teeth in its original position at the end of the examination. Every attempt should be made to reduce the risk of loss of these tissues.

Both the detached lower jaw and the attached upper jaw can be cleaned and subjected to precise dental examination and radiography. The advantage of this approach is that maintaining the upper jaw in-situ virtually eliminates the risk of subsequent mismatching. Once the examination is completed, the lower jaw is replaced and the incision closed, if appropriate and/or possible. The

jaw should be repositioned in its correct anatomical position for subsequent viewing of the body by family members, even if this seems very unlikely at the time of PM examination.

Fig 1. - Mortuary Layout ***Return to Contents***

The following diagram is an example of a mortuary facility layout.

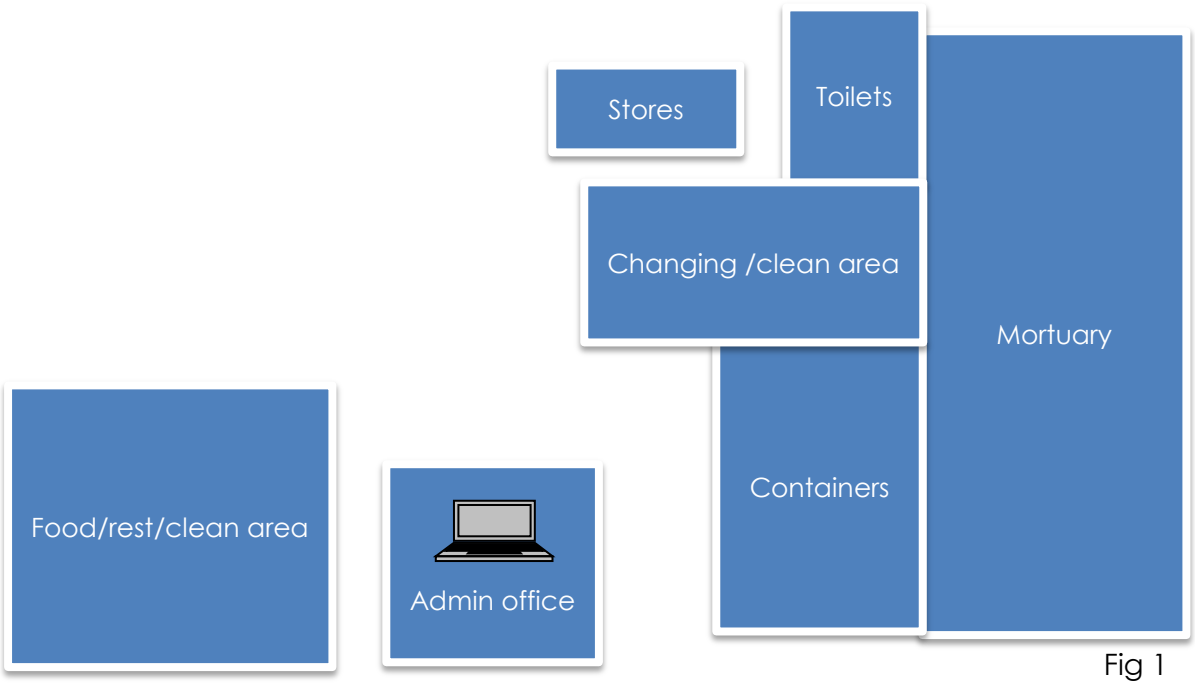

Fig 1

Fig 2. – Human Remains Processing ***Return to Contents***

The following diagram is an example of the layout of a mortuary for processing human remains.

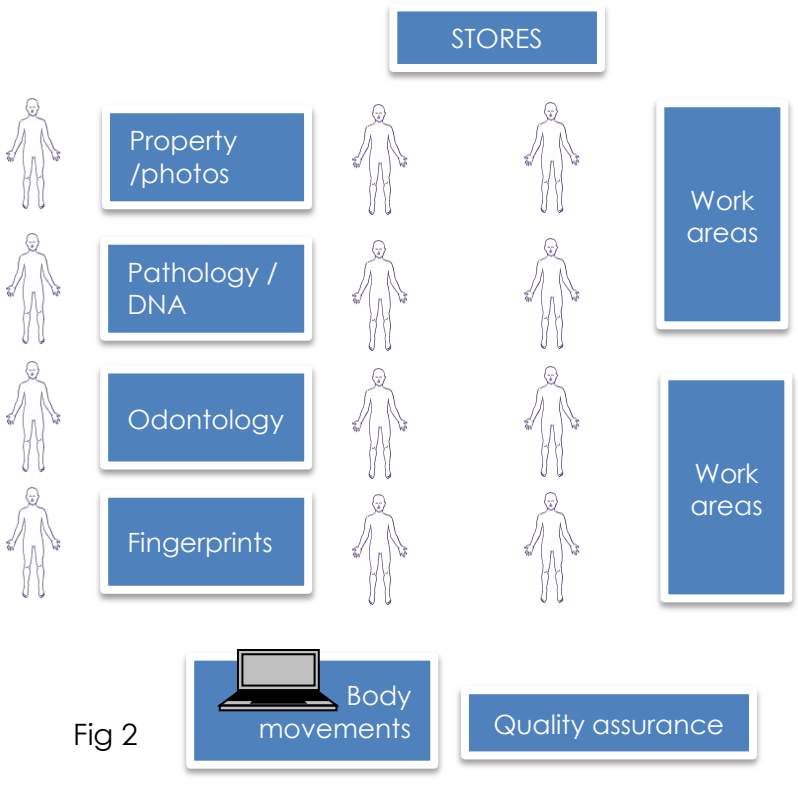

Fig 2

Annexure 6:

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Phase 3 > Ante-Mortem

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 6: Phase 3 > Ante-Mortem

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In order to properly scope the extent of a disaster from an identification perspective, it is crucial to, as quickly as possible, collect, record and process information regarding injured, missing and deceased persons, as well as individuals otherwise affected by the disaster. This becomes more important as the size of the disaster grows. By doing this, the process of AM collection can begin quickly and be appropriately resourced.

The AM Team integrated within the chain of command is initially tasked with collecting and recording all information relating to individuals who may be regarded as potential disaster victims. Experience gained in previous disaster response operations has shown that the number of reported 'presumed' victims varies and often substantially exceeds the number of 'actual' victims involved.

It is essential, therefore, that further action be carried out on the basis of the presumed victim data pool for the purpose of verifying or disproving the actual total number of missing persons. Continuous comparison with the lists of injured and uninjured survivors can result in a systemic reduction of the presumed number of victims.

The goal of this approach is twofold: a) to ensure that actual cases of missing persons are not overlooked; and b) to list all actual missing persons in order to facilitate the collection of AM data from relatives on the basis of the corresponding victim lists.

6.1. Documentation Management Systems

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All AM data obtained by the AM Teams should be documented. In this way, it will be possible to determine, even at a later date, what data was obtained, by which team, from which relatives, friends, etc. A corresponding personal file should therefore be set up for every potential missing person for use in documenting all incoming and outgoing information relating to the individual in question. This personal file should contain a cover sheet with a checklist ("to-do list") of all measures required to obtain AM data. On this checklist, the assigned AM Team keeps a progressive record of measures taken, measures still to be carried out and information that cannot be obtained despite intensive investigative efforts.

6.2. Collection of Ante-Mortem Materials

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AM Teams should ensure that all victim identification data is collected in accordance with the requirements contained in the INTERPOL DVI Ante-Mortem Form (yellow). It is also important to ensure that AM data is collected by the respective assigned specialists as completely as possible and is granted equal value. The non-availability of specific AM data should also be documented. For the purpose of collecting primary identification features, both the domicile and the workplace of each missing person as well as other areas in which the presumed missing person has been, should be treated like crime scenes and thorough, comprehensive and exhaustive searches for evidence conducted. Quality assurance measures should be established to maintain the high standards of AM data required for comparison purposes.

6.3. AM Data Collection Interviews

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Personnel collecting ante-mortem data should be experienced in obtaining detailed reports and should have a thorough knowledge of the layout and purpose of the appropriate forms. Police officers unfamiliar with the yellow INTERPOL DVI Ante-Mortem Forms will need thorough briefings.

Wherever possible, personal (face-to-face) interviews are to be conducted. However, exceptional circumstances may require telephone interviews. The location and timing of the interview will be dependent upon the location of the families of the missing persons, as well as the facilities available.

The following issues should be considered by the DVI Ante-Mortem Interview Teams when conducting interviews:

- The interview should commence as soon as possible after the victim's next-of-kin has been officially notified of the incident.
- Prior to the interview, the police officer leading the DVI Ante-Mortem Interview Team should endeavour to contact the next-of-kin or the friends of the missing person to advise them of the need for an interview, explaining why it is needed and to arrange a time and location.
- The place for the interview should be separate and distant from the morgue.
- If an interview cannot be conducted at the home of the next-of-kin or friend, the preferred location is an area that can be closed to the public and/or the media, and a place that ensures the individuals interviewed are provided with private and comfortable surroundings.
- If a time is set for an interview, the DVI Ante-Mortem Interview Team should be sure to arrive at the appointed time, showing both professionalism and courtesy.
- Upon arriving at the interview, the police officer leading the DVI Ante-Mortem Interview Team should introduce each team member to the relatives and friends present. If a speakerphone is used for telephone interviews, each member of the interview team should be introduced to the persons being interviewed.
- The DVI Ante-Mortem Interview Team should ensure that relatives and/or friends are willing to take part in the interview and that they are aware they may request a break at any time during the interview.
- Interviewers should ensure that they always refer to the missing person in the present tense and not in the past tense.
- When requesting specific information relating to the missing persons, the interviewer should refrain from asking personal and intimate specific questions.
- The members of the interview team should make a consistent effort to answer any specific questions asked by interviewees immediately and to the best of their ability throughout the interview. When questions cannot be answered, interviewees should be informed that the information in question will be obtained, if possible, and provided to them at a later date. No question should be ignored.
- Officers should make sure to collect information and materials needed within a single visit if possible in order to avoid further disturbance. The number of visits should be kept to a minimum.
- If more than one visit is required, the same team should conduct the subsequent visit.
- The following information and/or material should be gathered prior to the conclusion of the interview. If the interview is conducted by telephone, the police officer leading the DVI Ante-Mortem Interview Team should arrange for materials to be collected by the nearest police officer and forwarded to the DVI Ante-Mortem Coordination Centre:
  - Any and all original medical and/or dental records, charts, treatment records, radiographs (x-rays) and mouth guards, etc. in the relative's or friend's possession.
  - Names and addresses of any medical practitioners consulted by the missing person (e.g. Guthrie card data, which is a neonatal blood-screening device).
  - Names and addresses of dentists consulted by the missing person/potential victim.
  - Descriptions of jewellery and property worn by the missing person/potential victim.
  - Recent photographs showing full face, smile and/or teeth, tattoos, etc.
  - Buccal swab or blood sample taken from the biological parents or children of the missing person.

- Descriptions and/or photographs of any tattoos or other significant physical characteristics.
- Any object that may contain the friction ridge impressions and/or DNA of the missing person.

- The DVI Ante-Mortem Interview Team should ensure that a property receipt is issued for any property or material taken from the family or friends of the missing person.
- Consent for DNA testing should be obtained prior to taking any buccal swab or blood sample, pursuant to applicable laws.
- Procedures used in the collection, storage and management of DNA samples should be in compliance with applicable laws.
- The required yellow INTERPOL DVI Ante-Mortem Forms or other ante-mortem forms as required by the DVI Ante-Mortem Coordinator should be completed and submitted to the DVI Ante-Mortem Coordination Centre as soon as practicable after the interview.

The DVI Ante-Mortem Interview Team should enter each member's name and designation on the yellow DVI Ante-Mortem Form. The team should deliver or arrange for the delivery of DNA material, original medical or original dental records and radiographs, as well as photographs obtained during or after the interview, to the DVI Ante-Mortem File Section.

6.5. AM File Composition and Management *Return to Contents*

The following principles should be observed when compiling a missing person file:

- The file should be kept in an envelope or folder in order to prevent loss of materials.
- The file should have a cover sheet on which the name and gender of the missing person are entered legibly. The cover sheet should also contain a section for use in recording movements of the file.
- The file should contain as much information as possible to assist in identifying the deceased person.
- Files should be monitored regularly for duplication.
- Ante-mortem records should be forwarded to the Ante-Mortem DVI Centre for translation, transcription and data entry, accompanied by appropriate documentation (yellow INTERPOL DVI Ante-Mortem Forms and identifiers).
- Ante-mortem records should be released to an officer from the Ante-Mortem DVI Centre and signed for by that officer.
- Any ante-mortem records that do not proceed to the Ante-Mortem DVI Centre should be returned to the source from where they were obtained within a reasonable period of time.

6.6. AM Primary Identifiers: Considerations *Return to Contents*

Dental Status

In the aftermath of a disaster with significant numbers of victims, the local police office or other approved authorities will contact dentists who are identified as having treated specific missing persons. The following guidelines may be of assistance to police and dentists in obtaining corresponding ante-mortem data.

Please note that often dentists do not want to release patients' original records for such purposes. However, this is needed, as the original records are required during a DVI response. It is appropriate for the police officer to suggest that the dentist keep a duplicate of the records and then release the original records for use in the DVI effort. The types of records or objects able to be provided by treating Dentists include:

- All of the victim's dental records that are on file in the dental office.
- Conventional and/or digital radiographs of the teeth, jaws and/or skull.

- Dental casts or models.
- Dental prosthesis or other dental devices.

The information listed above is needed in order to reconstruct the ante-mortem dental status of the victim. It is essential to ensure all original treatment records and radiographic images are labelled with the name and date of birth of the patient, as well as dates of treatment, dates of exposure of radiographic images, stamps and signature of the treating dentist including the dentist's contact information (name, address, telephone number and e-mail address).

Speed in acquiring the ante-mortem records is of the essence but not at the expense of receiving the best quality original records in the dentist's possession. Requests for dental information and records should be answered immediately by the dentist in question. The dentist should also be requested to suggest other potential sources of data for the missing person, such as a practitioner who the missing person was referred to for specialized care.

Original records should never be released to relatives or other individuals acting on behalf of other authorities or unauthorized organizations. These records are irreplaceable and are critical to successful identification of the missing person. Dental records should be protected against loss by coordinating their seizure from the dentist's office and tracking their movement en route to the DVI response filing facility.

If the records and materials listed above cannot be obtained from the missing person's family dentist, the following may be other potential sources of information:

- Dental specialists.
- Dental technicians.
- School dental services.
- Hospital dental clinic.
- Hospital biopsy service.
- Dental health insurers.
- Dental records from correctional facilities or social security insurers.
- Military organizations.

Friction Ridge Analysis (Fingerprints, Palms Prints and Footprints)

The prerequisites for the identification of victims on the basis of friction ridge analysis is the availability of viable AM and PM prints together with the expertise of qualified friction ridge experts. Under these circumstances, the internationally recognized Automated Fingerprint Identification System (AFIS) technology can be used effectively and reliably during the request and registration phase as well as the comparison phase.

There are two main types of AM fingerprints; those deliberately taken for identification purposes (relating to a known person – Type 1) and those left in the form of latents in a living environment and on personal belongings (uncertain donor – Type 2). The investigator should be aware of all possible sources of prints. It is also of utmost importance that he/she be sensitive to the potential impact of such an intrusion into the (past) life of a missing person.

The process requires that all available dactyloscopic prints (fingerprints, palm prints and footprints) from a given missing person are obtained with the aid of appropriate evidence collection methods. In cases of missing children, the analysis of fingerprints, palm prints and footprints are of particular importance due to the frequent lack of AM dental records. Documentation should include the type of print, the name of the AM Team member who obtained the print and the location at which the print was obtained. It is also particularly important to record the names of other persons who reside in the household of the individual in question and/or have access to the individual's workplace. Reference prints should be obtained in order to avoid confusion regarding the identity of the person who left the prints. It may also be necessary to cross-reference AM files if there are multiple victims associated to the location from where the latent prints are collected. In instances

where there are multiple victims from one location (family/co-workers) the match of AM latent prints to a victim is not a positive identification as the latent only connects the victim to the location, and will therefore require other information such as DNA.

If possible, it is beneficial for PM prints to be taken to the scene of where AM prints are thought to be for immediate comparison at the scene by a friction ridge expert.

Relatives are often struggling to maintain balance between hope and fear. The search for material for identification purposes confronts them with the possibility/reality of death and disturbs the environment of the missing loved one. Relatives ordinarily want to preserve the integrity of that environment at all costs.

Thus, it is essential to explain the need for the search. The recovery of evidence may make the difference between uncertainty and reconciliation, between years of agony and the opportunity to mourn and achieve closure. It may also help avoid the administrative and financial problems that are commonly associated with unresolved situations.

Type 1 Prints (Registered Prints)

The following are categorised as type 1 prints:-

- Police (local / national) files established for criminal investigation and/or identification purposes; sealed files should not be overlooked.
- Immigration and asylum records.
- Police and civil files maintained in the home countries of immigrants.
- Friction ridge records of native citizens maintained in other countries for persons travelling or transacting business abroad (even CEOs are required to provide fingerprints in certain foreign countries).
- Files maintained by passport offices, motor vehicle departments and other agencies in which a missing person has resided.
- Police records relating to cases in which a missing person has been a witness to, or victim of a crime.
- Prison records.
- Footprints taken from babies after birth at hospitals in order to prevent misidentification.
- Fingerprint records maintained by maritime authorities.
- Finger/hand and footprints are regularly taken from aircrew.
- Many military organizations obtain footprints from their employees, such as pilots. The feet, which are normally protected by tight fitting boots and socks, will remain intact in many types of disasters.
- Friction ridge records for prominent persons in business or industry maintained on the advice of security firms and insurance companies in anticipation of possible kidnapping or hostage abduction.
- Fingerprints used for biometrics and/or personal identification/verification; such as in access systems, on smartcards, in passports, on personal computers, etc.

This means that an in-depth investigation should be conducted on the basis of the curriculum vitae of the missing person for the purpose of identifying potential sources of registered prints.

Type 2 Prints (Unregistered Prints)

An effort should be made to find additional prints from specific individuals by focusing on their personal belongings. Multiple prints increase the level of certainty.

The search for prints should be expanded to the extent possible, usually dependant on the number of personnel available. An expert can sort out latent prints later. Each latent should be carefully labelled with the relevant information and, if possible, an indication of a possible donor. Destructive detection techniques should be avoided in favour of lifting. Personal belongings should not be damaged, soiled or stained.

All prints should be cross-checked against those of living individuals who have legitimate access to the discovery site. All prints that can be safely eliminated should be excluded from further examination.

DVI teams should not be inundated with excessive quantities of materials or objects. Friction ridge specialists should seek to assist rather than hinder these teams, as they have countless puzzles to solve and do not need new problems to deal with. 'Inferior' fragments can be saved for later detailed examination if other information provides insufficient clues to a victim's identity.

To avoid confusion, it is important to rule out the possibility that other missing persons (from a different household) may have left prints at the site or on objects under investigation. These may include members of different families travelling together or colleagues from the same workplace who may have handled the objects, papers, etc. in question.

A search for footprints should be considered, as they are as reliable as fingerprints and often less susceptible to damage. The DVI Team should be consulted and advised accordingly.

Type 2 dactyloscopic prints can be found on:

- Magazines likely to have been read by a specific reader (e.g. car and fashion magazines, comic books)
- Recently read books (which should be processed using non-destructive techniques or cleaned after processing).
- Glossy photographs, which may bear excellent prints that can be detected with the naked eye and photographed.
- Car interior mirrors.
- Writing tablets, personal papers and/or appointment books.
- Empty (beer, soft-drink) bottles, bottle cases.
- Pottery, vases, plates, etc.
- Batteries in all types of toys and equipment.
- Sewing machines.
- CD and DVD discs and the containers.
- Airline flight tickets left at the airport at boarding; hotel receipts.
- Travel and insurance papers left behind for relatives.
- Tools, equipment and handcrafted objects; paint canisters (as latents) or patches of dried paint.
- Hobby material and objects (e.g. pottery).
- Drawings and paintings (children's finger-paintings).
- Bathroom floor (footprints) and wall surfaces; surfaces in other areas.
- Next to beds, where there may be magazines people have stepped on with bare feet.
- Objects/surfaces at the workplace.
- Other specific spots, such as rooms in (sport) clubs and on (private) training equipment.
- School paperwork.

The likelihood of making reliable identification on the basis of type 1 and type 2 prints increases in proportion with the amount of information available about the missing person's habits and daily routines. Giving relatives an opportunity to talk about these aspects may also serve relatives' needs, while facilitating the search for fingerprints as well.

The collection of AM friction ridge material should be documented in accordance with standard procedures for crime-scene investigation (e.g. list of prints/palm prints, to include descriptions, image numbers, dates and times, names of processing officers, evidence collection methods). A complete description of the site at which the prints were found and the material (object/surface) from which they were taken may be very helpful in establishing a link to a specific missing person. It is also important to ensure that a reference scale is included in every photograph of a friction ridge print.

Prior to forwarding for further evaluation, prints should be assessed with regard to their potential usefulness for dactyloscopic identification by an experienced friction ridge expert.

Friction ridge marks should be preserved on site evidence cards in all cases.

DNA Collection

DNA analysis is one of the primary methods of identification. Depending on the special characteristics of an incident the approach of the identification procedures will differ. Whilst in many cases dental or friction ridge investigations will be sufficient; others in which young people are involved, the remains are severely decomposed, or there are many body parts, the use of DNA analysis and comparison may be the best method.

Under such circumstances, DNA may be the only primary means of obtaining reliable identification. The decision as to whether DNA analysis is to be performed is taken by the head of the Victim Identification Team in consultation with the appropriate forensic laboratory.

DNA Management Guidelines

Ante-mortem (AM) samples should be collected as soon as possible for each missing person. Scientists with a background in forensic genetics should be available for training and consultations.

Samples should be obtained in sample collection kits/boxes and be labelled with a unique and traceable bar code.

Sample intake forms and family information should be properly completed and immediately checked for obvious data errors.

The set of loci to be analyzed has to be decided in accordance with the scientific community in the countries mostly involved. Notwithstanding this, a minimum of 15 independent loci and a gender specific locus should be selected.

Identification can be made on the basis of personal DNA samples with a simple, standard software program supported by statistical tables. Identification based on samples taken from blood relatives requires the use of a special program and consultation with experts in DNA analysis.

It is important to realize that language and cultural barriers may have an influence on relatives' willingness to provide DNA samples (the status of "biological relative" should be established).

All laboratories involved should observe standards for international nomenclature (ISFG – International Society for Forensic Genetics) and a standard data exchange format (e.g. the INTERPOL XML format).

AM Reference Samples for DNA

Taking into account the risk of false information, the choice of AM DNA reference samples should be limited to:

- First degree relatives (more than one if possible)
- Blood or biopsy samples from the missing person
- Personal objects that have been used by the missing person.

DNA profiles from first-degree relatives will always give adequate information for matching, except where the social father is not the biological father and in similar situations. In most cases it will also be possible to find and take samples from more than one relative. In certain cases, such as adoption; it may not be possible to obtain DNA samples from biological relatives and reliance will have to be on personal objects only.

NB: It is of paramount importance to understand the biological relationship between the missing person(s) and those providing comparison or reference samples, as there are limitations to the discrimination power of DNA analysis alone. For example, in the case where two siblings of the

same gender are missing, DNA comparison of the missing siblings to sample provided by a parent(s) will enable you to determine if the missing siblings are indeed biological children of those providing a comparison sample. However, it will not be able to conclusively tell you which sibling they are. In this scenario other evidence would be required (e.g. dental, anthropological, circumstantial) to make such determination.

AM Samples: Relatives

Prior to actual sample collection, contact should be established with the laboratory responsible for analysis in order to establish that the sample(s) will be suitable for the analytical procedure used at the laboratory.

Officers assigned to collect AM samples should be aware that the process could be very stressful for relatives. A professional, sympathetic approach is required, and visits should be kept to a minimum.

Sample collection should be accomplished in the least intrusive manner possible. Unless otherwise specified, buccal swabs are taken from the relatives in question. In the event that a blood sample is required, a drop of blood should be extracted from the fingertip and applied to FTA paper. Officers performing sample collection should be appropriately qualified and trained in the procedure. In some countries, only trained medical personnel are permitted to take blood samples. All required documents should be completed, including an official declaration of consent. The donor should be briefed regarding the reason for taking the sample and its intended use. In addition, the donor should be informed that the sample and the profile will be destroyed once the investigation is completed.

The officer collecting the sample should obtain official proof of identity and confirm the relationship with the presumed decedent from the donor at the time of sample collection.

Types of AM Reference Samples

Preferred samples are:

- buccal swabs
- droplets of blood extracted from the fingertip.

In order to achieve an optimum match, it is important to obtain samples from donors who are biologically related to the deceased. Proof of a direct biological relationship between the donor and the deceased is essential for the integrity of the process. Suitable donors are listed in order of preference below:

- Biological mother and biological father of the victim
- Biological mother or biological father of the victim and if possible a sibling
- Monozygotic/identical twins
- Biological children and spouse of the victim
- Siblings of the victim (multiple).

Official consent forms should be used when collecting DNA samples from relatives of disaster victims. These forms should contain the following information:

- Legal authorization for sample collection
- Reason for/purpose of sample collection
- Type of sample collected
- Confirmation that the sample is to be analysed and compared with samples from a victim of an “extraordinary disaster”
- Confirmation that all profiles derived from the sample are to be stored in a confidential database used solely for purposes of comparison

- Confirmation that the sample and the profile will be destroyed upon completion of the investigation
- Confirmation that the donor has provided the sample voluntarily
- Confirmation – in the case of a blood sample – that the donor has not been bone marrow transplanted or received a blood transfusion within the past 3 months
- Confirmation that there are no medical reasons that would prevent the donor from providing the sample
- Name and signature of the consenting donor
- Confirmation of the donor's identity
- Nature of the specific biological relationship between the donor and the victim
- Name of the person assigned to collect the sample
- Date, time and location of sample collection
- File/reference number of the Victim Identification Team.

Missing Person Blood / Biopsy Samples

Another source to be considered for obtaining high quality, DNA reference samples, is from samples which had been taken for medical examination or similar analysis prior to the deceased's death and stored in a bio-bank or other bio-medical source of DNA (such as hospitals, pathology units, and paternity and blood transfusion laboratories).

A good example is the blood droplets obtained for neonatal screening of various diseases such as PKU (phenylketonuria). The search for AM DNA should therefore include consultation with the potential victim's family doctor in order to determine whether blood or biopsy samples from the potential victim are available in cases where close biological relatives cannot be obtained.

Guthrie tests/neonatal blood samples are often preserved in many countries. Normally, laws pertaining to the use of samples restrict the use of such samples to research purposes only. However, it may be possible to obtain permission from the relevant authorities to use these samples for purposes of victim identification in cases of disaster.

Each sample has to be placed in a separate evidence bag or container that is immediately sealed and labelled.

An official proof of the identity of the sample has to be filled in and verified by the physician responsible for the bio-bank or biomedical source.

The officer collecting the sample should also verify a chain of custody report telling where and when the sample was collected.

Missing Person Samples from Property

It is also possible to get reference samples from objects that have been used by the deceased. However, if such victim reference samples are used, it is important to establish from the outset whether the objects processed belonged to and were used exclusively by the individual in question. If the person in question was not the sole user of an object (e.g. hair brush), the identity of the second or other person/s should be determined, and a DNA sample should be taken from that person/s for purposes of comparison and exclusion. As many objects as possible should be obtained for purposes of AM DNA collection, as it is entirely possible that individual items of evidence will not produce the desired analytical results.

In cases in which victim reference samples are to be collected, it is important to ensure that procedures are structured and coordinated. A central location can be designated for the collection of suitable material obtained from relatives. Alternatively, officers tasked with obtaining ante-mortem samples may travel to victims' homes to search for suitable material for analysis. Wherever possible, more than one object should be selected.

Although victim reference samples are suitable for DNA profiling for purposes of comparison with presumed victims, the risk of cross-contamination resulting in false profiles cannot be excluded.

The following precautions should be taken in order to minimize the risk of contamination and to preserve the integrity of the materials obtained:

- Each object should be placed in a separate evidence bag or a separate container.
- Every evidence bag should be sealed.
- Bags/containers should be labelled/marked appropriately in order to preserve the integrity, continuity and identity of their contents.
- A complete list of objects should be prepared for the purpose of documenting the receipt, transport and return of individual objects.
- Appropriate evidence control methods should be employed to ensure the safety of objects and adherence to chain-of-custody regulations.

Guide to AM Reference Samples

Biological relatives	• Take samples from close biological relatives like parents, children and siblings. If possible, try to get samples from two or more relatives. • Good profiles will be obtained from buccal swabs and blood samples placed on FTA papers.
Self samples	• Good self DNA profiles can be obtained from: - Extracted baby teeth or extracted third molars (wisdom teeth). - Samples from national bio-banks, bone-marrow donor programs. - Blood droplets obtained during neonatal screening for PKU (phenylketoneuria). - Other clinical blood or serum samples - Criminal police databanks, paternity testing laboratories, reference samples from military services members - Samples from sperm banks - Dried umbilical cord - Pathology preparations embedded in paraffin
Personal objects	• Examples of belongings from which it is possible to extract DNA: - Toothbrushes - Razor blades/razors - Hair brushes and combs - Combs - Lipstick dispensers, deodorant rollers - Used cups and glasses - Used underwear - Cigarette butts and pipes - Motorcycle and other sports helmets, caps and hats - Ear plugs, headphones - Eyeglasses - Jewellery - Wristwatches

6.7. AM Quality Control *Return to Contents*

Careful and thoroughly prepared documentation of the sample collection process (evidence collection report – chain of custody) is an absolute prerequisite for the matching of a reference sample to a specific missing person.

All sample receipt forms and information received from relatives should be reviewed and immediately corrected where errors exist before data is entered and committed to the matching process.

The corresponding documents and a complete chain of custody record should accompany all samples taken from relatives and direct reference samples from missing persons. Samples and documentation should be forwarded to the laboratory as quickly as possible. The laboratory should exercise utmost care in the handling and storage of these materials and be prepared to return personal items to the submitting police office for release to the family once the identification of disaster victims is completed. Personal items can hold great sentimental value for the families.

Annexure 7:

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Phase 4 > Reconciliation

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 7: Phase 4 - Reconciliation

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The Reconciliation Team compares the AM and PM findings submitted by the AM and PM Teams, respectively. For practical reasons, the Reconciliation Team should be set up as near as possible to the Operations Command Centre and/or Information Management Centre.

Considerable time can be saved in comparing AM and PM data, if data processing and evaluation software is used. However, no computer program, no matter how effective it may be, can be more than a helpful tool. Final decisions with respect to identification of the victim should be made on the basis of all relevant criteria.

If there is no possibility of using evaluation software, other methods of establishing best possible matches and comparisons should be utilised.

7.1. Management Structure

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The member in charge of the Reconciliation Team is responsible for all sections of the unit. He/she is responsible for task distribution and personnel assignments, as well as maintaining an overview of the disposition of all individual tasks.

There should also be sufficient supervision within the Reconciliation Team to coordinate the matching process. Matches obtained on the basis of identifying features should be submitted to other sections for review and confirmation. The management structure should also allocate authorised staff to prepare and complete identification documentation for the Identification Board.

Furthermore, the Reconciliation Team should also be structured to enable additional reviews and quality assurance activities of identification documents, as a final check prior to confirming matches. Responsibility also needs to be assigned to present completed matches with the assistance of appropriate experts to the Identification Board.

7.2. Reconciliation Sections

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A reception desk and an archive system should be established to store all AM and PM files. Separate sections should also be established that correspond to the specific identification disciplines. Within these sections, assigned experts perform the following duties and functions for each discipline:

Friction Ridge Experts – (Fingerprints)

- Quality Assurance of AM and PM data
- Statistical material submitted to the section
- Comparison of data in the (mini) AFIS and other databases, as required
- Preparation of expert opinions on matches for presentation to Identification Board
- Support for the Director at the Identification Board.

Forensic Odontology

- Quality Assurance of AM and PM data
- Establishment of best possible matches using the database software
- Physical comparison of AM and PM data maintained in specific software products and systems to identify the best possible matches
- Preparation of expert opinions on matches for presentation to Identification Board
- Support for the Director at the Identification Board.

DNA (Forensic Biology)

- Quality Assurance of AM and PM data
- Preparation of expert opinions on matches for presentation to the Identification Board
- Support for the Director at the Identification Board.

Secondary Identifying Features

- Quality Assurance of AM and PM data
- Comparison of data
- Compile data and information for presentation of circumstantial cases for the consideration of the Identification Board.
- Preparation of expert opinions on matches for presentation to the Identification Board.
- Support for the Director at the Identification Board.

7.3. Critical Reconciliation Activities *Return to Contents*

The Reconciliation Team receives the AM and PM files as soon as they arrive after appropriate quality control measures have been performed in the respective sections (AM and PM). Quality control continues within the Reconciliation Team, in order to ensure adherence to uniform data standards. In addition to these quality control measures, this area is responsible for:-

- Collection/review of AM and PM data
- Collective classification of identification conclusions
- Preparation of a list of key AM data points and key PM data points
- Recommendation for identification by member or team
- Independent verification by second member or team
- Preparation of report with level of conclusion for submission to Identification Board.

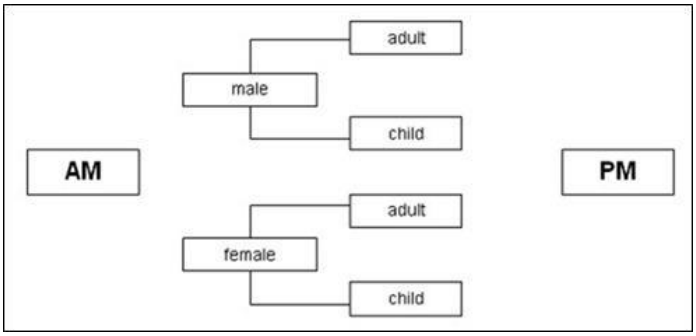
7.4. Classification Categories *Return to Contents*

Whilst software products are continually being developed to enhance the effective and efficient screening of AM and PM data, manual intervention is required to validate possible matches by specialist personnel.

Since searches employing PM findings with all of the available AM data is excessively time consuming, the collective data should be classified according to useful criteria so that, for example, PM records for female children are compared only with AM records for female children.

Hence, a classification by gender and age at the outset is helpful for both AM and PM records, and records should be filed accordingly.

Classification by ethnic affiliation or height is impractical in most cases, as the bodies of many victims of major disasters may be severely mutilated or destroyed (e.g. airline and train accidents) and/or because advanced stages of decomposition should be anticipated in many cases.



7.5. Preparation of AM and PM Key Markers

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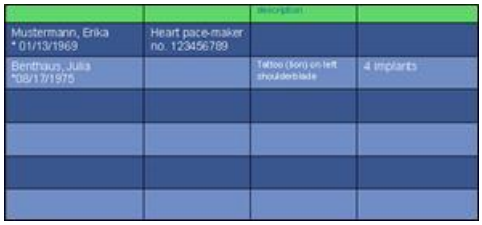
In order to find best possible matches between AM and PM data sets, it is helpful to prepare a list of special AM and PM markers. In this way, only particularly noteworthy features of a missing person or body are recorded in a list.

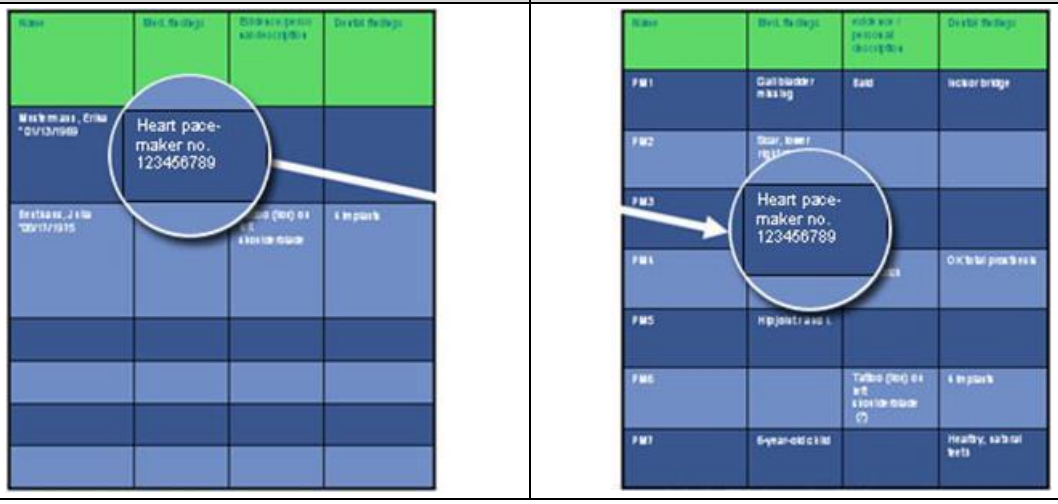
A key marker list is prepared for both the AM and PM subgroups.

Sample AM key marker list	Sample PM Key marker list
AM - adult female	**PM adult female**



Body No	Med. findings	Evidence (personal description)	Dental findings
PM1	Gall bladder missing	Bald	Incisor bridge
PM2	Scar, lower right abdomen		
PM3	Heart pace-maker no. 123456789		
PM4		Rolex wristwatch	OK total prosthesis
PM5	Hip joint r and l.		
PM6		Tattoo (lion) on left shoulderblade (?)	4 implants
PM7	6 –year-old-child		Healthy, natural teeth

Example of first matching	
List AM adult female	**List PM adult female**



During the subsequent individual comparison process, the matches obtained during the first matching process depicted above are collated and checked through individual comparison of the AM missing persons file with the corresponding findings in the PM file.

This process can result in identification, rejection (non-identification), or the establishment of a possible or probable identity.

As a rule, an identification can be verified if there is a match in primary identifying features. If a match is based on secondary identifying features only, additional supporting factors should be assessed before identification is established.

7.6. Comparisons by Experts

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Before any documentation is forwarded to the Identification Board for consideration, the relevant experts who are responsible for confirming identity are required to closely compare, analyse and arrive at conclusions based on the data collated and prepared during the earlier phases of the DVI process.

Friction Ridge Analysis

A friction ridge analysis expert should be assigned to this section. The expert compares AM friction ridge evidence with evidence obtained from the body of the victim. AFIS or similar database technology should be used in this context.

Forensic Odontology Comparison

A large amount of specific detail can be compared for the purposes of matching based on dental status. Forensic odontologists should be assigned to this section for individual comparisons.

DNA (Forensic Biology)

AM DNA profiles are compared with PM profiles by specially trained forensic biologists. Computer programs mainly make the potential match comparisons for the biologist to confirm and then calculate probability statistics. Kinship analysis may also be utilised in this process.

7.7. Identification Board *Return to Contents*

The Identification Board is a group of experts that meet at regular intervals to discuss and verify proposals submitted by the Reconciliation Team. The Board makes final decisions regarding the identification of given victims and certifies these decisions on the DVI documentation. These are then provided to the relevant Coroner or other Judicial body for consideration. The composition of this Board will be determined by the existing legal framework.

Final identification of a disaster victim is made with the approval of the Identification Board (IB). The IB has the following specific responsibilities:

- Review and evaluate the evidence provided in a given case
- Decide if the evidence is sufficient to identify the victim (if not, the case is sent back for further information)
- Localization and reassessment of non-matches
- Compilation of results from the Comparison Report into a Victim Identification Report and approval by signature, by the signatory with jurisdiction. This record is then regarded as formal confirmation of the identification of a deceased victim.

The Identification Board is responsible for the final identification of every victim and should therefore comprise of the most experienced identification experts involved in the operation, i.e. the heads of the various sections/units (forensic pathology, odontology, fingerprints, biology) and the Director, Commander or delegate of the DVI Team. In some countries, this identification process may require a further level of authority by way of a Coroner or other Judicial oversight before final acceptance.

It may be possible to have one or two representatives (as observers) of the different countries involved in the disaster at the Identification Board.

The Identification Board works under the auspices of the investigative authority with final jurisdiction in the home country for victim identification. Depending upon the locale, this can be a coroner, judge, medical examiner, military or police authority.

Annexure 8:

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DVI Management Roles

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 8: DVI Management Roles

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8. Key DVI Management Responsibilities

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There are a broad range of issues that must be considered by the authorities to ensure that jurisdictional requirements are met. The following is a summary of the main considerations of key management positions within the DVI process. They should not only be exercised during the response phase to a mass casualty event, as pre-planning and training is important in order to enhance the effectiveness of the response and the overall quality of the DVI outcomes.

8.1. DVI Commander

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As the DVI Commander is required to assume responsibility for the overall operational response to a DVI event, the following are considered essential in developing and maintaining such response:-

- Establish an appropriate DVI command and control structure to ensure all DVI activities are organised and co-ordinated.
- Gather accurate and timely information regarding the disaster – (scope and extent) so that tailored plans can be developed.
- Initiate the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Appoint the DVI Phase Coordinators and other key roles as required.
- Implement clear communication channels to facilitate the co-ordination and flow of information.
- Ensure that adequate capacity and capabilities are maintained to effectively respond to the incident.
- Brief the Coroner or equivalent authority and the relevant lead authority.
- Ensure adherence to occupational health, safety and welfare requirements.
- Ensure maintenance of incident and decision logs.
- Liaise with key participants to ensure the overall response is co-ordinated – eg: crime scene investigation command.
- In accordance with jurisdictional policies, activating national/international responses as necessary.
- Ensure all information and data is managed and tracked throughout the DVI process.
- Ensure regular situation reports are received from the DVI Phase Coordinators;
- Liaise with the lead authority to develop media strategies;
- Provide briefings to relevant authorities during the course of the DVI response.
- Ensure assets and equipment is made available to support the DVI response.
- Establish and maintain contact with other involved domestic and foreign agencies and other organizations (e.g. travel agencies, airlines).
- Engage technical support to assist in the identification process and manage information.
- Liaise with interested parties such as embassies, inter-agency organizations, international organizations, etc.
- Ensure appropriate communication and support are provided to next of kin
- Authorise identifications for the DVI Identification Board.
- Ensuring sustainability of overall DVI operations.
- Ensure adequate security is maintained for all DVI processes, sites and phases.
- In consultation with the Coroner or equivalent authority and relevant specialists, determine the autopsy procedures to be followed.

- In consultation with the Coroner or equivalent authority and relevant specialists, determine processes to be employed in the repatriation of human remains.

8.2. DVI Scene Co-ordinator *Return to Contents*

The DVI Scene Co-ordinator should be an experienced and senior DVI specialist who is responsible for the management of activities during the scene phase of the DVI operation. The following factors are considered essential to ensure that the integrity of the disaster site is maintained and that all DVI related activities are managed at a high level.

- Implement the scene phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Clearly establish the grid and numbering system to be applied.
- Implement clear communication channels to facilitate the co-ordination of activities at the disaster site.
- Provide the DVI Commander with accurate and regular updates.
- Ensure adherence to occupational health, safety and welfare requirements.
- Appoint key roles as required, including support roles.
- Maintain a log of all DVI scene activities and communications.
- Ensure that DVI equipment is available.
- Arrange DVI Scene team(s) for the scene.
- Liaise with other emergency services at the site.
- Ongoing assessment and evaluation of the incident.
- Source additional DVI personnel, both local and external through appropriate channels if required.
- Appoint and brief DVI Scene Team Leaders.
- Appoint a Human Remains Holding Area Controller and confirm the location of the Human Remains Holding Area.
- Appoint property teams to manage property.
- Monitor and coordinate DVI Scene teams, including support personnel.
- Liaise with the Human Remains Holding Area Controller and DVI Post-mortem Coordinator regarding the transfer of all remains to the allocated Mortuary.
- Ensure recording techniques, such as video, photography including aerial photography, scale maps and other electronic recording methods are used where appropriate;
- Ensure adequate security of the scene/site.
- Monitor quality assurance of DVI documentation.
- Appoint a DVI Information Technology member (if database is deployed at scene).

8.3. DVI Post-mortem Co-ordinator *Return to Contents*

The DVI Post-Mortem Co-ordinator should be an experienced DVI specialist who is responsible for the management and outcomes of activities during the post-mortem phase of the DVI operation. The following factors are considered essential to ensure that the integrity of post-mortem activities is maintained and that all DVI related activities are managed at a high level.

- In conjunction with the pathologist, implement the post-mortem phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Appoint the DVI Post-mortem Human Remains Team Leader.
- Appoint property teams to manage property.

- Ensure any direction from the Coroner or equivalent authority in relation to the examination of the human remains is implemented.
- Implement clear communication channels to facilitate the co-ordination of activities at the mortuary.
- Ensure adequate staffing for DVI post-mortem procedures.
- Provide the DVI Commander with accurate and regular updates.
- Liaise with key specialists to ensure a process for the conduct of all examinations is developed.
- Monitor quality assurance of DVI documentation.
- Ensure a person is appointed to assist with file management, if required.
- Ensure that completed DVI documentation is promptly delivered to the DVI Reconciliation Centre or Information Management Centre.
- Monitoring the repatriation of human remains in accordance with the direction of the Coroner or equivalent authority.
- Ensure adherence to occupational health, safety and welfare requirements.
- Ensure adequate security measures exist at the mortuary.
- Appoint a DVI Information Technology member (if database is deployed at the mortuary).

8.4. DVI Ante-mortem Co-ordinator *Return to Contents*

The DVI Ante-Mortem Co-ordinator should be an experienced DVI Police Officer who is responsible for the management and outcomes of activities undertaken during the ante-mortem phase of the DVI operation. The following factors are considered essential to ensure that the integrity of ante-mortem activities is maintained and that all DVI related activities are managed at a high level.

- Implement the ante-mortem phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Establish an Ante-mortem Coordination Centre (AMCC);
- Establish interview teams and co-ordinate their activities to complete missing person enquiries.
- Obtain passenger manifests and other information to compile missing person lists.
- Liaise with local and international police services, INTERPOL, consulates, embassies, other law enforcement agencies as well as Government and non-government agencies in relation to the collection of dental/odontological/fingerprint and medical records, and the completion of yellow INTERPOL DVI Ante-mortem Forms.
- Ensure adherence to occupational health, safety and welfare requirements.
- Ensure adequate staffing for DVI ante-mortem phase activities;
- Co-ordinate the gathering of all relevant ante-mortem information;
- Appoint a DVI AMCC Manager;
- Appoint a DVI Ante-mortem Records Team Leader;
- Establish a DVI Ante-mortem Records Section;
- Appoint a DVI Ante-mortem Interview Team Leader;
- Liaise with other DVI Phase Co-ordinators regarding updates from their activities so that the transmission of relevant information can be effectively and efficiently communicated.
- Provide the DVI Commander with accurate and regular updates.
- Establish a system to locate and maintain contact with families and friends of missing persons to complete ante-mortem collection processes.
- Liaise with those responsible for establishing Family Assistance Centres.
- Develop communication channels with relevant incident call centres.
- Ensure all ante-mortem information is collated and analysed prior to being forwarded to the DVI Reconciliation Centre or Information Management Centre.

- Co-ordinate the regular and timely dissemination of information relating to the incident to the next of kin of missing persons.
- Ensure quality assurance of all ante-mortem documentation.
- ensuring adequate security of the AMCC;
- appoint a DVI Information Technology member (if database is deployed during this phase).

8.5. DVI Reconciliation Co-ordinator *Return to Contents*

The DVI Reconciliation Co-ordinator should be an experienced DVI specialist who is responsible for the management and outcomes of activities undertaken during the reconciliation phase of the DVI operation. The following factors are considered essential to ensure that the integrity of reconciliation activities is maintained and that all DVI related activities are managed at a high level.

- Implement the Reconciliation phase of the DVI response in accordance with agreed operational plans and/or jurisdictional arrangements.
- Establish and manage the operations of the DVI Reconciliation Centre;
- Appoint key Team Leaders within the various units of the Reconciliation Centre.
- Establish a section to receive, log, record and file ante-mortem and post-mortem information.
- Prepare formal identification reports for approval by the DVI Commander;
- Convene the DVI Identification Board;
- Ensure adherence to occupational health, safety and welfare requirements.
- Liaise with the DVI Reconciliation Specialist Sections to establish their functions.
- Liaise with the DVI Commander regarding the provision of necessary resources for the phase four functions;
- Ensure regular liaison with the Team Leaders to manage the identification process
- Liaise with the DVI Post-mortem Coordinator and the DVI Ante-mortem Coordinator regarding the management of post-mortem and ante-mortem information;
- Provide the DVI Commander with accurate and regular updates.
- Oversee the preparation of elimination charts, if manual charting is implemented;
- Receive, record and chart the results of the specialist advisers;
- Prepare identification briefs for the Coroner or equivalent authority
- Attend and give evidence at courts, inquests or inquiries as required;
- Ensure file quality assurance;
- Appoint a DVI Information Technology member (if the database is deployed during this phase)
- Ensure adequate security of the Reconciliation Centre.

Annexure 9:

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INTERPOL DVI Recovery Labels and Forms

Source: *INTERPOL DVI Steering Group (Updated 2013/2014)*

Annexure 9: DVI Recovery forms

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This can be downloaded from the INTERPOL website:

http://www.interpol.int/INTERPOL-expertise/Forensics/DVI-Pages/Disaster-victim-recovery-form

Annexure 10:

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DVI Forms > Completion Guide

Source: *INTERPOL DVI Steering Group (Updated 2013/2014)*

Annexure 10: DVI Forms > Completion Guide

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This can be downloaded from the INTERPOL website:

http://www.interpol.int/INTERPOL-expertise/Forensics/DVI-Pages/Forms

Annexure 11:

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INTERPOL > PM and AM forms

Source: *INTERPOL DVI Steering Group (Updated 2013/2014)*

Annexure 11: INTERPOL > PM and AM forms

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This can be downloaded from the INTERPOL website:

http://www.interpol.int/INTERPOL-expertise/Forensics/DVI-Pages/Forms

Annexure 12:

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Methods of Identification

Source: *INTERPOL DVI Guide 2009 (Extract updated in 2014)*

Annexure 12: Methods of Identification

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12.1. Primary Methods of Identification

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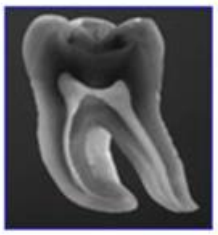
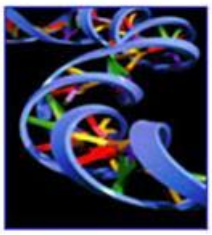
It has been internationally accepted that primary identifiers is the most reliable method by which identification can be confirmed. These identifiers are 'Friction Ridge Analysis', 'Forensic Odontology' and 'DNA'. The following symbols are widely used to depict the individual methods of identification.

Primary Identifiers		
Friction Ridge Analysis	**Forensic Odontology**	**DNA Analysis**
		

12.1.1. Friction Ridge Analysis

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There are three reasons why friction ridge analyses is a reliable indicator of identity:

Friction ridges found on the palmar (palms and fingers) and plantar (soles and toes) surfaces of the human body are unique. Friction ridge formations found on the human body are not repeated on any other person and therefore, this uniqueness enables friction ridges to be used to individualise or exclude persons conclusively.

Friction ridges found on the palmar and plantar surfaces of the human body are persistent from birth unless permanently damaged or from advanced decomposition. Papillary ridges are formed in utero and remain unchanged even beyond death. They grow back in the same pattern following minor injuries, whereas more severe injuries can result in permanent scarring. Such changes can still contribute to an identification or exclusion.

Friction ridge patterns on fingers (fingerprints) can be classified and searched. Because they can be classified, they can be categorised and registered systematically in a database or collection. Subsequently, impressions can be searched and retrieved easily for comparison and identification.

12.1.2. Forensic Odontology

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The unique structures and traits of human teeth and jaws readily lend themselves to use in the identification of living and deceased victims. Dental data can be recovered and recorded at the time of post-mortem examination and compared to ante-mortem data that is supplied by generalist and/or specialist dentists who treated the victim during their lifetime. The teeth are well protected in the oral cavity and are able to withstand many external influences at, near, or after the time of death. Teeth comprise the hardest and most resilient substances in the body, so that when the body's soft tissues deteriorate, the dental characteristics that are so valuable for identification purposes remain accessible. This is especially true of treatments in the teeth, such as restorative and cosmetic fillings and crowns, root canal procedures, implants and fixed and removable prostheses since these are custom-made as unique treatments for each individual. Other anatomical traits can also be compared even when no dental treatments are present, and these also provide useful data for identification purposes.

Conclusions that are available to the DVI odontologists following comparison of post-mortem and ante-mortem dental records include:

- Identification (absolute certainty the PM and AM records are from the same person).
- Identification probable (specific characteristics correspond between PM and AM but either PM or AM data or both are minimal).
- Identification possible (there is nothing that excludes the identity but either PM or AM data or both are minimal).
- Identity excluded (PM and AM records are from different persons).
- Insufficient evidence (neither PM nor AM comparison can be made).

In addition to comparing post-mortem and ante-mortem records to establish identification, odontologists are also able to provide conclusions about certain aspects of a person's life or lifestyle by examining the teeth. These can be valuable when searching ante-mortem databases for potential matches. For example, if the victim is estimated to be a young adult, this might limit the search criteria to certain aspects of the ante-mortem database. Human teeth progress through various stages of development from *in utero* to adult life and these stages of development and tooth 'eruption' can be used to estimate the chronological age of the body at the time of death. Teeth and jaws may contain congenital and/or acquired traits that are useful in determining a person's racial background, dietary and eating habits, and oral hygiene practices. It might be possible, based on the type of dental treatment present, to establish the probable country or region of origin for a given victim. These can then be used to limit or restrict the database to search for possible ante-mortem data for a given body.

12.1.3. DNA Analysis *Return to Contents*

DNA material is a proven source for identification, as a significant portion of the genetic information contained in a cell is unique to a specific individual and thus differs – except in identical twins, from one person to the next.

DNA testing can be performed even on cases involving partial or severely decomposed remains.

DNA matching is the best way to identify body parts.

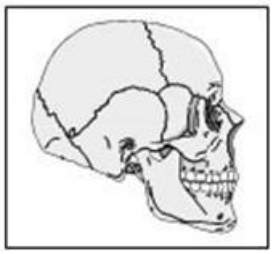
DNA analysis can be automated ensuring maximum quality and rapidity of high volume testing.

DNA matching can be based on profiles from biological relatives, self-samples or belongings and is the only method for primary identification that is independent of direct comparison (eg: fingerprint records, dental records).

DNA analysis requires a sample to be taken from the deceased body or body parts as well as from known reference material/source for comparison. The samples need to be sent to an accredited laboratory and analysed according to international standards and the profiles compared with the known reference samples (acknowledging that these may not be identical if originating in a biological relative).

12.2. Secondary Methods of Identification *Return to Contents*

Secondary identifying features have been regarded as secondary in quality whereas this is a temporal definition. Whilst primary identifiers may each individually, or in combination, provide rapid and reliable identification of the deceased, secondary identifiers tend to be used when primary identifiers have failed to secure a verifiable identification. Secondary identifiers in combination may provide sufficient information to make identification in selected cases, and where access to primary identifiers may be limited or absent they may be the only means whereby the deceased can be identified. It is therefore imperative that AM data collection does not neglect the information to be gained from the secondary identifiers.

Secondary Methods of Identification	
Personal Data/Medical Findings	**Evidence / Clothing**
	

12.2.1. Medical Information *Return to Contents*

The medical information that is to be collected may be categorized in a number of different ways: External vs. internal, congenital vs. acquired and normal variation vs. disease. This information is mainly acquired by medical professionals, but it may also be advisable to engage the services of a forensic anthropologist in the medical AM collection team.

A personal description consists of basic data (age, gender, height, ethnic affiliation) and specific distinguishing features. Medical findings, such as scars, evidence of disease as well as the surgical removal of organs may provide crucial information about a victim's medical history. Common types of surgery that exhibit few individual characteristics (e.g. appendicectomy) should be taken into account in this context. Unique numbers found on heart pacemakers and other prosthetic devices are reliable identifying features. Tattoos, moles and disfiguration may also serve as indicators of identity.

12.2.2. Pathology *Return to Contents*

Using a plan, the external congenital features to be noted are those that deviate significantly from what is common in the general population for it to be noted by the persons providing AM information, most often close relatives. These are numerous, but some of the more common ones should be mentioned. The shape of the head may be noted as well as peculiarities in the eyes. Eye colour is rarely of much use after death but the shape of the pupil may be of value, as may the size and shape of the nose. In the thorax congenital malformations in the skeleton may be visible externally. In the extremities there are common variations such as pronounced bow knees, absence of or supernumerary fingers and toes and the very common adhesions between fingers and in particular toes.

External acquired features may be the result of disease or may be due to cosmetic surgery or modifications. The former are most often sequelae to trauma in the shape of scars and bony deformities, but skin tumours of a certain size may have been noted by relatives or the general practitioner. Ventral or inguinal hernias are another common feature. The latter are represented by two main groups: Piercings and tattoos. Pierced ear lobes are now so common in women that they are of little use unless multiple, and the ear rings may provide a clue. Pierced ear lobes in the male are relatively common, but are still useful. Piercings may be found in nearly all parts of the body, and since they have often been photographed – the owner perhaps being more extrovert – documentation may be available. Tattoos are also extremely common in both sexes and in all social classes. When they are sufficiently distinctive they may provide support for the identity, but the habit of selecting common or popular art may lessen their value. Cosmetic surgery may need expert attention to be detected but will usually have left scars that may be hidden in natural openings or in folds of the skin. The most common ones are breast implants, and they will be found if a proper autopsy is performed and may in some case carry a serial number, which will then provide a safe identification. This is also true for joint replacement hardware.

Internal features may be very useful, but may need a full autopsy and/or a full body x-ray/CT scan to be documented. It is advisable to perform both since they supplement each other. Congenital or acquired changes in the skeleton being the province of the CT-scan while peculiarities in the soft tissues such as intestines will most often need the classical autopsy. In both cases the AM information must be precise and as for the radiology comparison between AM and PM radiographs/CT-scans will be useful and necessary. Here the anthropologist may be very useful. There is insufficient space for an exhaustive list of relevant diseases or congenital malformations, the most common ones useful for identification being those that have required operation. This should show up in the medical files during the AM work, such as appendicectomy, cholecystectomy, hysterectomy and fractures needing operations such as prostheses, nails and screws. Implants may be very useful, and may actually be critical since pacemakers usually have a unique serial number that may be used to identify the decedent.

12.2.3. Anthropology *Return to Contents*

In the AM team the forensic anthropologist will be able to address issues pertaining to body variation that will overlap to a greater extent with the information being retrieved by the medical practitioner. The forensic anthropologist will concentrate on hard tissue modifications although they also have extensive experience with soft tissue alterations and particularly those practitioners who have anatomical training. In addition, the forensic anthropologist will be interested in identifying sites of previous fracture regardless of whether orthopaedic hardware has been inserted. They will concentrate on diseases and trauma to the skeleton in an attempt to identify verifiable incidents that will link medical records or family recollections with the evidence retrieved at post-mortem. Access to AM radiographs of the missing person will also be of value as it may allow comparison, for example of internal bone architecture or indeed comparison of bone spaces e.g. air sinuses.

12.2.4. Articles / Evidence / Clothing *Return to Contents*

This category includes all effects found on the bodies of victims (e.g. jewellery, articles of clothing and personal identification documents).

Engraved items of jewellery may provide important clues to the identity of a victim. It is important to consider, however, that certain items of evidence may not actually belong to a given body (e.g. identity papers may be carried by a different person; items of jewellery or clothing may have been lent to another individual; during retrieval, items may have inadvertently been placed in a single, or wrong, body bag). Items of jewellery have a higher identification value if they are firmly attached to a victim's body (e.g. piercings or "ingrown" wedding rings).

In order to maximise the benefits of these secondary identifiers, investigators should endeavour to access and record details of the relevant items in minute detail. Although many of these property items may be quite common to the public, identifying several items may provide persuasive evidence in cases where they can be used to corroborate other forms of secondary identifiers mentioned above.

Annexure 13:

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INTERPOL Guidance: Numbering in Disaster Victim Identification Operations

Source: *INTERPOL DVI Steering Group (Updated 2013/2014)*

Annexure 13: Numbering in Disaster Victim Identification Operations

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A deceased disaster victim's body or any separate body parts should be allocated a unique number at the scene; this number will stay with the remains and any related personal property that can be clearly attributed to the victim. It will be used on all documentation and samples throughout the disaster victim identification investigation.

A simple numbering system has evolved through various DVI operations and recommendations to the INTERPOL Standing Committee on DVI, as shown below:

Post Mortem	Country Code	Number	Scene Reference
PM	**44**	**0025**	**A**

The example shown above is explained:

Post Mortem

PM – Post Mortem (Latin, meaning after death), this indicates that this number refers to the remains of a deceased disaster victim: the "PM number."

Country Code

44 – The telephone country code is used to indicate the country dealing with this part of the DVI operation; countries have two figure or three figure telephone country codes. Letter codes are not used as a label bearing the name of an individual country on a disaster victim's body, may cause tensions in politically sensitive situations.

In the event of a large operation where DVI teams from other countries are providing humanitarian assistance, this code will simply identify the origin of the team that has recovered the disaster victim's body.

The host country may prefer to issue all PM numbers bearing its own code; this must be clearly communicated to teams from countries providing assistance at the commencement of operations.

A small number of countries share the same country code, Canada and the United States of America share the telephone code "1"

Russia and Kazakhstan share the telephone code "7"

A simple solution is to use 1C for Canada and 1U for the United States of America. The code 7R would be used for Russia and 7K for Kazakhstan.

Number

0025 – The number allocated to the deceased disaster victim. The zeros are added in order to aid searching on computer based spread sheets or DVI matching software, this ensures that lists of numbers are displayed in the correct order. Four digits allows for up to 9,999 victims' bodies or body parts. If the numbers are expected to exceed 10,000 an extra zero should be inserted (00025).

Scene Reference

It is advised to use a scene reference for investigations, particularly where there are multiple disaster scenes being dealt with within the same DVI operation. Letters or a number should be added to indicate from which scene the disaster victim was recovered. This can help to prevent cross contamination of evidence between crime scenes and will greatly assist reconciliation investigators, who can see immediately from the PM number, which scene that a disaster victims remains were recovered from.

Use a letter or a number to identify scenes as A, B, C or 1, 2, 3 etc. as in the example, below where "A" has been recorded to show that this is "Scene A."

Post Mortem	Country Code	Number	Scene Reference
PM	**44**	**0025**	**A**

Previous DVI operations have also used abbreviations to represent a specific location. In the example used below "HS" has been added to indicate that this particular scene is "High Street."

Post Mortem	Country Code	Number	Scene Reference
PM	**44**	**0025**	**HS**

Any additional numbers or codes that are routinely required by countries as part of their own investigative processes should always be added after the PM number. This could be a sector reference, or the number of a sample or item of evidence, for example:
PM44-0025-A-Sector 4
PM44-0025-A-Sample 2
PM44-0025-A-Evidence item 21

DVI Labels
Labels used for a DVI operation should be produced on moisture proof material, or strongly protected with clear plastic. Metal plates have been used on some DVI operations. The label should be securely fastened to the disaster victim's remains. Each body or body part should be issued with a separate unique PM number.
The Online Disaster Victim Recovery Form uses this numbering system. This can be downloaded from the INTERPOL website:
http://www.interpol.int/INTERPOL-expertise/Forensics/DVI-Pages/Disaster-victim-recovery-form
Many countries use hard copy pre-numbered versions of this document in a booklet format.
If two or more body parts at a scene are believed to be linked, a note should be made on each Disaster Victim Recovery Form to clearly cross reference the PM numbers.

Bar Codes
Increasingly, as technology has developed, bar codes are used on labels to track body bags containing the remains of disaster victims, their property and associated hard copy files. The bar code must include the PM number.

Ante Mortem Numbers

The principal of the PM numbering system can also be applied to missing person documentation and Ante Mortem DVI Forms:

Ante Mortem	Country Code	Number
AM	**31**	**0006**

Ante Mortem

AM - Ante Mortem (Latin, meaning before death) is used to indicate that this is the number of a missing person: the "AM number."

Country Code

31 – The telephone country code is used to indicate which country is handling the missing person case and providing Ante Mortem information to assist the investigation.

Number

0006 – A number allocated to the missing person. Again, the zeros are added in order to aid searching on spread sheets or DVI matching software, this ensures that lists of numbers are displayed in the correct order.
Any additional numbers required should be added after the AM number, for example: AM31-0006-Sample 1
Within both AM and PM aspects of the investigation, strict care must be taken to ensure that the same number is not issued more than once.

DVI Software and Computer Based Spread sheets

When entering numbers onto DVI matching software or spread sheets numbers should be written as in the examples below:
AM31-0006
PM44-0025
PM44-0025-HS
Please note that no space is inserted, the dash used does not require use of the shift key on a computer keyboard.
If the numbers of missing persons, victim's bodies or body parts are likely to be in excess of 10,000 an extra zero should be inserted, for example:
AM31-00006
PM44-00025
PM44-00025-A

Quality Assurance

A review process must be established to ensure compliance and accuracy.
Throughout the DVI operation, great care must be taken in to ensure that the same AM or PM number is not issued more than once.
Care must also be taken when interpreting handwritten numbers and transferring them to other documents or spread sheets, for example: a handwritten number"1" being mistakenly interpreted as a number"7."
Avoid photocopying pink PM DVI forms or yellow AM DVI forms onto white paper.

Annexure 14:

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INTERPOL Quality Management Guidelines

Source: *INTERPOL DVI Steering Group (Updated 2013/2014)*

Annexure 14: INTERPOL Quality Management Guidelines *Return to Contents*

This can be downloaded from the INTERPOL website:
http://www.interpol.int/INTERPOL-expertise/Forensics/DVI-Pages/DVI-guide

Annexure 15:

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Guidance and Information for Families

Source: *INTERPOL DVI Steering Group (2013/2014)*

Annexure 15: Guidance and Information for Families

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You have reported a member of your family or a friend missing and fear they may be among the victims of a disaster. This is clearly a distressing time for you and can sometimes be a long and frustrating process. The following information describes this process and will give answers to some of your most urgent questions.

The Disaster Victim Identification Process

Specialists from the Disaster Victim Identification Team of your local Police are responsible for identifying victims of disasters. Those disasters can be man-made like aviation and transportation accidents, terrorist attacks, or natural disasters like floods and fires. The DVI Team is also deployed abroad. It consists of investigators from the police, medical specialists and counsellors. They will give families certainty about the fate of a missing person.

Identification of the human remains takes place according to internationally recognised procedures standardised by INTERPOL. It is a meticulous process to guarantee the correct identification of each deceased person in an incident where there are multiple fatalities. Depending on the incident it may take days or even weeks to fully recover the deceased from a mass fatality site.

The forensic evidence that leads to establishing the identity of the deceased is on the one hand collected during a post mortem examination of all human remains. The most important evidence comes from dental examination, finger prints and DNA profiling. Additional evidence is provided by other indications such as tattoos, scars, further body description and jewellery or clothing. Detailed information will be gathered and documented. All methods will be used to ensure appropriate identification. This information is referred to as “Post Mortem Data.”

However, your support is needed. An identification of the deceased can only be achieved with information regarding the missing person. This information is referred to as “Ante Mortem Data.”

In order to achieve this we kindly ask for your assistance:

Please contact a police station near you as soon as possible and file a report on the missing person from your family. The missing persons report is important to establish the identity of the deceased and the injured as well. Based on experience, the number of persons thought missing fluctuates heavily in the first few days following a disaster. We therefore also ask you to notify a police station near you immediately if the person you reported missing has contacted you in the meantime.

You will be asked to provide very detailed information about your family member during an interview. The police will require your assistance in order for them to fill out a standard forms set that which covers all necessary issues. Police officers will ask for entrance to the living quarters of the missing person. They need finger prints, medical and dental records as well as photographs that show for example: tattoos, scars and jewellery. They also need to collect items used by the missing person that may produce scientific evidence (DNA specimen) to assist in identification. You can assist the police by listing the names and addresses of the missing person’s doctors and dentists. This is an extremely detailed process which will require a lot of time and patience. Some questions may seem irrelevant, but we have learnt that any detail can be the clue to a successful identification.

The identification process depends on the quality and quantity of the Ante Mortem data.

A team of specialists then compares the information from the post mortem examination with the data from the missing persons to determine the identification. All efforts will be made to identify the deceased as soon as possible and release them to their families.

Frequently asked questions

Q. Where do I go for help?

A. Depending on the incident a contact officer or family liaison officer may be appointed to assist you with questions. They should be able to advise you regarding counselling or other support services available. Please contact the support services by telephone or e-mail to obtain help and information.

Q. Should I travel to the place of disaster?

A. We understand families wanting to visit scenes of the incident as part of the grieving process and access to the site is possible after the investigation process has concluded. This can take several days or in some cases considerably longer. You are an important part of the identification process by staying at home during this time. Please make sure that someone will be able to assist the Police with Ante Mortem data collection and contact a police station near you before leaving home. Please don't travel on your own initiative to the place of disaster. Family assistance centres may be able to facilitate you.

Q. Is it possible to visually identify a deceased person by photographs or with the help of a close relative?

A. Visual identification alone is not considered appropriate as a form of identification. Scientific testing must be carried out ensuring that each deceased victim is identified prior to being released to their families.

Q. How long does the identification process take?

A. Unfortunately, the search for and identification of victims of a disaster are often very time-consuming. We are aware that great patience and understanding is demanded of you and that you are in an extremely difficult position.

Q. How are the bodies handled during the identification process?

A. Each deceased person is afforded the appropriate respect and attention. Certain investigational procedures must be followed. However, wherever possible investigators will endeavour to respect the cultural and religious practices of victims during the investigation

Q. What happens after a body has been identified by the DVI Team?

A. As soon as the identity of the missing person is established, a person to be named by you will be contacted by the police. Arrangements will be made to return the body of the missing person home to a designated place. Please take care to ensure that other family members are then informed.

Q. Can I view the body/human remains?

A. Generally this is allowed and encouraged to occur as long as the body is recognizable. It is advised to do this only after consultation of support services, such as family assistance centres, family liaison officers or counsellors.

Q. What happens if a missing person cannot be identified?

A. Even if the majority of the disaster victims are already identified, all efforts will be carried out to find and identify all missing persons. This can last weeks, months or in some cases considerably longer. Legal procedures will declare a missing person as dead, if years of searching have not shown any results.

Q. What happens to the personal belongings of the victims found at the site of the incident?

A. Personal belongings will be secured and stored until the ownership is established. It is the aim of the DVI Team to return all personal belongings to the appropriate family. If a criminal investigation is under way, the belongings may be stored until the investigation is concluded.

Q. Do I need to collect the body personally?

A. You will receive assistance in returning the body of the deceased. If the incident took place abroad, you will be supported with the repatriation procedure.

Annexure 16:

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Guidelines for Dead Body Management and Victim Identification in CBRN Disasters

Source: *Guidelines for dead bodies management and identification in case of CBRN disaster. G. Ponsell, C. Fillon, and Y. Schuliar.*

[TRANSLATION OF ORIGINAL FRENCH ARTICLE]

Annexure 16: Guidelines for Dead Body Management and Victim Identification in CBRN Disasters

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Summary – *To respond to a CBRN disaster, such as an industrial accident or a terrorist attack, our country has specific plans to provide timely responses in terms of organization of rescue operations and care of the wounded. These plans are designed to optimize the protection of human life and address only briefly the management of dead bodies. But dead body management and victim identification are a necessary task. Indeed, victim identification is a legal obligation and a moral necessity. Victim identification in the wake of conventional disasters is a known and effective process, but what would happen in the event of a CBRN disaster? The handling of contaminated bodies poses a considerable risk not only to responders, but also and more broadly to the public and surrounding environment. In this article, we look at the dangers associated with contaminated bodies, and propose pre-identification decontamination procedures specific to each CBRN risk. We explain a victim identification exercise in a CBRN environment conducted by the Criminal Research Institute (Gendarmerie nationale). And lastly, we describe operational resources available to us today in the identification of CBRN victims.*

Introduction

Natural and man-made disasters are inevitable occurrences that have become part of the life experience of mankind. Natural disasters (earthquakes, tsunamis) are acts of God and therefore beyond our control. But we now live in a modern world where potential man-made disasters abound, whether it be due to increased air and air passenger traffic, ever-expanding industrial development and its inherent manufacture/use/transportation of hazardous materials or the threat of terrorism.

Terrorism has become an ever-present threat. In the wake of September 11, 2011, western society knows there are no limits to how far terrorists will go in the pursuit of their ideals. Special national plans (Secretariat General for National Defence and Security) have been developed in order to ensure the best possible response to all types of attacks, including those of a chemical, biological, radiological and nuclear nature (CBRN). These plans address all categories of CBRN incidents, whether they be the result of terrorist activity or accidental.

These plans, aimed at preserving human life, address only briefly the management of cadavers, and make no mention of victim identification.

Large-scale disasters of this nature, in addition to the obvious consequences, often result in mass casualties. In some cases, the degradation of corpses makes it impossible to visually identify victims with any certainty.

In today's world, victim identification is a moral necessity and a legal obligation. The legal response to the loss of a loved one will vary, based on whether the victim is a missing person or deceased. Families can begin to grieve only once death has been confirmed, and it helps if they have a body to lay to rest.

To manage dead bodies, you have to handle dead bodies. In a CBRN disaster, corpses are contaminated/infected by hazardous and often deadly agents.

The issue then becomes how to simultaneously identify victims, ensure the safety of responders and protect the public, not to mention conduct a investigation by identifying terrorists.

To begin, we will review the general principles of victim identification. We will then explain the dangers associated with the effects of CBRN agents in the management of dead bodies and propose appropriate decontamination procedures.

We will look at how France organizes victim identification operations, as well as specific CBRN resources available to us here. We will present a victim identification exercise conducted by Gendarmerie nationale members wearing CBRN protective gear. And lastly, we will look ahead to the future, with the development of imaging techniques and virtual autopsies.

Victim identification [10, 6]

Identification is based on the comparison of and search for similarities and/or incompatibilities between post-mortem (PM) and ante-mortem (AM) data.

The process is threefold: compile an AM file, compile a PM file, then compare the data.

The AM file contains information provided by the relatives/loved ones of a missing person. In meetings with the latter, authorities are able to gather information on physical traits/clothing/medical conditions, collect familial DNA samples and obtain contact information for health practitioners. These health professionals (physicians, surgeons, dentists, etc.) will be able to provide medical/dental records containing vital AM reference data.

The PM file is established based on anatomical data retrieved from the body and samples taken from the victim.

Disasters are typically categorized as either open or closed. An open disaster is a major catastrophic event resulting in the deaths of a number of unknown individuals for whom no prior records or descriptive data are available. It is difficult to obtain information about the actual number of victims following such events. The list of victims is established as the investigation progresses, based on persons reported missing by family members and loved ones.

A closed disaster is a major catastrophic event resulting in the deaths of a number of individuals belonging to a fixed, identifiable group (e.g. plane crash with passenger list). As a rule, comparative AM data can be obtained more quickly in the case of closed disasters.

Combinations of these two forms are also conceivable, for example when a plane crash occurs in a residential area.

There are different ways to establish a victim's identity, which can be used on their own or in combination.

Visual identification

Loved ones are sometimes able to identify corpses immediately after a disaster. Later, photographs of bodies can be shown to relatives/loved ones for identification purposes. With no scientific basis, this option is unreliable given the major psychological trauma of those attempting to make the identification. Visual identification can be helpful, but is insufficient on its own for the positive identification of victims and should therefore be avoided.

Personal effects

The analysis of personal effects can help investigators establish the possible identity of victims. For instance, a piece of jewellery, article of clothing or piece of identification can make it possible to quickly establish a presumed identity. Subsequent scientific evidence in support of said identity is required.

External exam

The forensic pathologist documents all physical features of the body (sex, age, height, build, skin/eye/hair colour, etc.), as well as special markings (scars, tattoos, moles, etc.).

Fingerprints

The epidermis and dermis are fairly resistant to PM degradation. Forensic experts are able to use special skin restoration techniques, even in the case of advanced decomposition. Obviously, there are limits to what can be done with severely decayed/burnt human remains.

Fingerprints are reliable indicators of identity. Because they can be classified, fingerprints can be identified and registered systematically and thus, subsequently, retrieved easily for purposes of comparison. In the event of mass casualties (9/11 attacks, December 2004 tsunami), AM and PM fingerprints are cross-checked using an automated system.

Palm prints and footprints can also be used in victim identification.

Internal exam

Ideally, a full autopsy is performed in an effort to identify the victim and determine the cause/circumstances of death. The forensic pathologist looks for surgical scars, prosthetic elements and possible medical conditions.

In female victims, the forensic pathologist checks for pregnancy, contraceptive devices or evidence of a hysterectomy.

Scars are dissected in search of medical devices (orthopedic, cardiac, digestive, esthetic, etc.).

Odontology

The unique structures and traits of human teeth and jaws readily lend themselves to victim identification. And teeth are virtually indestructible over time.

In the event of a violent death (plane crash, explosion), bodies are subjected to considerable energies and fire. The teeth are well protected in the oral cavity and are able to withstand many external influences at, near or after the time of death. Teeth are the hardest and most resilient substances in the body, so as the body's soft tissues deteriorate, the dental characteristics that are so valuable for identification purposes remain accessible. This is especially true of treatments in the teeth, such as fillings and crowns. Even when crowns are destroyed, the maxillary bone protects the roots, which can provide important information.

A person's mouth and teeth can be a key source of information (anatomy, physiology, pathology, therapeutics). This data can then be compared to AM data contained in records provided by a victim's dentist.

DNA

This technique is currently used as a complement to those listed above. DNA comparison is ideal in theory, but remains a complex task. It is easy to obtain samples from relatives, but collecting PM samples depends on the condition of the body (decomposition, carbonization). And infectious samples taken from bodies contaminated by biological agents must be processed in complete safety by P3 laboratories. Samples cannot be processed locally Ð they must be sent to specialized labs, in accordance with strict transport procedures. Turnaround times are long, and the cost of analyses is high.

DNA analysis is the only way to match all body parts belonging to a given cadaver.

It goes without saying that fingerprints, dental records, DNA analysis and medical data are of great use in positive victim identification, but of potentially equal importance is other information provided by anatomical features, tattoos, etc. Depending on the nature of the disaster, the condition of the body and available AM data, forensic experts will use the techniques best suited to the given situation.

Chemical, biological, radiological and nuclear risks [3]

The problem with the above-noted procedures is that CBRN corpses are contaminated by agents that pose a risk not only to responders, but also and more broadly to the public and surrounding environment.

RN risk

A nuclear disaster would cause mass casualties and completely destabilize management operations.

Most victims would be killed by the explosion itself (blast, heat). Some would be irradiated, not contaminated, and others would be irradiated and contaminated by radioactive materials (dust or aerosol).

Today, this type of incident with a nuclear explosion is considered unlikely. A more probable threat would be an attack involving an explosion with the dispersion of radioactive materials (dirty bomb).

In such a scenario, people would be killed immediately by the aftermath of the explosion, their bodies covered with radioactive materials in the form of both dust and shrapnel.

Responders who handle human remains that are potentially radiologically contaminated are exposed to irradiation and contaminant transfer.

B risk

Bioterrorism agents are categorized as follows by Atlanta's Centers for Disease Control (CDC). [2]

Category A
- Anthrax (bacillus anthracis)
- Botulism (Clostridium botulinum toxin)
- Plague (Yersinia pestis)
- Smallpox (variola major)
- Tularemia (Francisela tularensis)
- Viral hemorrhagic fevers (filoviruses – e.g. Ebola, Marburg – and arenaviruses, e.g. Lassa, Machupo)

These agents pose the highest risk to national security because
> they can be easily disseminated or transmitted from person to person;
> they result in high mortality rates and have the potential for major public health impact; > they might cause public panic and social disruption; and
> there are few or no treatments.

Category B
- Brucellosis (Brucella species)
- Epsilon toxin of Clostridium perfringens
- Food safety threats (e.g. Salmonella species, Escherichia coli 0157:H7, Shigella)
- Glanders (Burkholderia mallei)
- Melioidosis (Burkholderia pseudomallei)
- Psittacosis (Chlamydia psittaci)
- Q fever (Coxiella burnetii)

- Ricin toxin from Ricinus communis (castor beans)
- Staphylococcal enterotoxin B
- Typhus fever (Rickettsia prowazekii)
- Viral encephalitis (alphavirueses – e.g. Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis)
- Water safety threats (e.g. Vibrio cholerae, Cryptosporidium parvum)

These agents pose the second-highest risk because
> they are moderately easy to disseminate;
> they result in moderate morbidity rates and low mortality rates; and
> there are possible treatments.

Category C
. Emerging infectious diseases such as Nipah virus and hantaviru

These emerging pathogens could be engineered for mass dissemination in the future because due to
> availability;
> ease of production and dissemination; and
> potential for high morbidity and mortality rates and major health impact.

There are two levels of risk with respect to deceased body management. The highest risk involves handling human remains contaminated and infected with highly contagious agents (smallpox, HVF, plague). These agents can be easily disseminated among the population well beyond the primary contacts.

The second, lower risk involves handling bodies contaminated or infected with non contagious (anthrax, tularemia) or non-toxic (ricin, saxitoxin, botulinum toxin) agents. It is vital that responders eliminate the risk of contaminant transfer (e.g. agent in powder form) and protect themselves against the risk of accidental blood exposure (ABE).

In addition to external contamination, the primary concern with B risks is internal contamination or infection of the body by bacteria/viruses.

The management of bodies contaminated (externally) solely with a B agent is unlikely (explosion of P3 or P4 lab, etc.).

In most cases, the risk is therefore infection of an organism by a B agent.

C risk

People can be exposed to many different toxic chemicals, either accidentally (industrial accident) or intentionally (terrorist act).

For the purposes of deceased body management, only chemicals that are persistent in the environment (vesicants, nerve agents) pose a risk to responders.

After a few hours, gases (phosgene, hydrogen cyanide) are no longer present on a dead body. So other than proper ventilation, no specific precautions are necessary.

Below are the primary hazardous chemicals which pose a risk in the handling of dead bodies.
- Blistering agents/Vesicants (mustards and lewisites)
    - persistent in the environment for a long time
    - irritate the respiratory tract (vapour)

    - irritate the skin (liquid and vapour)

- Nerve agents (sarin, soman, tabun, VX)
    - persistent in the environment
    - irritate the respiratory tract (vapour)
    - irritate the skin (liquid)
    - ranked from the most volatile to the most persistent
        - sarin
        - soman to thickened soman
        - tabun
        - VX

- Choking agents (phosgene and diphosgene)
    - non-persistent gaseous agents
    - no risk to responders handling bodies after proper ventilation of the fatality zone

- Blood agents (arsine, hydrogen cyanide, cyanogen chloride)
    - volatile, non-persistent agents
    - no risk to responders handling bodies after proper ventilation of the fatality zone

- Incapacitating agents Đ non lethal (LSD, BZ)
    - powders
    - easily eliminated through decontamination

- Riot control agents Đ non lethal (tear gas, sternutators, skin irritants)
    - powders
    - easily eliminated through decontamination

Managing bodies exposed to chemical, biological, radiological or nuclear agents [8, 5, 16]

The first step is to evacuate survivors/injured from the disaster site. Cadaver management will then require that bodies be handled and moved.

- Recovery of bodies
- Body collection site
- Forensic examination (causes/circumstances of death, identification, collection of evidence/samples from bodies)

These procedures will expose responders to hazardous agents, which may be disseminated into the population and environment when the bodies are moved.

Where possible, and in an effort to minimize global risk, it is preferable that deceased bodies be decontaminated before they are handled/moved.

Decontamination is effective in the following situations:
- external contamination of a dead body by an agent, for example death due to injuries (explosion, accident) with exposure to a CBRN agent
- example: dirty bomb, fire shell, explosion in a P4 laboratory
- death due to irradiation and contamination (RN)
- death due to exposure to a persistent chemical agent

Decontamination is of little use in the case of death following infection with a B agent.
This could occur, for instance, in the days following the dissemination of a B agent, upon the discovery of dead bodies infected with the agent in question. It would be impossible to rid the organism of the B agent, and therefore dangerous to handle the body.

Decontamination would be ineffective, regardless of the mode of contamination, in the case of injured and fragmented bodies, as contaminants could be deeply embedded in the wounds.

But decontamination is still recommended, since in all instances it reduces overall risk. There are three options for the management of deceased bodies that have been exposed to a CBRN agent.

Interment or cremation – Bodies not handled

Public health authorities may opt for interment/cremation in the wake of a very large-scale disaster, when there are simply too many dead bodies to manage (e.g. nuclear explosion or uncontrollable dissemination of a severe epidemic like smallpox among the population).

In such instances, victim identification must take a back seat to protecting the health of the public.

Identification of bodies without prior decontamination

In this scenario, bodies are handled and forensic operations are carried out with no prior decontamination.

This procedure requires that bodies be moved only as far as is necessary from the disaster site to minimize the risk of further dissemination of the agent.

In theory, this means processing bodies in the immediate vicinity of the disaster site and setting up an autopsy line, which in some cases may be located close to an urban centre.

This option poses major risks to responders. This procedure is addressed in the exercise described in Chapter 5.

Decontamination of bodies prior to forensic operations

This option can significantly reduce risks for responders, as well as the public and environment.

How exactly things are done will depend on the scope of the disaster and, more importantly, the nature/dangerousness of the agent. Consideration must also be given to the risk-benefit balance for the general population.

Recovery of bodies

Dead body management begins after survivors and the injured have been evacuated. There is no rush, and it is even recommended that responders take their time (a few hours) in order to properly identify the CBRN agent(s) involved.

Determining the agent involved can sometimes be a long and difficult task. RN agents are easy to detect, but C agents require a series of different tests. And it can take several days to pinpoint B agents, as there are no rapid identification tests.

Authorities must also consider the possibility that agents from different categories were released in combination.

So initial body management must be done in a methodical and formal fashion, based on the assumption that one or several of the most dangerous agents are involved.

The only sure determination first responders can make is whether or not radioactive material is present at the disaster site. The presence of C agents can quickly be detected using tests at the disposal of responders.

First responders will divide the disaster area into three zones: the exclusion zone, the controlled zone, where body collection/decontamination operations are conducted (body collection site) and the support zone, considered as risk-free. [10]

Exclusion zone (disaster site) [1]

Respiratory protection (Fig. 1)

- self-contained breathing apparatus, SCBA (personal breathing apparatus with filtered, compressed air)
- filter mask with multi-purpose cartridge

Gear [9]

- decontaminable gear such as lightweight decontamination suit, with or without shoulder reinforcements for SCBA, with glove inserts, butyl gloves, butyl boots or overboots
- non-decontaminable filtering suit (T3P, S3P or TOM)

Both of these suits offer the same level of protection, but the advantage of filtering suits is they can be worn for long periods of time in extreme temperatures.

Specific material (if necessary)

- Geiger counter or similar device to detect beta particles/gamma rays, use of dosimetry if there is a radiological risk
- C agent detectors

In the event of radioactivity, the following is required:

- initial distribution map for radiation doses in given locations
- operational dosimeters for all personnel working in the exclusion zone, body collection site and decontamination zone
- system to record cumulative doses
- training to ensure minimal knowledge of radiation protection (dangers associated with doses)
- checkpoint personnel to control access to zones, keep records of individuals who enter zones, ensure dosimeter use and provide/reiterate security instructions

Depending on the radionuclide in question, there may be a delay before dead body management operations can get underway. For instance, radionuclides produced by a nuclear explosion are short-lived so responders can wait out the radiation period, but radionuclides used in a dirty bomb have a much longer life (a few years), in which case there would be no point in waiting to begin body management.

Figure 1 – The different zones [1]

If wind < 1 m/s If wind > 1 m/s
CONTROLLED ZONE
BODY COLLECTION SITE
SUPPORT ZONE DOWNWIND DANGER ZONE
EXCLUSION ZONE IMMEDIATE DANGER ZONE

The recovery of bodies can involve the following procedures:

- videotape/record the scene
- photograph the bodies and nearby evidence
- map out the scene and record the position of evidence (GPS)
- number/label the bodies and nearby evidence using waterproof, chemical-resistant materials
- collect/label scattered elements likely to be of interest in the investigation
- collect/store non-human evidence in chemical-resistant containers that are impervious to volatile products

- place bodies in body bags, which are to be left open
- ventilate the area

Move the bodies from the exclusion zone to the body collection site.

In the exclusion zone, information must be collected in a paperless fashion, with no inter-human contact between responders from the different zones.

In practice, a laptop and digital camera are to be kept in the exclusion zone to record all relevant data.

Said data are then passed on from the exclusion zone using a USB key or, ideally, via a wireless connection.

Body collection site

The body collection site is located between the exclusion zone and the controlled zone.

Exclusion zone gear must be worn at the body collection site.

This is where bodies/human remains are temporarily stored prior to decontamination.

Body collection sites must meet the following criteria:
- upwind from the exclusion zone
- out of public view
- refrigerated, if possible, especially if decontamination is not immediate
- covered and protected against animals/insects

Bodies are left out in the open, body bags are left open, and the area is well ventilated.

Decontamination of bodies

The purpose of decontamination is to eliminate, neutralize or break down harmful agents (Fig. 2). For B and C agents, it involves washing and impregnating bodies with sodium hypochlorite, which destroys B agents and facilitates the breakdown of C agents. The concentration of active chlorine should be between 1% and 2% to optimize decontamination, while limiting toxicity for responders.

Radiological agents cannot be destroyed, only moved; sodium hypochlorite is not necessary for this risk.

Figure 2 – Organization of body management operations

Exclusion zone

BODY COLLECTION SITE
Undress
Rinse

Controlled zone

Wash – Soap
Rinse
Sodium hydrochlorite
Rinse
Bag
Storage

Support zone

Morgue
Personal effects

Decontamination operations are organized in assembly line format.

Bodies should make their way through the decontamination line with minimal manual handling and as quickly as possible. The system must allow for the exposure of all body parts.

A gurney with large mesh could be set up on a rail system to rinse and saturate bodies with sodium hypochlorite, eliminating the need to handle bodies.

Responders at the start of the decontamination line must wear the same protective gear as required in the exclusion zone. Those located at the end of the decontamination line are not required to be as fully protected.

The decontamination line is set up in the controlled zone, also upwind from the exclusion zone.

Ideal conditions include:
- availability of running water
- protection of ground against leakage
- slanted surface to facilitate runoff and cleaning
- drainage and wastewater recovery system
- electricity

Organization of decontamination line

Stations can be set up along the decontamination line for the following tasks: [6]
- receive body and check number assigned to body
- photograph the clothed body/details of clothing
- remove all clothing from the body, paying close attention to the undressing phase Ð clothing carry most of the body's external contamination Ð the safest and easiest method is to cut the clothes off the body and leave them in the body bag
- place the body bag/clothing in a leakproof, numbered container
- photograph identification papers/telephones/jewellery not firmly affixed to the body and place them in leakproof, numbered containers
- leave jewellery firmly affixed to the body (earrings, piercings) intact
- decontaminate the body/human remains
  > absorb toxic liquid/solid (C risk)
  > cut hair if there is obvious contamination (C risk essentially)
  > rinse the body
  > wash with soap and water, focussing on the head (mouth, ears, eyes, hair), using a soft brush or sponge
  > rinse
  > spray thoroughly with a 1%-2% sodium hypochlorite solution and let it act for five minutes (minimum) to 15 minutes (ideal)
  > rinse

Spraying alone does not guarantee proper decontamination, especially if elements are soiled with greasy, organic or proteinic materials, such as blood clots. Mechanical cleaning (in which the body is scrubbed with a soapy solution) is imperative before the sodium hypochlorite solution can be sprayed on the body.

Alternatively, the body can be immersed in a sodium hydrochlorite bath. A special container is required, enabling responders to:
- handle the body (lift/lower body into bath)
- renew the decontaminating solution and control the concentration thereof

At the end of the decontamination line, responders can wear less protective gear and must complete the two following tasks.
> Place the body in two leakproof body bags (double bagged) and disinfect the outside of the bag. Special CBRN body bags are available on the market, for instance those manufactured by UK-based company Remploy Frontline.
> Store the bodies in a refrigerated container.

Management of personal effects

Personal effects (clothing, identification documents, jewellery, watches, telephones, etc.) are removed from bodies at the start of the decontamination line (undressing phase).

Personal effects are placed in leakproof containers, which undergo external decontamination prior to leaving the controlled zone.

Specialized firms process personal effects in a secure environment.

Only personal effects of value (e.g. jewellery) and forensically relevant elements are decontaminated.

Depending on the risk, most personal effects will have to be destroyed.

Forensic examination – Morgue

At this point, the agent in question has been clearly identified. The risk is therefore known, and bodies have been decontaminated as best they can.

RN risk

The decontamination process eliminates the external contamination of a body by radioactive dust.

Residual radioactivity (internal) is known because it was detected upon leaving the decontamination line. It will be clearly indicated on the bag.

All that persists is radioactivity resulting from the ingestion/inhalation of radionuclides, a priori, in very small quantities, but mostly radioactivity resulting from the presence of radioactive residue in wounds (shrapnel).

Internal contamination resulting from the ingestion/inhalation of radioactive material should deliver low enough dose rates so as not to endanger responders working in proximity of the body. But radioactive shrapnel must be removed with forceps, where possible.

Responders must wear protective gear 5 or 6 with an FFP2 respirator mask. Shielding can be added, if necessary.

When a dose rate persists, external and dental examinations must be done quickly. Internal examination is to be avoided. The collection of samples for DNA analysis must be controlled.

B risk

The biggest risk is accidental blood exposure (ABE). The use of sharp/pointy items is to be kept to a minimum.

Responders must wear protective gear 5 or 6 with an FFP2 respirator mask.

Internal examination is to be avoided given the risk of injury to responders. When anthrax is involved, cutting open the body will foster sporulation and the dissemination of spores.

The mandible should not be removed during the dental exam (risk of injury).

Muscle samples for DNA analysis must be collected quickly and safely with a special trocar instrument. The collection of bone samples is to be avoided, as the risk of injury is high.

DNA analysis must be conducted in a P3 lab; P4 labs are not able to perform such large scale analyses.

C risk

The AP2C chemical contamination control device can detect low concentrations in air of sulfur compounds like mustard gas.

Rigorous control at the start of the autopsy line, and when handling bodies with deep wounds, should make it possible to detect potential vapours.

The room must be fully ventilated and kept at a cool temperature to limit the vaporization of toxins.

Responders must wear protective gear 5 with an FFP2 respirator mask. A standard protective device (ANP filtering gas mask) or self-contained breathing apparatus (SCBA, personal breathing apparatus with filtered, compressed air) must be worn when there is a risk of persistent vapours.

The use of butyl gloves is recommended.

The duration of examinations must be kept to a minimum.

In the case CBRN contamination, even the most thorough decontamination is not enough to completely eliminate the risk. With respect to the handling of bodies and victim identification, every effort must be made to minimize the exposure of responders and the risk of injury. This is done by simplifying identification procedures. For example, with respect to dental examinations, removal of the maxilla and use of a probe could be replaced by a series of retro-alveolar radiographs and occlusal/lateral photographs. The odontogram can then be filled out at a later date in a safe environment.

Conventional reexamination procedures, whether to double check a finding or look for additional elements, must be kept to a minimum.

Funeral arrangements

In general, every effort must be made to minimize risks regarding the transfer of residual contamination.

Upon the completion of identification procedures, bodies will remain double bagged in the refrigerated storage zone.

Corpses will not be cleaned or preserved.

Families will be unable to view the bodies of their loved ones.

RN risk

Experts advise against incineration given the risk of dissemination of radioactive particles into the air.

The body will be placed in an airtight coffin, which will be marked with a trefoil to warn of potential radioactivity.

In the unlikely event that a body remains highly contaminated, burial in the controlled zone will have to be considered, following the same procedure as used for waste management in the nuclear industry.

B risk

When dealing with contagious B agents or agents that are highly persistent in the environment (anthrax) and pose a threat to health security, incineration is the recommended course of action.

When incineration is not an option, bodies will be buried in airtight caskets equipped with a gas purification system.

C risk

Experts disagree on how to proceed with C agents. Cremation destroys residual C agents, but poses an air-pollution risk. Incinerators equipped with special filters must be used.

Burial in airtight coffins is also an option.

Organization of disaster victim identification in France [6, 14]

Conventional disaster

In France, the Gendarmerie nationale and Police nationale each have a disaster victim identification unit. In practice, these two units pool their human/physical resources to ensure the best possible management of victim identification operations.

If a disaster occurs within the national territory, these units share body recovery and AM data collection duties. They may provide assistance to the forensic institute responsible for examining the bodies. If a disaster occurs outside the national territory and if local forensic resources are insufficient, medical examiners from the Gendarmerie nationale Disaster Victim Identification Unit are available to examine bodies.

The Police nationale Disaster Victim Identification Unit (UPIVC) belongs to the Central Forensic Identification Service (SCIJ). Members of this unit are skilled in crime scene management and disaster victim identification. This unit can work within the general organization of identification operations, in support to the AM team and has fingerprint/photograph specialists.

The Gendarmerie nationale Disaster Victim Identification Unit (UGIVC) is part of the Gendarmerie nationale Criminal Research Institute (IRCGN). This unit is able to manage the overall identification process. In fact, it is the only entity with a forensic component to work in partnership with the health service of armies (regular and reserve medical examiners/dental surgeons).

The UGIVC is deployable on a 24/7 basis and uses special equipment that is immediately transportable. For dental exams, the UGIVC has portable x-ray machines and a digital sensor system (no film) so photos can be archived directly onto a computer.

Together, the UPIVC and UGIVC form the National Disaster Victim Identification Unit (UNIVC). The UNIVC applies identification guidelines recommended by Interpol. This international law

enforcement agency has in fact proposed very specific methodology for disaster victim identification, providing a recognized basis for cooperation by international teams.

PM identification teams have to be created, trained and deployable immediately. Identification procedures get underway as soon as the disaster zone has been secured and the injured have been evacuated. A numbered reference grid is prepared for the zone; all recovered evidence is placed in bags, which are numbered in accordance with the grid.

Bodies and physical items (jewellery, personal effects) are numbered.

In the autopsy room, bodies are photographed, x-rayed and autopsied. Identification procedures via fingerprints, dental exams and DNA are carried out. All information is placed in the numbered PM file corresponding to the body being examined.

The organization/methodology of PM victim identification management procedures are clearly defined, but AM management of a disaster is much more complicated. In the absence of AM data, it is impossible to identify bodies. The collection of AM data is clearly a vital task, performed by staff trained to meet with families and contact practitioners. Physicians and dental surgeons are therefore required for this work.

Recent disasters (tsunami, Concorde crash) and the likelihood of terrorist attacks in large western cities highlight the international origin of victims. The AM team must be able to collect and translate data obtained in the homelands of victims.

AM data include photographs, verbal descriptions, medical/dental records, fingerprints and familial DNA.

AM data are analyzed and input on Interpol AM forms.

AM and PM data are compared in an effort to identify victims. Said comparison can be done manually for a small number of victims, or using an automated data comparison system in the event of mass fatalities (e.g. Plass Data DVI software).

Following the comparison of AM and PM data, positive identification is announced by a commission composed of those in charge of the AM and PM teams.

Chemical, biological, radiological or nuclear disaster [15]

In a CBRN environment, a team like the UNIVC requires support and assistance to ensure its security by teams specialized in CBRN risk management.

In the wake of the 1995 sarin gas attack on the Tokyo subway [13], the Gendarmerie nationale developed a CBRN action plan to ensure the continuity of its missions in the event of any such attack.

National CBRN unit (C2NRBC)

France's only specialized CBRN unit, the C2NRBC of the Gendarmerie nationale, is tasked with helping Gendarmerie teams carry out their missions in contaminated areas.

Its 17 members are first and foremost CBRN experts.

Taking into account the entire range of the CBRN threat, the C2NRBC performs several duties:

- it provides technical/operational advice to the Gendarmerie operations commander in a zone where a CBRN risk/threat action plan has been implemented;
- it guides all investigators required to work in a contaminated environment;
- it trains Gendarmerie personnel;
- it shares its expertise with the Gendarmerie response team;
- in cooperation with other civilian and military agencies specializing in CBRN crises, it participates in meetings, discussions and national/international exercises; and
- it uses a special vehicle (Biotox-Piratox) to enter areas contaminated by biological and/or chemical agents in order to collect samples, analyze them in situ and transport them to a registered lab while ensuring the preservation thereof and compliance with judicial procedures.

The national CBRN unit is stationed at the Gendarmerie's armoured mobile division in Satory (Yvelines). It is deployable within three hours, sometimes in as little as one hour depending on the situation, by road or by air, in full autonomy or in conjunction with the CBRN operational subdivision, both in and outside France.

CBRN operational subdivision (SGO-NRBC)

The SGO-NRBC is made up of four CBRN squadrons, one of which is on a permanent state of alert, and deployable within three hours (one hour if necessary). Equipped and trained, constituting a rapid intervention unit and coordinated by a tactical headquarters, it can intervene in a contaminated area anywhere on national territory and is systematically accompanied by a C2NRBC unit. Its mission is to:

- secure a contaminated area by reinforcing public safety following a CBRN attack;
- evacuate/channel the population and escort convoys;
- maintain/restore public order;
- contain violence in the contaminated area;
- protect major government bodies in the contaminated area; and
- support operations carried out in a dangerous technological context involving the response team (GIGN), the Gendarmerie nationale Criminal Research Institute (IRCGN) or any other specialized judicial police unit.

Gendarmerie nationale response team (GIGN)

The GIGN is part of the specialized teams that provide support to territorial units in the fight against CBRN threats, more specifically counterterrorism, the protection of VIPs and intelligence gathering.

GIGN members are fully equipped with state-of-the-art gear so they are able to operate in a contaminated area in complete autonomy.

Territorial resources

In each defence district, two mobile Gendarmerie squadrons are equipped and trained to intervene in the event of a CBRN risk or threat.

All units in charge of an industrial site posing specific risks (Seveso sites, nuclear power generation station), as well as all Gendarmerie research units (search teams, search sections) and the IRCGN, are able to intervene in the event of contamination.

Reinforcements

Based on the scope of the disaster, reinforcements could be sent in to provide assistance. Soldiers and firefighters/law enforcement officers have at their disposal CBRB experts and equipment.

These responders and their equipment are dedicated to rescue operations. The adaptation thereof to dead body management, the definition of individual roles/responsibilities, the availability of personnel and the loan of material are all key organizational items which have to be clearly defined.

Identification exercise in a contaminated area without prior decontamination

Context / Organization

As part of a joint IRCGN/C2NRBC study on potential techniques for use in a CBRN environment, an exercise was organized in November 2009 in the Paris area to determine if IRCGN forensic teams, in association with C2NRBC specialists, could autopsy non-decontaminated bodies in a tented forensic facility, similar to what was used following the tsunami or earthquake in Haiti.

Focussing on animal research, IRCGN specialists obtained the carcass of a farm pig, not yet gutted and placed under the permanent control of veterinary services. Thirty IRCGN and C2NRBC soldiers set up the forensic examination line and the full C2NRBC system. The forensic examination line included an x-ray station, an autopsy station and, lastly, a dental exam station. All three stations were set up in special tents with plastic flooring to protect against the leakage of fluids. The tents were installed in a closed building, where the floors had also been covered with tarps.

Each forensic examination station was inspected to ensure management of potential leaks.

The C2NRBC system included a command post, a personnel suit-up area and a decontamination area.

Three teams worked their way through the autopsy line over the course of the day in order to assess as accurately as possible the limitations of the exercise.

Presence in the zone was the responsibility of the C2NRBC. All two-person teams entering the zone were accompanied by a pair of C2NRBC officers. This requires a lot of physical resources, but ensures a high level of security. The active two-person team was supported by hands-on personnel, available to provide material assistance, with other responders in full action.

A beaten path was set up to optimize the movement of staff, helping to save time and increase the effectiveness of responders.

Exercise process [3]

The first team was in charge of taking x-rays, i.e. full body and dental (Fig. 3), using a system of plates which were later developed. This series of plates were protected against contamination, and decontaminated upon leaving the zone to avoid any possible proliferation of contaminants on the body. The C2NRBC controlled all access to the zone.

Operations could be watched live via a head cam, which not only ensured the security of responders at work in the zone, but also made it possible to see how things were progressing and anticipate the steps to be taken next.

The second team then performed the autopsy on the pig.

And lastly, the third team performed the dental exam, in this case first removing the maxillae. Practitioners were easily able to perform the extraction, unhindered by their protective gear.

The thick gloves worn by medical examiners as part of their CBRN gear did not hinder their ability to perform the autopsy, but simply made it a little more difficult to move their hands as freely as they would in normal autopsy conditions. Their protective gear did not hinder the movement/adjustment of equipment used to increase visibility, such as lighting.

When selecting a location for the exam, care must be taken to ensure there is plenty of room to move around the autopsy table.

C2NRBC personnel must be present at all times to oversee operations, ensure the security of responders and provide immediate assistance, as required.

Figure 3 Identification exercise in a CBRN environment

Lessons learned
There has to be as much synergy as possible between the C2NRBC and IRCGN, requiring highly efficient organization of resources at the site. A representative from each of these units must decide on how to proceed as soon as the site layout, examinations to be conducted and residual risks are known. Both units have to be deployed as soon as possible and simultaneously.

Flexibility is limited and routine crime-scene operations are considerably more complex in CBRN interventions, based on the nature of the risk, the definition of the different risk zones and the evolutional nature thereof depending on environmental conditions, more specifically aerological conditions, as well as security guidelines to be applied and protective gear to be worn. As such, tasks take much longer to complete, i.e. preliminary operations, on-site interventions and removal of personnel/samples. More frequent staff rotations are necessary in order to relieve responders working a CBRN environment, who face tremendous stress and find themselves limited by bulky protective gear. It is therefore a very slow process – staff rotations have to be carefully planned based on the time it takes for relief teams to suit up and the time it takes for teams exiting the zone to be decontaminated. Both units must work out of the same command post to ensure flawless coordination.

Because teams have to be rotated so frequently, the operation requires a very large pool of employees to keep examinations as short as possible.

An operation of this magnitude can be entrusted only to agencies with the necessary expertise/resources in the forensic investigation process (search/identification of potential terrorist(s), identification of authorities, bodies with severe wounds and which cannot be decontaminated, collection of samples from bodies, etc.).

When attempting to identify CBRN victims without prior decontamination, no more than two autopsies per day per team seemed feasible.

It must be noted that this exercise did not factor in management of the most highly contaminated element: clothing. In a real-life situation, removal of clothing from bodies will cause aerosolization of the CBRN agents, thus contaminating the air in the autopsy room.

Decontamination is therefore vital prior to the autopsy stage. Undressing and decontaminating bodies before they reach the autopsy line will help minimize the risk to responders, who will then be able to wear less protective gear and thus more easily perform their duties.

Looking forward [12, 4, 7]

As set forth above, managing bodies contaminated with one or several CBRN agents is a difficult task. We have to find simpler and/or safer ways of identifying victims as quickly as possible, with minimal exposure of responders to said agents. The focus is on finding ways for responders to perform exams while bodies remain in leakproof body bags, without ever having to handle the corpses..

One option is to use fully transparent body bags, allowing responders to make visual observations (physical features of body, clothing, etc.) without having to open the body bags, thus limiting the

risk of dispersion of contaminants. The systematic use of a full-body x-ray system (through the body bag) would make it possible to obtain vital identification data (anatomical/dental), as well as information on the nature of possible injuries. In the absence of sufficient information for a positive identification, DNA would be collected.

Another promising option is the use of state-of-the-art medical imaging techniques, more specifically 3D reconstruction software.

With digital x-ray technology (computed tomography), magnetic resonance imaging (MRI) and photogrammetry (3D optical scanning), the forensic examination of a body could be done by looking at images and taking samples from the body (toxicology, DNA).

Virtopsy, a research project developed by the Institute of Forensic Medicine of the University of Bern, in Switzerland, is a highly advanced virtual alternative to traditional autopsies. The goal is to revolutionize current procedures by replacing them with analysis of internal/external 3D images of the body.

On an experimental basis, after a body goes through the imaging system, forensic pathologists are able to determine cause of death, perform the autopsy, estimate the victim's age and detect identifying features.

For example, a CAT scan of a skull using 3D software can produce an image very similar to a panoramic x-ray, for easy comparison with AM x-rays.

These new technologies will not replace, in the short term at least, traditional autopsies, but they are especially promising in the field of forensics and would clearly be of great use in the management of contaminated bodies following a CBRN incident.

At the scene of a CBRN disaster, responders would take photographs, fingerprints and blood/muscle samples for DNA analysis. Jewellery and items of value would be removed, and the body would be permanently double bagged in leakproof body bags. The external, internal and dental exam would be conducted using imaging technology, with no direct contact with the corpse.

Although not as reliable as a direct visual examination by the forensic pathologist, especially for the external or dental exam, this solution would allow for an initial triage and significantly accelerate the identification of victims in the wake of a major disaster.

Traditional autopsies could then be performed on a limited number of bodies.

There are limitations to this technique, namely availability, the cost of imaging facilities and the training of image analysis operators. A recent article in the Journal of Forensic Sciences [11] describes guidelines in this regard.

Conclusion

In the wake of a disaster, following the evacuation of survivors/injured, the manner in which deceased victims are managed has a big impact on public opinion.

Just as we have national CBRN plans aimed at preserving human life, we have to develop written guidelines detailing possible dead body management procedures.

The risk-benefit balance between conducting victim identification operations and ensuring the security of the population/environment has to be carefully weighed.

Whereas there is no hesitation about taking even major risks in an attempt to save a human life, it is an altogether different story when managing dead bodies. In the wake of a disaster, responders must never take further undue risks in conducting identification operations, and all resources at the disposal of authorities must be taken to minimize said risks.

In this context, body decontamination can often significantly help reduce the risk to both responders and the population. Decontamination can also have a very positive psychological impact in reassuring the public and quelling its irrational fear regarding CBRN agents.

In practice, decontamination would be done using previously deployed resources for the decontamination of surviving victims and therefore not require additional logistical capabilities. On the other hand, the autopsy room will require very specific organization and logistical support.

Dead body management in the wake of CBRN disasters is a very difficult task. Objectives and requirements have to be carefully thought out.

The development of virtual autopsy techniques could, in what we hope is the very near future, contribute to optimizing victim identification procedures and minimizing risks to responders.

Conflict of interest declaration

The authors have submitted no conflict of interest declaration.

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[…]