

REPORTS AND DOCUMENTS

Managing the dead in catastrophes: guiding principles and practical recommendations for first responders

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Abstract

The proper management of the dead from catastrophes is an essential component of humanitarian response, together with the rescue and care of survivors and the provision and rehabilitation of essential services. Sadly, insufficient recognition of the importance of ensuring proper management of the dead and of caring for the needs of the bereaved, coupled with the frequent collapse of forensic services in the aftermath of catastrophes, contribute to perpetuating the tragedy and trauma suffered by survivors forever unable properly to bury and mourn their dead. In 2006 the Pan American Health Organisation (PAHO) and the International Committee of the Red Cross (ICRC), together with the World Health Organisation (WHO) and the International Federation of Red Cross and Red Crescent Societies (IFRC), published guidelines for the management of the dead, to help improve the management of the dead after catastrophes. The publication, Management of Dead Bodies after Disasters: A Field Manual for First Responders, offers practical and simple recommendations to non-specialists for the proper and dignified management of the dead in catastrophes and for the care of bereaved relatives. It also helps to dispel the principal myth which often complicates this difficult task: the unfounded association of cadavers with epidemics. The manual has proven to be a valuable tool for first responders, including humanitarian workers, for disaster response and preparedness in various operational contexts.

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In May 2006 the Pan American Health Organisation (PAHO)¹ and the International Committee of the Red Cross (ICRC), with the participation of the World Health Organisation (WHO) and the International Federation of Red Cross and Red Crescent Societies (IFRC), published *Management of Dead Bodies after Disasters: A Field Manual for First Responders*,² offering practical guidelines for non-specialists dealing with the dead in catastrophes.

The manual is the result of a meeting held in Lima, Peru, in May 2005 and organized by PAHO and the ICRC, on lessons learnt on managing the dead in armed conflicts, disasters and catastrophes, including the 2004 tsunami in south-east Asia.³

Catastrophes are understood as disasters of unexpected proportions, which often produce massive fatalities and totally overwhelm local and even regional emergency response services, thus forcing local residents and communities, volunteers and humanitarian workers to deal with the first response to the tragedy, including rescuing and caring for survivors and recovering and managing the dead.

It is increasingly acknowledged worldwide that the proper management of the dead is a core component of any humanitarian response to catastrophes, together with the recovery and care of survivors and the supply of basic services. The trauma suffered by bereaved families and affected communities as a result of the neglect and mismanagement of their dead, including lack of news of missing relatives, often lasts much longer than the more conspicuous physical effects of catastrophes. The tragedy of the missing in situations of armed conflict and internal violence, including of those whose bodies await recovery, identification and return to bereaved families, is well acknowledged by the international community, including the Red Cross and Red Crescent Movement.

During the 2005 meeting in Lima, forensic and humanitarian experts and practitioners from the Americas and other regions, including south-east Asia, warned about the lack of simple and practical guidelines for first responders on managing the dead and caring for bereaved families during the immediate aftermath of catastrophes, when forensic services are often collapsed and/or simply unavailable for lack of access to affected areas.

1 The Pan American Health Organisation (PAHO) is an international public health agency, established in 1902, which also serves as the regional office for the Americas of the World Health Organisation (WHO).

2 Permission to reproduce parts of the manual in this article was granted by the publisher.

3 The following participants at the Conference contributed to the drafting of the manual: Stephen Cordner, Director, Victoria Institute of Forensic Medicine, Australia; Boyd Dent, Lecturer, University of Technology, Sydney, Australia; Eric Dykes, Consultant in DVI; Yves Etienne, Head of Assistance Division, ICRC, Geneva, Switzerland; Claude de Ville de Goyet, Consultant in Emergency Response; Ute Hofmeister, Forensic Advisor, Assistance Division, ICRC, Geneva, Switzerland; Oliver Morgan, Honorary Research Fellow, London School of Hygiene and Tropical Medicine, UK; Ricardo Perez, Regional Advisor (Publications), PAHO/WHO; Pongruk Sribanditmongkol, Associate Professor, Department of Forensic Medicine, Chiang Mai University, Thailand; Boonchai Somboonsook, Deputy Director, Department of Health Service Support, Ministry of Public Health, Thailand; Morris Tidball-Binz, Forensic Coordinator, Assistance Division, ICRC, Geneva, Switzerland; and Dana Van Alphen, Regional Advisor, PAHO/WHO.

As illustrated by many examples analysed during that meeting, including from countries affected by the tsunami, existing guidelines and manuals for forensic practitioners on disaster victim identification (DVI), including the guide prepared by the International Police Organisation (Interpol), are of little or no practical use for non-specialists. On the other hand, specialists are often not at hand during the immediate aftermath of catastrophes – for days and sometimes weeks after events – to help in the recovery and identification of the dead.

During this critical period local residents and volunteers are the only people available to handle the dead. Worldwide, they require simple, practical and easy-to-follow guidelines for helping to ensure the proper and dignified management of their dead, including taking all necessary steps to aid future efforts by forensic specialists and investigators to identify them and clarify the fate of the missing. For this purpose, the simple procedures outlined in *Management of Dead Bodies after Disasters: A Field Manual for First Responders* for proper handling and storage of bodies and collection of basic information are complementary to professional requirements for disaster victim identification, including Interpol's DVI guide and forms.

Although the manual was drafted and designed for contexts with limited or unavailable forensic services, it has also been well received in countries with well-resourced and highly developed forensic services and disaster-response agencies as a useful tool for disaster preparedness.

The manual has proven so far to be a useful tool for humanitarian workers and first responders managing the dead in contexts of armed conflict and situations of internal violence,⁴ where the ICRC is promoting its use in combination with its other guidelines aimed at such contexts, including its *Operational Best Practices Regarding the Management of Human Remains and Information on the Dead by Non-specialists for All Armed Forces, for All Humanitarian Organizations*.

Contents of the manual

The 47-page manual is divided into eleven short chapters covering the main aspects of management of the dead in catastrophes, including the needs of bereaved families. Each chapter summarizes principal recommendations and practical advice for their implementation. It also includes a chapter with questions and answers for first responders, and annexes with forms for the collection and management of information on the missing and the dead.

4 After its publication in early 2006, in English and Spanish, a second edition was published at the end of that year in order to meet growing demands from the field worldwide. Limited editions of the manual, in Urdu, Sinhalese, Tamil, Bahasa Indonesian and French, were prepared by the ICRC during 2006 to meet specific needs in Pakistan, Sri Lanka and the Democratic Republic of Congo. Similarly, editions in Arabic, Japanese and other languages are under consideration at the time of writing.

The manual has two main purposes: first, to promote the proper and dignified management of the dead and ensure respect for the bereaved, and, second, to enable the identification of human remains.

Following catastrophes, implementing simple measures early on can significantly improve the opportunity for their successful identification. However, after the majority of catastrophes the immediate management of human remains is done by local organizations and communities and not by specialist teams of national and international experts. Consequently the manual focuses on practical recommendations for non-specialists.

In the immediate aftermath of a catastrophe there is little time to read guidelines, so the manual dedicates one chapter to each key task and uses bullet-points for brevity and clarity. Local co-ordinators can photocopy and distribute the relevant chapters to individuals responsible for specific tasks, such as body recovery.

The term “dead bodies” is used instead of the more respectful and technically correct term “human remains” because the term “dead bodies” is less ambiguous for readers whose first language is not English.

The manual does not provide a comprehensive framework for forensic investigation. However, following the recommendations will aid the work of forensic specialists when they arrive at the scene. Its recommendations will also help communities for whom forensic expertise is unavailable to collect basic information that may aid identification of the deceased. Nevertheless, the manual does not replace the need for specialist forensic identification of victims, including the need to collect thorough ante-mortem data (AMD) of the missing and to carry out thorough post-mortem examinations whenever possible. The use of the manual is expected to contribute towards and facilitate the later task of forensic investigators, including Interpol DVI teams, once they gain access to the areas affected by a catastrophe and become operational.

Co-ordination

The coordination of activities related to the management of the dead after catastrophes is a core component of disaster response and it is required at several levels: local, regional/provincial and national. Early coordination is vital for the following tasks:

- to manage information and co-ordinate assessment activities;
- to identify required resources (e.g. forensic teams, morgues, body bags, etc.);
- to put into practice and manage a plan of action for the management of dead bodies and corresponding information;
- to disseminate accurate information to families and communities about identification of the missing and management of dead bodies.

The recommendations outlined below help to guide early coordination efforts.

Effective local coordination

- As soon as possible, and in accordance with existing disaster preparedness plans, identify an agency and name a person to serve as a local coordinator with full authority and responsibility for the management of dead bodies (e.g. coroner, local governor, police chief, military commander, mayor, community leader).
- The choice of medical or hospital directors as co-ordinators for the management of the dead in catastrophes should be discouraged, as their primary responsibility is the care of the living and injured.
- Within the emergency operations center establish a team to coordinate management of the dead. Include key operational partners such as the military, civil defense, fire service, local emergency or rescue organizations, National Red Cross/Red Crescent Society, and local funeral homes, morticians, and coroners, etc.
- Appoint persons to be in charge of one or more of the following tasks and provide them with a copy of the relevant chapter in this manual:
 - body recovery
 - storage
 - identification
 - information and communication
 - disposal
 - support for families
 - logistics

Effective regional and national coordination

- As soon as possible, someone with the required level of responsibility should be appointed as the national or regional coordinator, and provided with the necessary authority to oversee the management of dead bodies (e.g. Minister, Governor, coroner, Police Chief, Military Commander, Mayor).
- Refer to the mass fatality section of your disaster response plan or major incident procedures manual, if available.
- Establish a coordination group including key individuals to advise on:
 - Communications with the public and the media.
 - Legal issues about identification and death certification.
 - Technical support for identification and documentation.
 - Logistical support (e.g. military or police).
 - Liaison with diplomatic missions, intergovernmental and international organizations (e.g. United Nations, World Health Organization, International Committee of the Red Cross, International Federation of Red Cross and Red Crescent Societies; in particular and with regard to the management of the dead, Interpol should be contacted as soon as possible for DVI advice and assistance).

Infectious disease risks

The fear that the dead will cause epidemics after catastrophes is often deeply ingrained, despite growing evidence to the contrary. Research has shown that the dead, including decomposing bodies, do not spread diseases after catastrophes unless they are in direct contact with drinking water. Instead, the surviving population is the most likely source of epidemics. The unfounded belief that the dead spread diseases is swiftly disseminated by the weary public after catastrophes and is often promoted by the media and on occasions even by misled sanitary authorities. The political pressure brought about by this belief too often causes authorities to call for hasty mass burials and cremations of unidentified bodies and for the use of ineffective “sanitary” measures, such as the use of masks and spraying the dead with so-called “disinfectants”, which may truly pollute water sources.

The mismanagement of dead bodies resulting from such hasty procedures may cause serious and long-lasting mental distress to bereaved families and communities exposed to the undignified handling of their dead and left unable to mourn their loved ones.

Infections and dead bodies

- Victims of catastrophes are normally killed by trauma (injuries), blasts, drowning, or heat – not by disease.
- At the time of death, victims are not likely to be sick with epidemic-causing infections (i.e. plague, cholera, typhoid and anthrax).
- A few victims will have chronic blood infections (hepatitis or HIV), tuberculosis or diarrheal disease.
- Most infectious organisms do not survive beyond 48 hours in a dead body. An exception is HIV which has been found six days post-mortem.

Risk to the public

- The risk to the public is negligible because they do not touch dead bodies.
- There is the potential risk of contamination of drinking water supplies by fecal material released from dead bodies.

Risk to body handlers

- Individuals handling human remains have a small risk through contact with blood, body fluids and feces (bodies often leak feces after death) from the following:
 - HIV
 - tuberculosis
 - diarrheal disease

- Body recovery teams work in hazardous environments (e.g. collapsed buildings and debris) and may also be at risk of injury and tetanus (transmitted via soil).

Safety precautions for body handlers

- Basic hygiene protects workers from exposure to diseases spread by blood and certain body fluids. Workers should use the following precautions.
 - The use of gloves and boots, when available, is highly recommended.***
 - Wash hands with soap and water after handling bodies and before eating;
 - Avoid wiping face or mouth with hands.
 - Wash and disinfect all equipment, clothes and vehicles used for transportation of bodies.
 - Face masks are unnecessary, but should be provided if requested to avoid anxiety.
- The recovery of bodies from confined, unventilated spaces should be approached with caution. After several days of decomposition, potentially hazardous toxic gases can build up. Time should be allowed for fresh air to ventilate confined spaces.
- See body recovery for recommendations on the use of body bags.

Body recovery

Body recovery by first responders is the first and arguably the most important step in managing the dead after catastrophes. If properly done it will greatly help in the identification of the dead and will also help reduce the anguish of bereaved families and communities.

The aim of body recovery

- Rapid retrieval is a priority because it aids identification and reduces the psychological burden on survivors.
- Recovery of bodies should not interrupt other interventions aimed at helping survivors.

The workforce

- Body recovery is often done spontaneously by a large number of individuals, including:
 - surviving community members
 - volunteers (e.g., National Red Cross/Red Crescent Societies)
 - search and rescue teams

military, police or civil-defence personnel

- Coordination of these groups is needed to encourage the use of procedures and health and safety precautions recommended in this manual.

Methods and procedures

- Bodies should be placed in body bags. If these are unavailable, use plastic sheets, shrouds, bed sheets, or other locally available material.
- Body parts (e.g., limbs) should be treated as individual bodies. Recovery teams should not attempt to match the body parts at the disaster scene.
- Body recovery teams work most effectively in two groups: one to take bodies to a nearby collection point and a second to take them to identification or storage areas.
- Noting the place and date where the body was found helps future identification.
- Personal belongings, jewellery and documents should not be separated from the corresponding remains during recovery, but only during the identification phase (see “Identification of dead bodies”).
- Stretchers, body bags and flatbed trucks or tractor-trailers can be used to transport bodies. Ambulances should not be used for this purpose as they are best used to help the living. Whenever possible, bodies should be concealed during transportation, to protect their dignity.

Health and safety

- Body recovery teams should wear basic protective equipment (heavy duty gloves and boots) and wash their hands with soap and water after handling dead bodies (see “Infectious disease risks”).
- Recovery teams often work among debris or collapsed buildings. First aid and medical treatment should be available in case of injury.
- Tetanus is a serious risk for unvaccinated workers. Local medical teams should be on the alert for tetanus-prone injuries.
- Many different people or groups are involved in body recovery. Communication and coordination with them is often difficult.
- This part of the process can be essential for identification and should be read in conjunction with the section “Identification of dead bodies”.
- Body recovery only lasts a few days or weeks, but may be prolonged following catastrophes.

Storage of dead bodies

Once recovered, bodies awaiting identification should be stored in a proper and dignified way. Dead bodies decompose rapidly in warm weather. For example, in hot climates the decomposition of a body may be too advanced within just 12–48

hours to allow for facial recognition. Conversely, cold storage slows the rate of decomposition and preserves the bodies for easier examination.

Storage options

- Whichever storage option is used, each body or body part should be kept in a body bag or wrapped in a sheet before storage.
- Waterproof labels (e.g. paper in sealed plastic) with a unique identification number should be used (see “Unique reference numbering for dead bodies” in “Identification of dead bodies”). Do not write identification numbers on bodies or body bags or sheets, as they are erased easily during transportation and storage.

Refrigeration

- Refrigeration between 2°C and 4°C is the best option.
- Refrigerated transport containers used by commercial shipping companies can usually be used to accommodate properly up to 50 bodies in racks.
- Enough containers are seldom available at the disaster site, and alternative storage options should be used until refrigeration becomes available.

Temporary burial

- Temporary burial provides a good option for immediate storage where no other method is available, or where longer-term temporary storage is needed.
- Temperature underground tends to be lower than at the surface, thereby providing natural cooling.
- Temporary burial sites should be constructed in the following way to help ensure future location and recovery of bodies:
 - Use individual burials for a small number of bodies and trench burial for larger numbers.
 - Burial should be around 1.5m deep and at least 200m from drinking water sources (see “Long-term storage and disposal of dead bodies”).
 - Leave approximately 0.4m between bodies.
 - Lay bodies in one layer only (not on top of each other).
 - Clearly mark each body (see “Identification of dead bodies”) and mark their positions at ground level.

Dry ice

- Dry ice (carbon dioxide (CO₂) frozen at -78.5°C) may be suitable for short-term storage.
 - Dry ice should not be placed in direct contact with bodies, even when wrapped, because it damages them. Build a low wall of dry ice (i.e. 0.5m high) around groups of about 20 bodies and cover with a plastic

sheet, tarpaulin, or tent. About 10kg of dry ice per body, per day is needed, depending on outside temperature. Dry ice must be handled carefully as it causes “cold burns” if touched without proper gloves. When dry ice melts it produces carbon dioxide gas, which is toxic. *Warning:* closed rooms or buildings should be avoided when using dry ice in preference to areas with good natural ventilation.

Ice

- The use of ice (frozen water) should be avoided where possible because:
 - In hot climates ice melts quickly and large quantities are needed.
 - Melting ice produces large quantities of dirty waste water that may cause concern about diarrheal disease.
 - Disposal of this waste water creates additional management issues.
 - The water may damage bodies and personal belongings (e.g. identity cards).

Identification of dead bodies

Identification of dead bodies is based upon the comparison and matching of information from missing persons (physical features, personal belongings, place and circumstances of death, etc.) with corresponding information from the deceased.

Forensic experts are qualified and often the only ones authorized to do this job. But mobilizing forensic experts and resources after catastrophes may demand several days. This means that early opportunities to help identify bodies may be lost as the bodies decompose. Visual recognition of cadavers or their photographs by acquaintances is the simplest method of identification, but this is prone to frequent errors. Therefore, whenever possible, it should be complemented with other means of forensic human identification, albeit at a later stage. Forensic procedures (autopsies, fingerprinting, dental examinations, X-rays, forensic anthropology, DNA analysis) can be used after visual recognition of bodies or photographs becomes impossible.

The early work of non-specialists in managing the dead (especially proper recovery, recording, documentation and storage) will determine much of the success of future identifications by forensic specialists. The forms included in *Management of Dead Bodies after Disasters: A Field Manual for First Responders* for collecting information on the dead and on missing persons (“Human Remains Information Form” and “Missing Persons Data Form” Annex I and II respectively in the manual) should be used by non-specialists to collect basic albeit essential information that will aid later forensic identification procedures.

The collection and management of samples from dead bodies and relatives of the missing, for possible DNA analysis and identification at a later date,

is too complicated for first responders to deal with in catastrophes, unless the necessary resources and forensic advice are available.

General principles

- Sooner is better for victim identification. Decomposed bodies are much more difficult to identify and require forensic expertise.
- The key steps to documenting dead bodies as described below are: unique reference number, label, photograph, record and secure.
- It should be appreciated that visual recognition and photographs, while simple, can result in mistaken identification.
- Injuries to the deceased or the presence of blood, fluids or dirt, especially around the head, greatly increase the errors in visual recognition.
- Any separate body part which proves that a person is dead can aid in identification and should therefore be managed as though it is a whole body (i.e. using a unique reference number).

Processes

Unique referencing (mandatory)

Assign unique and sequential reference numbers to each body or body part (Figure 1). Reference numbers must not be duplicated.

Labeling (mandatory)

- Write the unique reference number on a waterproof label (e.g., paper sealed in plastic) then securely attach it to the body or body part.
- A waterproof label with the same unique reference number must also be attached to the container for the body or body part (e.g. body bag, cover sheet or bag for the body part).

Photography (mandatory – if photographic equipment is available)

- The unique reference number must be visible in all photographs.
- If available, digital cameras allow for easier storage and distribution of photographs.
- Clean the body sufficiently to allow facial features and clothing to be properly represented in the photographs.
- In addition to the unique reference number, the photographs should include at least:
 - a full-length of the body, front view
 - whole face
 - any obvious distinguishing features
 - a scale (i.e. a ruler or measuring tape)

Unique reference numbering for dead bodies:

Each body or body part *must* have a unique reference number. The following is recommended.

PLACE + RECOVERY TEAM/PERSON + BODY COUNT

For example:

Colonia San Juan - Team A-001

OR

Chaing Mai Hospital - P. Sribanditmongkol-001

PLACE: Where possible, all bodies should be assigned a unique reference number indicating place of recovery. If recovery place is unknown, use instead the place where the body was taken for identification/storage.

RECOVERY TEAM/PERSON: Person or team numbering the body.

BODY COUNT: A sequential count of bodies at each site (e.g., 001 = body number one).

Note: Details about where and when the body was found and the person/organization who found it should also be recorded

Figure 1

- If circumstances permit, or at a later time, additional photographs can be included with the unique reference number of the following:
 - upper and lower part of the body
 - all clothing, personal effects and distinguishing features
- When taking photographs the following should be considered:
 - Blurred photographs will not be useful.
 - Photographs must be taken close to the dead body; when photographing the face, it should fill the entire picture.
 - The photographer should stand at the middle of the body when taking the picture, not at the head or feet.
 - The photograph must include the visible unique reference number to ensure that identification made using the photograph matches the correct body.
 - Minimum photograph set required for visual identification:
 - (a) whole face (b) whole body
 - (c) upper body (d) lower body

Record (mandatory)

- Whenever possible and regardless of whether photographs have been taken of the dead body or body part, use the Human Remains Information Form to record the necessary information, including:
 - sex
 - approximate age range (infant, child, adolescent, adult or elderly)
 - personal belongings (jewellery, clothes, identity card, driver's license, etc.)
 - obvious specific marks on the skin (e.g. tattoos, scars, birthmarks), or any obvious individualizing trait

- If no photographs have been taken, if possible also record:
 - apparent race
 - estimated stature (from heels to top of head)
 - color and length of hair
 - color of eyes (*only in very fresh cadavers*)
- The Human Remains Information Form should include the same unique referencing number used for the body or body part.

Secure

- Personal belongings should be securely packaged, labeled with the same unique reference number, and stored with the body or body part. This is mandatory.
- Clothing should be left on the body.

Release of bodies

- A dead body should only be released to the next of kin when identification is certain and the corresponding death certificate is signed. The release should be duly recorded.
- A body should only be released by the responsible authority, which must also provide documentation of the release (a letter or death certificate).
- Whenever possible visual recognition should be complemented, albeit at a later date, with other methods of forensic human identification, including fingerprints, dental traits and genetics, and information such as identification of clothing or personal effects.
- To increase reliability of visual recognition (see warning above), viewing conditions should minimize emotional stress to bereaved relatives.
- Although there may be no alternative following catastrophes, the psychological impact of viewing dozens or hundreds of dead bodies may further reduce the reliability of visual recognition as a method for identification.
- Viewing photographs of the highest possible quality may be a better approach.
- Data of the missing person should be used to cross-check visual recognition of a dead body *before* their release.
- Record the name and contact details of the person or relatives who claimed the body together with the body's unique reference number.
- Bodies that can not be identified should be properly stored for further examination and future identification (see "Storage of dead bodies") until forensic specialists can investigate.
- Care should be taken before releasing bodies that are not whole, as this may complicate subsequent management of body parts.

Information management

State authorities bear primary responsibility for the proper handling of information about the dead and missing in catastrophes. This information is

also required for coordination activities (see coordination). Even after relatively small disasters large amounts of information about the dead and missing will be collected and processed. Necessary resources (human, technical and financial) for information management should be planned and allocated accordingly.

Organizational arrangements

- Information centers should be established at regional and/or local levels.
- Local centers act as focal points for collection and consolidation of information on the dead and for attending to the public. They are particularly necessary for receiving tracing requests, leaving photographs and information about the missing, and for the release of information on persons found or identified.
- A national system for management and coordination of information should centralize all information on the dead and missing in disasters and catastrophes. Tracing services of the International Committee of the Red Cross and National Red Cross/Red Crescent Societies may assist in this task.
- Data should flow in both directions between the national and local level.

Information for the public

- The population should be promptly and clearly informed about the response and procedures adopted for:
 - searching for the missing;
 - recovery and identification of dead bodies;
 - collection and release of information;
 - support for concerned families and communities.
- Information can be provided through the local or regional centres.
- A wide range of media can be used:
 - radio, television, newspapers, etc.
 - noticeboards
 - the Internet

Information about dead bodies

- Basic information must be collected about all dead bodies when possible (see “Identification of dead bodies”).
- Likewise, information on missing persons which may aid their identification should be collected as soon as possible using a Missing Persons Data Form. More detailed information may be collected later (i.e. using the Interpol DVI forms) and this information entered into an electronic databases at a later stage.
- Information is likely to include valuable personal items and photographs which require careful and secure handling (better to photograph and properly record instead).

- A chain of custody is required to avoid misplacement of information and to ensure the availability of all evidence.
- Centralization and consolidation of information about the dead and missing is essential for increasing the possibility of finding a match between tracing requests for missing persons and available or known information of dead bodies.

Long-term storage and disposal of dead bodies

Once identified, dead bodies should be returned as soon as possible to their bereaved relatives. Conversely, bodies which remain unidentified will require appropriate long-term storage.

Method of disposal/long-term storage

- Burial is the most practical method as it preserves evidence for future forensic investigation, if required.
- Cremation of unidentified bodies should be avoided for several reasons:
 - cremation will destroy evidence for any future identification;
 - large amounts of fuel are needed (usually wood);
 - achieving complete incineration is difficult, often resulting in partially incinerated remains that have to be buried; and
 - it is logistically difficult to arrange for the cremation of a large number of dead bodies.

Location of burial sites

- Careful thought must be given to the location of any burial site.
- Soil conditions, highest water-table level and available space must be considered.
- The site should be acceptable to communities living near the burial site.
- The site should be close enough for the affected community to visit.
- The burial site should be clearly marked and surrounded by a buffer zone that is at least 10m wide, to allow planting of deep-rooted vegetation and to separate the site from inhabited areas.

Distance from water sources

- Burial sites should be at least 200m away from water sources such as streams, lakes, springs, waterfalls, beaches, and the shoreline.
- Suggested burial distance from drinking water wells are provided in table 1. Distances may have to be increased based on local topography and soil conditions.

Table 1. Recommended distance of graves from drinking-water wells

Number of bodies	Distance from drinking water well
4 or less	200m
5 to 60	250m
60 or more	350m
120 bodies or more per 100m ²	350m

Grave construction

- If possible, human remains should be buried in clearly marked, individual graves.
- In catastrophes, communal graves may be unavoidable.
- Prevailing religious practices may indicate preference for the orientation of the bodies (e.g. heads facing east, or toward Mecca, etc.).
- Communal graves should consist of a trench holding a single row of bodies each placed parallel to the other, 0.4m apart.
- Each body must be buried with its unique reference number on a waterproof label. This number must be clearly marked at ground level and mapped for future reference.
- Although there are no standard recommendations for grave depth, it is suggested that:
 - graves should be between 1.5m and 3m deep;
 - graves with fewer than five people should allow for at least 1.2m (1.5m if the burials are in sand) between the bottom of the grave and the water table, or any level to which groundwater rises;
 - for communal graves there should be at least 2m between the bottom of the grave and water table, or any level to which groundwater rises; and these distances may have to be increased depending on soil conditions.

Communications and the media

Good public communication contributes to a successful victim recovery and identification process. Accurate, clear, timely and updated information may help to reduce the stress and anguish experienced by bereaved families and affected communities. It also helps to defuse rumors and clarify any misinformation or false expectations about the handling and identification of the dead (see “Frequently asked questions”). The news media (television and radio, newspapers and the Internet) provide indispensable and arguably irreplaceable channels of communication with the public in disasters and catastrophes.

Working with the media

- Generally, most journalists want to report responsibly and accurately. Keeping them informed will minimize the likelihood of inaccurate reporting.

- Engage proactively and creatively with the media:
 - A Media-Liaison Officer should be assigned both locally and nationally.
 - Establish a Media-Liaison office (as near as possible to the affected area).
 - Co-operate proactively (prepare regular briefings, facilitate interviews, etc.).

Working with the public

- An information center for relatives of the missing and the dead should be set up as soon as possible.
- A list of confirmed dead and survivors should be made available, and details of missing individuals recorded by official staff.
- Information should be provided about the processes of recovery, identification, storage and disposal of dead bodies.
- Arrangements for death certification may also need to be explained.

Working with relief agencies

- Humanitarian workers and relief agencies, including UN agencies, the International Committee of the Red Cross, and Red Cross/Red Crescent Societies, have direct contact with affected communities and may act as a source of local information.
- Aid workers are not always the best informed about some technical aspects related to the management of the dead, and may give conflicting and unfounded information, including about the infectious risks of dead bodies.
- Providing correct information to aid agencies on management of the dead will further help to reduce rumors and to avoid incorrect information (see “Frequently asked questions”).

Information management

- Journalists, both local and international, often arrive on site soon after the events.
- Care is needed to respect the privacy of victims and relatives.
- Journalists should not be allowed direct access to photographs, individual records or the names of victims. However, authorities may decide to release this information in a managed way to help with the identification process.
- Soon after the disaster a decision must be taken whether or not to provide information about the number of victims. The disadvantage of this is that these estimates will undoubtedly be wrong. The advantage is that official statistics may prevent exaggerated reporting by the media.

Support to families and relatives

The dignity of the dead and the needs of the bereaved should be respected at all times throughout the response to catastrophes. The priority for affected families is

to know the fate of their missing loved ones. Therefore mistaken identifications should be avoided, and honest and accurate information should be provided at all times and at every stage of the recovery and identification process.

A sympathetic and caring approach is owed to bereaved families; and psychosocial support for families and relatives should be considered. Their cultural and religious needs should be respected.

Identification of victims

- A family liaison focal point should be established to support relatives and also to help collect information to help identify the missing.
- Families should be informed about findings and the identification of their loved ones before anyone else.
- Families of the dead and missing must be given realistic expectations of the process, including the methods used and timeframes for recovery and identification of remains.
- Families should be allowed to report a missing relative and provide additional information.
- Identification should be conducted as speedily as possible.
- Children should not be expected to aid in the visual identification of dead bodies.
- The need for relatives to view the bodies of their loved ones as part of the grieving process should be respected.
- Once identified, bodies should be released as swiftly as possible to their next of kin.

Cultural and religious aspects

- The overwhelming desire of relatives from all religions and cultures is to identify their loved ones.
- Advice and assistance from religious and community leaders should be sought to improve understanding and acceptance of the recovery, management and identification of the dead bodies.
- Undignified handling and disposal of dead bodies may further traumatize relatives and should be avoided at all times. Careful and ethical management of dead bodies, including disposal, should be ensured, including respect for religious and cultural sensitivities.

Providing support

- Psychosocial support should be adapted to needs, culture and context and should consider local coping mechanisms.
- Local organizations such as the National Red Cross/Red Crescent Societies, NGOs and faith groups can often provide emergency psychosocial care for those affected.

- Priority care should be given to unaccompanied minors and other vulnerable groups. Where possible, they should be reunited and cared for by members of their extended family or community.
- Material support may be necessary for funeral rituals, such as burial shrouds, coffins, etc.
- Special legal provisions for those affected (i.e. rapid processing of death certificates) should be considered and publicized within the affected communities.

Frequently asked questions

Those responsible for or involved in the management of the dead after catastrophes may be asked questions, which offer a good opportunity to inform concerned stakeholders accordingly. Listed below are some of the most likely questions and the recommended answers.

Information for the public

1. Do dead bodies cause epidemics?

No. Dead bodies from most disasters do not cause epidemics. This is because most victims die from trauma, drowning or fire. They do not have epidemic-causing diseases such as cholera, typhoid, malaria or plague when they die.

2. What are the health risks for the public?

The risk to the public is negligible. They do not touch or handle dead bodies. However, there is a small risk of diarrhea from drinking water contaminated by fecal material from dead bodies. Routine disinfection of drinking water is sufficient to prevent water-borne illness.

3. Can dead bodies contaminate water?

Potentially, yes. Dead bodies often leak feces, which may contaminate rivers or other water sources, causing diarrheal illness. However, people will generally avoid drinking water from any source they think has had dead bodies in it.

4. Is spraying bodies with disinfectant or lime powder useful?

No, it has no effect. It does not hasten decomposition or provide any protection.

5. Local officials and journalists say there is a risk of disease from dead bodies. Are they correct?

No. The risk from dead bodies after natural disasters is misunderstood by many professionals and the media. Even local or international health workers are often misinformed and contribute to the spread of rumors.

6. Is there a risk for those handling dead bodies?

For people handling dead bodies (rescue workers, mortuary workers, etc.) in most catastrophes there is a small risk from tuberculosis, hepatitis B and C, HIV, and diarrheal diseases. However, the infectious agents responsible for these diseases do not last more than two days in a dead body (except for HIV, which may survive up

to six days). These risks can be reduced by wearing rubber boots and gloves and practicing basic hygiene (i.e. washing hands).

7. Should workers wear a mask?

The smell from decaying bodies is unpleasant, but it is not a health risk in well-ventilated areas, and wearing a mask is not required for health reasons. However, workers may feel better psychologically if they are using masks. The public should not actively be encouraged to wear masks.

8. How urgent is the collection of dead bodies?

Body collection is not the most urgent task after a disaster. The priority is to care for survivors. There is no significant public health risk associated with the presence of dead bodies. Nevertheless, bodies should be collected as soon as possible and taken away for identification.

9. Should mass graves be used to quickly dispose of the bodies?

No. Rapid mass burial of victims is not justified on public health grounds. Rushing to dispose of bodies without proper identification traumatizes families and communities and may have serious legal consequences (i.e. the inability to recover and identify remains).

10. What should the authorities do with dead bodies?

Dead bodies should be collected and stored, using refrigerated containers, dry ice or temporary burial. Identification should be attempted for all human remains. Photographs should be taken and descriptive information recorded for each body. Remains should be stored (i.e. using refrigeration) or buried temporarily to allow for the possibility of an expert forensic investigation in the future.

11. What are the potential mental health issues?

The overwhelming desire of relatives (from all religions and cultures) is to identify their loved ones. All efforts to identify human remains will help. Grieving and traditional individual burial are important factors for the personal and communal recovery or healing process.

12. How should bodies of foreigners be managed?

Families of visitors killed in a disaster are likely to insist on the identification and repatriation of the bodies. Proper identification has serious economic and diplomatic implications. Bodies must be kept for identification. Foreign consulates and embassies should be informed and Interpol contacted for assistance.

Information for responders

13. I am a volunteer; how can I help?

To be helpful you should promote the proper recovery and management of dead bodies and assist in recording necessary information. You might also assist with the recovery and disposal of the dead, under the direction of a recognized coordinating authority. However, you would first need to be briefed, advised, equipped and supported for this difficult task.

14. I work with an NGO; how can I help?

Providing support for families and collection of information in collaboration with the coordinating authority will best help the surviving relatives. You may also

promote proper identification and treatment of the dead. NGOs should not be asked to carry out the identification of dead bodies unless they are highly specialized for this task and work for and under the direct supervision of a legal authority.

15. I am a health professional; how can I help?

The survivors need you more than the dead. Any professional help in fighting the myth of epidemics caused by dead bodies will be appreciated. Talk about this to your colleagues and members or the media.

Conclusion

Humanitarian interventions in major disaster situations, including catastrophes, are increasingly expected to address the proper management of the dead. National and international forensic services specializing in disaster victim identification, including Interpol DVI teams, may not reach the site of the event for days and even weeks. During this critical time first responders play a critical role in helping to ensure the proper and dignified management of the dead and improving the chances of their identification. In order to fulfil these goals they require simple, practical and easy-to-follow advice and guidance. The manual outlined in this article aims to address these needs. The authors and publishers of the manual will continue to monitor its use and implementation for improvements in its recommendations.

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