

出國報告（出國類別：國際會議）

參加 2012 年美國法醫刑事科學年會 報告書

服務機關：法務部法醫研究所

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摘 要

筆者於 2012 年 2 月 20 日至 25 日期間赴美國亞特蘭大市參加美國法醫刑事科學年會，為期 7 日。參加美國 2012 年美國法醫刑事科學年會（AAFS），會議採分組及分項形式同時進行，包括專題演講、研討課程、口頭發表論文及壁報張貼論文等，來自世界各地與會代表超過千人參與，本所並於年會中公開發表有關法醫矽藻分析之論文一篇：「Diatom Analysis from Suspected Drowning Cases」。

與來自全美各地、歐洲、亞洲、各地之學者專家、刑事科學檢驗者齊聚一堂，研習刑事科學相關課程、議題及發表心得報告，促進國際學術交流，並可了解先進國家在鑑識科學領域的具體作法，機會非常難得。建議鼓勵參加此類國際會議，一方面可增廣見聞，瞭解世界鑑識科學發展的趨勢，再者本所派員參加亦可促進學術交流，提升本所國際聲譽。

壹、會議目的

美國法醫刑事科學年會為全美國最大之鑑識科學學會，於 1948 年成立，每年都會舉行一次年會，主要成員來自美國，但參與年會的人員來自世界各個國家，成員組成涵蓋各個領域，包括醫師、律師、牙醫師、毒物學家、人類學家、文件鑑識、數位影像專家、物理學家、化學家與犯罪偵查專家等。會議裡包含研討會、國際會議、論文海報展示、還有相關儀器展示，可以一次獲得鑑識科學的新知，並且跟世界各國相關領域的專家交流。藉由參與國際會議學習法醫科技新知，了解世界刑事鑑識最新發展趨勢，並投稿論文海報一篇：Diatom Analysis from Suspected Drowning Cases，藉由研究成果的發表，提升本國在國際鑑識界的能見度，此外汲取國外法醫及刑事鑑識技術，並觀摩國際型會議舉辦之規模。

貳、過程：

- | | |
|----------|---|
| 2 月 19 日 | 自桃園機場搭乘長榮航空班機前往美國舊金山市 SFO 機場 |
| 2 月 20 日 | 自 SFO 轉機至亞特蘭大，抵達亞特蘭大市會議地點 Marriott Marquis Hotel，辦理報到手續 |
| 2 月 20 日 | 參加研討課程 Workshop: Advanced DNA Mixture Interpretation and Statistical Approaches |
| 2 月 21 日 | 參加研討課程 Workshop: Humanitarian Forensic Science: The Forensic Investigation of Human Remains From Armed Conflicts and Catastrophes |
| 2 月 22 日 | 投稿論文壁報展示 |
| 2 月 23 日 | 聽取與會人員論文口頭報告 |
| 2 月 24 日 | 參觀廠商儀器展示 |
| 2 月 25 日 | 回程 |

叁、會議內容：

會議內容包括專題研討會、分組討論、演講論文、壁報論文報告及法醫刑事鑑識科技儀器廠商儀器展示會等，多項會議同時進行。會中分組討論及研討會（workshops）多達二十四個場次，演講論文及壁報論文報告分成多個會場，依十一大項類別分項進行，包括刑事犯罪學（Criminalistics）、體質人類學（Physical Anthropology）、病理/生物學（Pathology/Biology）、一般法醫刑事類（General）、法律裁判學（Jurisprudence）、精神及行為科學（Psychiatry & Behavioral Science）、毒物學（Toxicology）、法齒學（Odontology）、工程科學（Engineering Sciences）、數位及多媒體科學（Digital & Multimedia Science）及文書鑑定（Questioned Documents）等專題。會議是採取分組、分項方式進行。會議前兩天分別為參加研討會，研討會容如下：

一、2012 年 2 月 20 日「Workshop: Humanitarian Forensic Science: The Forensic Investigation of Human Remains From Armed Conflicts and Catastrophes（人道主義法醫學：利用法醫學鑑驗武裝衝突及大災難的人類遺骸）」：

研討會主講人主要為國際紅十字的成員，以及協助國際間有關災難失蹤人口的專家學者，內容著墨在發生在災難及戰爭後各個面向上的處置，如進入戰亂地區的國家要如何和當地的武裝勢力取得信任和合作，你必須找到你能利用的任何資源，並且拓善分配物力和人力，把人力分組並且建立尋找罹難及失蹤者的基本標準，包含各種資訊的蒐集保存、比對方法需採用齒痕、DNA、指紋的方法等，另外工作人員和罹難家屬間的對應，不需吝嗇給家屬心理上的安慰，表達或說出我很抱歉等的話都能釋放些許的壓力。此外有專家利用程式分門別類的把資訊建立成資料庫，對有大量罹難者的災難非常有用，可以避免很多資料上的重複及混亂。

由於國際紅字會多年的經驗，他們已經建立一套準則，可供他人參考，其中最基本的是法律的層面，包含宗教、倫理的議題，還有如何跟當地的政治團體交涉，第二個面向是資訊的保全，包含跟罹難者家屬取得罹難者的各種資訊，或是武裝衝突裡目擊者的描繪，最後才是各種資源的調配及鑑識工作的展開。透過這場研討

會可以瞭解國際組織在大災難及戰爭中搜尋失蹤人口的經驗，儘管臺灣在各種災難中也建立很多運作的典範，裡面還是有許多觀點足以讓國內許多單位借鏡，例如有關罹難者資訊軟體的應用，可以透過資訊科技來交叉比對，還有如何彙整不管是來自媒體或是民眾間提供的資訊，讓資訊可以被驗證、建立、及連接到罹難者並資料庫化，研討會也附上國際紅十字會在大災難發生時給現場第一線人員處理罹難者遺骸的作業準則(Management of Dead Bodies after Disasters:A Field Manual for First Responders，附件 3)。

二、2012 年 2 月 21 日「Workshop: Advanced DNA Mixture Interpretation and Statistical Approaches DNA (DNA 混和物的判讀和計算統計方法進階)」：

DNA 混和型判讀的研討會，告訴學員如何在實驗室建立一套判斷的標準，首先得在實驗室建立判斷的準則，必須自己先做不同比例的混和樣本，確定混合樣品可以依訊號強度與強度比值判定主要型，然後再按照實驗室自己驗證的資料，確認小於 100RFU 波峰如何歸類，要確認出主要貢獻者和次要貢獻者訊號的比例，決定 DNA 貢獻出的量，最後利用主講者團隊自己寫出來的軟體判斷，其中利用統計學使用排列組合，計算各個型別組合篩選出最有可能的組合。在研討會中主要練習的都是兩人混和型在不同情況下的計算，主講者提到三人混和型的計算很困難，而當一個家庭內涉及到亂倫的情形下也很難計算出混和型的組合。

會議第三天為投稿海報之展示，投稿之題目為「疑似溺水案例矽藻分佈之研究 (Diatom Analysis from Suspected Drowning Cases)」本實驗藉由分析疑似溺水案件之法醫解剖檢體矽藻分布情形，包含矽藻定量及矽藻定性分析，探討矽藻檢驗於診斷溺水死亡之實用性和有效性。並且比較從解剖中獲得的資訊來評估矽藻檢驗用於刑事鑑識上的可行性。本實驗共收集 121 件疑似溺水案件及 20 件非疑似溺水案件，所有案件均收集自本所法醫師解剖案件，由法醫師解剖採集矽藻分析用檢體，包含 5 公克肺臟下葉組織、蝶竇內所含有液體及一段肋骨/鎖骨刮取內部骨髓，以上檢體經酸處理萃取出矽藻製成玻片後，於相位差顯微鏡下計數所有矽藻數量(矽藻定量)及辨識

出各種不同的矽藻屬別(矽藻定性)。本研究除了提供給法醫於診斷溺水死亡時能夠多一項有參考價值之診斷指標，也進行矽藻實驗室的認證作業並完成矽藻鑑定操作標準書。會中參觀人士均肯定實驗所需耗費的心力，並給予指教，有人建議可增加屍體在水中的陰性對照組實驗。

會議期間並觀摩數場有關血清證物及 DNA 鑑定演講論文及論文壁報，聽取各項新近研究報告，與外國專家學者做專業交流與技術經驗分享，共 8 篇擇要如下：

1、A4：「Standardization of Spermatozoa Identification in Sexual Assault Cases Using a Fluorescence-Based Assay (在性侵害案件中使用螢光法鑑定精蟲)」：

作者利用螢光免疫染色法來鑑定精蟲，並且完成確效實驗，除了驗證出具專一性、靈敏性、可靠性和穩固性外，也可避免精蟲傳統鏡檢所需耗費的大量時間，而且最佳化實驗流程，避免耗費昂貴的螢光染劑，也發現透過螢光染色在顯微鏡下確認到 10 隻精蟲以上，即可從剪取的棉棒上萃取出 Male Profiler Plus 圖譜，當觀察到有 100 隻以上時，可從原剪取棉棒上獲得 Profiler Plus 圖譜。

2、A77：「comparison of methods to collect contact DNA from Fabrics (比較從纖維上蒐集 DNA 的不同方法)」：

作者比較從纖維上取得 DNA 的 3 種方法，分別是直接剪取、棉棒轉移和膠帶黏取，發現其中以直接剪取的 DNA 回收率最高，但是也很容易在 DNA 圖譜上產生非實驗者的外來型別。作者實驗的方法是請志願者穿上欲採集的恤衫，隔一段時間使用 3 種方法採集肩膀部位，再萃取 DNA 進行 PCR 複製及電泳分析。

3、A78：「Optimizing Extraction Techniques for the Retrieval of DNA From Evidence Swabs (最佳化證物棉棒的 DNA 萃取回收率)」：

作者想知道怎樣的方法可以使在消化中的棉棒產生更多的 DNA 回收率，分別比較改變反應溫度、反應時間或是在作用時隔一段時間用 Tip 去戳或者是把棉棒不斷重新浸泡，發現只有隔一段時間把棉棒不斷重新浸泡才有明顯提升回收率結果，並且發現消化 18 小時以上的棉棒其 DNA 產出率會下降。

4、A81：「Novel method of DNA extraction from bones assisted DNA identification of World

Trade Center victims (利用從 911 罹難者骨頭殘骸中萃取 DNA 的新方法以鑑驗身份)」：

作者為紐約法醫室的主持人，提到從 911 恐怖攻擊事件後到現在的遺骸比對近況，由於遺骸數量龐大，所以他們採用外包減輕鑑驗的壓力，並且也採用 Mini-STR、SNP 等新方法，試圖比對出未確認身份的遺骸。

5、A83：「Who needs gold? (誰需要金?)」：

作者想比較當檢體 DNA 含量很少甚至開始分解並且有可能含有抑制物時，市面上哪種聚合酶能合成出較好 STR 圖譜，分別蒐集了 AmpliTaq Gold、Ex Taq、Diamond Taq、Titanium Taq，結論 Ex Taq 的實驗結果跟 AmpliTaq Gold 的實驗結果差異不大。

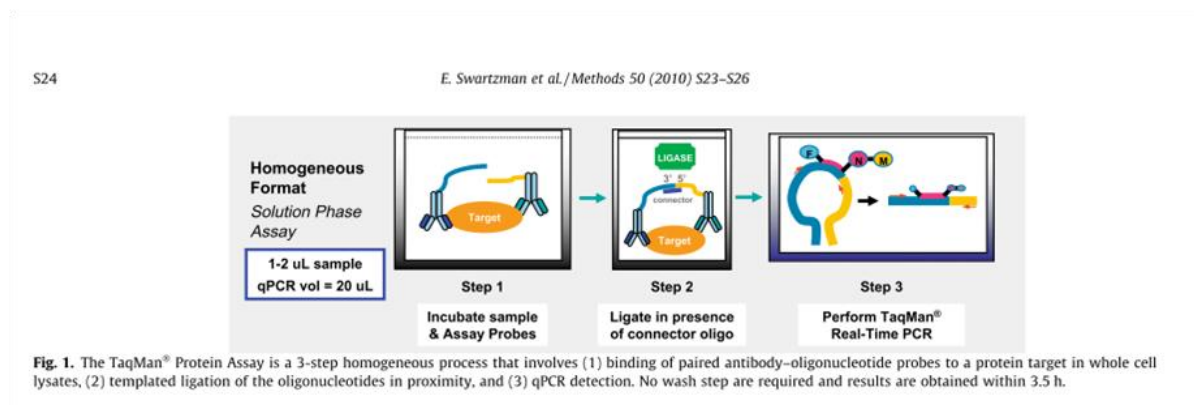
6、A93：「Development of a Single Mitochondrial DNA Amplification Strategy for Two

Platforms: Next Generation and Sanger Sequencing From the Same Amplicon Library(在次世代定序技術及傳統定序技術的兩種平台上發展單一線體 DNA 增幅策略)」：

第二代定序技術有別於第一代 SANGER 法在於反應的過程是即反應即偵測，不像 sanger 法反應過後，再經過毛細管電泳讀取，而且結合各種不同領域的技術，透過奈米技術外加光學偵測技術的成熟以及資訊科技的發達，使得定序能縮短到幾天內完成。目前第二代定序技術由三家廠商掌握，分別為 Roche/454、Illumina Applied Biosystems，主要定序策略亦為先解讀各小片段的基因序列，再運用資訊科技協助進行片段接合，達成整個基因組定序的目標。因此，首先透過基因工程的方法，將待定序的基因序列切成小片段，不同以往轉殖入細菌中放大，直接把小片段 DNA 接在奈米化產物上，然後進行各種 PCR 以快速增幅待測基因片段，爾後結合微製程、光學偵測與自動控制技術以不同定序原理的方法，迅速解讀大量的 DNA 序列。目前透過這種快速的定序技術，主要是想解決粒線體中 Heteroplasmy 的問題，利用 Roche/454 可區別出 99%比例和 1%比例的粒線體混和型。

7、A86：「Proximity Ligation RT-PCR (PLiRT-PCR) for the Forensic Detection of Spermatozoa (使用 PLiRT-PCR 來鑑定精蟲)」：

PLiRT-PCR 是一種結合免疫學和分子生物學的技术，在抗體上接上一段核苷酸序列，接著在有興趣的分子上設計出可以結合兩個相鄰抗原決定位(epitope) 的抗體，利用兩個相鄰抗體上的核苷酸序列再外加一段可以分別和兩段互補的核苷酸分子，接下來利用 Real-time PCR 的技术原理，透過 Reporter dyes 所激發出螢光強度會與每一個循環 PCR 增幅序列片段產物量成正比，來推算出有興趣分子的量(如下圖)，此實驗即欲透過分子生物學的方法試圖偵測精子細胞的量，避免傳統鏡檢需耗費大量時間。



8、A87：「Investigations on the Use of Tissue-Specific MicroRNA Markers to Determine the Wound-of-Origin of Bloodstains(發展具組織專一性的 MicroRNA 標誌來確認血跡的原始來源)」：

作者一開始是想能否用分子生物學的方法，來確認出留在犯罪現場的血跡是從哪個組織受傷產生的，避免血跡中的組織在顯微鏡下無法辨認，作者找到一個神經細胞特別的 MicroRNA 分子，然後設計出這個 MicroRNA 的 Primer，即可透過 PCR 反應來偵測，除了最佳化反應的步驟，也評估這個 Marker 的專一性，最後測試兩個分別來自胸口和頭部的槍傷，利用所噴濺出的血跡做實驗，結果只有頭部的槍傷能夠產生 PCR 產物。

肆、心得感想及檢討建議：

一、心得感想：

此次參與國際性會議，除了與各國專家進行學術交流及經驗分享外，亦見識到要舉辦一場成功的國際性會議實屬不易，與會人士來自全球各國，接受來自世界各地區的報名及投稿，包括網站系統建置、會場佈置、人員及時間配置、人員進出的管控及動線的安排是否順暢，均是相當重要且環環相扣的工作，足見會議籌備規劃的前置作業必須相當的縝密。

在看到各式各樣的論文後，深感國外研究機構所刊出的報告很具實驗精神，除了研究新方法外，更針對實驗中各種條件，進行實驗的改進，此外與會的人士多數為學校機構，透過學校機構可以深入的研究分子生物、病理、毒理等的機制，提供實務單位作為應用，然後實務機構多半提出使用心得及改善的目標，透過這樣的方式可以相得益彰，因此國內學術單位除了考慮在醫學及基礎科學上的應用，也可以考慮研究成果是否可用於刑事鑑識。而現在科技的進展都仰賴各種不同領域的結合，如現在的定序技術，是結合奈米、光學、分子生物的技術而成，雖然本文有提到目前商業化的第二代定序技術能尚在推廣中，但是已經有生技公司在發展第三代的定序技術，除了提供更快的定序速度，也希望定序技術能更普及。

此外見識到許多鑑識機構均有國際救災的經驗，充分表現出身為國際社會的一份子，除了展現人道關懷，也可以增加國際交流，如果我國以後在外交管道可以順暢的前提下，可以適時對受到大災難的國家詢問是否需要鑑識方面的協助。

二、檢討建議：

在通過實驗室認證後，除了繼續維持實驗室運行以達到實驗室設定的管理目標，更需透過國際研討會來學習新的知識和技術，使得本所鑑識水準能更上國際水準。

本所有幸每年均編有此項出國參加國際會議之經費預算，使本所能對外發表論文，參與國際會議，並有機會與各界鑑識專家接觸及學習。也希望法務部長官能持續支持本項經費，以提升我國法醫刑事鑑識水準，並邁向國際化，及國際地位的提

升。除觀摩法醫鑑識新科技與方法外，亦可評估選擇可供學習 DNA 鑑定等先進鑑識技術之刑事鑑識實驗室，未來或可派員前往學習相關鑑定技術。

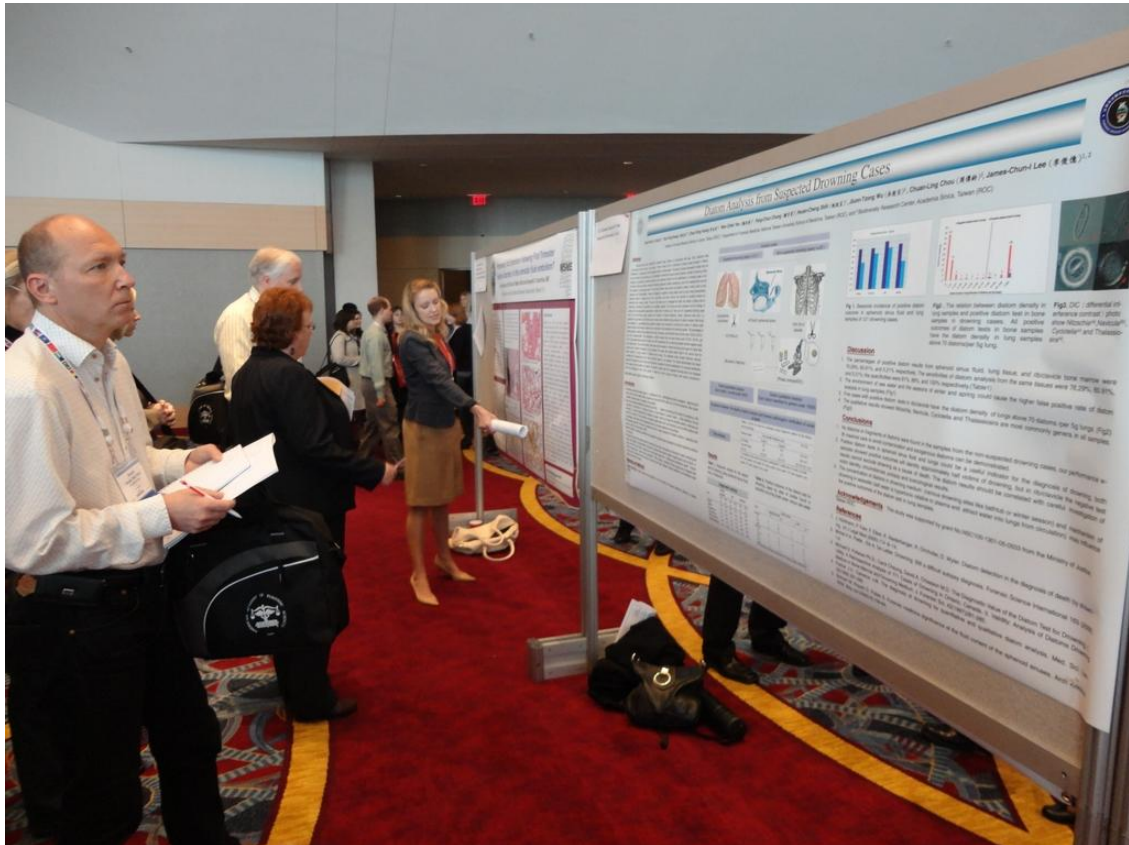
參考文獻：

1. American Academy of Forensic Sciences PROCEEDINGS 2012 VOLUME 18.
2. Workshop: Advanced DNA Mixture Interpretation and Statistical Approaches DNA Handbook.
3. Elana Swartzman and Mark Shannon, Expanding applications of protein analysis using proximity ligation and qPCR, Methods 50 (2010) S23 – S26.

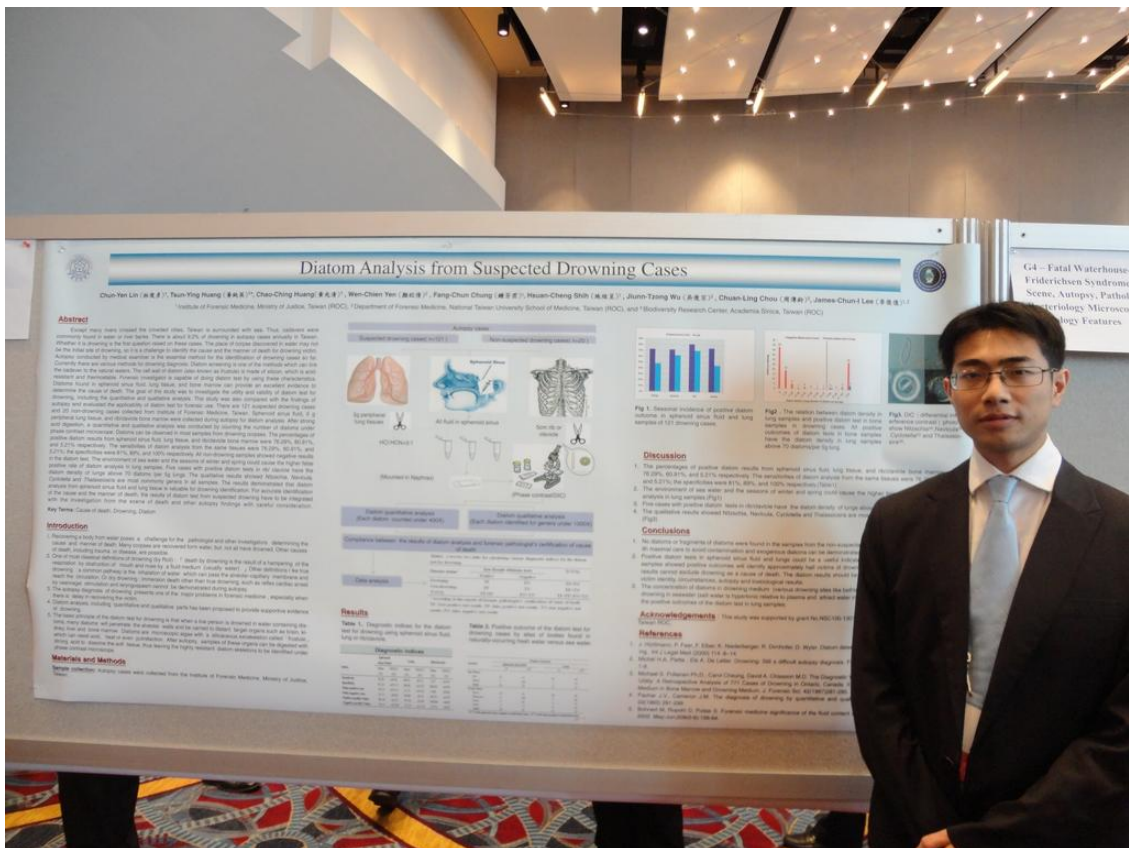
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說明：投稿壁報及筆者本人。

附件：

一、投稿摘要

Diatom Analysis from Suspected Drowning Cases

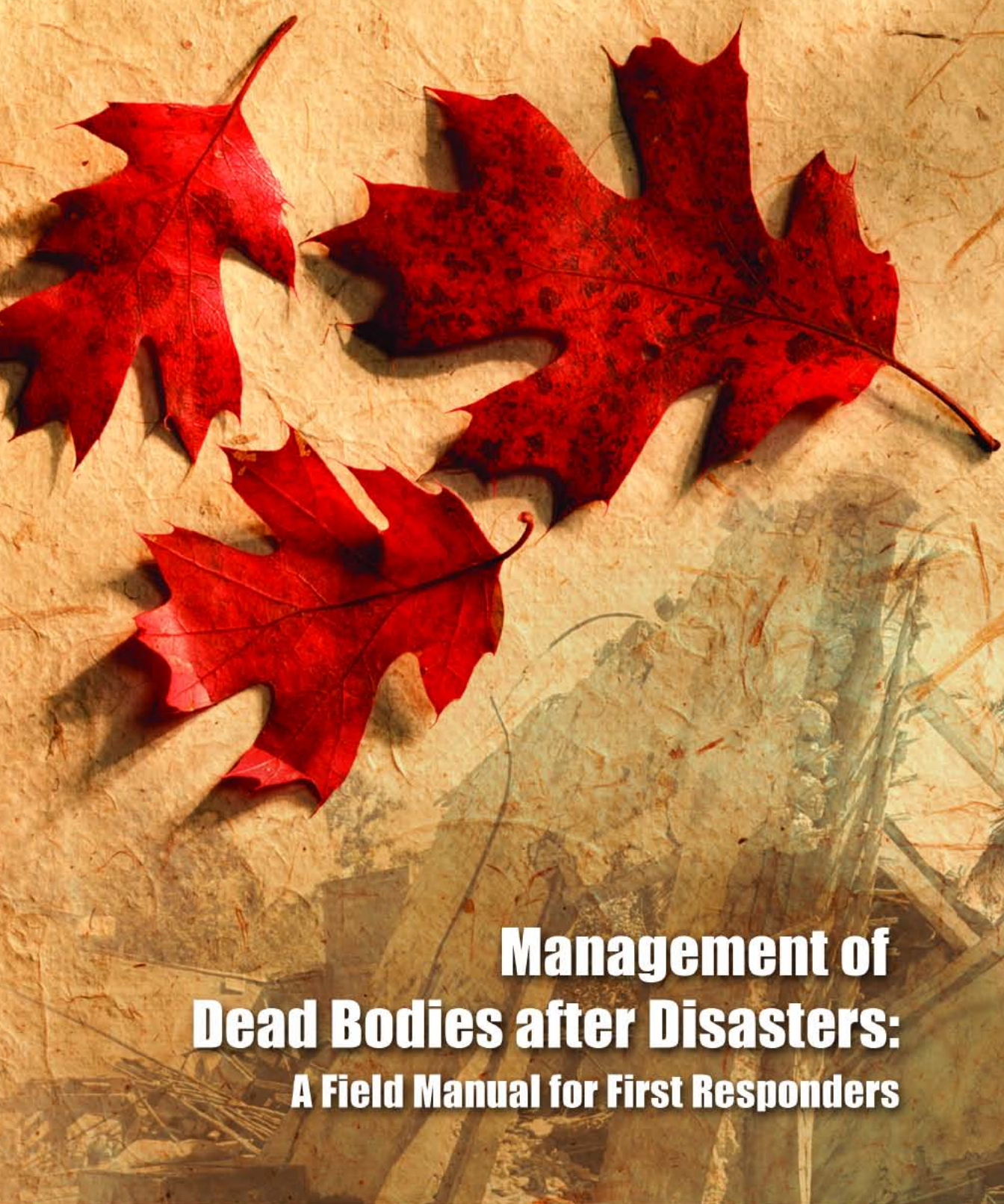
After attending the poster presentation, the attendees will get familiar with the utility and value of diatom test for the assistance of drowning diagnosis, including the quantitative and qualitative analysis of 105 suspected drowning cases.

This presentation demonstrates that diatom analysis from sphenoid sinus fluid, lung tissue and bone marrow is valuable for the diagnosis of drowning.

Except many rivers crossed the crowded cities, Taiwan is surrounded with sea. Thus, cadavers were commonly found in water or river banks. There is about 9.2% of drowning in autopsy cases annually in Taiwan. Whether it is drowning is the first question raised on these cases. The place of corpse discovered in water may not be the initial site of drowning, so it is a challenge to identify the cause and the manner of death for drowning victim. Autopsy conducted by medical examiner is the essential method for the identification of drowning cases so far. Currently there are various methods for drowning diagnosis. Diatom screening is one of the methods which can link the cadaver to the natural waters. The cell wall of diatom (also known as frustule) is made of silicon, which is acid-resistant and thermostable. Forensic investigator is capable of doing diatom test by using these characteristics. Diatoms found in sphenoid sinus fluid, lung tissue, and bone marrow can provide an excellent evidence to determine the cause of death. The goal of this study was to investigate the utility and validity of diatom test for drowning, including the quantitative and qualitative analysis. This study was also compared with the findings of autopsy and evaluated the applicability of diatom test for forensic use. There are 105 suspected drowning cases and 20 non-drowning cases collected from Institute of Forensic Medicine, Taipei, Taiwan. Sphenoid sinus fluid, 5 g peripheral lung tissue, and rib/clavicle bone marrow were collected during autopsy for diatom analysis. After strong acid digestion, a quantitative and qualitative analysis was conducted by counting the number of diatoms under phase contrast microscope. Diatoms can be observed in most samples from drowning corpses. The percentages of positive diatom results from sphenoid sinus fluid, lung tissue, and rib/clavicle bone marrow were 84.7%, 69.2%, and 6.2% respectively. The sensitivities of diatom analysis from the same tissues were 84.7%, 84.7%, and 6.2%; the specificities were 81%, 89%, and 100% respectively. All non-drowning samples showed negative results in the diatom test. The environment of sea water and the seasons of winter and spring could cause the higher false positive rate of diatom analysis in lung samples. Five cases with positive diatom tests in rib/ clavicle have the diatom density of lungs above 70 diatoms /per 5g lungs. The qualitative results showed *Nitzschia*, *Navicula*, *Cyclotella* and *Thalassiosira* are most commonly genera in all samples. The results demonstrated that diatom analysis from sphenoid sinus fluid and lung tissue is valuable for drowning identification. The diatom test for suspected drowning cases is a routine screening in Taiwan. For accurate identification of the cause and the manner of death, the results of diatom test from

suspected drowning have to be integrated with the investigation from the scene of death and other autopsy findings with careful consideration.

Key Terms: Cause of death, Drowning, Diatom



Management of Dead Bodies after Disasters: A Field Manual for First Responders



**Pan American
Health
Organization**

Regional Office of the
World Health Organization



**World Health
Organization**



ICRC



**International Federation
of Red Cross and Red Crescent Societies**

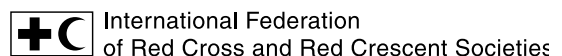
Management of Dead Bodies after Disasters: A Field Manual for First Responders

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1. CADAVER

2. NATURAL DISASTERS

3. DISASTER EMERGENCIES

4. DISASTER PLANNING

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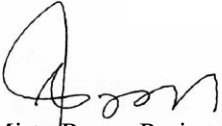
FOREWORD

Management of the dead is one of the most difficult aspects of disaster response, and natural disasters, in particular, can cause a large number of deaths. Although the humanitarian community has been aware of these challenges for over 20 years, the massive loss of life following the South Asian tsunami in 2004 highlighted limitations in our current capacity to respond. Several large natural disasters in 2005, including Hurricane Katrina in the United States, Hurricane Stan in Central America, and the earthquake in Northern Pakistan and India, further reveal the need for practical guidance.

Natural disasters frequently overwhelm local systems that care for the deceased. Consequently, the responsibility for the immediate response falls on local organizations and communities. The absence of specialist advice or mass fatality planning amplifies the problems, often resulting in the mismanagement of human remains. This is significant because the way victims are treated has a profound and long-lasting effect on the mental health of survivors and communities. In addition, correct identification of the dead has legal significance for inheritance and insurance that can impact on families and relatives for many years after a disaster.

This manual marks an important step toward promoting better treatment of victims and their families. It recognizes the vital role of local organizations and communities and the exceptionally difficult task of managing human remains following disasters.

We are pleased that the principles outlined in this document are being implemented and promoted by a variety of organizations, including the Pan American Health Organization, the World Health Organization, the International Committee of the Red Cross and the International Federation of the Red Cross and Red Crescent Societies.



Mirta Roses Periago
Director

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1. INTRODUCTION

This manual has two broad aims: first, to promote the proper and dignified management of dead bodies, and second, to maximize their identification. Following disasters, implementing simple measures early on can significantly improve the opportunity for successful identification. However, after the majority of disasters, the immediate management of human remains is done by local organizations and communities and not by specialist teams of national and international experts. Consequently, this manual focuses on practical recommendations for non-specialists.

Immediately after a disaster there is little time to read guidelines, so this manual dedicates one chapter for each key task and uses bullet-points for brevity and clarity. Local coordinators can photocopy and distribute the relevant chapters to individuals responsible for specific tasks, such as body recovery.

Throughout the manual we have chosen to use the term “dead bodies” 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.

This 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. These recommendations will also help communities for whom forensic expertise is unavailable to collect basic information that may aid identification of the deceased. Nevertheless, this manual does not replace the need for specialist forensic identification of victims.

2. COORDINATION

Overview

- ◆ Immediately after a disaster, emergency response is often chaotic and uncoordinated.
- ◆ Coordination is needed at several levels: local, regional/provincial, and national.
- ◆ Disaster preparedness plans may already have identified a coordination structure.
- ◆ Early coordination is vital for the following tasks:
 - ✱ Manage information and coordinate assessment activities.
 - ✱ Identify required resources (e.g., forensic teams, morgues, body bags, etc.).
 - ✱ Implement a plan of action for the management of dead bodies.
 - ✱ Disseminate accurate information to families and communities about identification of the missing and management of dead bodies.

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., local Governor, Police Chief, Military Commander, Mayor).
- ◆ The selection of Medical or Hospital Directors as coordinators should be discouraged as their primary responsibility is the care of the living and injured.
- ◆ Establish a team, within the Emergency Operations Center, 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 (Chapter 4).
 - * Storage (Chapter 5).
 - * Identification (Chapter 6).
 - * Information and communication (Chapters 7, 9 and 11).
 - * Disposal (Chapter 8).
 - * Support for families (Chapter 10).
 - * Logistics (Chapters 4, 5, 6 and 8).

Effective regional and national coordination

- ◆ As soon as possible, name a person as a national or regional coordinator and provide him or her with the appropriate authority for the management of dead bodies (e.g. Minister, Governor, 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, inter-governmental and international organizations (for example, United Nations, World Health Organization, International Committee of the Red Cross, International Federation of Red Cross and Red Crescent Societies and INTERPOL).

3. INFECTIOUS DISEASE RISKS

Overview

- ◆ After most natural disasters there is fear that dead bodies will cause epidemics.
- ◆ This belief is wrongly promoted by the media, as well as some medical and disaster professionals.
- ◆ Dead bodies do not cause epidemics after natural disasters.
- ◆ The political pressure brought about by these rumors causes authorities to use unnecessary measures such as rapid mass burials and spraying so-called “dis-infectants.”
- ◆ The consequences of mismanagement of the dead include mental distress and legal problems for relatives of the victims.
- ◆ The surviving population is much more likely to spread disease.

Infections and dead bodies

- ◆ Victims of natural disasters are normally killed by injury, drowning, or fire—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 postmortem.

Risk to the public

- ◆ The risk to the public is negligible because they do not touch dead bodies.
- ◆ There is the potential (but as yet undocumented) risk of drinking water supplies contaminated by fecal material released from dead bodies.

Risk to body handlers

- ◆ Individuals handling human remains have a small risk through contact with blood and feces (bodies often leak feces after death) from the following:
 - * Hepatitis B and C.
 - * 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:
 - * Use gloves and boots, if available.
 - * 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 Chapter 4 (Body Recovery) for recommendations about the use of body bags.

4. BODY RECOVERY

Overview

- ◆ Body recovery is the first step in managing dead bodies and is usually chaotic and disorganized.
- ◆ 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 Chapter 6, Identification of Dead Bodies.
- ◆ Body recovery only lasts a few days or weeks, but may be prolonged following earthquakes or very large disasters.

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 defense 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 identification (see Annex 1, Dead Bodies Form).
- ◆ Personal belongings, jewelry, and documents should not be separated from the corresponding remains during recovery, but only during the identification phase (see Chapter 6, 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.

Health and safety

- ◆ Body recovery teams should wear protective equipment (heavy-duty gloves and boots) and wash their hands with soap and water after handling dead bodies (see Chapter 3, 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 may be a particular problem in unvaccinated workers. Local medical teams should be on the alert for tetanus prone injuries.



Source: Oliver Morgan

*Protective equipment used for body recovery,
Banda Aceh, Indonesia, 2005.*

5. STORAGE OF DEAD BODIES

Overview

- ◆ Without cold storage decomposition advances rapidly.
- ◆ Within 12 to 48 hours in hot climates, decomposition will be too advanced to allow facial recognition.
- ◆ Cold storage slows the rate of decomposition and preserves the body for identification.

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 Box 6.1 in Chapter 6, Identification of Dead Bodies). Do not write identification numbers on bodies or body bags/sheets as they are erased easily during storage.

Refrigeration

- ◆ Refrigeration between 2°C and 4°C is the best option.
- ◆ Refrigerated transport containers used by commercial shipping companies can be used to store up to 50 bodies.
- ◆ 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 is lower than at the surface, thereby providing natural refrigeration.
- ◆ 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 1.5m deep and at least 200m from drinking water sources (see Chapter 8, Long-term Storage and Disposal of Dead Bodies).
 - * Leave 0.4m between bodies.
 - * Lay bodies in one layer only (not on top of each other).
 - * Clearly mark each body (see Chapter 6, Identification of Dead Bodies) and mark their positions at ground level.



AFP/Getty Images

Temporary burial of dead bodies in Thailand following the tsunami disaster on 26 December 2004.

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 on top of the bodies, even when wrapped, because it damages the body.
 - * 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 10 kg 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. 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).

6. IDENTIFICATION OF DEAD BODIES

Overview

- ◆ Identification of dead bodies is done by matching information from the deceased (physical features, clothes, etc.) with information from individuals who are missing or presumed dead.
- ◆ Mobilizing forensic resources may take 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 of the deceased is the simplest form of identification, but this is prone to errors. Therefore, whenever possible, it should be complemented with other means of forensic identification, albeit at a later stage.
- ◆ Forensic procedures (autopsies, fingerprinting, dental examinations, DNA) can be used after visual identification of bodies or photographs becomes impossible.
- ◆ The early work of non-specialists in managing the dead (especially proper recovery, documentation and storage methods) will determine much of the success of future identifications by forensic specialists.
- ◆ The Dead Bodies Identification Form in Annex 1 can be used to collect basic and invaluable information that will aid later forensic identification procedures.

General principles

- ◆ Sooner is better for victim identification. Decomposed bodies are much more difficult to identify and require forensic expertise.
- ◆ The key steps to identification as described below are: Unique reference number, Label, Photograph, Record, and Secure.
- ◆ It should be appreciated that visual recognition, while simple, can result in mistaken identifications causing serious embarrassment, distress to the bereaved and legal difficulties. It is always preferable to ensure that accurate identification is achieved by evaluating a combination of criteria and not solely on visual recognition.

- ◆ Injuries to the deceased, or the presence of blood, fluids, or dirt, especially around the head, will increase the chance of mistaken visual recognition.
- ◆ Any separate body part which proves that a person is dead can aid in the identification and should therefore be managed as though it is a whole body (i.e., using a unique reference number).

Processes

Unique reference (mandatory)

- ◆ Assign a sequential, unique reference number to each body or body part. Reference numbers must not be duplicated. (see Box 6.1, page 17 for a recommended numbering system).

Label (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).

Photograph (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.
- ◆ 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.

Minimum photograph set required for visual identification

A) Whole Face



B) Whole Body



C) Upper Body



D) Lower Body



Source: Pongruk Sitbanditmongkol / Photographer: Kunt Tongtarn Na Ayudhaya

Note: For the purpose of demonstration, photographs were taken of a volunteer and not of a deceased individual.

- * 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, and a scale, to calculate the size of features in the photo.

Record (mandatory)

- ◆ If photographs have been taken, record the following data together with the unique reference using the form in Annex 1: (Dead Bodies Identification Form):
 - * Gender (confirmed by looking at the genital organs).
 - * Approximate age range (infant, child, adolescent, adult, or elderly).
 - * Personal belongings (jewelry, clothes, identity card, driver's license, etc.).
 - * Obvious specific marks on the skin (e.g., tattoos, scars, birthmarks) or any obvious deformity.
- ◆ If no photographs have been taken, also record:
 - * Race.
 - * Height.
 - * Color and length of hair.
 - * Color of eyes.

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.

Identification and release of body to relatives

- ◆ To increase reliability of visual recognition, viewing conditions should mini-mize emotional stress to bereaved relatives.
- ◆ Although there may be no alternative following large disasters, the psychological impact of viewing dozens or hundreds of dead bodies may further reduce the validity of visual recognition.
- ◆ Viewing photographs of the highest possible quality may be a better approach.

◆ Release of a body:

- * A dead body should only be released when identification is certain.
- * Visual recognition should be confirmed by other information such as identification of clothing or personal effects.
- * Information collected about missing people can be used to cross-check visual recognition (see Annex 2, Missing Persons Form).
- * A body should only be released by the responsible authority, which must also provide documentation of the release (a letter or death certificate).
- * Record the name and contact details of the person or relatives who claimed the body together with the body's unique reference number.

Box 6.1 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). See Annex 3 for a list of sequential numbers.

Note: Details about where and when the body was found and the person/organization who found it should also be recorded on the Dead Bodies Identification Form (see Annex 1).

- * Bodies that can not be recognized by visual means, should be properly stored (see Chapter 5, 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.

7. INFORMATION MANAGEMENT

Overview

- ◆ State authorities bear primary responsibility for the proper handling of information about the dead and missing in disasters.
- ◆ A large amount of information is collected about the dead and missing, even after relatively small disasters. Necessary resources (human, technical, and financial) for information management must be provided.
- ◆ Management of information is a key role for coordination (see Chapter 2, Coordination).

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. 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 centers.
- ◆ A wide range of media can be used:
 - * The Internet.
 - * Notice boards.
 - * Newspapers, television, radio, etc.

Information about dead bodies

- ◆ Basic information must be collected about all dead bodies when possible (see Chapter 6, Identification of Dead Bodies, and Annex 1, Dead Bodies Identification Form).
- ◆ Early data collection may use paper forms (see data collection forms in Annex 1, Dead Bodies Identification Form and Annex 2, Missing Persons Form) and this information may be entered into an electronic database at a later stage.
- ◆ Information is likely to include valuable personal items and photographs.
- ◆ A chain of custody is required to avoid misplacement of information and ensure the availability of 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/known information of dead bodies (see Annex 1, Dead Bodies Identification Form and Annex 2, Missing Persons Form).

8. LONG-TERM STORAGE AND DISPOSAL OF DEAD BODIES

Overview

- ◆ All identified dead bodies should be released to relatives or their communities for disposal according to local custom and practice.
- ◆ Long-term storage will be required for remaining unidentified bodies.

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.
 - * 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 the following table. Distances may have to be increased based on local topography and soil conditions:

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.
- ◆ For very large disasters, communal graves may be unavoidable.
- ◆ Prevailing religious practices may indicate preference for the orientation of the bodies (i.e., 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 ground water 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.
 - * These distances may have to be increased depending on soil conditions.

9. COMMUNICATIONS AND THE MEDIA

Overview

- ◆ Good public communication contributes to a successful victim recovery and identification process.
- ◆ Accurate, clear, timely, and up-dated information can reduce the stress experienced by affected communities, defuse rumors, and clarify incorrect information (see Chapter 11, Frequently Asked Questions).
- ◆ The news media (TV and radio, newspapers and the Internet) are vital channels of communication with the public during mass disasters. Journalists, both local and international, often arrive soon after the disaster.

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).
 - * Cooperate 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 United Nations 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 well informed and may give conflicting information, especially 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 Chapter 11, Frequently Asked Questions).

Information management

- ◆ 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.

10. SUPPORT TO FAMILIES AND RELATIVES

Overview

- ◆ The dead and the bereaved should be respected at all times.
- ◆ The priority for affected families is to know the fate of their missing loved ones.
- ◆ 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 the families throughout the process.
- ◆ Mistaken identification should be avoided.
- ◆ Psycho-social support for families and relatives should be considered.
- ◆ Cultural and religious needs should be respected.

Identification of victims

- ◆ A family liaison focal point should be established to support relatives.
- ◆ 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 recognition 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

- ◆ Psycho-social 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 psycho-social 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.

11. FREQUENTLY ASKED QUESTIONS

Information for the public

1. Do dead bodies cause epidemics?

Dead bodies from natural disasters *do not* cause epidemics. This is because victims of natural disasters 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.

Information for workers

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

For people handling dead bodies (rescue workers, mortuary workers, etc.), 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.

Information for authorities

8. How urgent is the collection of dead bodies?

Body collection is not the most urgent task after a natural 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 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 of the media.

16. I am a journalist; how can I help?

If you hear comments or statements regarding the need for mass burial or incineration of bodies to avoid epidemics, challenge them. Consult PAHO/WHO, ICRC, the IFRC or the Red Cross/Red Crescent locally. Quote this and other publications. Please do not jump on the band wagon of alarmists spreading incorrect information. Be professional.

ANNEXES

Annex 1: Dead Bodies Identification Form

Annex 2: Missing Persons Form

Annex 3: Sequential Numbers for Unique Referencing

Annex 4: Body Inventory Sheet

Annex 5: Supporting Publications

**Annex 6: International Organizations Involved
in the Development of this Document**

**Annex 7: Mass Fatality Plan Checklist for Ministries of
Health and National Disaster Offices**

Note: Those interested in adapting or copying the forms in annexes 1-4 can consult or download them from the Internet, in MS Word or PDF format, at www.paho.org/disasters (click on Publications Catalog, and see the special page about *Dead Bodies in Disaster Situations*).

Annex 1

Dead Bodies Identification Form

Body/Body Part (B/BP) Code:

(Use unique numbering and include on associated files, photographs or stored objects.)

Possible identity of body:**Person Reporting**

Name:

Official Status: Place & Date:

Signature:

Recovery details (Include place, date, time, by whom, and circumstances of finding. Indicate if other bodies were recovered in the same area, including name and possible relationship, if identified)

B/BP Code:

A. PHYSICAL DESCRIPTION

A.1	General condition (mark one)	a	Complete body		Incomplete body (describe):		Body part (describe):	
		b	Well preserved	Decomposed	Partially skeletonized	Skeletonized		
A.2	Apparent sex (mark one and describe evidence)	Male	Female	Probably male	Probably female	Undetermined		
		Describe evidence (genitals, beard, etc):						
A.3	Age group (mark one)	Infant	Child	Adolescent	Adult	Elderly		
A.4	Physical description (measure or mark one)	Height (crown to heel):		Short	Average	Tall		
		Weight:		Slim	Average	Fat		
A.5	a) Head hair	Color:	Length:	Shape:	Baldness:	Other:		
	b) Facial hair	None	Moustache	Beard	Color:	Length:		
	c) Body hair	Describe:						
A.6	Distinguishing features: Physical (e.g., shape of ears, eyebrows, nose, chin, hands, feet, nails; deformities, missing limbs/amputation.) Surgical implants or prosthesis (artificial limb.) Skin marks (scars, tattoos, piercings, birthmarks, moles, etc.) Apparent injuries (include location, side.) Dental condition (crowns, gold teeth, adornments, false teeth.) Describe any obvious features.	Continue on additional sheets if needed. If possible, include a sketch of the main findings.						

B/BP Code:

B. ASSOCIATED EVIDENCE

B.1	Clothing	Type of clothes, colors, fabrics, brand names, repairs. Describe in as much detail as possible.
B.2	Footwear	Type (boot, shoes, sandals), color, brand, size. Describe in as much detail as possible.
B.3	Eyewear	Glasses (color, shape), contact lenses. Describe in as much detail as possible.
B.4	Personal items	Watch, jewelry, wallet, keys, photographs, mobile phone (incl. number), medication, cigarettes, etc. Describe in as much detail as possible.
B.5	Identity documents	Identity card, driving license, credit card, video club card, etc. Take photocopy if possible. Describe the information contained.

B/BP Code:

C: RECORDED INFORMATION

C.1	Fingerprints	Yes	No	By whom? Stored where?
C.2	Photographs of body	Yes	No	By whom? Stored where?

D: IDENTITY

D.1	Hypothesis of identity	Explain reasons for attributing a possible identity.
------------	-------------------------------	--

E: STATUS OF BODY

Stored	Specify morgue, refrigerated container, temporary burial; describe location:
	Under whose responsibility:
Released	To whom and date:
	Authorized by:
	Final destination:

Note: Those interested in adapting or copying this form, please download it, in MS Word or PDF format, at www.paho.org/disasters (click on Publications Catalog, and see the special page about *Dead Bodies in Disaster Situations*).

Annex 2

Missing Persons Form

Missing Person Number/Code: (Use unique numbering and include it on associated files, photographs or stored objects.)	
Interviewer name:	
Interviewer contact details:	
Interviewee(s) name(s):	
Relationship with missing person:	
Contact details Address: Telephone: E-mail:	
Contact person for missing person, if different from above: (who to contact in case of news: name/contact details)	

MP N°./Code: **Missing Persons Data****A. PERSONAL DETAILS**

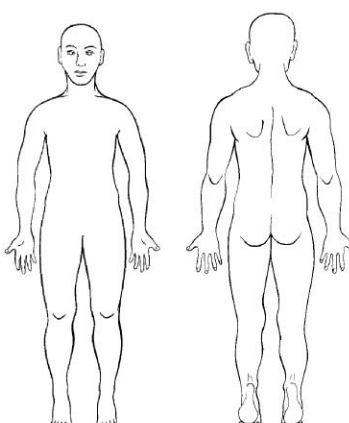
A.1	Missing person's name	Include surname, father's and/or mother name, nicknames, aliases:							
A.2	Address/Place of residence	Last address and usual address if different from the former:							
A.3	Marital status	Single	Married	Divorced	Widowed	Partnership			
A.4	Sex	Male	Female						
A.5	If female	Unmarried name: <table border="1"> <tr> <td>Pregnant</td> <td>Children</td> <td>How many?</td> </tr> </table>					Pregnant	Children	How many?
Pregnant	Children	How many?							
A.6	Age	Date of birth:			Age:				
A.7	Place of birth, nationality, principal language								
A.8	Identity document (Main details, N°, etc.)	If available, enclose photocopy of ID							
A.9	Fingerprints available?	Yes	No	Where:					
A.10	Occupation								
A.11	Religion								

B. EVENT

B.1	Circumstances leading to disappearance: (use additional sheet if necessary)	Place, date, time, events leading to disappearance, other victims and witnesses who last saw Missing Person alive (incl. name and address):				
	Has this case been registered/ denounced elsewhere?	Yes	No	With whom/where:		
B.2	Are other family members missing, and if so, have they been registered/identified?	List name, relationship, status:				

MP N°/Code: Missing Persons Data

C. PHYSICAL DESCRIPTION

C.1	General description (indicate exact measure, or approximate AND circle the corresponding group)	Height (exact/estimated?):		Short	Average	Tall
		Weight:		Slim	Average	Fat
C.2	Ethnic group/Skin color					
C.3	Eye color					
C.4	a) Head hair	Color:	Length:	Shape:	Baldness:	Other:
	b) Facial hair	None	Moustache	Beard	Color:	Length:
	c) Body hair	Describe				
C.5	Distinguishing features Physical e.g. shape of ears, eyebrows, nose, chin, hands, feet, nails; deformities	Continue on additional sheets if needed. Use drawings and/or mark the main findings on the body chart.				
	Skin marks scars, tattoos, piercings, birthmarks, moles, circumcision, etc.					
	Past injuries/amputations include location, side, fractured bone, joint (e.g., knee), and if person limped					
	Other major medical conditions operations, diseases, etc.					
	Implants pacemaker, artificial hip, IUD, metal plates or screws from operation, prosthesis, etc.					
	Types of medications used at time of disappearance					
						

MP N°/Code: Missing Persons Data

C.6**Dental condition**

Please describe general characteristic, especially taking into account the following:

- Missing teeth
- Broken teeth
- Decayed teeth
- Discolorations, such as stains from disease, smoking or other
- Gaps between teeth
- Crowded or crooked (overlapping) teeth
- Jaw inflammation (abscess)
- adornments (inlays, filed teeth etc)
- any other special feature

Dental treatment

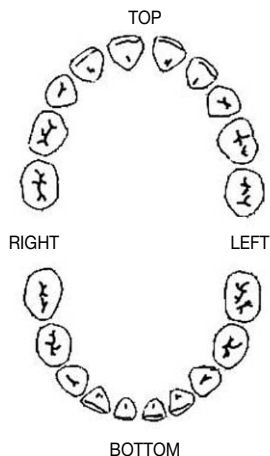
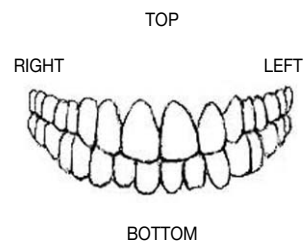
Has the Missing Person received any dental treatment such as

- Crowns, such as gold-capped teeth
- Color: gold, silver, white
- Fillings (incl. color if known)
- False teeth (dentures)- upper, lower
- Bridge or other special dental treatment
- Extraction

Also indicate wherever there is uncertainty (for example, the family member may know that an upper left front tooth is missing, but is unsure which one).

If possible, use a drawing, and/or indicate the described features in the chart below

If the missing person is a child, please indicate which baby teeth have erupted, which have fallen out and which permanent teeth have erupted and use the chart below

BABY/PRIMARY TEETH**ADULT/PERMANENT TEETH**

MP N°/Code: **Missing Persons Data****D. PERSONAL EFFECTS**

D.1	Clothing (worn when last seen/at time of disaster)	Type of clothes, colors, fabrics, brand names, repairs: describe in as much detail as possible.
D.2	Footwear (worn when last seen/at time of disaster)	Type (boot, shoes, sandals), color, brand, size: describe in as much detail as possible.
D.3	Eyewear	Glasses (color, shape), contact lenses: describe in as much detail as possible.
D.4	Personal items	Watch, jewelry, wallet, keys, photographs, mobile phone (incl. number), medication, cigarettes, etc: describe in as much detail as possible.
D.5	Identity documents (which the person was/might have been carrying when last seen/at time of disaster)	Identity card, driving license, credit card, video club card, etc. Take photocopy if possible. Describe the information contained.
D.6	Habits	Smoker (cigarettes, cigars, pipes), chewing tobacco, betel nut, alcohol, etc. Please describe, incl. quantity.
D.7	Doctors, medical records, X-rays	Give details of doctor, dentist, optometrist, or other.
D.8	Photographs of missing person	If available, enclose photos or copies of photos as recent and clear as possible, ideally smiling (with teeth visible). Also, photos of clothing worn when disappeared.

Note: The information collected in this form will be used for the search and identification of the missing person. Its content is confidential and any use outside of the intended context will need explicit consent by the interviewee.

Place and date of interview:

Interviewer signature: Interviewee signature:

If requested, a copy of this form with contact details of interviewer should be made available to the interviewee.

Note: Those interested in adapting or copying this form, please download it, in MS Word or PDF format, at www.paho.org/disasters (click on Publications Catalog, and see the special page about *Dead Bodies in Disaster Situations*).

Annex 3

Sequential Numbers for Unique Referencing

See Chapter 6, Box 6.1, for recommended unique numbering (place-team/person-number).
When using the list below, cross each number off the list when it is used to avoid using it twice.

001	051	101	151	201	251	301	351	401	451
002	052	102	152	202	252	302	352	402	452
003	053	103	153	203	253	303	353	403	453
004	054	104	154	204	254	304	354	404	454
005	055	105	155	205	255	305	355	405	455
006	056	106	156	206	256	306	356	406	456
007	057	107	157	207	257	307	357	407	457
008	058	108	158	208	258	308	358	408	458
009	059	109	159	209	259	309	359	409	459
010	060	110	160	210	260	310	360	410	460
011	061	111	161	211	261	311	361	411	461
012	062	112	162	212	262	312	362	412	462
013	063	113	163	213	263	313	363	413	463
014	064	114	164	214	264	314	364	414	464
015	065	115	165	215	265	315	365	415	465
016	066	116	166	216	266	316	366	416	466
017	067	117	167	217	267	317	367	417	467
018	068	118	168	218	268	318	368	418	468
019	069	119	169	219	269	319	369	419	469
020	070	120	170	220	270	320	370	420	470
021	071	121	171	221	271	321	371	421	471
022	072	122	172	222	272	322	372	422	472
023	073	123	173	223	273	323	373	423	473
024	074	124	174	224	274	324	374	424	474
025	075	125	175	225	275	325	375	425	475
026	076	126	176	226	276	326	376	426	476
027	077	127	177	227	277	327	377	427	477
028	078	128	178	228	278	328	378	428	478
029	079	129	179	229	279	329	379	429	479
030	080	130	180	230	280	330	380	430	480
031	081	131	181	231	281	331	381	431	481
032	082	132	182	232	282	332	382	432	482
033	083	133	183	233	283	333	383	433	483
034	084	134	184	234	284	334	384	434	484
035	085	135	185	235	285	335	385	435	485
036	086	136	186	236	286	336	386	436	486
037	087	137	187	237	287	337	387	437	487
038	088	138	188	238	288	338	388	438	488
039	089	139	189	239	289	339	389	439	489
040	090	140	190	240	290	340	390	440	490
041	091	141	191	241	291	341	391	441	491
042	092	142	192	242	292	342	392	442	492
043	093	143	193	243	293	343	393	443	493
044	094	144	194	244	294	344	394	444	494
045	095	145	195	245	295	345	395	445	495
046	096	146	196	246	296	346	396	446	496
047	097	147	197	247	297	347	397	447	497
048	098	148	198	248	298	348	398	448	498
049	099	149	199	249	299	349	399	449	499
050	100	150	200	250	300	350	400	450	500

Note: Those interested in adapting or copying this form, please download it, in MS Word or PDF format, at www.paho.org/disasters (click on Publications Catalog, and see the special page about *Dead Bodies in Disaster Situations*).

Annex 4. Body Inventory Sheet

[illegible]

Note: Those interested in adapting or copying this form, please download it, in MS Word or PDF format, at www.bahco.org/disasters (click on Publications Catalog, and see the special page about *Dead Bodies in Disaster Situations*).

Annex 5

Supporting Publications

de Ville de Goyet, Claude. 2004. Epidemics caused by dead bodies: a disaster myth that does not want to die. *Rev Panam Salud Publica* 15(5):297-299. Available at: http://publications.paho.org/english/editorial_dead_bodies.pdf

ICRC, 2004. *Operational Best Practices Regarding the Management of Human Remains and Information on the Dead by Non-Specialists*. Available at: www.icrc.org

ICRC, 2003. Report: *The Missing and Their Families*. Available at: www.icrc.org

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Annex 6

International Organizations involved in the development of this document

Pan American Health Organization, Regional Office for the Americas of the World Health Organization (PAHO/WHO), Area on Emergency Preparedness and Disaster Relief

In 1976, the Pan American Health Organization created this program in response to a call by the Member Countries to establish a technical unit to strengthen health sector disaster preparedness, response, and mitigation activities. The main objective of the Area on Emergency Preparedness and Disaster Relief has been to support the health sector in strengthening national disaster preparedness programs and coordinating all sectors involved in disaster preparedness. This support is channeled to the countries of Latin America and the Caribbean in three principal areas:

- ◆ *Disaster Preparedness.* Preparing the health sector to face disasters is a permanent and ongoing responsibility. Disaster preparedness enhances the capacity of the health sector to respond to all types of disasters, create awareness of the associated public health risks, and improve the knowledge and skills of all health actors. Technical areas of work include information dissemination and management, hospital disaster preparedness, mass casualty management, evaluation of damage and needs, and humanitarian supply management.
- ◆ *Risk Reduction.* PAHO/WHO encourages the Ministries of Health to promote a national culture of disaster prevention. Its own technical contribution focuses on the safety of health facilities. As an example, countries are urged to use existing knowledge and tools to build new hospitals with a level of protection that helps ensure they remain operational in disaster situations. They are also encouraged to examine the vulnerability of existing health facilities and incorporate appropriate disaster mitigation measures. PAHO/WHO applies this same strategic approach to risk reduction in water and sewerage systems to safeguard this critical infrastructure.
- ◆ *Disaster Response.* In disaster situations, PAHO/WHO mobilizes its extensive network of public health experts to survey damage and provide an authoritative assessment of health sector needs, conduct epidemiological surveillance, detect potential health risks, monitor water quality, and improve the overall coordination and leadership in the health sector. The humanitarian supply management system, SUMA, is activated to help bring order to the chaos that often results from the massive influx of international aid. PAHO/WHO also summarizes and publishes the lessons learned from major disasters in an attempt to improve the management of future emergency situations.

For more information, please visit: www.paho.org/disasters

World Health Organization, Health Action in Crises

Within WHO, the principal objective of the Health Action in Crises Department is to reduce avoidable loss of life, burden of disease, and disability in crisis-prone and crisis-affected countries. WHO works with local authorities, civil society, other international organizations, and NGOs in responding to the health aspects of crises. The major activities of WHO in a crisis are to:

- ◆ Measure ill-health and promptly assess health needs of populations affected by crises, identifying priority causes of ill-health and death;
- ◆ Support Member States in coordinating action for health;
- ◆ Ensure that critical gaps in health response are rapidly identified and filled;
- ◆ Revitalize and build capacity of health systems for preparedness and response.

WHO brings together expertise in epidemic response, logistics, security coordination, and management. It works in coordination with, and strengthens the response to health crises provided by other UN teams (typically the United Nations Children's Fund, United Nations Population Fund, United Nations Development Programme, United Nations High Commissioner for Refugees, International Organization for Migration, and the World Food Programme). Whether in Country Offices, Regional Offices, or at Headquarters, the WHO network for Health Action in Crises (HAC) provides information and services, and mobilizes partners to agree on standards and courses of action.

For more information, please visit: www.who.int/hac/en

International Committee of the Red Cross (ICRC)

The International Committee of the Red Cross (ICRC) is an impartial, neutral, and independent organization whose exclusively humanitarian mission is to protect the lives and dignity of victims of war and internal violence, and to provide them with assistance. This involves:

- ◆ Visiting prisoners of war and security detainees.
- ◆ Searching for missing persons.
- ◆ Transmitting messages between separated family member.
- ◆ Reuniting dispersed families.
- ◆ Providing safe water, food and medical assistance to those in need.
- ◆ Promoting respect for international humanitarian law.
- ◆ Monitoring compliance with that law.
- ◆ Contributing to the development of that law.

Established in 1863, the ICRC is at the origin of the International Red Cross and Red Crescent Movement. It directs and coordinates the international relief activities conducted by the Movement in situations of conflict. It also endeavors to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles.

For more information, please contact: www.icrc.org

The International Federation of Red Cross and Red Crescent Societies

The International Federation of Red Cross and Red Crescent Societies is the world's largest humanitarian organization, providing assistance without discrimination as to nationality, race, religious beliefs, class, or political opinions.

Founded in 1919, the International Federation has a membership of 183 Red Cross and Red Crescent societies, a Secretariat in Geneva, and more than 60 delegations strategically located to support activities around the world. There are more societies in formation. The Red Crescent is used in place of the Red Cross in many Islamic countries.

The Federation's mission is to improve the lives of vulnerable people by mobilizing the power of humanity. Vulnerable people are those who are at greatest risk from situations that threaten their survival, or their capacity to live with an acceptable level of social and economic security and human dignity. Often, these are victims of natural disasters, poverty brought about by socio-economic crises, refugees, and victims of health emergencies.

The Federation carries out relief operations to assist victims of disasters, and combines this with development work to strengthen the capacities of its member National Societies. The Federation's work focuses on four core areas: promoting humanitarian values, disaster response, disaster preparedness, and health and community care.

The unique network of National Societies—which cover almost every country in the world—is the Federation's principal strength. Cooperation between National Societies gives the Federation greater potential to develop capacities and assist those most in need. At a local level, the network enables the Federation to reach individual communities.

The Federation, together with National Societies and the International Committee of the Red Cross, make up the International Red Cross and Red Crescent Movement.

For more information, please visit: www.ifrc.org

Annex 7

Mass Fatality Plan Checklist for Ministries of Health and National Disaster Offices

The Pan American Health Organization has developed a checklist on mass fatalities that can serve as an annex to any National Health Sector Emergency Management Plan or National Disaster Management Plan. It is based on the London Resilience Mass Fatality Plan, 2006 and Management of Dead Bodies after Disasters: A Field Manual for First Responders.

The checklist contains the essential elements that should be addressed by Ministries of Health and Disaster Management Offices as they develop a mass fatality plan. The plan does not need to be standalone; it can be an annex to the National Disaster Management Plan. As such, the mass fatality annex only needs to focus on elements unique to a mass fatality.

It is important that countries exercise their plans on a regular basis to evaluate organization's capability to execute one or more portions of the plan and to promote preparedness.

Recommendations for Organizing the Plan: We recommend that the plan can be organized first by "essential elements" with specific activities to deal with fatalities caused by various types of disasters.

The Essential Elements

I. Introduction and Purpose

- ◆ Outline the purpose of the plan.
- ◆ List assumptions of a Mass Fatality Plan.
- ◆ Define the scope of the plan and local hazards that can create mass fatalities, i.e. type, frequency, level of impact, etc.
- ◆ List members of mass fatality coordination committee/key partners, stakeholders in the planning and implementation process.

II. Activation

- ◆ Describe the activation process and identify who or what agency will be responsible for activating the Plan, i.e. Same authority as in the National Health Sector

Emergency Management Plan or the National Disaster Management Plan.

- ◆ Include a call out chart and attach roles and responsibilities to each individual for this phase of the plan.

III. Command and Control

- ◆ Discuss with local health, law enforcement and disaster management officials where/how mass fatality fits in with national plans.
- ◆ Discuss role of health authorities, NGOs and national disaster offices during mass fatalities.
- ◆ Discuss legal authority for handling of dead bodies from the point of examination by a physician/pathologist to the actual burial process. Consider the investigative needs of law enforcement agencies.
- ◆ Outline the local incident command structure and provide an organizational chart for chain of command, including operations, logistics, planning, and finance/administration. Reference all hazards/emergency operations plan as appropriate.

IV. Logistics

- ◆ Consider arrangements for providing transportation for the movement of the deceased/remains/personal effects.
- ◆ Storage facilities for temporary morgues may involve the commandeering of 20/40 ft refrigerated containers. Remember that each container has limited capacity and requires considerable quantities of fuel – the cost of which can be substantial.
- ◆ Emergency communications with all relevant parties must be done through secured channels that are not easily accessible by the media and general public.
- ◆ Provision of resources – are there national/regional stocks available that can be used i.e. coffins, body bags, waterproof labels, dry ice etc.
- ◆ There may be the need for provision of portable electrical supply and water to field sites.
- ◆ Designate a trained individual supporting team members to manage and oversee logistical arrangements.
- ◆ Identification of local and regional technical specialists/resources and arrangements for obtaining their services through agreements.

V. Welfare

- ◆ Mention provisions that will be made for handling the welfare needs of family and friends including a designated area for viewing/identifying bodies (consider cases where bodies have to be isolated as in the case of some epidemics).
- ◆ Discuss with the medical examiner the process involved in releasing or allowing for burial of the dead and the recognized forms of burial in the country. Ensure that provisions are made in the plan for addressing local cultural and religious needs of the community.
- ◆ Include linkages with local Crisis Intervention Teams or psycho-social support teams and define procedures for their activation based on level of assistance that they can provide.

VI. Identification and Notification

- ◆ Identify a team of persons from law enforcement, health authority, social services etc. who can serve to identify the deceased (with use of forensic procedures), securing the remains and reuniting with family/friends. Consider the local rescue and recovery procedures in place and how these will be linked to the work of this team. A physician or pathologist should determine how partial remains would be handled and these decisions included in the plan.
- ◆ Include information regarding the legal rights of the deceased, e.g. Law Enforcement Acts, Interpol Resolution AGN/65/res/13 (1996), humanitarian laws and other ethical and social norms.
- ◆ Arrangement for viewing of bodies should be included, facilities identified and arrangements for setting these up as well. Consider how the bodies will be stored and presented and who will be responsible for these activities.
- ◆ The matter of investigation should be carefully considered and the relevant information included – review legislation relevant to inquests, registration of death, insurance procedures, criminal actions etc.
- ◆ The plan should consider disaster situations when specialist identification teams are not available or the scale of the disaster exceeds local capacity. Arrangements for external assistance and/or local arrangements to facilitate identification at the local level should be considered.

VII. International Dimensions

- ◆ Mass fatality incidents may involve foreign nationals. These may be foreign work-

ers living in the affected areas, tourists, illegal immigrants or relatives of affected families.

- ◆ The mass fatality plan should be distributed to foreign embassies or consulates of countries from which large tourist populations arise.
- ◆ Many countries deal with illegal immigrants on a regular basis and therefore procedures should be available to support this element of the plan. Include all provisions for repatriation of victims to home country – consult with Immigration and Attorney General’s chambers and consider finances for such actions.
- ◆ Department of Foreign Affairs or Governor’s Offices should be consulted on arrangements for returning victims who are nationals from your country who died in the country where the disaster has occurred. Arrangements for receiving these victims should be included in the plan and provisions for handling the deceased once they have been received .
- ◆ Consider special arrangements that may be required such as embalming and how the death certificates will be issued.
- ◆ In the event that tourists or high level officials are involved and their remains are being shipped, consideration must be given to the sensitivity of such situation and the controlled release of information to the local and international media. Consult the Pan American Health Organization/World Health Organization resolution on the International Transportation of Human Remains (1966) (www.interpol.int/Public/DisasterVictim/Guide/appendices.asp#c).
- ◆ Identify the national and regional INTERPOL counterparts and define arrangements for requesting their assistance when required.

VIII. Site Clearance and Recovery of Deceased Victims

- a. Clearly define procedures for photographing victims/body parts and placement of proper identification tags – what tagging system will be used as per police procedures and who will be responsible for keeping accurate records of these. Also consider where these procedures will take place (collection point) and provision of adequate security measures.
- b. Procedures for photographing, labeling and securing personal effect must also be included in the plan – who will be responsible for these processes? Most likely assigned to the Police. Are resources available such as digital cameras with sufficient memory?
- c. Provisions should be made for a victim audit (may be advisable to have an external group to the police) to verify that the correct procedures were followed. The plan must define who, where and how this will be performed.

- d. In certain situations such as criminal and/or terrorist attacks the disaster site must be preserved for investigative purposes – whose responsibility will this be and how will it be done, This should be outlined in the plan in a step by step format – consult with a law enforcement agency on this matter.

IX. Mortuary

- e. For storage and body preparation local morgue facilities and funeral homes – location, capacity, resources etc., should be listed in the plan with relevant contact details. Transportation to these facilities must be considered. The plan should consider the development of national/regional stocks of coffins, body bags etc. MOUs can be developed with private morgue/funeral homes and included as part of the plan. Consult with Attorney General's Chambers on these arrangements.
- f. Ensure that the plan addresses issues such as individuals who die while being transported and those who die in hospitals as a result of injuries sustained from the disaster. In some countries they are passed through the same procedures as those who have died at the disaster site.
- g. Consider arrangements for handling the media and for security at these facilities.
- h. A general principle should be applied – hospital mortuaries should **NOT** be used unless numbers are manageable especially in the case where there is only one available hospital. Temporary mortuary facilities should also be considered.
- i. Ensure that law enforcement agencies identify and provide procedure for securing routes for transporting victims to identified morgue facilities.

X. Disposal Final Arrangements

- ◆ Procedures for returning the deceased to families must be clearly defined – these can be provided by the physician/pathologist. The wishes of the family for returning partial remains must also be considered.
- ◆ Discussions should take place with the physician/pathologist and social welfare or other relevant local agencies regarding the disposal/burial of unclaimed victims/remains. The legal issues must be considered and discussed with the Attorney General's Chambers. Ensure that these are clearly documented in the plan.

XI. Chemical Biological Radiological Nuclear (CBRN)

- ◆ Include procedures for handling such events including how remains should be han-

dled, personal protective equipment, decontamination requirements and procedures and ongoing monitoring of the site and any remains or items removed and where cold storage facilities can be located.

- ◆ Consider decontamination arrangements for vehicles and other storage equipment and facilities and environmental impacts along with requirements for evacuation or isolation of surrounding communities.
- ◆ Arrangements with external agencies may have to provide for risk assessments and advice on viewing, return of bodies, burial, cremation and repatriation. Identify such agencies in the plan and establish MOUs accordingly.

XII. Public Information and Media Policy

- ◆ Many countries have National Public Information Plans and Policies. These can be applied to this element of the plan. Official statements should be channeled through the relevant media centers either at the National Emergency Operations Centre (NEOC) or incident command post in the field. Information from all sites, i.e. mortuary, hospital, family viewing areas, should be channeled to the NEOC for compilation.
- ◆ Media should be restricted from entering mortuary facilities or crisis intervention centers/family viewing areas – include procedures for securing these areas and for channeling information to the media center.
- ◆ Procedures for releasing names of deceased should be clearly defined in the plan especially considering large numbers of unidentified deceased victims. Provisions should be made for setting up facilities for the public to enquire about missing/deceased persons and these site should be away from the hospital and mortuary.

XIII. Health and Safety

- ◆ Consider provisions for the welfare and psychological needs of responders – the local Crisis Intervention Teams or mental health services can lend support in this area. Consider how volunteers from the Red Cross and other similar services can be accommodated to provide such support – once they are trained.
- ◆ There may be a need to identify and equip rest areas – whose responsibility will this be and how will the resources be acquired should be established locally.
- ◆ Provision should also be made to determine how responders who have lost family members and friends will be handled and by whom.

XIV. Disaster Mortuary Plan

- ◆ In many countries it is the responsibility of the Police to set up and manage the documentation of the deceased at the mortuary and for evidential continuity. Relevant forms, procedures and a layout of the mortuary should be included in the plan.
- ◆ In the event of a large scale event involving numerous victims it may be necessary to establish a mortuary management team. The composition of the team should be included in the plan along with call out procedures and responsibilities for each individual.
- ◆ Include as part of this element the mortuary procedures to be followed: Registration and arrival, storage, examination and photographing, cleaning of body, radiography, fingerprints, Odontology, re-bagging, embalming, viewing, release of body, bodies not claimed, repatriated bodies, DNA and toxicology, documentation, securing of property, equipment list, waste disposal, staffing, visitors, health, safety and welfare.

Management of the dead is one of the most difficult aspects of disaster response. It has profound and long-lasting consequences for survivors and communities. Globally, disasters claim thousands of lives each year. However, care of the deceased is often overlooked in disaster planning and the absence of guidance for first responders has recently been highlighted following several large disasters.

Immediately after a major disaster, identifying and disposing of human remains are often done by local communities. Forensic specialists may not be available or unable to rapidly access the affected area. There are simple steps that first responders can take to ensure the dead are treated in a dignified way and that can assist in their identification.

This *Field Manual for First Responders* presents simple recommendations for non-specialists to manage the recovery, basic identification, storage and disposal of dead bodies following disasters. It also makes suggestions about providing support to family members and communicating with the public and the media.

This manual will be useful during the immediate response to a disaster and where forensic response is unavailable. Furthermore, it will be useful for those preparing mass fatality disaster plans. The recommendations are relevant for local, regional and national authorities as well as for non-governmental organizations.

The principles outlined in this document are being implemented and promoted by a variety of organizations, including the Pan American Health Organization, the World Health Organization, the International Committee of the Red Cross and the International Federation of Red Cross and Red Crescent Societies.

This document can be viewed on Internet at:
www.paho.org/disasters (click on Publications Catalog)



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