

出國報告（出國類別：出席國際會議）

## 參加 2010 年美國法醫師年會 報告書

服務機關：法務部法醫研究所

姓名職稱：蕭開平/組長

派赴國家：美國

報告日期：99 年 12 月 30 日

出國期間：99 年 10 月 01 日至 99 年 10 月 06 日

## 目 次

壹、會議目的：.....	3
貳、會議過程：.....	4
參、專題演講：.....	6
一、演講論文內容.....	6
二、發表演講論文.....	12
肆、心得與建議.....	14
伍、附件.....	17

## 壹、會議目的：

法醫師國際協會(National Association of Medical Examiners-NAME)是一個位於美國，職掌死因研究的國際性組織。此國際間最大的法醫師協會創立於1966年，旨在培育專業的法醫師於死因偵查上，並且宣導專業知識、技術新知對法醫科學進步的重要性。此國際性協會成員的範圍不只全美，更擴及全世界，成員包含法醫師、法醫調查員、法醫行政管理人等。為了促進法醫科學、刑事鑑識科學、死因研究的學術交流、案例討論與經驗分享，在每年秋季會舉辦一年一次，為期一週的研討會。本次會議為『第四十四屆美國法醫師年會』於2010年10月01日至06日在美國俄亥俄州第一大城-克里夫蘭(Cleveland)舉行，參與盛會的專家來自美國、加拿大與世界各個國家，參加成員主要為各地的法醫病理醫師，其他的專長涵蓋各個領域，包括醫師、律師、牙醫師、毒物學家等。本會議主要目的是要推動美國法醫學的發展及提升法醫相關人員的專業水準。藉由參與國際會議學習法醫科技新知，並與法醫病理及病理學專家學者交換世界法醫學最新發展趨勢，汲取各國的實務經驗，建立國際交流管道，也將台灣法醫發展的最近專業學識領域與技術包括墜落動力學研究、交動事故3D動畫製作與骨質刀痕鑑定技術宣揚並推廣於國際法醫鑑識界。本次會議並發表口頭研究報告1篇：『1999至2008年間臺灣地區毒藥謀殺案例探討(Murder by Poison-Taiwan Experience (1999-2008)；蕭開平、鍾芳君、鐘如惠、曾柏元、潘至信)\_』，並藉此案介紹法醫現代鑑識實例及現況，以提升台灣法醫學與法

醫科學的國際地位。

## 貳、會議過程

本年度會議為『第四十四屆美國法醫師年會』於 2010 年 10 月 01 日至 06 日在美國俄亥俄州第一大城-克里夫蘭(Cleveland)舉行，有來自世界各國的人與會，參加人數為數百人，學術報告約 74 篇，壁報論文約 22 篇。會議包括專題研討會、workshop 分組討論、演講論文、壁報論文。分組討論及研討會達數十個場次，壁報論文則在展覽會場四周舉行。此次行程參與的演講場次包含：美國法醫科學的演進 (Evolution of Forensic Science in the U.S.-The Cleveland Connection)；克里夫蘭第一起連續殺人案：分屍殺人魔- The Kingsbury Run Murders (Cleveland's First Serial Killing: The Torso Murderer-The Kingsbury run Murders)；八件 H1N1 流行性感冒病毒致死案例之解剖發現 (Autopsy Finding in Eight Patients with Fatal H1N1 Influenza)；外傷性脊神經受損的死亡原因和死亡方式：全美州法醫辦公室的 20 年回顧性研究 (Cause and Manner of Death in Traumatic Spinal Cord Injuries)；不明原因死亡之女演員的死因探討 (Unexpected Death in an Actress with Unanticipated Findings)；實驗室犯罪現象 (Laboratory Crime Scene)；共同解決突然致死事件-從有十年基礎的心臟病學，法醫病理學，及緊急用藥教訓中學習 (Solving Sudden Death Together : Lessons from a Decade-Long Community-based Cardiology, Forensic Pathology and Emergency Medicine Collaborative)；青少年死後的基因檢測-拯救了死者的胞弟(Post-Mortem Genetic Testing of Teenager Saves Little Brother)；驗屍後

基因檢測/DNA 銀行之準則-針對年輕人的突發性心臟病致死案例 (Guideline for Postmortem Genetic Testing/DNA Banking. Focus on Sudden Cardiac Death in the Young)；發展尿液或體液(腦脊髓液)於濫用藥物的篩檢方法：回顧性研究 (Analysis of Usage of a Tableside Urine Drug Screen Immunoassay at Autopsy: A Retrospective Review)；美國印第安納州的畜牧產業相關死亡案：解剖與死亡現場調查的案例報告 (Farm Related Deaths in East Central Indiana: Case Reports with Autopsy and Scene Investigation)；以致息性氣體自殺之案例探討 (Suicide is a Gas, Gas, Gas!)；設計法醫解剖場所的考量因子 (Design Consideration For Medicolegal Autopsy Facilities)；大都市中經濟困苦對自殺率的影響 (Effect of Economic Hardship On Suicide Rates in a Major Metropolitan Area)等等的 22 場演講。並且在 2010 年 10 月 5 日發表口頭研究報告 1 篇：1999 至 2008 年間臺灣地區毒藥謀殺案例探討(Murder by Poison-Taiwan Experience (1999-2008)；蕭開平、鍾芳君、鐘如惠、曾柏元、潘至信)，分享台灣區濫用藥物與致死性化學物質死亡案例的流行病學研究。

參、專題演講

一、重要論文演講摘錄：

(一) 發展尿液或體液(腦脊髓液)於濫用藥物的篩檢方法：回顧性研究

**(Analysis of Usage of a Tableside Urine Drug Screen Immunoassay at Autopsy: A Retrospective Review)**

Tableside Urine Drug Screening 在屍體解剖上是一個實用的即時分析工具 (real time tool)，是一個對個案具有即時策略性偵查分析的方法。並且可即時釐清或排除死亡案件有藥物之相關性，卻在屍體解剖後即可判定死亡方式如自然死亡的情況。在美國自然死亡案件中有 77% 死者夾帶有毒藥物反應，但卻以嚴重心臟病為死因，最後仍以自然死亡直接結案而沒有等毒物報告出來。特別在像是紐約市這種法律框架下對開立死亡證明的時間非常緊迫的區域，(一般死亡證明書必須要在三天之內開立完成，就算死因是未確定的狀況以完成後續的遺體處理程序)。而快速的藥物篩選能有效的降低死亡證明是未確定(uncertain cause of death) 的案件數。此篩檢方法也有重要的考量因素存在：個案的選擇；呈現偽陰性或偽陽性結果的可能；或能洞察那些不確定的檢測卻呈現過份自信判定的情況；尿液檢體在有些案例中無法取得，而以腦脊髓液為檢體，但此檢體還未被確認是否合適；嬰兒較無尿，容易無藥物反應。

此 Tableside 試驗已經在 2006 年於 Onondaga County Medical Examiner's Office 施行。藥物篩選包含 10 種主要的藥物/類別：安非他命-amphetamine、甲基安非他命-methamphetamine、迷幻性藥物-天使塵(phencyclidine:PCP)、鴉片類藥

物-opiates、大麻類藥物-cannabinoids、古柯鹼-cocaine、鎮定安眠藥物  
-benzodiazepines、抗癲癇藥物-barbiturates、美沙酮-methadone、三環抗憂鬱劑  
-tricyclic antidepressants。

此回顧性研究是在一年內連續的狀況下施行，以尿液和腦脊髓液作為檢體。藥物篩選結果會和毒物檢測結果作比較去偵測初步的偽陽性或偽陰性結果。

## (二) 外傷性脊神經受損的死亡原因和死亡方式：全美州法醫辦公室的 20 年回顧性研究

### **(Cause and Manner of Death in Traumatic Spinal Cord Injuries : A 20 year Retrospective Review at a Statewide Medical Examiner Office)**

本篇報告探討有外傷性脊神經受損(Spinal Cord Injuries : SCI)之死者的死亡案例中流行病學趨勢、死亡原因、死亡方式的決定和執行診察的方法。近期的 SCI 研究對決定死亡原因(COD)和死亡方式(MOD)的影響也在報告中被討論。

在美國有近 250,000 人患有 SCI 且死亡發生幾乎與此相關。利用全美國法醫所(Medical Examiner's Office)的電子資料庫檢索 1989 到 2008 年中共有 305 個 SCI 案例，其中男性占 81%而女性占 19%。患有 SCI 的種族幾乎與新墨西哥的人口分佈一致，而主要死亡年齡(53 歲)並不會因性別不同而有顯著差異。死亡案例中有 38.7%會進行解剖，剩下的 61.3%則會進行外觀調查(屍體相驗)。SCI 案例中死亡方式為意外死占 80%；他殺占 7%；自然死占 4%；未確定占



2%。而最普遍的 SCI 死亡原因是汽車事故(42.6%)；fall from a standing height(12.8%)；fall from above a standing height(9.2%)；槍傷(8.8%)；dividing accidents(4.6%)；摩托車事故(4.6%)。SCI 患者的平均存活時間明顯因死亡方式不同而有差異( $p=0.03$ )：他殺案的存活時間最短(8.6 年)；意外和自殺案的存活時間分別是 11.4 年和 11.7 年；自然死的最長(22.2 年)。而 SCI 死亡原因的不同也顯著的影響患者的平均存活時間( $p=0.0001$ )：汽車事故是 14.4 年；槍傷 11.4 年；fall from above a standing height 是 9.1 年；fall from a standing height 為 0.7 年。男性在患有 SCI 後傾向比女性存活時間長。並且 18 歲以下的患者平均存活時間是 24.3 年，而 60 歲以上的患者平均存活時間是 2 年，可見年紀越輕的患者存活時間也較長。另外也發現美國過去 20 年來患有 SCI 的患者平均存活時間顯著呈現增加的趨勢。

近期研究指出患有 SCI 的病人比不患此病的人有更高的風險提早死於心血管疾病，這是由於他們的血壓和代謝異常(如抗胰島素，糖尿病)所致。總結而論，利用全美國法醫所的資料來研究外傷性脊神經受損的死亡型式，可提供良好的流行病學資料在病歷追蹤上，並提供預防 SCI 的可行計畫。

### **(三) 克里夫蘭第一起連續殺人案：The Torso Murderer- The Kingsbury Run Murders**

#### **(Cleveland's First Serial Killing: The Torso Murderer-The Kingsbury run Murders)**

這篇報告呈現關於一起發生在 1930 年代克里夫蘭 Torso Murders 的法醫師

協同驗屍官調查及執法研究。研究內容將會對在當時最有才智的專家：法醫學領域的 Cuyahoga County Coroner Samuel R. Gerber, M. D.及司法領域的 Elliot Ness 都面對的挫折進行討論。並且藉由比較克里夫蘭第一起連續殺人案之間的相似和不同點來強調法醫學在死因鑑定的優勢。

在 1935 到 1939 的五年間，12 具屍體在克里夫蘭的 Kingsbury Run 地區被發現。穿越克里夫蘭東邊的 Kingsbury Run 在那時是個貧瘠的蠻荒之地，有些地方達 60 英尺深。不要的垃圾、報紙、錫罐、輪胎甚至是報廢的汽車都被棄置在那裏。流浪漢、遊民和無家可歸的人流連在此。許多屍體在這附近被找到，大部份的受害者遺體已腐敗，有許多在軀體被攔腰截斷，幾乎所有受害者都被斬首且有些情況是永遠找不到頭部，還有四肢或生殖器官被截斷的情形。受害者的年齡從 20 初到 40 中都有，共通點是通通是白人且絕大多數是男性。執法官認為這所有殺人案件的兇手都是同一人。屍體調查結果透露出軀體的支解和截斷是由某個熟悉解剖學的人所為。但至今大部份的身體依然還未找齊，且令人難過的是這些受害者並不被他們的家人或朋友所懷念。這起駭人聽聞的連續殺人案的兇手目前還未抓到。然而卻大量存在關於像誰是嫌疑犯之類的推測。最近克里夫蘭社區又處在另一起發生於城市東邊，位於 Imperial Avenue 屋內的連續殺人案的恐懼之下。11 具屍體在房子的地基或是庭院中被找到。所有的屍體都已腐爛，且全部都是非裔美籍的女性。所有的受害者都在 35 天之內被找到，而且在第一具屍體被找到的一個禮拜內逮捕了整起事件的兇嫌。總結而論，這篇報告將回顧不幸發生在克里夫蘭的兩起相距近 75 年的連續殺

人事件。研究這些兇殺案情來判斷兇手的特徵，以及可能用於犯案的毒藥物：像是 1.有誰熟悉毒藥物；2.誰能得到毒藥物；3.有哪些人會有犯案動機；4.犯案能得到什麼好處。並討論屍體調查的成果和環繞於死亡事件周圍的環境研究。

#### (四) 設計法醫解剖場所的考量因子

##### **(Design Consideration For Medicolegal Autopsy Facilities)**

此演講在討論建構現代化的法醫解剖場所所需的設計理念和考量因子。坐落於加拿大多倫多和安大略湖的 Office of the Chief Coroner(OCC)和 Ontario Forensic Pathology Service (OFPS)提供安大略省的死亡案件研究,其中包括法醫解剖和相關服務。作為一項長期策略-更新公共基礎建設的一部份，加拿大安大略省準備將建築重新設計和結合，計畫 Forensic Services and Coroner's Complex (FSCC)要容納 OCC,OFPS,安大略省的犯罪實驗室和法醫科學中心。以下數點是對建構現代化的法醫解剖場所關鍵性的設計理念和考量因素：

一、光線

二、動線

三、人員工能分佈

四、影像診斷機儀：如 CT、3D 重現、MRI、X 光、螢光機 (Fluoroscopy)

五、汙染/防感染機器：如 BSL-2、BSL-3、(CL-2 或 CL-3)

六、家庭區：

1. (遠端)影像人身鑑別區和會議區
2. 進入口區
3. 無障礙區
4. 隱私和安全考量
5. 溫馨感覺

## 七、未來規劃與發展

1. 前瞻規劃
2. 未來解剖率之成長
3. 屍體(遺體)儲存量與未來發展
4. 解剖工作房區
5. 組織器官儲存容量考量
6. 人員規劃空間
7. 至少考量 10 年或更長遠規劃成長空間

### (五) 大都市中經濟困苦對自殺率的影響

#### **(Effect of Economic Hardship On Suicide Rates in a Major Metropolitan Area)**

最近美國報導指出生活環境存在著自殺事件因失業率上升和經濟衰退而有增加的趨勢。自殺風險也被認為會在經濟困苦時增加。當這樣的報導存在時，作者們企圖藉由資料庫的系統性回顧來確立一個普遍的趨勢。如果能闡明之間存在的因果關係(causal relationship)而不是相關性(correlation)的存在性，續而

將能在經濟困苦時期控管公共健康危險因子估算，進而預防自殺死亡事件。

壹、計劃目的：比較美國地區自殺率和相對應時間點的經濟情況。

貳、實驗設計：此篇研究利用圖表和過往資料作相關性回顧研究。分析出自殺率和市場趨勢之間的相關性。每年的自殺率紀錄了三個不同的管轄區域，包含一個主要都市中心和兩個郊區。研究時間是從 1989 年 1 月到 2009 年 12 月的 21 年間，包含了 3000 張統計圖表。這三個地理區域擁有多樣的人種和社會經濟背景，適合以人口統計學的方法做經濟因素對自殺率影響的研究。除了記錄人口統計學的資料，也會研究每個個案中已故者在自殺前的經濟情況。並且記錄自殺者的精神狀況和自殺的方式。所有的結果會以圖表作統計分析。

參、結果：自殺率由高到低：新婚者>喪偶者>離婚有小孩>離婚無小孩>結婚無小孩>結婚有小孩。研究發現在美國自殺事件有以下特性：患有慢性病、慢性疼痛或剛開完刀者自殺率高；自殺者多有使用抗憂鬱症藥物治療(患有憂鬱症)；經濟因素差會增加自殺率；自殺事件發生有地區性，多發生在美國西部及中南部和佛州北部；失業換工作、畢業及裁員會增加自殺率；自殺危險因子-經濟因子：股票指數為自殺率主要指數。

肆、總結：本篇研究的重要性在於將自殺率與經濟環境做比較。評估主要都會區中三個地理上有相近司法管轄的地區，用以描述不同人種間經濟困難的影響。這項研究加強病理學在公共衛生的角色，並可作為經濟困難期間公共衛生政策執行的基礎。最後希望達到預防自殺事件的成果。

### 三、發表演講論文：

此次筆者於美國法醫年會本所發表演講一篇，報告題目為：1999 至 2008 年間臺灣地區毒藥謀殺案例探討 (Murder by Poison-Taiwan Experience (1999-2008))。法醫學研究從 1999 到 2008 年 17230 件法醫解剖案例的回顧性討論，其中包含 1874 件濫用藥物致死案與 750 件家用有毒化學物致死案的流行病學研究。所發表文章當場即獲得好評，深得國際與會人士讚賞與肯定，給予高度的評價（數據資料如件）。

## 參、心得與建議

### （一）與會心得：

美國法醫師年會每年一次的研討會是經過大會精心策劃的活動，今年已經邁入第 44 年，顯示美國政府至國際間對法醫學與法醫科學的重視，並積極推動法醫相關學術與技術的發展。

會中法醫師、相驗員、醫學死因研究員、法醫系統管理員、鑑識科技相關人員菁英雲集，提供各項領域之專業學術交流、案例討論、新興技術推廣與經驗分享。使的來自世界各國的法醫學專家能汲取各方知識，不但能補強國內法醫學界不足的地方，也能將台灣法醫學研究的強項推廣於國際，增加往後互助合作的機會。

隨著現代科技的進步，法醫學與其科技發展一日千里，面對社會的變遷，各式新穎的疑難刑事死亡案件，伴隨而來之挑戰與日俱增，在鑑定過程要如何零缺點，以期能夠經得起法庭上的千錘百鍊，除了要有豐富的經驗、熟練的技術為基礎外，仍需不斷充實知識，以強化死因鑑定之證據力。此次美國法醫師年會之行，不但增加了許多寶貴的會議經驗，更從中認識許多國外亞太地區專業法醫師，且強調專業法醫師的訓練均以醫師、病理住院醫師、解剖病理專科醫師、法醫病理醫師為法醫師培訓制度與管道。為提昇我國法醫國際地位、我國在 2011 年舉辦亞洲-太平洋地區法醫病理學研討會中、世界各國法醫制度的研討將列為會議中的重要議題，並邀請亞太地區及歐美各國法醫名流參與。總結而論，參與國際性研討會可促進國際學術交流、增進與同領域內學者專家之

情誼、建立日後聯繫的管道，使我國法醫鑑識工作邁向國際化，拓展科技視野，建立國際宏觀。

台灣法醫的發展長期有如下困難議題：

法務部法醫研究所為法務部所屬機關中唯一具有法定職掌，可進行解剖、鑑定死因之機關，法醫死因鑑定與鑑識科學的鑑驗結果不僅為提供檢察機關起訴之參考，並為法庭審判的依據。多年以來政府精簡人力政策下，國內法醫人力嚴重不足，培訓新生代法醫師、參與刑事訴訟詰辯等程序，更需要不斷研究因科技快速成長所引發新的致死因素。

(1)教育訓練場地缺乏：法醫師的訓練常須和警察及司法檢察官配合，只有在大城市政府設立的法醫中心，才可能具有此種能力來訓練正規的法醫病理專科醫師。

(2)缺乏研究環境及經費：一般地方政府（含美國、加拿大）以前設立的法醫中心，只求法醫業務的推展，卻缺乏醫學院良好的學術研究環境，此種現象阻止了眾多優秀的法醫病理專科醫師執行法醫師的鑑定工作。近年來美加現代國家(含美國司法部)在研究設施及經費均有重視及增力口趨勢。



(三)建議：

1. 修訂本國「法醫師法」建構主任法醫師制度及以具醫師資格之法醫病理醫師為主導之死因偵查體制。
2. 汲取歐美現代法醫制度建構健全法醫病理專科醫師制度:建構非法醫病理專科醫師，病理醫師於完成四年之病理住院醫師訓練過程前不得獨立實施解剖，經四年病理住院醫師訓練取得病理專科醫師證書，尚須再接受至少一年全職的法醫病理住院醫師訓練，方能取得法醫病理醫師（病理專科法醫師）資格，才能獨立進行法醫病理死因偵查工作。
3. 增加法醫刑事鑑識經費，推動法醫刑事鑑識研究工作
4. 建構獨立的法醫鑑識大樓，提升中央級(Centralized)高法醫水準及現代化法醫設備及提高法醫、現場調查、司法偵查的獨立性，以建構更現代化完善之法醫設施。

### **Murder by Poison-Taiwan Experience (1999-2008)**

Retrospective study of 17230 forensic autopsy cases of medicolegal investigation during 1999 to 2008, a total of 1874 illicit drugs-related fatalities and 750 cases of household toxic chemical-related fatalities were collected for the epidemiological analysis. In addition, case study of each unique murder by poison can benefit to the death investigation. 229 homicide cases (12.2%) of total 1874 illicit drug-related fatalities are 103 methamphetamine-related (45.0%), 61 heroin-related (26.6%), 27 ketamine-related cases (11.8%) and others (70 cases; 30.6%). Total 48 homicides (6.4%) of total 750 toxic chemical-related fatalities that including 370 alcohol (14.1%), 275 insecticide (10.5%), 105 chemicals-related fatalities (together with rarely found toxic substance of cyanide, corrosive poison, GHB and ether etc.; 4.0%) were studied. The uniqueness of the illicit drugs and household toxic chemicals as the poison tool could be used to profile the poison murderer. A correlation of illicit drugs abusing behavior and uniqueness of household toxic chemicals with murder suspects' characteristics could play a crucial role during the death investigation. Understanding the suspect's background, growing experiences, education, psycho-social behavior, history of illicit drug abuse may play a crucial rule to deduce the manner of death.

Ether-related homicide of mother (Case I) and two daughters found dead in a locked door from inside apartment accompanied with natural gas odor. GHB-related homicide of pregnant woman (Case II) was found dead on a burn vestige of her living room with intention of fraudulent insurance by her husband. A profiling of the suspect's background, education (especially with chemical or medical expert), growing experiences, expert education etc. may play a key rule to correlate the unique chemical to the suspect's murder behavior. Illicit drug-related homicides of a teenager (Case III) with ketamine-related drowning homicide on the beach and a victim of heroin abuse combined with methamphetamine-related homicide cases (Case IV) could be used to sketch a pattern of violent as well as the murder behavior.

Pharmacokinetic study of blood and urine concentration, ratio of poison and evidences of forensic pathology can determine the cause of death, manner of death and time of death. Diversity of poison used as the murder tool could be concluded into uniqueness of the knowledge of the toxic chemicals or habitual abuse of illicit drugs. Once the toxicological results and forensic evidences can conclude the manner of death as homicide, tracing, the poison murderers can possibly exit.

附件二：研究報告簡報

**2010 NAME MEETING**

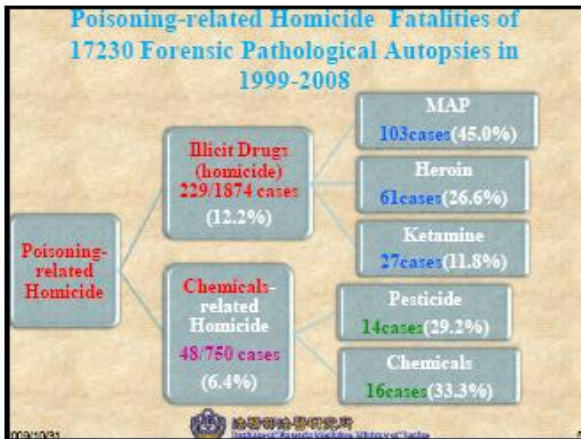
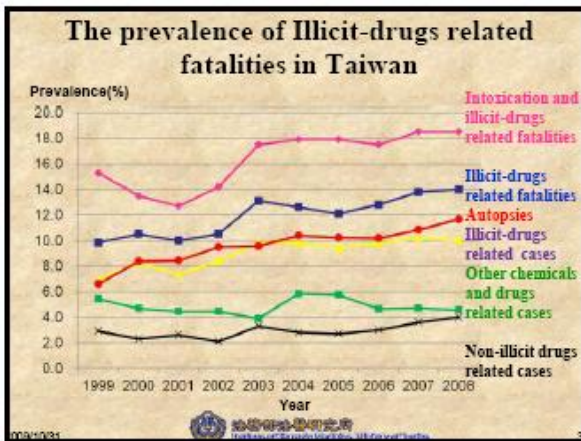
**Murder by Poison –  
Taiwan experience (1999-2008)**

**Institute of Forensic Medicine,  
Ministry of Justice**  
Kai-Ping Shaw MD., PhD.



**Profiles of poisoning-suspect  
(background and professional)**

Group	Background Education
Ether-related	Biological Lab · Medicine · Chemistry · Chemical engineering
GHB-related	Chemistry · Chemical engineering, Medicine
Cyanide-related	Biology · Medicine · Chemistry · Chemical engineering · Electroplating worker
Ketamine-related	Teenager · Illicit drug user
Controlled Drugs-Related	Illicit drug abusers



**Manners of deaths during 1999-2008 of illicit drug-related fatalities**

Years	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	total
<b>Manner of Death</b>	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)	Cases (%)
<b>Accident</b>	61	84	69	93	114	110	112	129	114	128	1004
<b>Suicide</b>	22	15	22	25	34	29	38	31	51	54	321
<b>Homicide</b>	15	21	23	18	15	22	26	29	24	36	229
<b>Natural death</b>	12.9	15.6	16.8	11.8	7.9	11.1	11.7	12.4	10.5	13.8	12.2
<b>Others</b>	11	12	16	14	21	27	28	27	25	23	204
<b>Total</b>	64.4	69.2	69.2	70.4	77.1	68.4	67.8	73.5	74.6	75.4	71.4

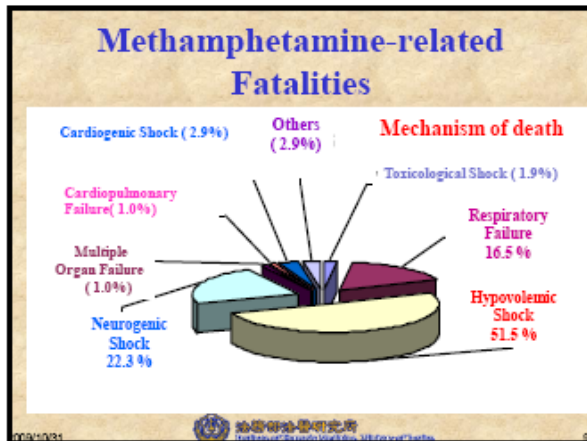
### Manners of deaths of Alcohol, pesticide and chemical-related fatalities (1999-2008)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
<b>Manner of Death</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>	<b>Cases (%)</b>
Accident	26	26	23	19	16	49	51	31	34	28	303
	40.6	43.3	37.7	29.7	28.6	53.3	48.1	36.9	43.6	32.9	40.4
Suicide	27	25	30	29	30	31	35	28	28	37	300
	42.2	41.7	49.2	45.3	53.6	33.7	33.0	33.3	35.9	43.5	40.0
Homicide	8	2	1	6	5	5	6	4	5	6	48
	12.5	3.3	1.6	9.4	8.9	5.4	5.7	4.8	6.4	7.1	6.4
Natural death	3	6	4	2	4	3	9	12	9	10	62
	4.7	10.0	6.6	3.1	7.1	3.3	8.5	14.3	11.5	11.8	8.3
Others	0	1	3	8	1	4	5	9	2	4	37
	0.0	1.7	4.9	12.5	1.8	4.3	4.7	10.7	2.6	4.7	4.9
<b>Total</b>	<b>64</b>	<b>60</b>	<b>61</b>	<b>64</b>	<b>56</b>	<b>92</b>	<b>106</b>	<b>84</b>	<b>78</b>	<b>85</b>	<b>750</b>
	35.6	30.8	30.8	29.6	22.9	31.6	32.2	26.5	25.4	24.6	28.6

### The Age/Gender of Methamphetamine-Related Fatalities of Forensic Autopsies during 1999-2008

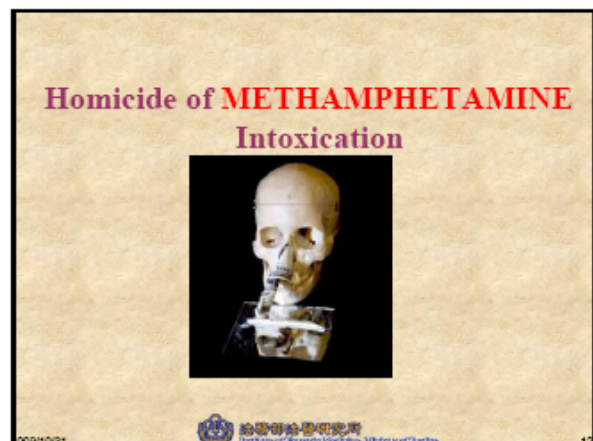
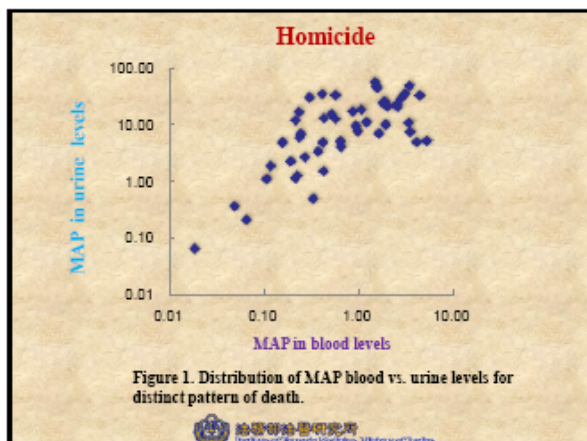
#### Methamphetamine-Related Fatalities


gender	Men		Women		Total	
age	cases	%	cases	%	cases	%
0-14	1	1.2%	3	15.0%	4	3.9%
15-24	14	16.7%	3	15.0%	17	16.5%
25-34	27	32.1%	4	20.0%	31	30.1%
35-44	30	35.7%	7	35.0%	37	35.9%
45-54	9	10.7%	3	15.0%	12	11.7%
55-64	1	1.2%	0	0.0%	1	1.0%
>65	0	0.0%	1	5.0%	1	1.0%
<b>Total</b>	<b>82</b>	<b>79.6%</b>	<b>21</b>	<b>20.4%</b>	<b>103</b>	<b>100.0%</b>



### The MAP Concentrations of Blood and Urine of MAP-related Cases Classified to Six Groups Dependent on Their Pattern of Death

Manner of Death (Symbol)	n	Mean $\pm$ SEM		
		Blood (mg/L)	Urine (mg/L)	Urine / Blood
Natural cause (N)	18	0.24 $\pm$ 0.06	14.21 $\pm$ 6.35	98.80 $\pm$ 52.87
Accident death by MAP overdose (Ad)	87	2.88 $\pm$ 0.62	17.73 $\pm$ 2.40	21.20 $\pm$ 4.17
Accident death unrelated drug lethality (Al)	51	0.28 $\pm$ 0.08	4.38 $\pm$ 0.82	28.48 $\pm$ 5.72
Homicide (H)	52	1.27 $\pm$ 0.18	14.27 $\pm$ 1.84	17.75 $\pm$ 2.78
Suicidal death by MAP overdose (Sd)	7	13.33 $\pm$ 5.08	24.39 $\pm$ 5.83	7.93 $\pm$ 4.32
Suicidal death unrelated drug lethality (Sl)	22	0.38 $\pm$ 0.08	8.49 $\pm$ 1.85	34.64 $\pm$ 9.30
<b>Total</b>	<b>236</b>	<b>1.88 <math>\pm</math> 0.28</b>	<b>12.83 <math>\pm</math> 1.14</b>	<b>28.01 <math>\pm</math> 4.33</b>

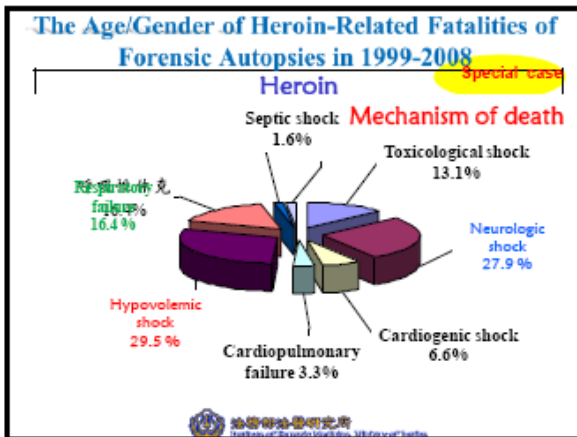



Case report of Methamphetamine (MAP)			
The murder of motivation: Mr. Tan and Miss Kung planned to get married, but Mr. Tan changed his mind due to having an affair with other girl. Miss Kung knocked him out by warm water added with MAP. Then killed him by smothering.			
Cause of death	The dead took overdose MAP, alcoholic drinks and hypnotic drugs before being murdered by smothering.	Manner of death	Homicide
Toxicology	1. Blood: Amphetamine 0.071mg/ml, Methamphetamine 1.691mg/ml, Lorazepam 0.76mg/ml, ethanol 0.1888%(w/v). 2. Gastric content: Amphetamine 0.694mg/ml, Methamphetamine 9.112mg/ml, Acetaminophen, Lorazepam 0.78mg/ml, ethanol 0.1742%(w/v). 3. Urine: Amphetamine 0.248mg/ml, Methamphetamine 9.969mg/ml.		
			

## Case Report of Methamphetamine(MAP)

The time sequence of the crime :

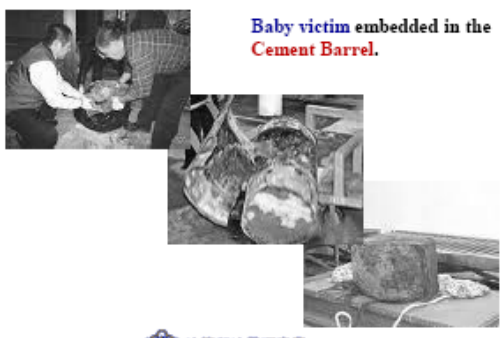
- Mr. Tan drank the poisoned drink with MAP at AM9:20 in 17<sup>th</sup> Nov.
- He took 20 hypnotic drugs(Lorazepam) at AM9:25.
- At AM9:45, Miss Kung smothered Mr. Tan's head with the pillow and choked his neck until she confirmed that he lost his breath.
- She confessed her crime to 119 on phone later at PM13:15.



Case report of Heroin-related			
History	1. The deceased 4 year-old girl whose body was embedded inside the cement blocks (Feb 26, 2008). 2. The suspect testified that he found his drugs Heroin disappear before the little girl's lifetime. Therefore, he had the reason to doubt that the little girl take his Heroin by accident.		
Cause of death	A. Suspicious respiratory failure B. Bruises in mouth and neck areas, suspicious smothering and strangling over the neck. C. Multiple abusive blunt trauma around mouth and neck areas, starvation, weakness, and unidentified aggressive factors for her death?  <b>Contributing factors :            Suspicious Heroin intoxication</b>	Manner of death	Homicide
			

## Case report of Heroin

Baby victim embedded in the Cement Barrel.



## Case report of Heroin-related



## Case report of Heroin

### Toxicology:

The plural effusion sample(contained blood) was examined Alcohol 51 mg/dL (0.051%).



Embedded for 2 years in cement



The manner of death is homicide

## The age/gender of Ketamine-related Fatalities of Forensic Pathological Autopsies in 1999-2008

gender	Ketamine				Total	
	Men		Women		cases	%
age	cases	%	cases	%	cases	%
0-14	0	0.0%	0	0.0%	0	0.0%
15-24	11	44.0%	0	0.0%	11	40.7%
25-34	5	20.0%	2	100.0%	7	25.9%
35-44	7	28.0%	0	0.0%	7	25.9%
45-54	1	4.0%	0	0.0%	1	3.7%
55-64	1	4.0%	0	0.0%	1	3.7%
>65	0	0.0%	0	0.0%	0	0.0%
total	25	92.6%	2	7.4%	27	100.0%

## Case report of Ketamine-related

An un-identified female found dead by the riverbank.



## Case report of Ketamine

### Toxicology

1. Blood sample :Alcohol 24 mg/dL (0.024%)、PMA 0.065 mg/mL, PMMA 5.591 mg/mL, Ketamine 0.215 mg/mL, Norketamine 0.146 mg/mL.
2. Urine sample :Alcohol 16 mg/dL, PMA 0.053 mg/mL, PMMA 4.656 mg/mL, Ketamine 0.358 mg/mL、Norketamine 0.121 mg/mL, Nimetazepam.
3. Gastric content :PMA 0.056 mg/mL, PMMA 37.281 mg/mL, Ketamine 1.261 mg/mL, Norketamine 0.428 mg/mL, Nimetazepam, but alcohol was not contained.

## Case report of Ketamine

### Cause of death :

- Toxicological shock and respiratory failure
- Multiple drug intoxication and drowning

C. Abuse of PMMA and Ketamine

Manner of death:

Suspicious homicide




## Age/Gender of Pesticide-Related Fatalities of Forensic Autopsies (1999-2008)


Gender	Pesticide-related Fatalities				Total	
	Men		Women		cases	%
age	cases	%	cases	%	cases	%
0-14	1	20.0%	5	55.6%	6	42.9%
15-24	1	20.0%	0	0.0%	1	7.1%
25-34	0	0.0%	1	11.1%	1	7.1%
35-44	1	20.0%	1	11.1%	2	14.3%
45-54	0	0.0%	1	11.1%	1	7.1%
55-64	2	40.0%	0	0.0%	2	14.3%
>65	0	0.0%	1	11.1%	1	7.1%
total	5	35.7%	9	64.3%	14	100.0%


Pesticide-Related Fatality			
History	1. The victim was <b>admitted for stroke</b> , and had been unconscious since the onset of stroke. During hospitalization, she was taken care by nurse hired by the family. 2. <b>In the morning of 18<sup>th</sup> Oct, 2002</b> , her vital sign was stable when the doctor visited the victim during his ward round. 3. <b>About PM 20:00 in the evening</b> , the victim's son fed the victim with a bottle of <b>papaya milk</b> bought from outside the hospital.		
Cause of death	Methomyl intoxication	Manner of death	Homicide
Toxicology	1. According to the toxicology finding, both <b>gastric washing</b> from emergency and <b>gastric content</b> from autopsy were examined <b>Methomyl</b> (pesticide). 2. They were the same with the <b>Methomyl</b> (pesticide) hold in custody. 3. But the <b>papaya milk</b> hold in custody wasn't examined organophosphate insecticides.		

### Pesticide-Related Homicide



Methomyl mixed with juice





**Cause of death:**  
Methomyl intoxication

**Manner of death:**  
Homicide

Pesticide-related (Euthanasia)			
History	1. The old woman had been in <b>vegetated state</b> , was found dead in her room. The scene reveals the charcoal-burning suicide committed by her husband, who was also found dead in the scene. 2. According to the brother of her husband, the dead came into vegetated state in a car accident. Her husband was exhausted in taking care of her. Recently, <b>her husband got into financial crisis</b> .		
Cause of death	1. Respiratory failure 2. Feeding with <b>Pesticide</b> and removing of the endotracheal tube 3. Vegetated state after car accident	Manner Of Death	Homicide
Toxicology	1. <b>Blood sample:</b> Alcohol 5 mg/dL ( 0.005% ) , Valproic acid, Phenytoin 2. <b>Bile sample :</b> Valproic acid · Phenytoin 3. <b>Gastric content:</b> Alcohol 6 mg/dL · Phenytoin · Dimethoate(pesticide) excess amount of Permethrin		

### Age/Gender of Chemical-Related Fatalities of Forensic Autopsies (1999-2008)

Chemical-related fatalities

age	Men		Women		Total	
	cases	%	cases	%	cases	%
0-14	0	0.0%	3	33.3%	3	18.8%
15-24	0	0.0%	1	11.1%	1	6.3%
25-34	1	20.0%	1	11.1%	2	12.5%
35-44	1	20.0%	1	11.1%	2	12.5%
45-54	1	20.0%	2	22.2%	3	18.8%
55-64	2	40.0%	0	0.0%	2	12.5%
>65	3	60.0%	0	0.0%	3	18.8%
<b>Total</b>	<b>8</b>	<b>50.0%</b>	<b>8</b>	<b>50.0%</b>	<b>16</b>	<b>100.0%</b>

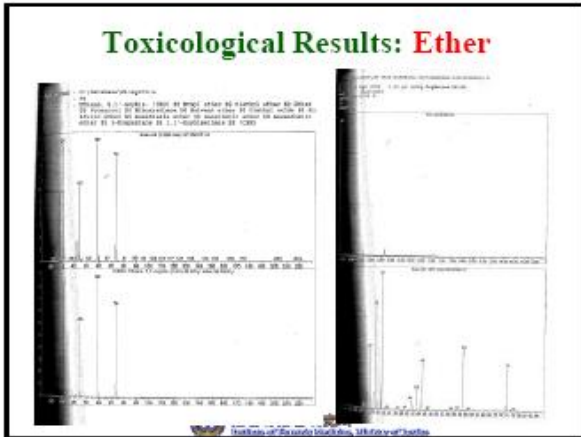
### Cases : Poisoning by CO, Ether or Smother

1. **The mother and two daughters were dead in their 16<sup>th</sup> floor apartment**, under the suspicion of **natural gas (methane) intoxication with continuous gas odor and discharge**.
2. **Husband declares they are in a status of marital separation and his wife has depression**.
3. **Door locked from the inside**
4. **The windows were all sealed with clothes**.
5. **The neighbor reported the police after sensing the smell**.

\*\*\*\* **Police and Prosecutor Convinced is Suicide** \*\*

### Natural Gas: Chemical Composition

Component	Typical Analyte (mole %)	Range (mole %)
Methane	95.2	87.0 - 96.0
Ethane	2.5	1.5 - 5.1
Propane	0.2	0.1 - 1.5
Iso - Butane	0.03	0.01 - 0.3
normal - Butane	0.03	0.01 - 0.3
Iso - Pentane	0.01	trace - 0.14
normal - Pentane	0.01	trace - 0.04
Hexanes plus	0.01	trace - 0.06
Nitrogen	1.3	0.7 - 5.6
Carbon Dioxide	0.7	0.1 - 1.0
Oxygen	0.02	0.01 - 0.1
Hydrogen	trace	trace - 0.02



### Reference: Ether been proved in Blood

**DETECTION OF DIETHYL ETHER IN BLOOD AND VITREOUS IN AN UNUSUAL MURDER**  
 A. Perez, R. Garcia, M. Bergueta, D. E. Mena, C. Garcia, U. Garcia, M. Anido  
 Laboratory of Toxicology and Legal Chemistry, Supreme Court of Justice, Havana, Cuba  
 Journal of Forensic Sciences, 1997, 42(1):141-7.

In September of 2000, a couple was found dead on their bed, in Havana. After profuse search, the body of the husband died in the coronal region. There were, according to the report, no signs of any drug use or signs of self-harm prior to death. Autopsied analysis for volatile compounds in blood and vitreous was performed using a gas GC-MS (EI) at MS detection. Screening for drugs of abuse, toxicologic and forensic toxicology of forensic toxicology was performed using HPLC, HPLC-UV, GC-MS in solid phase extraction (SPE) before (EM) respectively.

In the case of the case the sample was put in sealed recipient, and frozen immediately after death in the laboratory up to the moment they were analyzed. The concentration found in blood, vitreous and urine in both, lung and blood respectively. In the vitreous humor (after analysis), diethyl ether was also found but in lower levels (0.02, 0.02, 0.02 respectively). The presence of paracetamol in the vitreous humor suggest an unexpected death during sleep conditions, before or during the laboratory. Some days had elapsed between the death and the beginning of the toxicological analysis. These two of death (other than the evidence) is analyzed in this phenomenon. On the other hand, the large of both victims are unknown compound and there were signs of dermographic edema. However, signs in the case, diethyl ether was found in blood, lung and brain, these allowed us to affirm the fatal body of a homicide followed by a suicide. Additional toxicological studies proved the use of a double homicide.

And later on have been used in previous normal laboratory studies prior to the murder. Forensic Toxicology, Homicide, pathological findings, toxicological analysis.

**Prosecutor opinion:**  
 Contaminated with  
 Perfume chemicals,  
 isopropanol

### Back to the scene: Top (17<sup>th</sup>) Floor

Top floor Ventilator

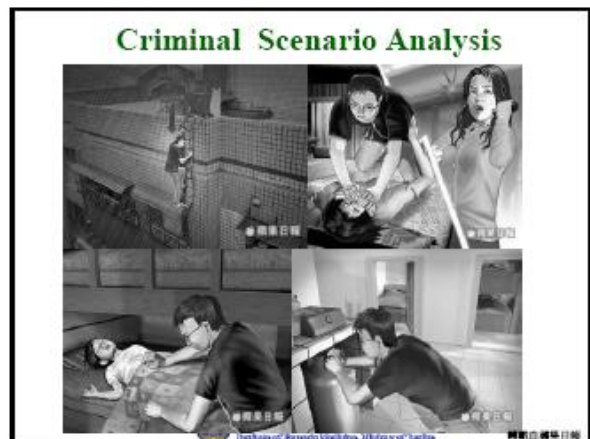
10 months later Back to the Scene:  
 1. Who is the suspect?  
 2. How to start the investigation



### Suspect Profiles?

- Who can get the ether?
- Who can climb the floor?
- Who has the benefits

• Answer: **Education** and **Occupation**  
**Chemical Engineer** in Community College,  
 and **Plumber-Air Conditioner Engineer**





## Mother

### ◆ Cause of Death :

- A. Toxicological shock
- B. Ether and CO intoxication.
- C. Suffocating by covering nose and mouth.



Manner of Death : Homicide



## Older Daughter

### ◆ Cause of Death :

- A. Toxicological Shock and Respiratory Failure
- B. Ether and CO intoxication.
- C. Smothering, Natural Gas Inhalation



Manner of Death : Homicide



## Younger Daughter

### ◆ Cause of Death :

- A. Toxicological Shock and Respiratory Failure
- B. Ether and CO intoxication.
- C. Smothering and Natural Gas Inhalation



Manner of Death : Homicide



## Three lives-killing case solved; Neighbors comforted deceases

The **bloody mother-and-daughters murder** case was solved by the police yesterday, after the husband confessed **killing his wife and two daughters**.



Finally, Justice prevails.

The neighbors worship the deceases



轉自新聞雜誌

## Using GHB to murder a pregnant woman for insurance fraud in Taiwan



A **7-month pregnant woman** died in a fire incident while she was unconscious after poisoned by GHB


Site: in a remote and peaceful village of Chi-Yi county in Southern Taiwan  
Time: Oct. 27, 2001

## Case report of GHB


- A woman died in a fire incident after being unconscious. Her husband escaped from the fire because he had an acute abdominal pain and was sent to the hospital by her brother in law before the fire start.
- At the beginning, it was taken as a fire accident by the police. Later on, the parents feel curious after discovered that her husband was negotiating with high amount of insurance payment of NTDS 32,500,000 (US\$1,000,000).



## Case report of GHB



- They reported to the police and confirmed the toxicological results of high concentration of GHB. Insurance fraud did not succeed correlative with other evidences.
- According to investigation, the husband, in order to obtain the insurance payment of \$ 32,500,000 NTD, poisoned the pregnant wife into unconsciousness (with GHB) and set the house on fire (with a delay trigger device). Husband was accused killing the mother and the unborn baby.



## Case report of GHB

- First Sentence : All sentenced to death penalty
- Second instance: Reduced the death penalty to life in prison.




The Sue family still preserved the crime scene, and refused to rebuild.



## Criminal Scenario Analysis of GHB Case-(1/3)

**Education:** the defendant majored in chemistry in college.




- Occupation: the defendant came to know his wife in July, 1999, when he was on parole a bribery case.





## Criminal Scenario Analysis of GHB Case-(2/3)

- Intension: the defendant married his wife in May, 2001, when his wife was in pregnant for 3 months.
- Benefits: On June 30 of that year, under the consent of his wife, he bought insurances for her from various insurance companies, and assigned himself as the beneficiary of the insurances up to US\$ 1,000,000.00

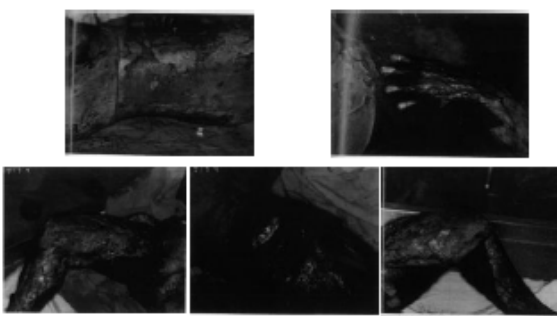



## Criminal Scenario Analysis of GHB Case-(3/ 3)

- Criminal Scene: After the fire incident, police found a gas tank, a blanket, cigarettes and delay fire device, which, in combination, can be used as a delay ignition device for the fire.
- Toxicological Evidences: In autopsy, it was found there were high level (95.1µg/mL) of GHB ( gamma hydroxybutyrate ) in the victim's blood. High level of GHB was also found in residual milk.



## Case report of GHB

### Case report of GHB

- The body of the dead pregnant woman:
- 37-year-old healthy female
- Charcoal particles noted in the trachea
- High level of GHB (95.1µg/mL) in the blood


• Manner of death:  
**Homicide**



法醫毒物學研究所  
Institute of Forensic Toxicology, National Sun Yat-sen University

### Case poisoned by Cyanide: Copy of 1982 Chicago Tyneol Killer

- A man has bought and drunk a bottle of energy drink called "Man-Niu; Buffalo", that been contaminated with Cyanide. He lost his consciousness immediately and died two hours later.
- Three others are survived because they felt bad taste and stopped drinking immediately



法醫毒物學研究所  
Institute of Forensic Toxicology, National Sun Yat-sen University


### Case report of Cyanide

<b>Toxicology Results</b>	<ol style="list-style-type: none"> <li>1. Blood sample : MetHb 1.7%、Cyanide 0.192 µmol/mL, (upon arrival ER 7.7 µg/ml).</li> <li>2. Urine sample : Cyanide 0.115 µmol/mL.</li> <li>3. Gastric content : Cyanide 0.099 µmol/mL .</li> <li>4. Bile sample : Cyanide 0.075 µmol/mL .</li> </ol>
---------------------------	--

法醫毒物學研究所  
Institute of Forensic Toxicology, National Sun Yat-sen University

### Case report of Cyanide


1. Cause of death:
  - A. Toxicological shock
  - B. Cyanide intoxication  
(Blood sample: Cyanide 7.7 µg/ml)
  - C. Drank the energy drink added with Cyanide
2. Manner of death: Homicide



法醫毒物學研究所  
Institute of Forensic Toxicology, National Sun Yat-sen University

### Profiles of Suspect

- The background of the suspect :  
Name : Mr. Wang, 45 years old  
Occupation :An employee of Pest Control Company
- Self-dubbed as Man of a Thousand Faces  
*Antisocial personality!!*



Poisoned the energy drink "Man-nju" with Cyanide!

法醫毒物學研究所  
Institute of Forensic Toxicology, National Sun Yat-sen University

### Case report of Cyanine

*Apple Daily news:*  
The case of poisoning "Man-nju" is solved!!  
Fled abroad several times.



**Typical type of Intelligent crime.**

法醫毒物學研究所  
Institute of Forensic Toxicology, National Sun Yat-sen University

## Case report of Cyanide

- 9 Cyanide-contaminated bottles of "Man-Niu" Energy Drink with 5000 ppm Cyanide is found.



0094034

台灣師範大學  
Institute of Toxicology, National Taiwan University

64

THANKS FOR YOUR  
ATTENTION

0094034

台灣師範大學  
Institute of Toxicology, National Taiwan University

65