Forensic Aspect of Disaster
Casualty Management;
Tsunami Victim Identification
in Thailand

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Scope of presentation

• Tsunami victim identification in Thailand
  – What have been done?
  – What did not work?
• What do we learn?
• What should be done?
December 26, 2004, a 9.0 Richter scale earthquake occurred north of Sumatra Island.
• Caused a huge tsunami
• struck countries on the coast of the Indian Ocean, including Thailand


Tsunami hit Thailand

10:05 hours
Max. height
4-10.6 m
(12-32 feet)

http://www.aviation.go.th/rbm/tsunami_files/tsunami.htm#4
The number of deaths in Thailand

<table>
<thead>
<tr>
<th>Province</th>
<th>No. of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranong</td>
<td>160</td>
</tr>
<tr>
<td>Phang Nga</td>
<td>4,224</td>
</tr>
<tr>
<td>Phuket</td>
<td>279</td>
</tr>
<tr>
<td>Krabi</td>
<td>721</td>
</tr>
<tr>
<td>Trang</td>
<td>5</td>
</tr>
<tr>
<td>Satun</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,395</strong></td>
</tr>
</tbody>
</table>

reported by the Thai authorities Official figures as at 24 March

Forensic Aspect

• Under the Thai law, a forensic investigation is required for these types of deaths.
• In general, the purpose is
  – to identify the victim
  – to determine the time and place of death
  – to determine the cause and manner of death.
Management of Dead Bodies in Thailand

Coordinated by

Responsible Institution

Supported by

Inter-institution Teams

Search and Recovery

Identification

Storage and preservation

Final Arrangement

Assistance for Family members
Responsible Institution

• At the beginning- not clear, no command center related to management of dead bodies

• During the early period; under
  – Department of Disaster Prevention and Mitigation, Ministry of Interior
  – The Royal Thai Police
  – The Ministry of Public Health

• Jan 13, 2005; Set up The Tsunami Victim Identification Executive Committee, chaired by the Minister of Interior
Inter-institution Team

- academic institutes
- local government
- military
- police
- Public Health
- NGO
- volunteers
Body search and recovery

- Conducted by
  - Local Government / Ministry of Interior
  - Military
  - Charity Foundations Team (volunteer rescue teams)
Body search and recovery

- Performed after rescued survivors
- Transferred bodies to temporary morgues
- No central coordinator, not in the order
- Did not map the location where the bodies found
- Did not label the corpses
Examination of bodies

Morgue sites

• Established in the affected area by forensic teams and local government

• Using temples or public areas
Setting in the temporary morgues

• Holding area
  – On the floor
  – In the pavilion of temples
• Examination Area
  – On the site
  – sunny and temperature up to 39 °C
  – performed examination on the ground, no facilities
Body identification

1. Conducted by local authorities then released at scene.
   – Families came and identified victims at scene.
Body identification

2. Examined by Thai forensic teams from various institutes.
   - Using institute’s protocol
     • Labeling number to the cases
     • Photograph
     • Record external appearance, personal belongings and specific marks.

• No committee nor meeting together before start working.
Finger printing

- Conducted by crime scene investigation police
- performed about 600 cases
- Reasons not to collect all of the cases
  - Lack of cooperation between relevant authorities
  - Not enough staff
  - Bodies were decomposed
Dental examination

- Occurred on the fifth day after the disaster
- Organized by the Thai Dentist Council
- Conducted by the Thai dentists from
  - Various universities - Government hospitals
  - Private hospitals and clinics
- About 550 dentists, mostly were not forensic dentists
Identification and released of the bodies

Summary of identifications, examinations and releases by Thai forensic teams

<table>
<thead>
<tr>
<th>No. of deaths</th>
<th>Identified by local authorities</th>
<th>Examined by Thai Forensic team before TTVI</th>
<th>Released by Thai Forensic team before TTVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,395</td>
<td>560</td>
<td>3,698</td>
<td>1,151</td>
</tr>
</tbody>
</table>

Almost identified by external and physical appearance
Summary of victims identified by Dental record during the early phase

<table>
<thead>
<tr>
<th>No. of deaths</th>
<th>Dental examination by Thai Dentist team</th>
<th>Identified and released based on dental records</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,395</td>
<td>2070</td>
<td>111</td>
</tr>
</tbody>
</table>
DNA analysis

• Specimen collection from post mortem
  – Buccal during the first few days
  – Hairs during the first few days
  – Muscle during the first few days
  – Rib
  – Tooth
  – Femur
DNA Laboratories

• Department of Forensic Medicine, Siriraj hospital
• Forensic unit, Ramathibody hospital
• Institute of Forensic Medicine, and Crime Scene Investigation Police Office, Royal Thai Police
• Forensic Science Institute, Ministry of Justice
Result of DNA analysis from Thai laboratories

<table>
<thead>
<tr>
<th>AM</th>
<th>PM</th>
<th>Possible match</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930 cases</td>
<td>664 cases</td>
<td>310*</td>
</tr>
</tbody>
</table>

*In the process of identification or collecting more specimens to compare*
**Storage and preservation of the bodies**

**During the first week**

**After the second week**

**During the end of first week**
Bury the deceased

- After a week, without any proper preservation method and the bodies were more decomposed.
- About 300 corpses from Phang-Nga then were buried, but later the bodies were excavated up and kept in the refrigerated containers for further identification.
Assistance for Family members

• To receive victim’s ante mortem data using
  – local hospital staff
  – police
  – volunteers

• No really set up the AM center nor the Family assistance center to help the family members get over with this tragedy and accept for the losses of their loved ones.
Problems in victim identification

• Management perspective
• Technical perspective
Problems in victim identification

Management perspective

• Lack of central coordinator and command center.

• No proper storage method and preserve the bodies

• Shortage of available resources response to the situation
Problems in victim identification

Technical perspective

• No single numbering and labeling system
• No standard protocol of body examination.
• Redundant body examinations
• Lack of experienced and number of staff, eg. forensic dentists, fingerprint experts
• Cannot consolidate information to single system.
Problems in victim identification

• Lack of ante mortem information from families especially dental records and fingerprints
Problems in victim identification

Lack of National Mass Fatality plan
Consolidation of victim identification

• Thai Tsunami Victim Identification (TTVI)
• International DVI and Thai forensic teams cooperation under the control of Thai authorities
• All bodies were treated equally using the Interpol DVI examination protocol.
• All the information are consolidated into a single system
### Number of bodies examined, identified and released under TTVI operation

<table>
<thead>
<tr>
<th>Body examination (including additional examination)</th>
<th>Identified and released (cases)</th>
<th>Bodies unidentified (cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,684</td>
<td>1,369</td>
<td>2,315</td>
</tr>
</tbody>
</table>

Approximately 43% of total deaths in Thailand

Source: TTVI on April 18, 2005
Reconciled bodies by primary evidence

Source: TTVI on April 18, 2005
At present

- All the unidentified bodies had dental, fingerprints and DNA specimens collected.
- All post mortem data are placed in the TTVI database (PLASS data)
- 2242 ante mortem records are in the system, only 368 from Thai
Reconciled Thai victims by primary evidence under TTVI (after Feb 3, 05)

Source: TTVI on April 18, 2005
What do we learn?

• Identification and return bodies back to their families is an important health issue related to mass disaster.

• This tsunami devastation is over the expectation and the available resources.
What do we learn?

- The command center of victim identification is necessary and should be set up as soon as possible and responsible for the whole processes of identification.
- The labeling and numbering should be one system to avoid confounding bodies and data.
What do we learn?

• Preparation of morgue sites as well as storage system is important at the beginning in order to have a proper work place and avoid any hazard to personnel as well as the environment.

• Data should be consolidated to one system so that it is easy to access by victim’s families.
What do we learn?

• Identification of the victims should be based on the external evidences, dental records, fingerprints, and DNA.
  –Should not rely only on DNA-
What should be done?

- National Mass Fatality Plan
- System of National Mass Victims Identification
  - Recruitment of personnel.
  - Post mortem storage and examination.
  - Ante mortem information from families.
  - Long term storage of unidentified corpses.
  - Data management
  - Family assistance
What should be done?

Since the severity of any disaster may not be predicted exactly, preparation of the relevant resources may not be enough.

International cooperation and assistance are necessary and play an important role in an international disaster.
Thanks for your attention