IRIDeS Fact-finding mission to Philippines
(2nd mission, January 16 - 24, 2014)

International Research Institute of Disaster Science
Tohoku University, Japan
IRIDeS Survey Team

Hazard and Damage Evaluation Team

Dr. Shuichi Kure (Team Leader, Disaster Potential Study)
Dr. Jeremy D. Bricker (Technology for Global Disaster Risk)
Dr. Erick Mas and Mr. Bruno Adriano
(Remote Sensing and Geoinformatics for Disaster Management)
Dr. Carine J. YI (International Strategy for Disaster Mitigation)

Disaster Medicine Team

Prof. Shinichi Egawa
(Team Leader, International Cooperation for Disaster Medicines)
Prof. Toshio Hattori and Dr. Haoile C-Y
(Disaster-related Infectious Disease)
Prof. Hiroaki Tomita (Disaster Psychiatry)
IRIDeS Survey Team

From Philippines Counter Parts

Prof. Cristopher Stonewall P Espina (College of Architecture, UP)
Dr. Maritess S. Quimpo (Bureau of Research and Standards, DPWH)
Mr. Karl Taberdo (College of Architecture, UP)
Mr. Paul Tupaz (BS Economics, UP)
Mr. Christer Kim Gerona (BS Political Science, UP)
Hazard and Damage Evaluation Team

MISSIONS AND RESULTS
Hazard and Damage Evaluation Team

Missions

- Verify satellite image analysis using ground truth data and grasp the damage characteristics of typhoon disasters regarding building

- Data measurement and collection for detailed storm surge and wave modeling

- Investigation on other hazards (flooding, landslides, wave intrusion along the river, etc.) induced by Typhoon HaiyanTo seek and establish collaborative partnerships to evaluate impact on mental health system of the affected people or Japanese residents for psychosocial postvention
Survey Results (Inundation Heights)

Field Survey of Typhoon Haiyan - Leyte and Samar Islands -
Types of damage in downtown Tacloban near the shoreline

- Surge up to 6 m above sea level
- On top of surge, wave height up to 0.8 x depth
  - Low-lying coastal areas only 1 m above sea level
  - Possible wave height up to 4 m
- Scour around structures
- Beached ships destroyed homes
- Most buildings destroyed
Types of damage in downtown Tacloban near the shoreline
Types of damage in inland downtown Tacloban

- Surge up to 6 m above sea level, but no waves
- RC masonry buildings dirtied but standing
  - Many windows and doors destroyed
  - Some thin walls destroyed
- Some wood frame buildings destroyed (possibly due to wind)
Surge travelled far to the north in Samar-Leyte strait

- Northern Leyte and Samar villages feel neglected because NGO’s and foreign governments haven’t paid attention to them
Damage in Eastern Samar

- Waves only (no storm surge)
  - Waves break over coral reef, then run up onto land as bores
  - Inundation and run-up measured up to 11 m above sea level
- Punched through coral-fill seawall
- RC structures destroyed
- Foundation blocks transported up to 30 m landward
- Scour
- Coral boulders
Damage in Eastern Samar
Seawall Damage (Airport)
Seawall Damage (MacArthur Landing Memorial Park)

Google map
Widespread damage due to wind

- Rafters tied to building columns well
  - Good connection, so during storm roof frames did not lift off
- Corrugated galvanized iron (GI) roofing sheets nailed to rafters
  - Sheets pulled up and ripped off ties
Widespread damage due to wind
Widespread damage due to wind

Layte Convention Center
Temporary Houses
New Findings and Observations

- Detailed inundation map in and around downtown Tacloban city was obtained.

- Significantly high waves more than 10 meters (up to 14 meter) were observed in Eastern Samar.

- Surge travelled far to the north in Samar-Layte strait

- Local flood inundation of rivers and landslides due to heavy rainfall was observed at some points around Palo city.

- Etc.
Problems for Evacuation

• “Storm Surge”
  Some people do not understand “what a storm surge is”.

• Poverty
  Young strong men should stay in their homes in order to protect their properties.

• Many facilities are not appropriate for evacuation.

• Many people already rebuilt houses in the highly damaged areas except for the no-build zone.
Problems

• Evacuation facilities
Many facilities such as Tacloban city convention center, Layte convention center, schools, churches were not appropriate for the evacuation (Near sea side, severely damaged by strong wind, etc.).

Tacloban City Convention Center  Layte Convention Center (Palo)
Problems

• New houses were already reconstructed in highly damaged areas.
Divisions of Disaster Medical Science

MISSIONS AND RESULTS
Divisions of Disaster Medical Science

Missions

- International Cooperation for Disaster Medicine (Prof. Egawa)
  - To summarize the medical and public health support.
  - To summarize the damage of the hospitals.
  - To assess the health conditions in evacuation centers or temporary houses.

- Disaster Related Infectious Disease (Prof. Hattori)
  - To conclude MOU between UP to facilitate the project
  - Collaboration on diagnosis of Dengue, Leptospirosis and tuberculosis among febrile patients.

- Disaster Psychiatry (Prof. Tomita)
  - To seek and establish collaborative partnerships to evaluate impact on mental health system of the affected people or Japanese residents for psychosocial postvention.
### International Cooperation for Disaster Medicine

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Hospital surveillance according to geographical Information and satellite images

Courtesy of Dr. Carine Yi
Hospital Surveillance in the affected area revealed

- Hospitals close to the coastline were damaged by storm surge and strong wind. Strong wind blew off the roof and broke the window resulting in the damage of vital facilities of the hospitals.
- One hospital had saved CT scan, that served the whole area afterward.
- All hospital had disaster manager and trained the faculties to act properly at Typhoon, but the hazard was beyond expectation.
- Preparedness reduced the damage in some hospitals
- Very few actual in-patient loss and employees injury.
- Domestic and international medical aids came in and supported each hospital by coordination in the municipal office and DOH.
- Loss of electricity, water and communication caused serious functional damage, but most of the hospitals continued to treat patients as much as possible. Some hospitals were taken over by Aid team, but planning to restart before the Aid team will fade out.
Damage by wind

- Serves as the local medical, nursing and midwifery school
- Classrooms and maternity facilities were destroyed.
- Very important as the human resource supplier
- Loss of communication facility is remarkable
Damage by wind

- Only this hospital had psychiatry ward in this region
- Out patient was restarted two months later and few numbers of in-patient
- In the process of rehabilitation
#11 Leyte Provincial Hospital

Damage by surge and wind
- Three months old new buildings and facilities were broken. Some of them were even before use,
- Medical and reconstruction aid from China and Korea
- Out patient was continued
- In-patients in the emergency area
#10 Tacloban City Hospital

Damage by wind
- Surge was prevented by outer wall
- Functional damage by wind and rain
- Restarted out patient a week later
- Aid from municipal office and JICA
#1 Eastern Visayas Regional Medical Center

- Located by the coast
- Largest governmental hospital in the region
- Kept running out patient and in-patient care and accepted community referrals

Damage by surge and wind
- Located by the coast
- Largest governmental hospital in the region
- Kept running out patient and in-patient care and accepted community referrals
#3 Philippine National Red Cross (operation center)

- **Damage by surge and wind**
  - Mini and mobile clinic right after Yolanda
  - Relief operations by sectors
  - Cooperation with health and welfare sector in the Airport
  - Kept supply of blood transfusions
  - Rapid assessment according to SPEED system and prevention
#7 Tacloban Maternity Hospital

Damage by surge and wind

- Several deliveries at the time of Yolanda, but unable to keep running due to lack of resource
- Closed its history as the oldest maternity hospital in Tacloban
- No detailed information about reopening.
Damage by surge and wind

- Protected the glass window in front of ICU by hard board two days before Yolanda
- Roof tops were blown off, X-ray, MRI, labs were damaged
- Kept running out patient and in-patient
- New facilities reduced the risk
#5 Tacloban Doctors Medical Center

Damage by wind

- Kept running out patient and in-patients
- Only functional CT in the region
- Aid from parental group
- Emergency power generator was functional

5th floor with roofs blown out

Glass windows in the front

CT was saved at the center of building
#9 Remedios Trinidad Romualdez Medical Foundation

Damage by wind
- Kept running out patient and in-patients
- Lost CT by power outage
- Got aid from congressman RTR and served as a center for medical and relief operations under control of disaster manager (medical director)
- Schools restarted two month later

Operations at Tacloban and vicinity

Owns its medical and nursing school
**Red Cross Base Camp**

- **Operation led by Danish RC**
  - Concept started from Denmark
  - To be functional and comfortable to support the delegates
  - Logistics including location, facilities, conflict with local economy, timing of withdrawal are fundamental issues

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**Water purification system**

**Medical room for delegates**

**Shower and toilets**
#6 Bethany Hospital

Damage by surge and wind
- Closed on Nov. 22, but was taken over by MSF. Employees were hired by MSF until restart.
- Only one severe in-patient in ICU could not survive the power outage
Affected people living on the sea shore

Possible threat to the health

- Water and food supplies periodical
- Mass vaccination for tetanus and measles were provided
- No lunch provided in school
- Cooking by burning woods and coals polluted the air
- Direct sewage to the sea

Cooking by burning the debris

House built on wrecked container

Toilet on the sea
Affected people living in the tent

Possible threat to the health

- Food supplies periodical but lack of information was remarkable
- No lunch provided in school
- Increasing diarrhea and asthma
- Tent has no floor and only limited space of ground cover. Several families live in one tent

Information varies by the community

Tents were right behind the sea wall

No floor in the tent
# Safe Hospital: Last Building Standing in Disasters

**Opening remarks:** Hon Secretary Dr. Enrique Ona

| Introduction and opening | Dr Roland Cortes, Assistant Secretary of Health  
Dr Julie Hall, WHO Representative in the Philippines |
|--------------------------|-------------------------------------------------|
| Technical presentations  | Overview: Dr Arturo Pesigan, WHO  
Philippines: Safe Hospitals Programme: Assessment of Hospitals Dr Marilyn Go, Preparedness Div. Chief, HEMS  
Disaster Base Hospitals and Business Continuity Management: Lessons from the Great East Japan Earthquake: Prof Shinichi Egawa, Tohoku University, IRIDeS |
| Panel of reactors        | Representative, Bureau of Design, DPWH  
Atty Violeta Seva, Earthquakes and Megacities, Inc (EMI)  
Professor Ruel Ramirez, UP Diliman |
| Technical inputs from participants and recommendations | Guided discussion on recommendations for Post Haiyan Recovery and safe hospitals  
Moderator: Dr Sandra Tempongko  
Deputy Director, SEAMEO-TROPAMED Network |
Safe Hospital Technical Discussion in DOH
Mission: To conclude the MOA with University of Philippines:

- UP System requires the Inter-university agreement
- Previous agreement with Akita University will serve as a model case (Dr. Crisostomo).
Meeting with Drs. Junichi Nitta, Yasuyuki Matsumoto, and Akira Yokoyama @ Embassy of Japan in the Philippines. Topics: How Japanese residents were affected by the super typhoon Yolanda, How Embassy of Japan have been dealing with the Japanese residents in the affected area, and involved in the recovery process of the affected area.

Picture: Hattori, Tomita, Dr. Yokoyama, Egawa, Haorile, Dr. Nitta (from Lt to Rt)
Disaster Related Infectious Disease

Collecting samples of leptospirosis

Drs. Telan, Dimaano, Talitha, Susan (from left)

San Lazaro Hospital @ SACCL

Meeting with Dr. Lourdes L. Ignacio @ 40th Annual Convention of the Philippine Psychiatric Association (PPA), who is a founder of PPA and the Mental Health Task Force in Disaster Management (MHTFDM). Dr. Ignacio recently published a book entitled “Ginhawa: Well-being in the Aftermath of Disasters” based on her and her colleagues’ experiences post-disaster psychosocial interventions.