Follow-up Workshop on Tsunami Recovery Impact Assessment and Monitoring System; TRIAMS

Aonang Villa Resort, Krabi, Thailand

26 June 2007

Jointly Organized by:

The Department of Disaster Prevention and Mitigation (DDPM) of the Ministry of Interior (MOI), Thailand

Faculty of Tropical Medicine, Mahidol University, Thailand

Department of Health Service Support (DHSS), Ministry of Public Health (MOPH), Thailand

World Health Organization (WHO)

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Workshop Report

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Introduction

The South Asian tsunami claimed thousands of lives and left thousands of families homeless in many countries. Affected countries and their respective governments alongside local and international non-governmental organizations are all in the process of reconstruction and rehabilitation of affected areas.

The Tsunami that struck Thailand on December 26, 2004 was the greatest natural disaster in the country’s history. It left in its unprecedented damage and destructions. The Tsunami affected 25 districts, 95 tambons and 407 villages, of which 47 are almost destroyed, in 6 provinces in the Southern Thailand. The provinces are Krabi, Phang Nga, Phuket, Ranong, Satun and Trang and most affected provinces are Krabi, Phang Nga and Phuket. The Royal Thai Government (RTG) led an effective emergency response to the disaster and UN Country Team (UNCT) in Thailand offered assistance to the RTG and WHO Thailand joins UNCT.

WHO initiated several projects in the Tsunami affected provinces including Tsunami Recovery Impact Assessment and Monitoring System (TRIAMS). Recently, WHO Thailand/SEARO established an Emergency and Humanitarian Action/Health Action in Crises (EHA) Unit in Bangkok and WHO EHA Country Focal Point is facilitating the process of coordination among various sectors involved in TRIAMS implementation. The Department of Disaster Prevention and Mitigation (DDPM) of the Ministry of Interior (MOI) is the coordinating agency for TRIAMS in Thailand.

Finally, a National TRIAMS workshop was organized jointly by Phuket Provincial Public Health office (PHO) of the MOPH, DPM of the MOI and WHO inviting several officials working in 6 tsunami affected provinces. The workshop was held in Phuket on 9 March 2007 and the draft National TRIAMS workshop report was shared at the 2nd Regional TRIAMS workshop held from 21 to 23 March 2007 in Bangkok. The DDPM/MOI in collaboration with other sectors presented their ‘TRIAMS action plan for 2007 to 2009’ at the 2nd Regional TRIAMS workshop.
WHO planned several projects with specific focus on health related recovery process and the Faculty of Tropical Medicine, Mahidol University implemented the projects on (1) GIS Mapping of Health Facilities in 6 Tsunami-affected provinces in the Southern Thailand; (2) Assessment of Disability and Quality of Life in the Tsunami-affected provinces in Thailand; and (3) Monitoring of key Health Indicators (TRIAMS) at Sub-district Health Facilities Level in the Tsunami-affected provinces in Thailand.

Currently, a pilot project on ‘Assessment of Current Situation on Emergency Preparedness for the Health Sectors and Communities in Phuket Province in Thailand’, supported by TRIAMS funds, is ongoing. It is expected that the results will be presented at the workshop.

As the projects involve the Tsunami-affected provinces, it was decided to share the results of the study to senior to mid-level health officials working in Provincial PHOs and other key sectors (education, housing, shelter, livelihoods etc.) in 6 Tsunami-affected provinces to have their feed-back and plan accordingly. Therefore, it was decided to organize a ‘one-day Follow-up Workshop on TRIAMS in Thailand’ and the workshop will provide an opportunity to the participants to discuss TRIAMS indicators. It is expected that 45 to 50 officials join the workshop. Therefore, a Follow-up Workshop on Tsunami Recovery Impact Assessment and Monitoring System; TRIAMS was jointly organized by the Department of Disaster Prevention and Mitigation (DDPM) of the Ministry of Interior (MOI), Faculty of Tropical Medicine, Mahidol University, Department of Health Service Support (DHSS), Ministry of Public Health (MOPH), Thailand, and World Health Organization (WHO). The key objectives of the national workshop were: (1) To share the preliminary results of Mahidol University/WHO Tsunami projects implemented by Mahidol University and discuss these findings and possible implications for the recovery process in Thailand. (2) To present and discuss TRIAMS indicators for 2006-2007 and review the indicators and adapt them in Thai context. (3) To share the TRIAMS draft action plan for 2007-2009 and update accordingly, following the above objectives. (4) To prepare the recommendations from ‘Day I’ workshop to update the Policy Makers about the TRIAMS process in Thailand

**Workshop Process and Outcome:**

The one-day Follow-up Workshop on National TRIAMS workshop was held in Aonang Villa Resort at Krabi Provincial capital on 26 June 2007 organized by the DDPM/MOI, Faculty of Tropical Medicine, Mahidol University, DHSS/MOPH and WHO. The workshop was attended by the officials from the Government, international agencies including UN at the central and provincial level. The provincial level officials were from 6 Tsunami-affected provinces representing key sectors such as health, education housing/shelter, labor, livelihoods including the Provincial Disaster Prevention and Mitigation Office (DPMO). The central level officials were from the DDPM and the MOPH. In addition, the delegates form IFRC, TRCS-Thailand and WHO attended the workshop. During the opening session, Mr ChaiLert Pinyoratanachote, Deputy Governor of Krabi Province formally opened the workshop and delivered an excellent opening speech (Annex I). The opening session was attended by 75 delegates.
**Session I** began with an Introduction to the objectives, workshop process and the draft agenda (Annex II) of the workshop by Ms. Siriluk Duangkeo, Chief of Research and Development Sub-Bureau, DDPM of the MOI. Following introduction, two presentations were made. A PowerPoint presentation on ‘Tsunami Recovery Impact Assessment & Monitoring System (TRIAMS)’ was delivered by Dr Nevio Zagaria, Coordinator for Recovery and Transition programs/Health Action in Crises, WHO Geneva. Dr. Nevio Zagaria, Coordinator for Recovery and Transition programs. Health Action in Crises, WHO presented the analysis which is based on data collected during the Assessment of Difficulties and Quality of Life Due to Health Conditions in Tsunami-Affected Provinces in Thailand 2006. The data were collected by a team from the Mahidol University. The main points: Specific objectives are to study the quality of life and mental health of populations who lived in Tsunami-affected provinces by using WHO DAS (Disability assessment schedule) questionnaires that selected from affected villages with deaths and no death. The survey has 3 components: A measure of functioning: the WHO Disability Assessment Schedule (WHODAS 12), a measure of quality of life derived from the WHO Quality of Life (WHOQOL) instrument, and measures of Mental Health such as stress, satisfaction and happiness. All data were collected in face to face interviews with selected respondents. The sample is composed by 1,260 households in 180 villages selected using a multi-stage random sampling. The survey enrolled people from the 6 affected provinces as the target population adapting the “30 by 7 cluster sampling technique” (7 households by 30 villages per 6 provinces). More details are available in the survey protocol. In the sampling, villages were stratified using the mortality from the tsunami as the stratifying variable. (Annex III) The second presentation was made by Prof Dr Pratap Singhasivanon, Dean, Faculty of Public Health and Tropical Medicine of Mahidol University, on the ‘Monitoring of Key Health Indicators (TRIAMS) at Sub-district Health Facilities Level in Tsunami-Affected Provinces in Thailand’ (Annex IV)

**Session II** began with the introduction to the participant by a team of core facilitators on group work session followed by plenary sessions. The facilitator’s team comprised of experts from the DDPM, the MOPH, Mahidol university (Annex V). The participants were divided by sectors into three working groups and the group reported the outcome at the plenary session. The working groups were: Group I: Health Indicators (facilitated by Dr Pornpet Panjapiyahul); Group II: Non-Health Indicators, (facilitated by Ms. Siriluk Duangkeo); and Group III: Comment on the Results of Non-Health Indicators (facilitated by Prof Pratap).

The facilitators introduced the topics to the groups for group work. The topics were: (1) Scope of area for data aggregating (2) Source of raw data for health indicators (3) sector needed to be incorporated. (4) Unclear definition of some indicators. (5) Consistencies of resulting analyzed indicator. The group work was joined by 71 delegates from 6 tsunami-affected provinces (40), central level (27), TRCS-Thailand (1) and IFRC agencies (3).

The representatives from the key Thai Government agencies gave their opinions on the facts finding.
presented by Dr Nevio Zagaria and Prof Dr Pratap Singhasivanon. Most participants agreed with the results of the studies and made their comments. The brief reports are mentioned below:

1. **Ms. Boonrasri, Social Security Officer**: Most of Tsunami orphans still suffered at the moment because their parents were from outside of 6 Tsunami affected provinces and some of them did not join the social security long enough to have right to get assistances. They stay with their grand parents or relatives and can not get assistance in education from the social security. Although much assistance had been put into the areas, the memories of Tsunami disaster could not be wiped out and still remained forever. Therefore, mental health is the key factor to solve this problem.

2. **Mr. Maytha Pookpiboon, Phang Nga Disaster Prevention and Mitigation Office (DPMO)**: There were two remained problems as unclear source of budget to manage corpses and the land ownership.

3. **Mr. Chooigiat Pinsiwan, Phang Nga Fishery Office (FO)**: All the fishermen’s requirements have been fulfilled according to governmental regulations but might not reach their requirements. The reason might be their previous backgrounds were from the poor situations and the assistances received did not reach the expected point. Therefore, to measure the achievement of the assistance had to be redefined.

4. **Dr. Phitukpon Boonyamalik, Mental Health Department, Bangkok**: The memories’ effect symptom was known as “PTSD”. After the Tsunami effect, it was surveyed and existed about 10%, but might be less at present after 2 years of recovery. To know the existence of PTSD, new survey needs to be conducted in the future. The interviewer should be trained not to stimulate their memories’ effect symptom.

5. **Mr. Bancha Karkong, Krabi provincial MOPH**: The affected areas were not well defined since most people affected by Tsunami were not living in the affected areas but migrated from another areas eg. Pee Pee island was the affected area but mostly the affected people were from outside of the island. Therefore, to solve this problems, the routine works must be strengthen and focus on the affected people. It was also noticed that number of suicide cased in Krabi has been increased at the moment that might be due to Tsunami crisis. The Tsunami effect passed on to the next generation should be conducted in the future. Finally, there were many studies on Tsunami crisis and need to be

6. **Mr. SermSook Chaisorn, Trang provincial Education MOE**: There was a case that a child was severe injured and still had mental illness in Trang province, but health assistance given to either severe or minor injury child was the same which should not be the case. At the moment, more than 1000 students were waiting for education funds. The areas in this province were almost flat and there was no place to hide from Tsunami. The fishermen needed help to continue their live.

7. **Ms. Arunee Marnagla, Trang Fishery Office (FO)**: The fishery office had already provided assistance to those fishermen. Now they were adjust to recent live but still needed to be educated in Tsunami phenomena.

8. **Mr. Bancha Karkong, Krabi provincial MOPH**: The reason why there were mental health differences between non-affected and affected villages might be their previous backgrounds were from the poor situations and the Tsunami crisis had worsen their situation. Therefore, two years of recovery program might not sufficient to solve their problems.
9. **Mr. Kajorndet Juntayanee, Public Health MOPH:** There was a need to have Tsunami warning system in the areas to warn people before hand. People will have less stress when they feel secure and safe to live in the area.

10. **Mr. Chatsaru Suratrandkagol, Phuket provincial MOPH:** To solve the problem, the “Strong and Healthy Family Project” should be emphasized in 6 Tsunami affected provinces.

**Suggestions and Recommendations from Group Work**

I. **Suggestions and recommendations of Nevio’s presentation**
   1. To prepare national Tsunami database and put it on the web to be easily accessed by interested people.
   2. Collect all research results related to Tsunami by arranging a workshop supported by WHO to encourage information sharing among various sectors
   3. To strengthen a project on strong and healthy family by Public Health Department with 14 indicators to be measured.
   4. The local government should collect additional indicators to answer why Tsunami affected people are still in worse situation even after the affected areas have been recovered.
   5. Train and prepare “Ready-to-work-volunteer” from various sectors cover the whole country.
   6. Present the outcome of this workshop to the central government to get approval and budget in order to strengthen the Tsunami affected local people’s situation.
   7. IFRC comment: We would appreciate seeing a recommendation on Disaster prevention in the community level to strengthen communities to help themselves next time a disaster strikes.
   8. This data needs to be relevant on local level to assist them in making decisions. Central government needs to allocate also financial resources to local government on regular basic to make this a sustainable process in the long term.

II. **Indicators review:** These are the problems identified from data collection and collation:
   - Scope of area for data aggregating is not clear whether it should be in district or sub-district level.
   - Part of health indicators are in private sector, needed to be incorporated.
   - Data availability.
   - Due to missing data, some indicators at the sub district level could not be analyzed.
   - Results of the spatial analyses are purely exploratory and require more data to carry out more in-depth and sophisticated analyses.

III. **Obstacles / challenges:**
   - Period of data collection was not the same system between fiscal year and calendar year
   - Understanding of indicator definition was not clear among officials involved in data collection and collation.
   - Lack of knowledge and understanding of data collecting tools
• Some indicators are not part of routinely collected data, should have plan for this kind of extra data
• No database system available
• Information center should be established at DDPM
• Financial limitation

Session II continued with the emphasis from the Mental Health department representative that the fact revealed that some problems still existed after two years of recovery programs. The reasons for these must be identified to readjust the recovery programs accordingly. The representative from IFRC also recommended the need for data collecting persons to understand how importance and usefulness of the collected data.

Closing session began with the concluding remarks made by Prof Dr Pratap Singhasivanon. He mentioned that the outcomes/recommendations of this workshop would be tabled for the Consultative Meeting for Policy Makers on Tsunami Recovery Impact Assessment and Monitoring System; TRIAMS.

Finally, Ms Siriluk, on the behalf of DDPM, thanked all the participants for their contribution to make the fruitful outcome of this workshop.

For further information and comments, please direct communications to:

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Annex I:

Opening Speech: Mr ChaiLert Pinyoratanachote, Deputy Governor of Krabi Province

WHO, UNDP, IFRC representatives, and representatives from MOPH, DDPM, Mahidol University, TRCS and representatives from all 6 affected provinces. On behalf of Krabi Province, I am glad that Krabi was chosen to conduct this tsunami recovery monitoring workshop.

As known to everyone that the 2004 Indian Ocean Tsunami claimed thousands of lives in many countries and we have in Thailand 6 provinces 25 districts were affected. As a result, there was historical phenomenon from international and national cooperation to assist those affected people in all aspects. The assistance has last from emergency state until recovery stage after the tsunami.

Thank to everyone involving in organizing this national workshop today which will benefit those required for information in order to assist in recovery process of tsunami affected in all aspects. I hope that this workshop will light the idea of information system management in order to handle with information that is now scattered in all sectors. Finally, this information will point out and fulfill those areas where assistances are to be achieved.
Annex II:

Draft Agenda

Follow-up Workshop on
Tsunami Recovery Impact Assessment and Monitoring System (TRIAMS)
Organized by
Department of Disaster Prevention and Mitigation; DDPM ; MOI
Department of Health Service Support; MOPH
Faculty of Tropical Medicine, Mahidol University
World Health Organization ; WHO

At AoNang Villa Resort Hotel, Krabi province, Thailand

Tuesday 26th, June, 2007

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>08.30 am - 09.00 am</td>
<td>Registration</td>
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<tr>
<td>09.00 am - 09.15 am</td>
<td>Welcome address and introduction:</td>
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<tr>
<td>09.15 am - 09.40 am</td>
<td>Brief TRIAMS and Objectives by DDPM</td>
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<tr>
<td>09.40 am - 10.00 am</td>
<td>Presentation and discussion of 2006-2007 monitoring of TRIAMS indicators in Thailand, DDPM</td>
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<tr>
<td>10.00 am - 10.30 am</td>
<td>Presentation of preliminary findings from the WHODAS-QoL-Mental health household survey by Dr. Nevio Zagaria : Coordinator for Recovery and Transition programs. Health Action in Crises, WHO</td>
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<td>10.30 am - 10.45 am</td>
<td>Coffee Break</td>
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<tr>
<td>10.45 am - 11.15 pm</td>
<td>Presentation of the results of monitoring of key health TRIAMS indicators in the tsunami affected areas, by Prof. Pratab Singhasivanon</td>
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<tr>
<td>11.15 pm - 12.30 pm</td>
<td>Working groups by sector to discuss the findings and make the conclusions of the WHODAS-QoL-Mental health household survey</td>
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<td>12.30 pm - 01.30 pm</td>
<td>Lunch Break</td>
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<tr>
<td>01.30 pm - 02.30 pm</td>
<td>Presentation of the Group work and cross sectoral analysis of the monitoring of all TRIAMS indicators presented so far</td>
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<tr>
<td>02.30 pm – 03.30 pm</td>
<td>Revision and adaptation to THAI context of TRIAMS indicators by Ms. Siriluksana Duangkaeo : DDPM Dr. Pornpet Panjapiyakul :MOPH Prof. Pratab Singhasivanon : Mahidol University</td>
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03.30 pm - 03.45 pm: Coffee break

03.45 pm - 04.30 pm: Update of TRIAMS action plan for 2007-2009: MOPH/DDPM

04.30 pm - 05.30 pm: Draft and discussion of key recommendation on tsunami recovery for the Policy Makers consultative meeting of 27 June

05.30 pm - 05.45 pm: Closing
Annex III

PowerPoint presentation on the ‘Tsunami Recovery Impact Assessment & Monitoring System (TRIAMS)’: Dr Nevio Zagaria, Coordinator for Recovery and Transition programs/Health Action in Crises, WHO Geneva

This analysis is based on data collected during the Assessment of Difficulties and Quality of Life Due to Health Conditions in Tsunami-Affected Provinces in Thailand 2006. The data were collected by a team from the Mahidol University.

The survey has 3 components: A measure of functioning: the WHO Disability Assessment Schedule (WHODAS 12), a measure of quality of life derived from the WHO Quality of Life (WHOQOL) instrument, and measures of Mental Health such as stress, satisfaction and happiness. All data were collected in face to face interviews with selected respondents.

What is Health Status information?
- Disease Status (ICD): Information about Illness, disorder, injury, trauma
- Functional Status (ICF): Information about functioning
- Quality of Life: Subjective well-being, satisfaction

Measurement Domains
- Functioning measured by using WHODAS II
  1. Understanding and communicating with the world (cognition)
  2. Moving and getting around (mobility)
  3. Self care (attending to one's hygiene, dressing, eating and staying alone)
  4. Getting along with people (interpersonal interactions)
  5. Life activities (domestic responsibilities, leisure, and work)
  6. Participation in society (joining in community activities)
- Days out of role (work, education etc.)
- Quality of Life measured by using WHOQOL
  1. Satisfaction with health and well-being

Quality of Life (WHO-QOL) Questions
  1. How satisfied are you with your health?
  2. How satisfied are you with your ability to perform your daily activities?
  3. How satisfied are you with your personal relationships?
  4. How satisfied are you with the conditions of your living place?
  5. How would you rate your well-being?

Mean scores of WHO Disability Assessment Schedule: In this table a big difference between Thailand and Indonesia scores.
Mean score of WHO-DAS 12 in Thailand, by category of tsunami affected villages: In this table a small difference between the affected villages with and without deaths categories is present and both categories are higher than that of non-affected villages.

WHO-DAS II household survey, Thailand December 2006: general main score and by the domains with significant variance across the three categories of villages: The scores reveal the same as in case of “Mean score of WHO-DAS 12”.

Key findings:

People in Tsunami affected villages have overall more severe disability (WHO DAS II), less quality of life (WHO QoL), and poorer mental health (MH Questions). They experience the greatest difficulty in Cognitive functioning (concentrating, learning a new task), Mobility (standing, walking) and Life activities (work performance and household task). They also face Higher need for health care and Higher number of days out of their usual role, which means low or loss of health-related work productivity due to the disability profile. The vulnerable groups as women, elderly, and unemployed have the highest disability burden.

Conclusions

Despite the recovery efforts conducted so far, in the Tsunami affected population the nature and scope of disability is significantly worst than among the non-affected population.

Among the Tsunami affected population there is need to improve non-fatal health outcomes of vulnerable population groups, restore functioning in particular in domains which allow to regain work productivity and consider different intervention choices at improving the functioning of the person and/or his/her environment (e.g. provision of crutches vs. provision of prosthesis vs. environmental changes (workplace adaptation).

For future work :

Study cost-effectiveness of interventions using WHO DAS II 36 item version (possibly with WHS impairment module and EF question): Monitor how disability index and profile changes over time following interventions

Incorporate measurement of non-fatal health outcomes using WHO DAS II as a core indicator for impact monitoring of the overall recovery efforts
Annex IV:

PowerPoint presentation on the ‘Monitoring of Key Health Indicators (TRIAMS) at Sub-distinct Health Facilities Level in Tsunami-Affected Provinces in Thailand’: Prof Dr Pratap Singhasivanon, Dean, Faculty of Public Health and Tropical Medicine of Mahidol University, Thailand

The South Asian tsunami of 2004 has claimed thousands of lives and left thousands of families homeless. Affected countries and their respective governments alongside local and international non-governmental organizations have initiated numerous programs for the reconstruction and rehabilitation of the affected areas. Recovery activities are still ongoing and several are still being planned.

Of major interest now is to evaluate the progress of recovery in the affected areas. The Tsunami Recovery Impact Assessment and Monitoring Systems (TRIAMS) have been set up to initiate processes and strengthen regional and national mechanisms to facilitate planning for further recovery activities, hence, the formulation of numerous core and country-specific impact assessment and monitoring indicators under 4 major headings: 1) vital needs, 2) basic social services, 3) infrastructure, and 4) livelihoods. But in order to succeed in monitoring such indicators, a detailed and reliable database is critical which necessitated the conduct of this survey. The objectives of this survey are to measure the impact of the tsunami on health using key indicators derived from the TRIAMS, and to generate a baseline database of health-related indicators in the tsunami-affected villages.

Spatial analysis was performed on collected data and results were presented through thematic maps and summary statistics.

Demographic indices: Indicators such as crude and under 5 death rates give an overall picture of the current standards of health in the surveyed areas. Crude death rates in the tsunami-affected districts range from 1.8 per 1,000 population in Nua Khlong, Krabi to 17 per 1,000 in Muang Ranong, Ranong. On average, the crude death rate in the affected district is at 4.63 + 2.95 per 1,000. Mortality rates of children under 5 years were highest in Hat Samran, Trang with 5 per 1,000. Followed by Muang Ranong, Ranong with 4.6 per 1,000 along with 11 other districts with rates <5 per 1,000.

Vital needs: Percent population with access to water from an improved source was lowest in Ko Lanta district, Krabi with 74.4% followed by Kathu district, Phuket with 83.6%. The rest of the affected districts have 90%-100% of its population with access to water. Incidentally, the highest percentage of population without basic sanitation facilities was highest in Ko Lanta, Krabi with 12.2%. Khlong Thom and Nua Khlong districts in Krabi province both have 1% while Hat Samran and Kantrang districts of Trang have 1.2% and 4.2%, respectively. Khura Buri, Phangnga have 5% of its population without basic sanitation facilities while the rest of the affected districts have such facilities. Ko Lanta, Krabi have the lowest measles immunization coverage with 90% followed by Thai Muang, Phangnga with 95%. Rest of the other affected districts has more than 95% coverage. The proportion of low birth weight (LBW) outcomes in each district is also illustrated. Percent LBW is highest in Ko Lanta, Krabi with 10.7% closely followed by Hat Samran, Trang with 9.5% and 8.3% in both Palian, Trang and Ko Yao, Phangnga. On the other hand, the lowest percentage of LBW outcomes is in Nua Khlong, Krabi. Proportion of children under 5 years who are underweight was highest in Ko Lanta, Krabi with 38.1% followed by Hat Samran, Trang (13.6%) and Kapoe, Ranong (11.3%). The rest of the affected districts have <10% underweight children. From the same population of children under 5, the reported percentage of wasting is highest in Ko Lanta, Krabi with 25.2%, Kapoe, Ranong with 11.3%, Hat Samran, Krabi with 10.7%, and the remaining districts with less than 10%. Suk Samran district in Ranong has no reported occurrence of wasting.
Access to basic social services: No. of hospital beds per 10,000 population (in-patient and maternity), No. of outpatient consultations/person/year, % children 12-23 months who are fully immunized against all antigens, No. of health facilities with Emergency Obstetric Care per 10,000 population, Adequate antenatal coverage (at least 4 visits during a pregnancy), % subdistrict covered by outreach psychological support by community workers, and % birth attended by skilled birth attendant.

Problems encountered & limitations
Data collection: The biggest challenge encountered by our team of surveyors was the unavailability of some data at the time of the survey. To solve this, the appropriate checklists were given to local health personnel and subsequently have them sent as priority mail to the Faculty of Tropical Medicine, Mahidol University. However, some still failed to forward the information needed which resulted to a few indicators having missing data.

Spatial analysis: Indicators with missing values have been dropped from the analysis since existing methods and computer packages do not have adjustments for missing observations. So only those with complete data can be analyzed. Furthermore, results of the spatial analyses are purely exploratory and require more data to carry out more in-depth and sophisticated analyses.

Conclusions and recommendations: Since data presented in this report shows baseline statistics for various health indicators, constant surveillance of such variables is vital in monitoring the progress of recovery activities. While all efforts have been made to collect data for all areas of interest, some information were either inaccessible or not available which resulted to missing information. The presence of capable local personnel who can manage and analyze such data efficiently and promptly alongside a surveillance system to monitor all indicators of interest (both health and non-health) will assure constant flow of high quality data.
Annex V:

Facilitator’s Team

- Ms Siriluksana Duangkeo, Chief of Research and Development Sub-Bureau, Research and International Cooperation Bureau, DDPM, MOI, Bangkok
- Prof Dr Pratap Singhasivanon, Dean, Faculty of Tropical Medicine, Mahidol University, Bangkok
- Dr Pornpet Panjapiyahul, Chief of Academic Service Section, Bureau of Health Service System Development, MOPH, Bangkok.

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