Consultation report on "The Project for Child Health in Department of Quetzaltenango, Guatemala"

March 2006

For
Area de Salud, Quetzaltenango, Guatemala
Ministry of Health, Guatemala City, Guatemala
Japan International Cooperation Agency (JICA)

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I. Executive Summary:

Training was conducted in an effort to strengthen the professionalism and clinical skill efficacy of primary care providers at the health post level. Professionalism and clinical skill advancement were tackled through specific tasks including; 1) increasing the utilization of the resources by villages so that they can detect seriously sick infants, 2) to prevent avoidable deterioration of infantile illnesses, and 3) to enable care providers to promptly administer appropriate treatments for pneumonia and diarrheal diseases. These goals are significant in the progression of reaching the larger objective of improving the confidence of the general population in the primary health care level. Confidence in the primary health care system is vital to improving the overall function of Guatemala's three pillar health care system.

The main part of the training was the workshop. The same workshop was provided twice, February 14-18 and February 21-24, with over 50 participants from six project sites. The workshop consisted of three main parts, 1) simple assessment tool called the assessment triangle, 2) introduction of a new practical charting system, called NS chart, and 3) instruction of auscultation skills for lung assessment using a stethoscope.

These workshops were followed by monitoring site visits. Each health post and center was visited to discuss problems in implementing NS system and to obtain feedback for revision. New succinct referral forms were developed to facilitate better communication and feedback among health care tiers.

Further revision of NS system is essential to help primary care providers to treat and refer patients timely before patients become seriously sick. In order to curb the infant mortality rate in the project area, multi-level interventions strengthening at the primary care level and facilitating effective communications between health care tiers is essential.

II. Background

Overall background information regarding the chronological evolution of the project goal and outcome was addressed elsewhere previously. Briefly, JICA project coordinator Ms. Fumiko Kudo has been conducting a series of participatory community assessment with her counterparts in the ministry of health, Quetzaltenango over the past two years. The overall goal that Guatemalan counterpart set is to reduce infant mortality by 50% in four years.

In order to achieve this overall goal, one of the outputs of the project is set as follows: "Healthcare providers give quality and warm care to infants under one year old before they indicate critical condition with respiratory infections and diarrhea." I was recruited to provide technical training to achieve this purpose based on my expertise in giving training to primary care providers in different cultural and social setting in the past and my expertise as the bedside clinical trainer at an academic institution in the US.

III. Activities

1. Preparation

Previous survey results were reviewed and discussed with the chief advisor, Ms. Kudo on our arrival to Quetzaltenango. The emphasis on the intervention was to strengthen the primary entry point to public health care system, at the health posts. Based on both her observations and discussions with counterparts, it became clear that the lack of professionalism contributes critically to the low usage of public health care services by villagers in the project areas: lack of competency in medical skills and lack of motivation to interact with patients. Even though clear instructions for care givers regarding warning signs and symptoms are pivotal to prevent deterioration of illnesses, it is often difficult to give those instructions if you are not competent with medical skills. Lack of motivation often hinders high quality interactions with patients, which require a kind and caring manner.

Beginning on February 5th, I met with my counterparts everyday to discuss the contents of the workshop. It was useful to make an initial field trip briefly to see what exactly auxiliary nurses are practicing at health posts. This field trip made me realize the need to develop a simple practical tool to help them sort out sick patients promptly and enable them to administer medications in a timely fashion. Drs. Juan Carlos Moir and Diego Manrique were my direct counterparts to discuss the contents of the workshop. They both are keenly interested in the idea to develop a new system which is practical, cutting back the amount of paperwork and easy to use for auxiliary nurses.

Concept of "Assessment Triangle"

The easy conceptual framework to help practitioners to assess the overall status of a sick child promptly is essential. Often, practitioners are caught in the details of each disease entity and diagnosis. As we can see in the approach employed by IMCI, it is often more valuable to assess patients for their overall conditions quickly than making a precise diagnosis by ruling out each disease entity. (Please see the discussions for IMCI as well).

A simple conceptual framework is often useful to assess sick pediatric patients. I have been teaching my residents and medical students, in the US, to be aware of three critical factors to examine sick patients. These are infection, nutrition, and fluid status. We decided to employ this triangular approach to let participants realize 1) dynamic nature of patient assessment, that means patients status can change rapidly and clinical manifestations will vary, 2) these three factors are intricately related and we need to develop general assessment skills not only for infection, but the degree and consequences of infection, often manifested as dehydration or malnutrition, and 3) that the tool should be easy to remember and easy to use without a complicated theoretical background. Throughout the workshop, we focused on discussing this concept of the triangle through clinical case discussions.

Development of NS chart

Based on my observation in the health posts where health care providers are inundated with complicated and often redundant paperwork, I realized the need to develop a simple, practical way to help them sort out sick patients and guide them to appropriately treat them. I have been using the T-system[1] at the several emergency rooms and urgent care centers in the United States. The T-system was developed as a checklist, instead of the conventional SOAP[2] system, to guide busy physicians working in emergency departments to quickly rule-in or rule-out medical conditions based on the patient's chief complaint.

After the workshop, one of my counterparts, Dr. Manrique showed me a new form distributed by the ministry of health. This new forms are supposed to replace AIEPI and other clinical forms. The format of these new forms is, in fact, similar to T-system; a checklist type for quick review and less paperwork. However, the new form doesn't include the checklist of clinical signs. Therefore, it is highly questionable, how much these new forms will help practitioners to make a timely diagnosis and referral.

2. Implementation

Workshop:

I conducted two workshops one and a half days long each session. Each workshop hosted approximately 20 participants from six project sites. Please refer to the schedule for the workshop at the Appendix A. The workshop was aimed to be as practical as possible and as simple as possible while providing participants with tools they can use right away. Their previous clinical training related to child health was about four or five years ago regarding AIEPI, a Guatemalan version of Integrated Management of Childhood Illnesses (IMCI). (Critique for the AIEPI, please refer the following section.)

For most of the participants this was the first time they were taught how to use a stethoscope. Auscultation skills were supplemented by using a digital-audio to show them

[1] T-system is on of the examples of "checklist" approach using a pre-formatted form based on patient's chief complaints. It is widely used in the field of emergency medicine in the US. The system will save significant time for documentation instead of writing, but checking boxes on the list. The system also helps physicians to avoid missing critical signs or dangerous conditions related to the chief complaints. Subsequently, it helps physicians to avoid undercoding for the medical consultation.

[2] SOAP system is usually employed and widely taught in health care in the United States and in many other countries as a medical documentation system. SOAP system is organized in four parts, incorporating Subjective findings and narratives from the patients or caregivers, Objective findings at the examination or laboratory, imaging studies, then followed by an Assessment or assessments, and the Plans follow at the end.

several adventitious sounds. Auscultation skills have been totally ignored in the IMCI approach, based on the fact that a majority of life threatening conditions can be identified without stethoscope. However, whether the auscultation by a stethoscope by primary care provider would improve detection rate of pneumonia has never been studied.

Referral system:

After discussions with Dr. Acievedo, the director of the Regional Hospital of the West, and with Dr. Mejia, the chairman of the pediatric department, our counterparts and I all in agreement to the need of a standardized referral form to facilitate bidirectional communication between tertiary care center and primary health posts. We developed two forms; one from post to hospital and the other from the hospital to the post. These forms will be in place at both facilities and the results of these communications will be reviewed closely on a monthly basis to see how this instrument will help us to facilitate better care of the patients.

Continuing education:

Based on the list of topics discussed with auxiliary nurses at posts, our counterparts and the chief advisor will continue to provide monthly continuing medical education (CME) activities at each health center.

3. Follow-up visits

In health posts in Huitan and Cabrican, NS chart was on their desk as reference in three out of four places. In all places, they used their own stethoscope (provided by our program) and they warmed up the stethoscope before direct use on patients, as we discussed during the workshop. We made a list of topics the participants of training were interested in through monthly follow-up visits and feedback sessions by the chief advisor and counterparts. These lists include following topics:
1) Skin conditions
2) Food and water borne disease
3) Suture workshop
4) Respiratory infections
5) Eye diseases

4. Other activities:

I had opportunities to give two lectures at the Regional Hospital of the West in two different occasions.

1. Lecture on “Epidemiology & International Health” for medical students at University of Mesoamericana on February 13, 2006 (Please refer Appendix D for detail).

2. Lecture on “Trauma Surgery in Reflection” for residents and attending trauma surgeons at the department of traumatology on February 22, 2006. (Please refer Appendix E for detail.)

IV. Observations and current issues

A. Health care system architecture in Guatemala

Like many other low-income countries in the world, the health care delivery system in Guatemala is structured by a dual system: public and private. The government, through the ministry of health, is providing free care for the poor majority and its level of care is marginal. A minimum level of equipment and a chronic shortage of skilled personnel are noted throughout the public health system. Areas where indigenous Mayan tribes are dominant, the accessibility and effectiveness of the public service is variable[3]. While the rural poor and majority of indigent populations have only the public health option, the rich few can afford to seek medical care in private clinics and hospitals, receiving a similar level of care as available in many industrialized countries. This dual system prevents the public health tiered health system from function properly.

There are three essential assumptions for the pyramid health care system to function[4]. First, there is a tier approach (or ladder approach) that the higher tier will consult patients referred from the lower tiers. Second, there is a functional referral system among tiers. And in the third, there should be no other competing system existing[5]. If there is other health care systems in co-exist, they will prevent the pyramid structure to function for a number of reasons: 1) Dual systems compete for the resources by duplicating services, 2) These other structures will destroy ladder approaches by bypassing some tiers and/or making self-referral and, 3) The competing systems reduces confidence in the pyramid health care system. Subsequently, tertiary care centers are overwhelmed with simple cases that are supposed to be dealt with at the lower tier facilities. This phenomenon will waste valuable resources at the tertiary care facilities that need to be allocated to more complex and serious cases. Currently, it is highly doubtful whether a functional tier system exists in the project sites considering many competing sectors in the areas including private clinics, pharmacies and traditional healers.

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[3] ASECSA (2002). "Model of indigenous Maya medicine in Guatemala."
In this anthropological study conducted by ASECSA found that public health service reaches only up to 50% in some indigenous Mayan communities.

[4] Key concepts in health care pyramid system in low-income countries were presented at the 2nd International Family Medicine Consultation workshop by AAFP in Portland, ME, September 2005.

[5] There are two studies clearly showed the functional tier system in the US. The most recent one, please refer Green, L. A., G. E. Fryer, et al. (2001). "The ecology of medical care revisited." N Engl J Med **344**: 2021-2025.

1. Observations at each tier

1) Primary care level (Health Post: Puesto de Salud)

Waiting rooms of health posts are flooded with various kinds of posters and slogans, signifying the effects of "vertical" programs offered and campaigned by various organizations. Subsequently, auxiliary nurses at the post are inundated with many different forms that come with each different vertical program. These vertical programs have created many different forms for statistics and/or drug inventory. Excessive and redundant paperwork limits patient-contact time at the clinic, e.g. giving instructions to patients or examine patients.

2) Secondary level (Health Center: Centro de Salud)

Currently, the health center does not function as the secondary tier in the health care pyramid since they don't offer any treatments different from the primary level. Many patients in fact, are referred directly from the post to the hospital, or even self-triaged and visit directly to the hospital. These are the violation of tier system approach.

Various reasons have lead to the lack of trust by the population of these health care centers. One of the important reasons is its office hours: they are not open 24 hours a day and physicians and nurses are in the center only few hours in most days if they show up.

Physicians at the health center contribute to the lack of effectiveness of the centers. Their morale is low and they often don't show up to work. These physicians all live in the city and commute everyday to their rural workplace. Many of them are busy managing their private practice in the city; they don't have much time to stay at the health center.

3) Tertiary care level (The Regional Hospital of the West)

My observation at the pediatric emergency department at the hospital is summarized at Appendix F. Briefly; the hospital is overwhelmed with many self-referral cases that ignored the referral or tier system. There is not enough manpower to deal with sick patients effectively and efficiently; in fact, the hospital is managed by residents and medical students most of the time.

2. Health care provider issues

1) Unclear training for generalist physicians

Currently, physicians can open their independent practices immediately after graduation and national licensure examination. There are still significant numbers of physicians either joining private practice or obtaining jobs in the public sector without any post-graduate training in Guatemala. Many physicians working at the public sector do not have any clear residency training or specialty board certification.

2) Low incentive, lack of motivation, lack of resources, and mistrust for the system constitutes viscous cycle.

- A low financial incentive in the public sector has made it hard to attract practitioners with high quality. It also often leads to lack of motivation in patient care and their work in general. This phenomenon will affect the trust of the health care system provided by the public sector.

- Health care practitioners lack the skills to handle various tasks at the health center level, due to the lack of structured post-graduate training.

3) There is no continuing medical education or quality assurance of the performance of physicians by specialty board or state board organizations.

- Education and training is a critical problem at all levels of health care professionals in Guatemala.

4) Urban-rural divide; the majority of physicians commute to the health centers from the city. Therefore, they cannot stay at the center longer than a few hours a day since they have to go back to the city to manage their daily private practice.

3. Training problems

1) "Trainer training myth"

In many countries, international donors including UNICEF, WB, tends to provide trainer's training sessions at the capital city or major cities inviting faculty members of the ministry of health or teaching institutions. Donors expect that the effect of training will trickle down to the primary care level (to the beneficiaries of the service) by local initiative. This assumption has never been proven. Unfortunately, in many places, training at the primary and secondary level is left to NGOs or local ministries. Subsequently, these trainings often lack a standardized approach among different NGOs or the practical scope needed at the primary care level.

2) IMCI problems

The Integrated Management of Childhood Illnesses has been developed with WHO and UNICEF for many low-income countries in the early 1990s. Modification of IMCI contents are encouraged based on resources and capacities of each community.

The major difference of the IMCI approach compared to previous ones is IMCI focuses on sorting out sick patients requiring attention immediately, rather than taking the time to diagnosis by ruling out conditions one by one based on detailed examinations. Subsequently, the examination skills employed in IMCI approach are very basic and do not incorporate any auscultation skills at the bedside. Assessment is reliant on simple

tools, such as respiratory rate per minute, or characteristics of breathing as tools. Even though pediatric auscultation skills are difficult[6] and often unreliable[7], the field use of auscultation skills have never been studied or tested in the field.

The Guatemalan version of IMCI is called AIEPI and had been introduced in the late 90s. However, the algorithm chart and patient sheet utilized by AIEPI is not practical in a busy practice for a number of reasons.

1. The health care provider has to go through a relatively complicated algorithm to sort out patients' immediate referral, treat at home and low risk needs.

2. The chart does not provide an exact dosage of medication or the length of treatment for common pediatric conditions, such as pneumonia; just states "appropriate dose".

3. Some of the signs incorporated into IMCI/AIEPI are not accurate and updated. For example, the clinical signs of dehydration are still controversial, but signs like sunken eyes are verified as not an accurate parameter in recent meta-analysis[8]. All in all, it simply lacks practicality.

4. Charting system goes more than one page and the user has to go over detailed fine prints to follow instructions.

5. The formula used in AIEPI is not the formula used in the project area: for example, Acetaminophen in the handbook was 125mg/5ml, but they are using 120mg/5ml formula.

6. Dosage of antibiotics used in AIEPI doesn't consider bacterial resistance which emerged in the late 90s: S. Pneumoniae, one of the most common bacteria for infantile

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[6] Refer for instance, Chapter 28 Pneumonia in Strange GR. (2002) Pediatric Emergency Medicine. American College of Emergency Physicians (ACEP). Also, in recent meta-analysis on JAMA, does not incorporate any auscultation findings as tools to rule in pediatric pneumonia.

[7] Margolis, P. (1998) "Does this infant have pneumonia?" JAMA **279**:308-313

This meta-analysis showed there was a significant variations among the value of auscultation findings for children with pneumonia. One of the reasons for this variation was due to the confusion of medical terminology used in those studies.

[8] Steiner, M. and D. DeWalt (2004). "Is this child dehydrated?" JAMA **291**: 2746-54.

In this meta-analysis, common clinical signs including sunken eyes seems to provide little clinical help to make a diagnosis of dehydration in children. For sunken eye, the LR estimate from previous studies was 1.7. The most useful clinical signs to make a diagnosis of dehydration were prolonged capillary refill time, abnormal skin turgor and abnormal respiratory pattern.

pneumonia, is now resistant to the conventional dose Amoxicillin[9]. Therefore, current practice in many parts of the world, particularly if the patient doesn't respond to the treatment, requires an appropriate higher dose.

7. The last training for AIEPI was at least four to five years ago. Since then, the conduct of training is left for local health ministries and they have been conducting trainings only for new recruits, naturally, there is a lack of standardization of treatment protocol, triage procedure of patients among different centers and posts.

8. As I discussed on "assumptions for trainer's training" section, AIEPI training was conducted primarily for top and mid-level administrators in the public sector. Health care workers in the primary care level were never directly instructed.

B. Observations and issues regarding our workshop

1. Findings from the post-evaluation from the workshop

Many participants want further training in certain areas including skin problem, nutrition, pregnancy, and other adulthood illnesses.

Comparing pre- and post-test, in all three questions, there were improvements in rates for correct answers. However, pharmacology knowledge tested before and after our workshop indicated an incessant void in the knowledge base of participants: medication education including side effects, dosages, and indications should be conducted in the future.

2. Findings from monitoring visits

Many auxiliary nurses working at health posts in the project site showed enthusiasm for future learning opportunities. One auxiliary nurse at Palestina told me, (the following excepts are through a translator):

> *"We really appreciate you coming and sharing your knowledge and skills with us. Only a few physicians in our system have done this in the past. We really would like to improve our skills and we need feedback about our performance. I really appreciate what you've done to us."*

Another auxiliary nurse at same location mentioned, (Again, a quote through the translator):

> *" I was not sure about the usefulness of this training. But now, you really came to visit our clinic and shared with us such a useful clinical skill, I have no doubt in my mind that this would be very successful and I really thanked JICA and Professor Mori."*

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[9] Gilbert DN et al. (2005) The Sanford guide to antimicrobial therapy 2005. 35th edition
This is the standard guidebook in the United States to see the most updated information regarding bacterial resistance and standardized treatment regimen for various infectious diseases. The guidebook is revised annually.

These comments shows the high demand for educational opportunities by health care workers at the primary care level and such opportunities has not been provided previously. The feedback I received after my workshop and other lectures during my stay coming directly from the audience at various levels of nurses, auxiliary nurses, physicians and medical students, I realized that practical bedside teaching is urgently needed at all levels in the health care structure.

Now we came up with concrete "wish list" of topics our nurses and doctors would like to know, we have to focus on how to implement and conduct continuing training sessions on a regular basis. That requires good coordination and a commitment to gather scarce resources here in Quetzaltenango, identifying the pearls of clinical knowledge and presenting them to our health care providers in relevant and practical way.

V. Recommendations

A. LOGISTICS

1. **Logistician is URGENTLY needed to support the chief advisor of the project**.

The long-term technical advisor for the project, Ms. Kudo is managing all logistical work as well as the coordination of the training, besides advising and supervising health posts and centers for child health care project. It is more than overwhelming amount of logistical work she has to handle for the preparation for the training.

2. **Unclear restrictions on recruitment of short –term experts and consultants should be made transparent to outside the JICA IMMEDIATELY.**

Even though the purpose of the training and workshop was only met by combining two expertise, counseling skills and clinical skills, that I share with my spouse, Hikari Morikawa, we had to face significant unreasonable reluctance from JICA to send both of us together to the project at the same time. It is almost laughable, rather than absurd to see how numerous personnel in several JICA offices made our assignment abide by the unwritten, unexplainable, yet common rule of "no recruitment of couples to the same project at same time."

B. PROJECT

1. **Usage and relevance of NS chart system should be monitored closely for immediate revision and improvement.**

The NS system covers two major morbidity and cause of mortality in the project site, pneumonia and diarrhea. The relevance of the form should be tested in the field, at the primary care facilities and should be revised incorporating given feedback.

2. **A user friendly, simplified drug inventory system and statistical reporting system should be developed to help primary care providers to allocate more time for patient-contact rather than paperwork.**

Health care providers at the primary care level are inundated with numerous documentation tasks. Many practitioners have to either work extra hours for free to comply with the paperwork requirement, or close their clinic to fill out forms. Each time the central government creates a new program, or international organizations implement new campaign, another form is added to current works. Amazingly, these forms and documents are rarely integrated into a simpler, more user friendly one. This is one of the major obstacle for the quality of care in primary care health facility.

3. **The newly implemented referral system between the hospital and primary care clinics should be monitored closely to make sure it functions appropriately.**

Sound communication between tiers, primary, secondary and tertiary facility is essential to make a tiered health care system functional. Effective linkage should be monitored rigorously to maintain the communication and collaboration. Regular communication between the Area de Salud counterpart and the faculty members of the pediatric department, the Regional Hospital of the West, Quetzaltenanago, should be encouraged.

4. **Regular educational sessions should be continued to provide practical and useful clinical pearls to health care workers at the health posts and health centers.**

There are dire needs for education at all levels in health care in the project sites. It is critical to explore local resources, coordinate those resources, extract the knowledge and provide them in practical feasible way to the health care provider. This regular session will help maintain the motivation and morale of health care workers to serve the beneficiaries of the service with confidence and more professionally.

5. **Clarify "ecology of care[10]" in the project communities so that we can have better idea how to integrate health care pyramid structure to treat sick patients more effectively.**

We do not have any data based on the general population in the communities. However, it is imperative for us to understand the actual health seeking behavior and referral practice in the communities in order to better strategize how to make health care pyramid work.

[10] Verification of the existence of health care pyramid was studied in the US in 1960 and 2000. For the latter, please refer Green L. article in New England Journal of Medicine in 2001 cited above.

VI. Appendix

Appendix A. Timetable of the workshop

Appendix B. NS chart

Appendix C. Referral forms

Appendix D. Abstract of lecture “Epidemiology & International health”

Appendix E. Abstract of lecture “Trauma Surgery in Reflection”

Appendix F. Observation of pediatric floor and emergency room at the Regional Hospital of the West

Appendix A:

Professional Skills for Children's Health: Communication, Empathy & Medical Skills Feb. 14-17 & 21-24, 2006, 7:45 am – 4:30 pm

Day 1: Communication Skills & Empathy	Day 2: Communication Skills & Empathy
▪ Sign-in ▪ Pre-training Self-assessment ▪ Welcome by Dr. Diego ▪ Objectives ▪ Icebreaker ▪ Getting To Know Each Other ▪ Training Methods & Group Norms ▪ One Day at a Health Facility (drama): Observation & Discussions ▪ Coffee Break ▪ Dynamics ▪ Another Day at a Health Facility (drama): Observation & Discussions ▪ How Professional Am I? ▪ Dynamics (Introduction to Communication Skills) ▪ Communication Skills I: Non-verbal Expressions ▪ Lunch ▪ Dynamics ▪ Communication Skills II: Attentive Listening ▪ The Most Difficult Listening ▪ Coffee Break ▪ Tree of Life (Self-reflection)	▪ Sign-in ▪ Yesterday-in-Review & Today's Agenda ▪ Energizer ▪ Communication Skills III: Clearly Sending Messages & Trust-building ▪ Communication Skills IV: Effective Usage of Open-ended Questions ▪ Diversity, Prejudices & Stereotypes ▪ Coffee Break ▪ Dynamics ▪ Thinking about Discrimination & Inequality ▪ Positive Thinking ▪ Lunch ▪ Conflict Management: Exercise and Discussions ▪ Training Evaluation (Self-administered) ▪ Coffee Break ▪ Making Contract for Personal & Professional Growth ▪ Diploma Ceremony for 2-day Participants
Day 3: Assessment of Sick Children & NS System	**Day 4: Assessment of Sick Children & NS Sysmem**
▪ Sing-in ▪ Energizer ▪ Introduction to the World of Health Care Providers ▪ How Do You Examine Sick Child? ▪ Natural History of Sick Child ▪ Coffee Break ▪ Assessment Triangle ▪ Stethoscope & Auscultation Skills ▪ Lunch ▪ NS System I: Dangerous Signs ▪ Coffee Break ▪ Dynamics ▪ NS System II: Treatment Regimen	▪ Sign-in ▪ Energizer ▪ NS System III: Case Practice ▪ Coffee Break ▪ Dynamics ▪ Healthy Children for Healthy Family ▪ Training Evaluation (Self-administered) ▪ Training Evaluation (Five Stone Method) ▪ Diploma Ceremony ▪ See You Again! (Singing) ▪ Lunch

Appendix B:

NS Chart

Demographics:

Name: _____ Age: _____ Sex: _____ Weight: ____ Kg

Temperature: _____ C

General Appearance:

☐ Well ☐ LETHERGIC ☐ UNCONSCIOUS ☐ CONVULSION

Nutrition:

Oral Intake:

☐ Well ☐ VOMIT EVERYTHING ☐ UNABLE TO DRINK

Weight-for-Age:

☐ Appropriate ☐ Below the curb

Edema: ☐ Yes ☐ No

Infection:

☐ No fever ☐ Fever > 38.5 C ⇒
☐ FEVER > 38.5C AND AGE ≤ 3 MONTHS OLD

Cough: ☐ Yes ☐ No

Breathing:
Rate > 50 if less than 12 months old ☐ Yes ⇒ ☐ No
Rate > 40 if 12 months or older ☐ Yes ⇒ ☐ No

Labored breathing:
Chest indrawing at every breath ☐ YES ☐ No
Strider at rest ☐ YES ☐ No
Bloody Diarrhea ☐ Yes ⇒ ☐ No

Dehydration:

Slow skin pinch ☐ Yes ⇒ ☐ No
Sunken eyes ☐ Yes ⇒ ☐ No

One teaspoon (tsp) = 5 ml

- Fever > 38.5 C

Acetaminophen (120mg/5ml)	
< 6 months old	1/2 tsp every 6 hours
< 2 years old	1 tsp every 6 hours
<3 years old	1 1/2 tsp every 6 hours
≤ 5 years old	2 tsp every 6 hours

- Every 6 hours and make sure child can start drink and eat better and looks better (more active and playful) in 2 days.

- Fast breathing: treat for Pneumonia:

Co-Trimoxazole (TMP40mg/SMX200mg/5ml)	
≤ 4 months or ≤ 5kg	1/2 tsp every 12 hours
< 12 months	1 tsp every 12 hours
< 3 years old	11/2 tsp every 12 hours
≤ 5 years old	2 tsp every 12 hours

Amoxicillin (250mg/5ml)	
≤ 4 months old	1/2 tsp every 8 hours
< 18 months old	1 tsp every 8 hours
< 3 years old	1 1/2 tsp every 8 hours
≤ 5 years old	2 tsp every 8 hours

- Cotrimoxazole 2 times a day x 10 days (Make sure the child gets better in 2 days, if not bring the patient back for reevaluation

- Bloody diarrhea: treatment for dysentery

TMP/SMX as above

- Cotrimoxazole 2 times a day for 5 days (Make sure the child gets better in 2 days)

- Dehydration:

ORS
Wt x 75 ml in 4 hours

Appendix C:

EFERRAL FORM1
(Tertiary to primary)

Hospital Contact Phone Number: _____

Date: _____

Name of the patient: _____

Address of the patient: _____

Patient contact number _____

Diagnosis: _____

Instructions for health post:

1. _____
2._____
3._____
_____
_____

Discharge Medications: 1_____
2_____
3_____
4_____

Instructions given to the patient:

_____
_____
_____
_____
_____

Course of events/Assessment:

_____

Name of the person filled in this form:_____

REFERRAL FORM2
(Primary to Tertiary)

Health post contact Phone Number: _____

Date: _____

Name of the patient: _____

Address of the patient: _____

Patient contact number _____

Reason for referral:

☐ LETHERGIC ☐ UNCONSCIOUS ☐ CONVULSION
☐ VOMIT EVERYTHING ☐ UNABLE TO DRINK
☐ FEVER > 38.5C AND AGE ≤ 3 MONTHS OLD
☐ CHEST INDRAWING AT EVERY BREATH
☐ STRIDER AT REST
☐ Other: _____

History of present illness:

_____

Treatment given if any:

_____
_____

Instruction given to the patient:

_____

Name of the person filled in this form:_____

Appendix D:

Abstract of lecture, "Epidemiology and International Health"
University of MesoAmericana
February 13, 2006

I was invited by the vice-dean of the medical school, Dr. Barrios to give a lecture on the above topic at the auditorium at the San Carlos Teaching Hospital on February 13.

University of MesoAmerica enrolls approximately 200 students for their first year class, but as year advances, there is much attrition through academic performance or financial reasons.

I started my discussion arguing the importance of primary medical care in the world. I cited the WHO/WONCA data arguing the serious shortage of primary care providers and also the significant maldistribution of medical personnel attributing to fact that 90 % of the people are seen by 10 % of the physicians in the world today. The importance of good primary care is cooperated by the Global Burden of Disease Study[11], which clearly demonstrated that majority of top ten causes of mortality and morbidity can be dealt with at the primary care level or preventable.

I then discussed the evolution of disaster epidemiology based on previous experiences of natural disasters including Guatemalan earthquake in 1976[12]. The use of rapid epidemiological assessment skills is crucial in disasters to accurately access the magnitude of the problem. We discussed two examples of rapid assessment: one is

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[11] Michaud, C. M., C. J. L. Murray, et al. (2001). "Burden of Disease-Implications for future research." JAMA **285**: 535-539.

This is one of the studies conducted by Harvard group, showed the global burden of diseases and its policy implications. The group has been an advocate for using DALY (Disability-adjusted life years) instead of life expectancy to decide the true burden of morbidity in the society. Technical discussions and theory behind the DALY, please refer Murray, C. J. L. (1994). "Quantifying the burden of disease: the technical basis for disability-adjusted life years." Bull WHO **72**: 429-445.

[12] De Ville de Goyet, C. and E. del Cid (1976). "Earthquake in Guatemala: Epidemiologic evaluation of the relief effort." Bull PAHO **10**: 95-109.

This is one of the landmark studies clearly demonstrated that the relief efforts are most useful from domestic or local organizations. International relief efforts usually do not reach affected areas on time.

cluster-sampling technique[13] in disaster situations. Some detail of the sampling technique was demonstrated and standardized UNICEF/EPI clusters were explained. The next example was how to incorporate epidemiological data into practice. I presented my survey conducted during the internal conflict in Kosovo[14] and how we utilized the data of household smoking into preventing upper respiratory infections in children.
I concluded this session stressing the importance of public health in primary care, particularly the importance of epidemiology as a strong tool in public health in practice.

Then, I took questions from the audience. There were several questions regarding the delay of response during the recent natural disaster of hurricane Stan. Participants voiced their concerns over the postponed efforts by their own government and their observations that relief services are challenged to reach the neediest populations. I emphasized the importance of rapid accurate evaluation using standardized epidemiological methodologies and structures and using these results in a well-coordinated response structures. Unfortunately, it is not yet easy to practice this method, as we have seen in the recent US for Hurricane Katrina disaster.

[13] Bennett, S., T. Woods, et al. (1991). "A simplified general method for cluster-sample surveys of health in developing countries." Wld Hlth Statist Quart **44**: 98-106.

[14] Masahiro Morikawa. Upper respiratory infection in acute pediatric care in internal conflict, Kosovo, 1999. Journal of Tropical Pediatrics 2001; 47: 379-382.
This is one of the studies conducted under the war and tried to incorporate the finding into preventive practice in busy pediatric practice. The study demonstrated that the presence of smokers in the same household was a significant risk factor for developing upper respiratory infection among children.

Appendix E:

Abstract of lecture "Trauma Surgery in Reflection"
The lecture presented at the Traumatology Grand Rounds on February 21, 2006
Department of Traumatology, The Regional Hospital of the West
Quetalzenanago, Guatemala

Based on my experiences of accessing capabilities of trauma care system in many countries in various levels, I will define traumatology is a refection of the medical care system of the society. Numerous previous studies demonstrated that the length of time of transportation of trauma patients inversely correlates to the number of admission of severe trauma cases in the trauma unit. The shorter the transport time becomes, the more sick patients arrive to the trauma unit alive. In any society, the trauma center will be inundated with trauma as EMS system is implemented into the community. Certainly, as you can imagine, the surgery per se is part of the equation of survival of injured patients. Saving a life of injured patients is a product of the sequence of events, so-called "Chain of Survival[15]". This scheme involves stabilization of the patient out in the field, transportation, initial management in the primary trauma care, and tertiary or definite trauma care at the tertiary care level. Prevention plays pivotal importance: motorcyclists in many countries do not wear helmets, including Guatemala.

Trauma care training in Japan and the Unites States has its own advantage and disadvantages. In Japan, trauma surgery training includes general surgery, surgical intensive care, and trauma craniotomies (neurotrauma). In the US, however, the training is provided through a two-year fellowship. While the Japanese traumatologist may have a deeper overall trauma-specific knowledge and skills compared to the US counterpart, US traumatologist certainly has an advantage for his/her broader general surgical knowledge and skills.

As the transportation time shortens and technology for resuscitation continues to improve, the morality of trauma patients shifts from conventional biphasic curve to triphasic curve. The conventional two peak curve represents early mortality by shock and late mortality due to sepsis. However, in many trauma centers in Japan and the US now has another peak represented as mortality due to the so-called lethal triad. The triad represents hypothermia, coagulopathy and acidosis: This is the advent of the concept of DCS (damage control surgery). The late mortality related to sepsis and MOF (multiple organ failure), there are several research topics on the horizon: efficacy of activated

[15] Husum, H. (2000). "Save lives, save limbs."

Author is an Norwegian traumatologist and activist advocating the use of "Jungle University" method to train medics to be capable life-saving field surgeons. This book covers basic concepts of field epidemiology explaining strategies to develop a community-based emergency medical system, called Chain of Survival.

protein C in trauma related sepsis, use of immune-enhancing nutrition, and various hemofiltration techniques.

The evolution in trauma surgery in the past decade in Japan stems from the aging population in the country. Senility related traumas require the development of a new set of critical skills and management proficiencies in traumatology. Surgeons must be able to manage multiple comorbid medical condition in the intensive care setting.

Then, Trauma surgery in the international perspective was discussed by addressing four topics. First is by far the most prevalent trauma problem in the world today, which is a motor vehicle accident (MVA). Again, there is a huge role for legislative action in the prevention and regulation of the MVA. Second, injuries posed by explosive remnants of war (ERW[16]), including landmines and cluster bombs. These victims often seek medical care few days after the injury due to lack of transportation, so very basic surgical principles should be applied to deal with contaminated, often infected wounds. Third, significance of injuries posed by the proliferation of assault weapons was reviewed. In any post-conflict communities exposed to war, high velocity assault weapons, e.g. AK-47 are highly prevalent and inflicting significant injuries. Lastly, trauma surgery particularly pertains to natural disasters was reviewed. Specifically, we discussed the importance of recognition of crush syndrome after an earthquake was discussed.

After my talk, there were active discussions regarding techniques used during the civil war in Guatemala, e.g. improvised external fixation equipment, pros and cons to use tourniquet for amputating limbs was discussed.

[16] Landmine Action (2005). "Explosive Remnants of War and Mines other than anti-personnel mines. Global Survey 2003-2004."

The definitions terms including ERW, UXO are stated clearly in the introductory section of this report. This report extensively covers the burden of ERW in each country studied.

Appendix F:

An Observation of pediatric emergency room and pediatric floor at the Regional Hospital of the West

I had two occasions to visit the pediatric department of the hospital. One was the observation through interactions with care providers at the pediatric department and pediatric emergency room at the hospital when I attended one of the patients referred from Health Center in Cabricam. The other occasion was when I meet with Dr. Mejir, the chairman of the pediatric department and he provided me a tour of the floor. The followings are the results of my interview and observations:

- Pediatricians in Guatemala consult patients until thirteen years old. All patients above that age are seen internists. There is no adolescent medicine in this country yet.

- Attending physicians typically stay at the hospital between 7 am to 11 am, afterwards they are only reachable via pager or cell phone. The entire floor, including the intensive care unit and emergency room, is managed by house officers and medical students.

- Exclusive breastfeeding is encouraged as a policy of the department of pediatrics at the low-risk postnatal care floor.

- NICU has ten beds and PICU has three ventilators.

There are 8 to 10 beds in the pediatric ER at the hospital. The ER is managed by the first year resident (intern) with a few medical students. These physicians in training do not have any final decision-making power; consequently, the intern on-call has to run all cases by the attending physicians outside or senior residents up on the floor. This tedious process contributes to significant delay in the treatment. In fact, the patient I attended when I visited the hospital spent three hours at the emergency room before the intern examined the patient.

I went up to visit the pediatric floor around 9 pm to meet with the chief resident and the supervisor-attending physician. I found that four residents took care of more than 80 patients on the floor. Besides there is no cap on the number of patients each resident has to admit per night: it is obvious there is much less supervisions available when compared to the training programs in the US.

Dr. Mejir contended that nearly half of the infant morality is due to neonatal morality; therefore it is imperative to support the NICU to improve infant mortality. However, I vehemently opposed the proposal to a hardware endowment to the NICU, e.g. ventilators or incubators. My reasoning takes into account the current hospital conditions which include a lack of supervision for trainees and high caregiver to patient ratios which significantly affects the quality of care, i.e. timely diagnosis and treatment. Due to the

lack of supervision and timely intervention, patients may have longer rates of in-hospital care compared to US care system. Staying in the hospital only four hours to provide teaching rounds means each attending physician can only “eye ball” their patients every day. Dr. Mejir admitted that no attending physician could survive solely on the salary from the hospital; they are forced to practice privately. Dr. Mejir he has his own pediatric practice and he regularly does consultations at two private pediatric hospitals.

Under the current environment, it is unclear how much improvement we can anticipate through providing only equipment to the hospital. Obviously, this hospital is suffering from multitude of system problems.

Lack of an appropriate tier system causes unnecessary duplication of the service among tiers. For example, this hospital tries to provide weight monitoring for some patients after discharge asking them to come back to the hospital for weight checks, while the health post and visiting nurses can easily take over that role. At the same time, the hospital is overburdened with simple, straightforward pneumonia or dehydration self-referred by patients, which could be easily dealt with at the primary level.