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Prehospital Care of Road Traffic Injuries in Chiang Mai, Thailand

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Introduction

Road traffic accidents (RTAs) cause enormous morbidity and mortality in developing countries. The Global Burden of Disease Study projected that RTAs will be the third highest cause of disability adjusted life years (DALYs) by 2020.¹¹ Ninety percent of the DALYs due to RTAs are in developing countries.¹⁴ Because the majority of trauma deaths in developing nations occur in the prehospital setting, it is imperative that emergency medical systems be established and improved in such countries.^{9,16} Two studies in Central America found that increasing the number of emergency dispatch units and prehospital personnel training increased the utilization of emergency medical devices and lowered the percentage of patients who die en route to the hospital.^{1,6}

RTA fatalities are rising faster in Asia than anywhere else in the world.^{11,14} The countries of Asia are making progress in organizing emergency medical systems, but a lot of work remains to be done. A survey in Beijing in the 1980s found only 7.4% of spinal trauma patients were sent to the hospital by ambulance, and the average time from injury to arrival at hospital was 15.2 hours!²² In a 5-year study in Malaysia in the 1990s, none of a series of 120 patients with acute traumatic spinal or spinal cord injuries had spinal immobilization during transport from the injury site to the hospital.⁴

While living in Chiang Mai, Thailand, from 1993 to 2002, I had the opportunity to witness road traffic injury management by emergency rescue patrols on many occasions. I found their performance generally unsatisfactory. The first-aid administered was very limited, sometimes no more than an attempt at using ammonia to awake an obtunded patient. I did not see any of the workers wearing gloves, although the accident

victims were bloody on two occasions. Two obtunded patients were assumed to be intoxicated, rather than assumed to be head injured. The transfer of one unconscious patient was done in haste without precaution for the patient's head and neck. Private foundation rescue units and hospital-based rescue units appeared to be vying for cases without coordination and there seemed to be no system for making triage decisions. Those observations prompted me to return to Chiang Mai to study efforts being made to develop an effective emergency medical service (EMS) system.

This is the report of a field study conducted between May and June 2003 in Chiang Mai and Bangkok. Information was gathered through oral interviews and written questionnaires and was supplemented by publications of The Narenthorn EMS Center of the Ministry of Health and unpublished documents of the Chiang Mai Health Department Office of Emergency Care. The research objectives were: (1) to learn how emergency rescue services are organized in Chiang Mai (2) to learn about ongoing public health efforts to improve such services, and (3) to learn about the training, certification, employment and medical device usage of prehospital personnel. There was no specific a-priori hypothesis.

Methods

This was a cross-sectional study-field survey. The study site was Chiang Mai, Thailand. Officials at the Ministry of Health, private rescue foundations, the Chiang Mai Provincial Hospital and two private hospitals were contacted prior to the study to arrange preliminary interviews. Snowballing technique was used to arrange subsequent

interviews with officials at the Chiang Mai Health Department Office of Emergency Medicine, the police and fire departments of Chiang Mai, hospital-based and foundation-based emergency services and one rescue club. These were oral interviews conducted in the Thai language by the investigator based on a pre-written list of key questions specific for each interviewee. Interview information was recorded in written notes that were subsequently analyzed and organized under major categories.

In Bangkok, site visits were made to two hospital emergency rooms and two EMS communications centers. In Chiang Mai, site visits were made to four emergency rooms, two hospital-based EMS services, three private foundation rescue services, a rescue club, the health department, police and fire departments and one outdoors trauma and fire training seminar. Detailed emergency vehicle inspections were made at five sites.

Structured questionnaires were prepared for emergency rescue workers in consultation with two North American physicians (an emergency room doctor and an orthopedic surgeon), a paramedic who oversees emergency medical technician (EMT) certification for a California county and an EMT textbook.⁸ The questions were pre-tested with twenty American EMTs (2 basic level and 18 intermediate level), translated into Thai with the help of a professional translator and then pre-tested with two Thai nurses and one Thai emergency rescue worker. The questionnaire included four parts: (1) sixteen closed-ended questions to collect demographic information, (2) three Likert scale questions regarding quality of training, job satisfaction and seatbelt use, (3) eight open-ended questions regarding triage decision making, work-related problems, suggested improvements and barriers to change, and (4) emergency equipment knowledge and use

battery. The English version of the emergency equipment battery is included in the appendix to this report.

All aspects of the emergency rescue worker survey were done according to the protocol approved by the Human Subjects Committee at U.C. Berkeley. Recruitment was by written invitation distributed by the employer. For all participants, informed written consent was obtained before study participation. The questionnaires were conducted by a Thai research assistant who also assisted in translating the open-ended answers into English. The participants received 100 baht (\$2.50 USD) for participating. All participants were full-time emergency rescue workers in the Chiang Mai municipal area.

Of the total participants (n = 40), there were 27 employed by rescue foundations, 4 employed by a rescue club and 9 employed by hospitals. Because the numbers in two subgroups were small, statistical comparisons were not made.

Results

The results have been organized into sections, as follows:

1. Overview of Road Traffic Accidents (RTAs) in Thailand
2. Vulnerable Road Users and RTAs in Chiang Mai
3. A National Plan to Support Emergency Medical Services (EMS)
4. Current Status of EMS in Thailand
5. Current Status of EMS providers in Chiang Mai
6. The Grounds for Government Intervention in Chiang Mai:
Counterproductive competition between an array of EMS providers.
7. The Grounds for Government Intervention in Chiang Mai:
Need for emergency rescue worker training and registration
8. The Chiang Mai Health Department's EMS Development Program
9. Outcome of the Health Department's EMS Development Program
10. Maintenance of emergency room and ambulance standards
11. Ambulance Driving and enroute safety
12. A profile of emergency rescue workers in Chiang Mai
13. Shortage of EMS workers in Thailand
14. Training of emergency medical technician (EMT) basics
15. Training programs for EMT intermediates and paramedics

1. Overview of Road Traffic Accidents in Thailand

Thailand has a constitutional monarchy and a population of 61 million. It is situated roughly equidistant between India and China with an area of 513,000 square kilometers, approximately equal to Spain. There are 76 provinces and 795 districts, each with at least one government hospital. Since 2001 all citizens are covered by some form of private or social health insurance. This study focuses on the second largest province, Chiang Mai, which is located in the North. Chiang Mai Province has a population of 1.47 million of whom 248,000 live in the municipal district and about 200,000 live in its immediate suburbs. There are 45 hospitals in the province; over half are in the vicinity of the city, which is also named Chiang Mai.^{7,20}

In Thailand, injuries (including poisonings) are the second leading cause of death overall. Injuries are responsible for nearly 30,000 deaths annually, with a rate of 48.5 per 100,000. Amongst injury subcategories, transportation accidents are the leading cause of morbidity and mortality, killing 12,000 and injuring about 500,000 per year, at an economic cost of U.S.2.5 billion US dollars. Thailand is one of many developing countries that are experiencing rising RTA fatality rates at a time when rates are steadily falling in highly developed countries.¹⁰ The traffic mortality rate increased from 8.6 per 100,000 population in 1985 to 18.9 per 100,000 in 1999. In 1998, there were approximately 35 RTA fatalities per 100,000 cars in Thailand, compared with a rate of 20 per 100,000 cars in the U.S.A. The central region of Thailand has the highest number of motor vehicle registrations and also the most RTA fatalities. Second in both categories is the northern region. There is not much seasonal variability in RTA death rates, although

the peak month, April corresponds to the summer school holidays, when travel is highest. The frequency of accidental deaths peaks between the ages of 15 to 34. In this age group, the male to female ratio is at least 4:1.^{2,17,19,21,24}

Many factors contribute to the rising RTA fatality rates in Thailand. Urbanization and economic growth have been accompanied by rapid motorization. The number of registered passenger cars and motorcycles increased 13-fold between 1980 and 1997.³ Road infrastructure and traffic safety have not developed as quickly as the motorization of society. Traffic safety problems include deficiencies in traffic separation (e.g. non-motorized vehicles and pedestrians sharing speedways with faster motorized traffic), inadequate speed control (fewer traffic calming measures, limited law enforcement and dangerous driving habits), poorer vehicle safety standards, infrequent use of restraint devices and high volume of vulnerable road users.

2. Vulnerable Road Users and RTAs in Chiang Mai

For a given velocity of collision, pedestrians, bicyclists and motorcyclists are at greater risk of death or injury than are four-wheeled vehicle users. In developing countries like Thailand, the percentage of vulnerable road users is relatively high. For example, in the late 1990s, motorized two-wheeled vehicles (motorcycles and motor-scooters) comprised 66% of the total registered vehicles in Thailand, but only 2% of the vehicles in the U.S.A.^{3,10} Although helmet use is legally mandated, it is not strictly enforced. According to one Ministry of Health official, Chiang Mai has the worst compliance with the helmet law in the country. Based on personal observations at typical

Chiang Mai intersections, about 40% of the motorcycle drivers are wearing helmets. Middle-aged and older persons are more likely to wear helmets than younger motorcycle drivers, who constitute a large majority. It is common to see two or more persons riding on a motorcycle, especially during the morning and afternoon commute and in school neighborhoods. Less than 20% of adult passengers and almost no child passengers wear helmets. Moreover, many motorcycles drive aggressively or carelessly, passing cars left and right, crowding two or three abreast in a lane, crossing over the dividing line to get around traffic or driving near or on the sidewalk opposite the direction of traffic. Consequently, motorcycles are involved in RTAs with alarming frequency. Motorcycle accidents account for 72% of all road traffic injury hospital admissions (including all motor vehicle occupants, pedestrians and pedal cyclists) in Thailand versus only 1.8% of all motor vehicle injuries in the U.S.A. In Bangkok, about 70% of emergency cases and 27% of spinal cord injuries are attributed to motorcycle accidents.^{15,20,23}

At the provincial hospital of Chiang Mai (Nakorn Ping Hospital), injuries were the leading cause of admission in 2002. As a subcategory, motorcycle crashes accounted for 40% of injury admissions at a rate of about five per day. (Nakorn Ping Hospital) Central Memorial Hospital of Chiang Mai reported that 80% of its EMS cases are road traffic injuries, of which 50% involve motorcycles. The Ruamjai Rescue Foundation in Chiang Mai reports 63% of its rescues were for motorcycle accidents in the month of November 2002. Of these crashes, 50% were motorcycle-automobile crashes, 25% motorcycle-motorcycle and 25% single motorcycle crashes. The foundation of the Provincial Administration Organization in Chiang Mai reports 80-90% of its rescues are for motorcycle-pick-up truck crashes.

Some examples of unsafe motor vehicle settings are given in figures 1-4.

3. A National Plan to Support EMS and Related Pilot Project

In Thailand, the country with the most RTAs in S.E. Asia, progress on road safety has been slow. An agency governing road traffic safety is still on the drawing board after four years of planning at the Department of Transportation and Communication.² For over twenty years, medical associations, the national police department and the military have tried to establish EMS systems, but without much coordination, funding or lasting results. Real progress has only come in the past five to ten years under the auspices of the Ministry of Health.⁵

Narenthorn EMS Center, in Bangkok, is a division under the Ministry of Health. It oversees an EMS network covering 15% of Bangkok's land mass and 23% of the population. Under Thailand's 9th National Plan for Economic and Social Development, the Narenthorn EMS Center aims to make EMS available at the local level throughout the country by 2006. An annual budget of 450 million baht (\$ 10,700,000 USD at present rates) has been appropriated from the National Health Insurance Program to support a pilot project in a limited number of provinces until 2004.^{5,14}

The program is predicated upon promoting the existing loose network of provincial emergency rescue providers, rather than replacing them with a uniform workforce.

Therefore, rescue foundations (described below) are given responsibility for the prehospital care of most EMS cases. For life-threatening injuries, neurological injuries, vascular injuries and severe orthopedic injuries, hospital-based ambulance services are

responsible for prehospital care. Payment for EMS services comes on a per-case basis: 500 baht (\$12.50 USD) for each basic life support (BLS) case and 800-1000 baht for each advanced life support (ALS) case. Triage decisions are made at an EMS radio control room located at the provincial health office, police station or provincial hospital, depending upon the requirements of each province. Participating hospitals and rescue foundations are required to have annual vehicle inspections and staff-training courses. The inspecting committee will include provincial health nurses and emergency room doctors. Project goals include:

- a. Hitting a target response time of ten minutes or less.
- b. Field stabilization by EMT basic and intermediate personnel.
- c. Providing pre-hospital services through this program for 25% of all emergency cases in the participating provinces.

There was marked confusion regarding the implementation of this project. Through interviews at the Narenthorn Center in Bangkok, the Provincial Health Office in Chiang Mai and the Provincial Hospital in Chiang Mai, I heard three different versions of the starting date of the pilot project and three different lists of what provinces are participating. I was told variously that Chiang Mai entered the pilot project in 2002, that it would enter in July of 2003 and that it would not enter before 2004. These discrepancies might stem from a program that has already been started on paper, but is not in effect. One official stated that funding has only been established for the first six months and that continued support is uncertain.

EMS providers will receive government payment based on the number of cases and seriousness of cases that they retrieve, not based on the size or comprehensiveness of the prehospital service that they maintain. This approach is in contrast to the national health insurance scheme, which reimburses hospitals based on the number of persons that they

enroll, not based on the actual number of patients seen. It reflects a decision to allow multiple EMS providers to operate in the same location. One emergency room physician criticized this “load and go” principle on the grounds that it will encourage EMS providers to focus on volume of services, increasing competition between EMS providers without improving safety.

4. Current Status of EMS in Thailand

Within most provinces, police departments and army bases have ambulances, but these are used for civilian casualties only in large-scale disasters. Most urban fire departments have certain officers trained for medical emergencies, but they are seldom mobilized for RTAs. For example, the Chiang Mai municipal fire department has a medical emergency staff of 21 officers. They have two large “special EMS trucks” used for fires, drowning, power-line electrocutions, animal attacks and for emergency standby during visits by V.I.P.s. However, they seldom participate in RTA management beyond freeing people who are trapped in crashed vehicles

All accredited hospitals in Thailand are required to maintain ambulances with features approximating Western standards (the ambulances are vans with emergency lights and sirens, a stretcher, first-aid kit, bag valve masks, oxygen tank and intravenous stand in the back). Only a few large urban hospitals have full 24-hour staffing for ambulances. Smaller hospitals have drivers on 24-hour call and rely on the hospital nursing staff to attend to patients during patient transportation. Most hospitals will send

ambulances in response to phone requests or police radio requests, but the primary use of hospital ambulances is non-emergency patient transportation.

There are also emergency transport services provided by philanthropic organizations and hospitals, each maintaining its own workforce and emergency vehicles. The two largest such organizations are in Bangkok: the Por Tesk Tueng Foundation and the Ruamkatanyu Foundation. They were founded in the early 20th century by Chinese-Thai associations with the mission of removing corpses from river banks, highways, alleyways and cheap hotels. Volunteers would take the corpses to police stations, forensic medicine offices and storage facilities. As their reputations grew, so did the number of donors and volunteers and the size and scope of their operations. For over twenty years, these two foundations have been providing free ambulance services in Bangkok.

The Por Tesk Tueng Foundation has 1500 volunteers and 100 paid rescuers. It maintains a radio communications center, a dozen pickup truck units for BLS cases and three hospital-based ambulance vans for cases that require ALS. The BLS units are staffed by paramedical staff and are equipped with oxygen, dressing supplies, splints, gloves and a spinal board and/or stretcher. The ALS units have at least one nurse on the team and have equipment for intravenous fluids, suction, intubation, defibrillation and parenteral drug administration. The workers average 6 shifts per week at 12 hours per shift and average two emergency calls per shift. For the Bangkok organizations, 55% to 80% of calls are for live rescues and the remainder for corpse retrieval. Table 1 shows the categories of rescues provided by the Ruamkatanyu Foundation.¹⁸

Table 1. Rescues in 1999 and 2000 from the Ruamkatanyu Foundation¹⁸

<i>Cause of Injury</i>	<i>Total Rescues</i>	
	<u>1999</u>	<u>2000</u>
R.T.A.	7626	7241
Unknown cause	2113	2582
Intentional injury	1487	1540
Illness	675	533
Drowning	324	350
Electric shock	104	84
Falls	101	212
Other	364	767
<i>Total</i>	12,794	13,309

Smaller charity organizations have cropped up in most provinces. Factors that vary between organizations include: (1) the mix of ambulance services vs. other services (e.g. disaster relief and fire brigade), (2) professionalism of the emergency workers (volunteers versus salaried staff), and (3) the emergency training of the staff. Generally, these foundations maintain emergency vehicles operated by teams of two or three men. The men are paid a small salary for their services, although they are called “volunteers” or “professional volunteers” by the organizations. The vehicles that they operate are simplified ambulances: most often a pick-up truck with or without a covered cabin over the bed in the rear. In Bangkok, they are distributed one unit per each police precinct. These volunteer patrols park at street-side locations where they await a command from their communication unit. When an emergency message is received, they hasten to accident sites and transport the injured persons to public or private hospitals. Figures 5 – 8 illustrate the emergency vehicles of four private EMS providers in Chiang Mai.

5. Current Status of EMS providers in Chiang Mai

In Chiang Mai, the first rescue foundation was the Ruamjai Foundation, established in 1990 as a philanthropic initiative of the ethnic Chinese community. It remains one of the biggest EMS providers in the city today, with four rescue vehicles operating 24 hours a day, twenty-two rescue employees and one hundred volunteers. It manages all of this on an annual budget of only \$40,000 USD. The Thunderbirds (Samosan Wee-hok Sai-fa) is another old rescue organization in Chiang Mai. It could be better characterized as a “club” than a foundation, since it is not allowed to accept donations. According to a spokesman, its financial support comes from news organizations. It has two rescue vehicles with five rescue employees and many volunteers. Both of these organizations have their own radio bands. They were in direct competition until the Health Department zoning agreement in 2002 (see below).

Another foundation under the Provincial Administration Organization began rescue services in March 2002. It has 17 rescue employees and 12 firemen and maintains three emergency vehicles at stations in Northern parts of the municipality. Because of budget limitations, it can only provide emergency services between 8 am and 8 p.m. There is also a municipal Civilian Defense Foundation with 1,030 volunteers. This organization is part of a loose national association under the Ministry of Interior. They maintain a radio station, staffed by three, and one emergency rescue vehicle staffed by unpaid volunteers. They have their own radio band, but do not have a public emergency phone hotline. First and foremost, they are a volunteer fire brigade. Few of their rescue cases are from RTAs. The fire department gives them an annual five-day training seminar, which includes basic

first-aid and cardiopulmonary resuscitation (C.P.R.). Table 2 contains summary statistics for the Chiang Mai foundations.

Table 2.

- I. **Ruamjai Foundation:** Twenty-two full-time rescue employees. Four or five 24-hour emergency units. Road traffic injuries (RTIs) = 70% of total cases. Statistics for 2002: 4,147 injury cases and 339 cadaver retrieval cases.
- II. **Provincial Administration Organization Foundation:** Seventeen full-time rescue employees. Four 8 a.m. – 8 p.m. emergency units. RTIs = 77% of total cases. Statistics for last 6 months (Dec 2002 – May 2003): 209 injury cases, 2 cadaver retrieval cases.
- III. **Municipal District Civil Defense Volunteers** (connected with fire department): No full-time rescue employees. One part-time rescue unit. RTIs < 50% of total cases. Average monthly total: 20 injury cases.
- IV. **Thunderbirds Club:** Five full-time rescue employees. Two 24-hour emergency units. RTIs = 90% of total cases. Total for 2002: 100 injury cases, 2 cadaver retrieval cases.

Two private hospitals and one public hospital have EMS programs. The hospitals have between two and nine full-time rescue workers and between one and four 24-hour rescue units. Statistics for 2002 could not be obtained from the hospitals.

Both rescue foundations and hospital-based EMS programs are geared toward road traffic injury management and not toward transporting people with illness from home to hospital. Unlike RTA services, which are free, hospitals charge a fee of about 500 to 1000 baht (\$12 to \$24, USD) to pick up a patient from home. Most often, sick patients, no matter how acutely ill, are brought to the hospital by their family. When there is no family car, neighbors or a local see-lor (pick-up truck) taxi will be enlisted for transportation.

6. *The Grounds for Government Intervention in Chiang Mai:*

Counterproductive competition between an array of EMS providers.

In the United States, “911” is widely accepted as the essential emergency phone number. Calls to “911” are directed to the local police department or highway patrol depending upon whether the call is made from a home phone or mobile phone. Once it has been ascertained that the call is a medical problem and the urgency of the situation is determined, an ambulance (and in many areas, a fire engine, too) is dispatched. There is generally only one ambulance company responsible for EMS in a given county.

In Chiang Mai Province, the central government and provincial government had minimal involvement in developing EMS until the last few years. Prehospital services were first provided in the early 90s by civic groups and individual hospitals. The result was multiple overlapping EMS providers with varying capacities, each with its own communication network. Although much has been done to coordinate communications between the emergency networks, there are still a half-dozen or more emergency hotlines to choose from. Calls to “1669” go to the four-zone Health Department EMS network described below. Calls to “191” go to the police department and “199” calls go to the Fire Department. Emergency calls are also made directly to hospitals. Finally, there are three rescue foundations with their own accident hotlines and radio bands.

As the number of prehospital providers and emergency hotlines grew during the 1990’s, the EMS system became disjointed and competitive. A recent magazine article on Chiang Mai rescue foundations reported, “They have been accused of fighting over bodies, of stealing money and clothes off corpses and being blood hungry scavengers.”²³

I was told two anecdotes that illustrate some of the negative consequences: First, a husband and wife involved in a crash were treated at the scene by two emergency units from two different foundations. The emergency units could not agree on where to take the couple and wound up transporting each to a different hospital. Second, a sparsely equipped vehicle from a very small hospital reached the scene of a single rider motorcycle crash moments before a fully equipped EMS ambulance from a larger hospital. Since the first team had already put their stretcher down on the road when the second arrived, this meant that they “owned” the patient. The second team stood and watched as the patient was taken to the smaller hospital, which may not have been fully prepared to provide trauma care.

In the past, hospitals have been known to pay a gratuity to foundations for bringing cases to their E.R. as a form of “finder’s fee.” This practice may have influenced the triage decisions made by the foundation-based rescue workers, and in some cases, inappropriate decisions may have been harmful to the patients involved. I discussed the “finder’s fees” with an emergency physician, a police dispatcher, a public health official and a few rescue foundation workers. All agreed that the problem existed in Chiang Mai and some named specific foundations and hospitals that carried on the practice. Five hundred baht (\$12.50 USD) is said to have been the going rate for a “finder’s fee.” Two years ago, a clamor of disapproval was generated when the practice of finder’s fee payment was reported in the local media. One worker confided that this bad publicity prompted his volunteer organization to stop providing emergency rescue services for RTAs.

The Ministry of Health has forbidden hospitals from paying such gratuities to emergency rescue patrols and they are probably on the way out. There are permissible ways for hospitals to support foundations. For example, a few hospitals in Chiang Mai have donated radio equipment and cervical collars to foundations.

7. The Grounds for Government Intervention in Chiang Mai:

Need for emergency rescue worker training and registration

Emergency room statistics indicate that Thai people who witness an accident are likely to take matters into their own hands, sending the injured off to the hospital by private car, *tuk-tuk* or *see-lor*.^{*} Consequently, by the time that the ambulance arrives at the crash site, the injured person may already be on their way to a hospital. Who knows which? In fact, one of Chiang Mai's designated trauma centers receives about half of its emergency cases by private vehicles. Even in Bangkok where EMS service is most readily available and people are most educated, most injury cases arrive at the hospital in private vehicles.¹⁴

There are several explanations for this citizen-rescue phenomenon. First, the availability of EMS is still limited, especially in rural districts and in the setting of non-traffic related injuries and illnesses. Many people believe that it is better to move injured persons to the hospital A.S.A.P., rather than wait for an ambulance that may or may not arrive at the scene of injury. Secondly, litigation for personal injury is uncommon. Even now, most doctors do not carry malpractice insurance. In Thailand, Good Samaritan-type

^{*} A tuk-tuk is a three-wheeled taxi. A see-lor is a taxi pick-up truck.

citizen rescuers can essentially take matters into their own hands with impunity. Thirdly, there is a tradition of amateur rescue organizations in Thailand. The four private rescue services that I studied in Chiang Mai boasted a cadre of between 100 and 1,000 volunteers each. Many of the volunteers participate in emergency rescue units on a weekly basis. This volunteerism may help fill manpower needs, but it has some untoward effects. It degrades the social and professional status of paid rescue workers. It depresses their wages. It makes training, certifying and monitoring rescue workers more difficult.

Until 2002, there was no registry of emergency rescue workers in Chiang Mai. The Health Department had no control over the staffing of rescue vehicles. The only way that it could enforce standards for emergency worker prehospital training was by sponsoring voluntary courses and encouraging emergency rescue service providers to send their regular workers to them.

8. The Chiang Mai Health Department's EMS Development Program

The Provincial Health Department's Office of Emergency Medicine launched its effort to bring organized EMS to Chiang Mai in 2002. It convened a series of meetings attended by officials of most of the local EMS private organizations and major hospitals to devise an EMS referral plan for metropolitan Chiang Mai. Modeled after the Ministry of Health plan, rescue foundations were granted responsibility for management of emergency cases with only BLS requirements. Hospital-based EMS units were given charge of emergency cases with ALS requirements. There were originally nine hospitals

that offered to provide EMS. Each was to operate EMS units only within their designated EMS zone (within ten kilometers of the hospital). As for the rescue foundations, separate, non-overlapping territories were carved out for each.

Triage of patients with the most acute critical care needs (severe trauma, neurologic event or cardiac event) was organized separately. The city was divided into four zones, each with a hospital that approximated a Level I trauma center. Overseeing the pre-hospital triage process was a central radio communication center, the Wiang Ping Rescue Center, which had already been established within the provincial hospital. The dispatch workers were to use the following factors to determine the triage decision:

- (a) Patient's medical signs
- (b) Patient's insurance status
- (c) Patient's request
- (d) Hospital proximity (not more than 5 km or 10 minutes distant)
- (d) Hospital preparedness for the type of injury

9. Outcome of the Chiang Mai Health Department's EMS Development Program

The 2002 meetings set a blueprint for the orderly conduct of emergency dispatch and triage to hospital. Most of the hospitals that entered into the agreement have not fulfilled their pledges to establish EMS programs. The few hospitals that have done so maintain nearly exclusive self-referral practices, regardless of their status as a Level I, II or III trauma center. For the most part, private rescue foundations have confined their activities to their designated territories and cross-boundary raids are fewer than before. Private rescue foundations have been less willing to defer ALS cases to hospital-based ambulances and restrict their own services to BLS cases. The EMS dispatch center is regarded by EMS providers as a source of accident information, but not as a command

center. They continue to monitor other emergency radio networks and take uncoordinated unilateral action in response to crashes that occur within and sometimes beyond their domains.

Of the twenty-three hospitals around the city of Chiang Mai, nine agreed to be EMS providers in the 2002 plan. As of June 2003, only three have set up active pre-hospital ambulance programs. I asked a physician at one of the inactive hospitals (the hospital responds to less than one emergency dispatch per month), to explain the reason. He explained that the hospital is long on enthusiasm, but short on funds. Currently, there is no hospital budget to hire and train the emergency workers, to acquire additional emergency vehicles and equipment or to set up and staff a radio center. His hospital's ambulances are kept busy with non-emergency transports, such as taking an in-patient to an out-of-hospital MRI scanner or bringing a debilitated patient from home for out-patient physical therapy. Staff for the ambulance outings are simply borrowed from the Emergency Room as the need arises. This hospital is participating in the EMS scheme as one of the four designated primary trauma referral hospitals. Its inability to support an EMS program, however, means that all of the trauma cases are brought by the rescue foundation units, no matter how severe the case or how ill-equipped the rescue unit.

The three hospitals that do have EMS programs are providing BLS and ALS services within their catchment areas. All nine hospital-based emergency rescue workers who were interviewed reported that they brought patients to their own hospitals exclusively, even though they might have to bypass other hospitals closer to the accident scene to do so. One hospital has extended its zone of operation to cover most of the territory that was formerly served by a rescue foundation. Like the rescue foundations, it maintains four

basic rescue patrols stationed around the city. These hospitals may reason that if they are going to expend resources on EMS, they don't want to restrict themselves to ALS cases or lose the patient by transporting him or her to another hospital. More problematically, these hospitals may be using expanded catchment areas, causing hospitals nearer to the crash scene to be bypassed and patients to endure longer transport times.

Mandatory motor vehicle insurance provides an indirect incentive for these hospitals to put forth EMS programs. The insurance covers 15,000 baht (\$366 USD) in crash-related health care. Therefore, hospitals can expect to recoup at least that much for emergency room and in-patient care subsequent to the free prehospital care. One private hospital worker explained that when the 15,000 baht in coverage is exceeded, his hospital may transfer the patient to another hospital where the patient has more complete health insurance, such as through the National "30-baht" health insurance program.

One hospital that maintains an EMS program has a policy to send a physician along with the regular rescue team for ALS cases. When I asked one emergency room physician at the hospital about his most recent field-ALS case, he replied that he had not been out on such a case in two years. When asked how many physicians had gone out on ALS calls during the last six months, he replied, "None." Another hospital has a policy to send a registered nurse out with the rescue team for ALS emergency cases. At least one of the nurses there has gained some special training in emergency rescue and trauma care. As of June 2003, none of the 196 registered emergency rescuers in the Chiang Mai municipal area were females. Thus, the few female nurses who are involved in prehospital care are working with all-male rescue workers. This gender inequity might discourage female nurses from participating in rescue teams. Only in Bangkok did I see

routine participation of registered nurses in emergency rescue patrols. Further investigation is needed to identify the social, cultural and occupational barriers against female rescue work in Thailand.

The attempt to establish territories for the various rescue foundations has been a partial success. One worker was able to describe the line of demarcation for his foundation street by street in an east-west direction across the city. He felt that the concept of shared responsibility and cooperation is more widely accepted than before. However, another rescue worker at the same hospital complained that within two months of the agreement, cross-territorial “raids” on crash victims resumed. Since others were snatching cases in his territory, his team felt obliged to respond likewise. This problem is partly due to the limited authority of the official emergency dispatch system.

The Wiang Ping Rescue Center (Soon Wiang Ping Kucheep) is the communication center that receives all emergency medical “1669” phone calls and dispatches EMS units within the Health Department system. The center consists of a single room with a lot of radio equipment located within the provincial hospital. When I visited the communication room, the operator was absent.

The most frequently called emergency number in Thailand is “191,” the police emergency hotline. Each province has a police office to handle local 191 calls. In the past, the police in Chiang Mai sent 191 accident alerts directly to emergency rescue foundations. In response to the Health Department’s effort to organize EMS communications in Chiang Mai, the police 191 center now transmits all accident alerts to the Wiang Ping Rescue Center. A police officer at the control center said that he prefers the new method, because it relieves his staff of medical responsibility and allows them to

concentrate on mobilizing police cars in response to crimes and other types of emergencies.

According to the Health Department's EMS plan, rescue foundation teams and hospital-based ambulances should tune into the Wiang Ping Rescue Center radio channel and communicate with the center's operator before responding to an emergency call. At present, this expectation is being met halfway. All of the EMS providers listen to the Wiang Ping Rescue channel. However, they simultaneously monitor several other emergency networks. The police emergency radio band (associated with 191 calls) remains the favorite. They also monitor the fire department radio band (there is a "199" phone number to report fires), local radio news stations and have their own telephone hotlines as well. When they pick up a message from one of these networks reporting an accident in their vicinity, they will ordinarily respond without first notifying the Wiang Ping Rescue Center and asking for their permission.

One Chiang Mai hospital with an EMS program receives about 50% of its emergency messages from the Wiang Ping Rescue Center and the other 50% comes directly through the hospital's emergency phone hotline. When messages come through the hospital hotline, they are unlikely to be transmitted on to the Wiang Ping Rescue center. Two rescue foundations reported receiving only about 20% of their calls through the Wiang Ping Rescue Center and for a third center it was less than 10%. The majority of their messages are picked up from the police radio network. They usually make referral decisions on their own. Based on interviews, the top four factors in making

referral choices are hospital proximity, patient's medical status, health insurance and patient request for a specific hospital.

There are incentives for the foundations to get as many cases as possible and they have a better chance of getting cases if they respond independently, without waiting for dispatch from the Wiang Ping Center. However, the government plan stipulates that the rescue foundations defer management of ALS cases to hospital-based ambulances. For example, at a Health Department seminar, rescue foundation workers were taught not to move seriously injured cases (e.g., comatose or suspected spinal injury) from the injury site. They are supposed to wait for a hospital-based ambulance to arrive and take over the case instead. However, the head rescue workers of two foundations described only three situations in which they usually wait for back-up: (1) when the injured persons cannot be extricated from the crashed vehicle (2) when the injured are otherwise inaccessible, such as dangling from a power line, and (3) when the victim is already dead. One rescue worker explained that the hospital ambulances are often staffed by nurse's aides who have limited emergency rescue knowledge and less sufficient equipment than the workers at his foundation. He added that, sometimes, the hospitals don't have enough staff members on duty to put an ambulance in the field. He feels that his foundation is overall better staffed than hospital-based ambulances. Thus, he is reluctant to defer any cases to other emergency units.

One way to stop rescue foundations and hospitals from sidestepping the authority of the Wiang Ping Rescue Center would be to prohibit these institutions from tuning into the police and fire radio networks. It is already illegal for private citizens to do so. However, a police official explained that the rescue foundations are seen as providing a

public service and they are afforded informal permission to monitor the police radio band. Permission to monitor the fire department's radio network requires a letter to the municipal authority, but this is usually a mere formality.

The city fire department emergency medical unit is acknowledged to have well-trained workers. They work in two shifts of ten men; half have had two months of emergency training in Sweden. This expertise is not used to full advantage in RTA management. This is partly because the fire department EMS program has not been enlisted into the Health Department's plan and so it is rarely notified when an RTA occurs. Another communication problem is insufficient information contained in dispatches. One hospital has both basic and advanced rescue units, which are used according to the anticipated need. They usually receive few details regarding the number of persons injured or the nature of the injuries from the Wiang Ping Rescue Center. The root of the problem is that the hotlines usually receive no more than the following accident information from callers: location, type of vehicles involved and whether there are dead, injured or not injured people. A police dispatcher said that he seldom receives details such as the number of injured persons or what the nature of the injuries might be. When the Wiang Ping Rescue Center receives sketchy information, it can only guess which type of emergency unit to send.

The public phone system for emergency calls has its own shortcomings. Calls to "191" and "199" are automatically connected to the nearest radio station of the police and fire departments, respectively. The only glitch is with some mobile phone services, which may transmit the emergency call to the wrong district in Chiang Mai. Calls to "1669" are a little more complicated: there is no need to dial an area code when calling

from home, but it is necessary to do so when dialing from a mobile phone. This difference may confuse some callers. Chiang Mai's public phones are frequently out of operation or occupied by callers, so mobile phones are the most convenient means to report a RTA. I was with a health official who made a phone call to the 1669 hotline on her office phone and was unable to get through. She then switched to another phone and was able to get connected. Had she been calling in an emergency, she might have been inclined to give up on 1669 after the first attempt and call 191 or 199, instead. Furthermore, there are a lot of prank calls to the emergency numbers, but the emergency hotlines do not have caller identification systems to crack down on such pranksters.

I asked 40 rescue foundation workers what number they would call if they witnessed an injury-accident. Twenty-two said that they would call the police hotline while nine said Wiang Ping Rescue Center and eleven had other choices. Given that over half of the rescue workers did not know the correct number to call, we can assume that the general public is also unlikely to call the Wiang Ping Rescue hotline.

To summarize, the Health Department's EMS plan has already made some progress in eliminating the pre-existing "free-for-all" of EMS providers in Chiang Mai. Territorial zones for hospitals and foundations have been accepted by most EMS providers. However, emergency calls in Chiang Mai reach EMS providers through a range of channels and most calls are acted upon without clearance through the Health Department's communication system, especially by rescue foundation respondents. So far, the attempt to dispatch hospital and foundation EMS units based on the severity of the injury has not been very successful. Rescue foundations often go beyond their designated responsibility for BLS cases and also manage ALS cases. Some hospitals are

providing emergency services for ALS cases as planned, but also challenging the foundations for BLS cases and sending units out of their own catchment areas, bypassing other hospitals that may be nearer to the crash scene. Most decisions about hospital referral are made by the EMS units without much input from the Health Department's communication center. Many rescue workers are either unaware of the intended dispatch role for the Wiang Ping Rescue Center or else they are unwilling to relinquish decision making to the dispatch center. The prevailing attitude is "finders keepers," i.e. the first EMS unit to respond almost always manages the pre-hospital care and transportation. Meanwhile, the majority of hospitals that agreed to provide EMS within their zones have not gotten their programs started and are serving only as receiving hospitals. In short, rescue foundations are still operating much the same as before the EMS plan was introduced, while hospitals are either going too far or not going far enough. The system is still only a few years old. Further definition of EMS roles, responsibilities and procedures are likely to improve in the next several years.

10. Maintenance of emergency room and ambulance standards

The Health Office EMS plan stipulates two requirements for emergency receiving hospitals. First, they must agree to accept emergency cases. Secondly, they must be able to "open" the operating room within 30 minutes of need. Thus far, no emergency room inspections, tests of readiness to open operating rooms or method of monitoring performance have been instituted as part of this program. I was told by one hospital medical officer that all ambulances must be inspected and certified by the Emergency

Medicine Division of the Chiang Mai Health Department. However, when I pursued this with the Emergency Medicine Division, I learned that they wish that it were so, but they presently have no such authority. Presently, hospital-based ambulances and emergency rooms are inspected by a separate public health office as part of the annual hospital-accreditation process. Rescue foundation vehicles are given a license by the local police department, but they are not subject to much scrutiny.

The Health Department's policy regarding equipment of Chiang Mai's hospital-based ambulances seems to be driven by national standards with little relevance to the local situation. Consequently, the policy mandates that every hospital ambulance in Chiang Mai should be equipped with ALS equipment including laryngoscope, defibrillator and spinal board. However, training of the ambulance workers in the use of ALS equipment is not required. Moreover, the laryngoscopes and defibrillators are actually kept at the hospital emergency rooms and they are not routinely taken out in the ambulances. As for the spinal boards, they are mostly lacking.

In practice, rural district hospital ambulances are rarely called upon to give ALS to RTA victims. Most often, they are utilized for between-hospital patient transportation and their routine equipment is limited to a stretcher with an intravenous stand, an oxygen tank, bag-mouth breathing apparatus and a basic first aid kit. Hospitals providing EMS services in the city of Chiang Mai have the best-equipped ambulances in the province. Even so, they are generally not equipped with defibrillators, ventilators or equipment for intubation. It appears that they do have spinal boards, scoop stretchers and cervical collars.

Based on Western principles, one would think that bigger van-type ambulances would naturally be better than the smaller covered-bed pick-up trucks. The former are used by all hospitals and the latter by all rescue foundations in Chiang Mai. Surprisingly, two rescue workers at a hospital with both pick-up and van varieties of vehicles said that they prefer to work in the pick-up vehicle, because it has better road visibility, gets through traffic more easily and is easier to equip.

Equipment in the rescue foundations is limited by the small space available in the back of a pick-up truck. Typically, they contain a stretcher, home-made spinal board and splints for arms and legs. Cervical collars, first-aid kits, gloves and bag-mouth apparatus are often lacking.

Table 3 contains the results of an equipment survey of 40 emergency rescue workers in Chiang Mai. Gloves and leg splints were reported to be uniformly present and used in the emergency vehicles. Stethoscopes and oral airways were the devices least likely to be present and used. There was little difference between the frequency of an item's presence and its use. These results were based on questionnaires and not on vehicle inspection. This may have produced a reporting bias in favor of completeness of equipment. For example, in one EMS program, four workers were first interviewed and all reported that the vehicle that they had and used a cervical collar. Later, when I inspected their vehicle, there was no cervical collar there. Figures 9 and 10 demonstrate the ways in which patients are transferred and transported when spinal boards or cervical collars are deficient.

Table 3. Emergency equipment questionnaire conducted with 40 emergency rescue Workers in Chiang Mai.

Equipment Item	Number and percentage of the equipment being present in the vehicle	If present, frequency that the equipment is actually used
Medical gloves	40 (100%)	100%
Leg splint	40 (100%)	100%
Compressive dressing	35 (87.5%)	100%
Oxygen tank	35 (87.5%)	94%
Bag valve mask	33 (82.5%)	97%
Spinal board	31 (77.5%)	100%
Cervical collar/immobilizer	31 (77.5%)	100%
Sphygmomanometer	30 (75%)	70%
Oral airway	26 (65%)	96%
Stethoscope	16 (40%)	100%

11. Ambulance Driving and en-route safety

Presently, there is no course for training ambulance drivers in Thailand. In Chiang Mai, ambulance driving etiquette was included in the 2002 Basic Trauma Life Support seminar (see below). Most drivers are experienced emergency workers, who have learned to drive an ambulance through experience. There is some public disapproval of erratic ambulance driving and the Ministry of Health is trying to cool the wheels of ambulance drivers through the Narenthorn Center's information program. In Chiang Mai, I encountered a hospital ambulance driver using lights and sirens when transporting a stable patient from one hospital to another. He explained that he did this so that cars would get out of his way and not slow him down. He believed that using the lights and sirens in this way made his driving safer. He had attended seminars for ambulance drivers hosted by the police department and the Motor Vehicles Department. These had covered appropriate use of lights and sirens. As a rule of thumb, he said that if

the patient can sit, he does not use the sirens and if the patient is lying down he usually does.

I rode in a hospital-based ambulance in Bangkok as it responded to a motorcycle accident. Having no prior experience to compare this with, I can only comment that I felt petrified that we would strike a car, motorcycle or pedestrian while weaving in and out of traffic, often using the lanes of oncoming traffic. The driver, who had two years of ambulance-driving experience, did not wear his seatbelt. He justified this on the grounds that the seatbelt would interfere with his driving and ability to quickly jump out of the ambulance. There was no seatbelt for me on the front-passenger side and none in the back of the ambulance.

As part of my survey of 40 emergency rescue workers in Chiang Mai, I asked them to report the frequency with which they wear seatbelts while riding in their rescue vehicles. Sixteen (40%) responded “never,” 21 (52.5%) responded “sometimes,” and 3 (7.5%) responded “always.”

Most of the rescue vehicles are pick-up trucks with a covered truck bed. Some of these vehicles had no mechanism to lock the stretcher into place. Furthermore, I never saw a pick-up truck type rescue vehicle that had seatbelts for the emergency workers in the truck bed. At a simulated multiple-injury-crash training session that I observed, two emergency staff in the back of a vehicle sat on the back door of the pick-up truck as they drove away from the crash site (see figure 11).

12. A profile of emergency rescue workers in Chiang Mai

The results of interviews with 40 emergency rescue workers are contained in Table 4. This was an all-male survey. In fact, there is not one woman among the 196 registered emergency rescue workers in Chiang Mai, although I heard tell of one unpaid female volunteer and there are female nurses in supervisory roles. It is an occupation for young men with low education (a ninth-grade education is mandatory and the average education in this survey was 9.7 years). A large majority of the participants have been employed as rescue workers for more than one year, suggesting that job turnover is fairly slow. This may be explained by the high ratings for job satisfaction. That almost all participants rated their job satisfaction as good or excellent is somewhat surprising, considering their poor salaries, especially when calculated on an hourly wage basis. On average, the rescue workers receive about 25% less monthly wage than do nurse's aides at hospitals. Yet, they work about 30 hours more per week. However, most of the time at work is spent waiting for an emergency call. The fact that some of the workers perform 24-hour shifts indicates that there is ample time for rest while on the job.

Table 4. Demographics of emergency rescue workers in Chiang Mai (n=40)*

Variable	Findings	Comments
Site of employment:		
Hospital	n = 9	
Rescue Foundation	n = 27	
Rescue Club	n = 4	
Gender	Male = 40, Female = 0	
Age	Mean = 27	Range = 18 - 46
Years of Education	Mean = 9.7	Range = 6-14
Pre-employment training:		Range = 3 hours- 2 years
≤ 24 hours	n = 25	
25 – 80 hours	n = 6	
81 – 160 hours	n = 6	
161 – 320 hours	n = 1	
≥ 320 hours	n = 2	
Certification for Basic Trauma Life Support	Yes = 35 (88%)	
	No = 5 (12%)	
Certification for Emergency Medical Technician	Yes = 4 (10%)	
	No = 36 (90%)	
Time employed in emergency rescue:		
< 1 year	n = 6	
1 - 2 years	n = 16	
≥ 3 years	n = 18	
Hours worked per week	Mean = 76	Range = 60 - 96
Number of workers per rescue unit (including driver)	Mean = 2.6	Range = 2 - 3
Monthly salary (U.S.\$)	Mean = \$84	Range = \$73 - \$153
Hourly wage (U.S.\$)	Mean = \$0.28	Range = \$0.19 - \$0.81
Self-reported case-load per 12-hour shift	Mean = 3.0	Range = 1- 7
Job satisfaction:		
poor	n = 0	
fair	n = 1	
good	n = 19	
excellent	n = 20	

*All results are self-reported and unverified.

The rescue workers were asked to describe the most important problems at work. The most frequent response was that there are no problems at work (n = 14). Insufficient emergency equipment was second (n = 7) and poor cooperation from road traffic was third (n = 4). When asked what should be changed to improve EMS in Thailand, the top five answers were to improve training (n = 11), improve equipment (n = 10), improve coordination between different EMS programs (n = 5), no improvements needed (n = 5)

and increase funding (n = 4). The top ranking barriers to change were poor administrative support, inadequate funding and inadequate public cooperation.

13. Shortage of EMS workers in Thailand

In the U.S.A., EMT training and licensing requirements vary by location. EMT programs are taught at two-year colleges and private trade schools. In California, the EMT curriculum averages 130 hours, including 8 hours of clinical experience. To become a paramedic, one must complete an EMT training program and do additional training (1040 hours in California). Both EMT's and paramedics are awarded two-year licenses.

In Thailand, the Government has given low priority to EMT education. Consequently, there are few EMT training schools producing very few graduates (see Table 5).

Table 5.*

<u>Professionals</u>	<u>Graduating Health Professionals in Thailand</u>
Physicians	960/yr (1998)
Nurses	3393/yr (1998)
EMT's	60/yr (2002)
<u>Paramedics</u>	<u>none</u>

* References^{5,19}

In Thailand, the lack of trained personnel has been cited by the Narenthorn Center as one of the chief impediments to developing a national EMS network. The director has said, "In the future, we must have EMT and paramedics enter into the field and take full responsibility. We must develop these occupations through advanced training of the

current emergency personnel or those with a minimum of at least high school education.” (author’s translation) About 6 million people use emergency room services per year in Thailand. Ten percent of them require advanced life support and 20% basic life support. From this, the nation’s need for EMS personnel has been estimated at 1,500 paramedics and 9,000 “EMT basics or intermediates,” (One paramedic per 40,000 and one EMT per 6,700 people). As of this writing, there are 196 registered emergency rescue workers in Chiang Mai, three of whom are also registered as EMT’s. Thus, there is only one EMT per 500,000 people in the province.¹⁴

14. Training of EMT basics

Across Thailand, policemen are usually the first personnel to arrive at accident scenes. Their emergency medical training is, however, limited to a few lectures on emergency medicine during their year at police academy. Once they join the police force, they rarely have the opportunity to attend first-aid training seminars. In Chiang Mai, the police play only a supporting role in treatment of injury victims: helping to extricate the injured from their vehicles and controlling traffic. Bangkok has an exceptional police emergency response program as a royal project. The service has enlisted 144 policemen who respond to accidents, give first aid, deliver babies and escort ambulances to hospitals in Bangkok. Firemen receive BLS training, but their focus is on extrication and they usually defer prehospital care to other organizations.

The Medical Council has criticized the volunteer organizations in the past for fielding inadequately trained and ill-equipped emergency rescue teams.⁵ On the other

hand, the foundations would like to receive more educational and financial support from the Government. Basic trauma life support (BTLS) educational programs for emergency workers are still somewhat rudimentary and inconsistently available. As yet, there is no standardized basic EMT examination and no nationally recognized licensing body. EMT courses are being sponsored by the Medical Council of Thailand, the Ministry of Health and individual Provincial Health Departments. Each one independently certifies the program graduates as qualified. Guidelines call for 110 hours of EMT training before sitting for an examination, but this is probably not achieved in most instances, including the training courses that have been given in Chiang Mai. Most hospitals do not provide EMS services, and these have ambulances staffed by nurse's aides, who have some BLS training. Central Memorial Hospital is exceptional in Chiang Mai, in that it has an EMS training program of its own. It puts all of its new EMS workers through a three-month health care course for nurse assistants, followed by one month of on-the-job training.

A certifying BTLS program for rescue workers was first conducted in Chiang Mai in 2002 by the Provincial Health Department, Office of Emergency Medicine. All of the foundations and hospitals with EMS programs in the city of Chiang Mai were invited to send their emergency workers to the course, which consisted of 2.5 days of theory and practice followed by a half-day quiz. All material was at a basic level. The 100-point test was based on a Ministry of Health manual and foreign textbooks and was prepared by local health workers. It had 40 written questions and 60 points from three practice stations: (1) Patient assessment, (2) C.P.R., and (3) first aid. A passing score of 60 or above was achieved by 90% of the attendants. Those who succeeded were given a certificate and were registered with the Health Department. A one-day follow-up

seminar is planned for late 2003 for the registered rescue workers, but there is currently no plan for another introductory seminar for new emergency rescue employees in the city.

District nurses who observed the three-day BTLS seminar in 2002 have been charged with teaching the same course in their own districts this year. Since there are no full-time emergency workers in the rural areas, the course attendants are district hospital emergency room staff, policemen and civil defense volunteers. After completing the training, the attendants are given the same BTLS examination as was used in the municipality in 2002. However, the passing criteria are relaxed to adjust for lower education levels and to make sure that most of the attendants pass the examination. This approach is consistent with the Narenthorn Center's (Ministry of Health) policy to allow local areas to formulate their own teaching plans, but to formalize the certification process through testing.

Of the 40 participants in the emergency rescue worker survey, the majority received no more than 24 hours of pre-employment training. When asked to rate the adequacy of that training, however, only one rated it as poor and 29 (73%) rated it as good or excellent. New recruits at the rescue foundations start out paired with a more experienced rescue worker and gradually learn on the job. One worker said that he learned by trial and error. When faced with an unfamiliar situation, he would take a guess at what to do and then later on ask an emergency room doctor whether or not he had acted correctly. Nearly 90% of the participants attended the 2002 Basic Trauma Life Support (BTLS) course hosted by the Health Department and passed the examination.

There has not been another course since, so that certification of new employees is not yet possible, unless they attend one of the outlying district seminars.

The foundations have periodic in-services, conducted monthly to quarterly by different organizations. I had the opportunity to observe a morning in-service put on by one foundation during my stay. I observed a simulated rescue of a multiple-injury motorcycle-bicycle accident managed by two basic rescue vehicles with three staff in each crew. Because there were only two stretchers, one patient with an imaginary leg fracture was carried by three men to the vehicle and then put on the floor of the vehicle. A home-made spinal board was used to transfer a patient with a presumed back injury. Gloves were worn by all of the rescue workers. When the exercise was completed, there was no review and discussion about what was done right and what was done wrong in the exercise. They just moved on to the next activity, which happened to be jogging around the field. The instructor made the candid confession, “This might be wrong according to standard practice, but anyway, it is where we are at right now.” Hopefully, the Basic Trauma Life Support course that was conducted in 2002 at the Health Department will be followed by annual seminars to refresh the rescue workers’ skills and knowledge.

A test was given to forty emergency rescue workers in Chiang Mai to assess their knowledge of basic emergency medical equipment (see the appendix). For each of ten emergency devices, they were given one point if they could correctly name the item (in Thai) and another point if they could choose the most appropriate use for the item in a multiple choice question. With a maximum possible score of 20, the participants had a mean score of 17.4 (range 12 – 20). By comparison, an English version of the same test was given to 20 EMT basics and intermediates in Utah for pre-testing. Their mean score

was 19.8 (range 19 – 20). Amongst the Thais, the most frequently missed question was the proper use of a compressive dressing (18 of 40 answers incorrect) and oral airway (10 of 40 answers incorrect).

15. *Training programs for EMT intermediates and paramedics*

The first objective is to meet the need for basic emergency medical workers. Once that is achieved, Thailand can focus on building the force of advanced emergency workers. Khon Kaen University has had a two-year EMT-intermediate vocational program for several years and two other universities are starting similar programs. Many of the EMT students are actually on the staff of various hospitals around the country and receive stipends from the hospitals for their education. Once they graduate, they may return to their hospitals to head the ambulance teams. The graduates are capable of some ALS procedures (starting intravenous fluids, resuscitation, giving injections), but not intubation or operation of a defibrillator. The Narenthorn EMS Center in Bangkok has a six-month EMS training course that produces EMS intermediates, but it only accepts a few students per term.

Dr. Verawat Muttarak at McCormick Hospital in Chiang Mai is co-instructor for the Health Department's BTLS courses and author of the certifying BTLS examination. He would like to see a two-year EMT-intermediate course started at one of the two universities in Chiang Mai. Most likely, the program would be a separate academic track taught by nursing and medical faculty. The students would be employees of district hospitals of Chiang Mai and other Northern provinces, receiving financial support during

their study in return for a service commitment after completing their studies. At the moment, the National Health Insurance program is placing such great demands on the teaching hospitals in Chiang Mai that the thought of starting such a program is like “opening a new can of worms.” So, it will probably be several years before such a program is begun.

It is also hoped that Thailand will someday have a 4-year college program producing paramedics capable of administering advanced life support. However, the current plan would turn nurses into paramedics through continuing-education nursing programs. The Chiang Mai Provincial Health Department supports this plan, but has no related educational program at present. The Chiang Mai University School of Nursing holds an annual two-week emergency course for over one hundred nurses. Some of the course’s attendants are leaders of ambulance programs for public and private hospitals around the country.

Figures

All photographs were taken by the author. Pictures of emergency rescue personnel and equipment are used by permission of the individuals and organizations involved.

Figure 1 and 2. Manual laborers, construction and industrial materials and agricultural goods are often transported in the easiest way possible, usually by means of a pickup truck crowded to the top.

Figure 3 and 4. Motorcycles are very common forms of transportation for parents sending their children to school and for students. Young motorcycle users are more likely to crowd two or more onto the motorcycles. Compliance with the motorcycle helmet law is poor and enforcement is limited. Women who wear skirts often prefer not to