Quality of maternal health care at Shoklo Malaria Research Unit in Mae La refugee camp in 2008

An evaluation using WHO Safe Motherhood Needs Assessment




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Table of contents

List of figures, tables and charts

Abbreviations

ALSO	Advanced Life Savings in Obstetrics
AMI	Aide Médicale International
ANC	Antenatal care
ANR	Antenatal record review
AROM	Artificial rupture of membranes
ART	Anti-retroviral therapy (for HIV/AIDS)
BP	Blood pressure
CBCA	Criterion-based clinical audit
CCSDPT	Committee for Coordination of Services to Displaced Persons in Thailand
CDC	Centers for Disease Control and Prevention
CDE	Complicated delivery (eclampsia) record review
CDO	Complicated delivery (obstructed labour) record review
DHT	District health team interview
EC	Emergency contraception
EmOC	Emergency obstetric care
EOC	Essential obstetric care
FAC	Facility management interview and observation
FGM	Female genital mutilation
FHB	Foetal heartbeat
FP	Family planning
GBV	Gender-based violence
HIS	Health information system
IAWG	Inter-Agency Workgroup on Reproductive Health in Crisis Situations
ICPD	International Conference on Population and Development
IDPs	Internally displaced persons
IMMPACT	Initiative for maternal mortality program assessment
IPD	Inpatient department
IUD	Intra-uterine device
KIT	Royal Tropical Institute
KNU	Karen National Union
MDG	Millennium Development Goal
MMR	Maternal mortality ratio
MISP	Minimal initial service package
MoH	Ministry of health
MORU	Mahidol - Oxford Research Unit
MSF	Médecins Sans Frontières
NDR	Normal delivery record review
NGOs	Non-governmental organisations
NMW	Midwife interview
OPD	Outpatient department
PAI	Population Action International
PEP	Post-exposure prophylaxis
PLWHA	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission (of HIV)
PPAT	Planned Parenthood Association of Thailand
PPH	Postpartum hemorrhage
RH	Reproductive health
RHI	Reproductive health indicator
RHRC	Reproductive Health for Refugees Consortium
RRI	Reproductive risk index
SBA	Skilled birth attendant
SMNA	Safe motherhood needs assessment
SMRU	Shoklo Malaria Research Unit
SRH	Sexual and reproductive health
SROM	Spontaneous rupture of membranes
SOV	Surveyors observation
STIs	Sexual transmitted infections
TBA	Traditional birth attendant
UN	United Nations
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency of International Development
VE	Vaginal examination
WHO	World Health Organization

Annexes

Abstract

Quality of maternal health care at Shoklo Malaria Research Unit in Mae La refugee camp in 2008: an evaluation using WHO Safe Motherhood Needs Assessment.
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Key words: safe motherhood, perinatal care, quality of care, needs assessment, refugees, reproductive health

Problem statement: As part of a quality improvement project a WHO Safe Motherhood Needs Assessment (SMNA) was performed at the SMRU clinic in Mae La refugee camp.
Objectives: To describe availability, use and quality of perinatal care and to identify gaps in the provision of care.
Methods: Facility observations, record reviews, staff interviews and observations of deliveries were conducted using SMNA instruments with locally adapted structured survey forms.
Findings: Availability of appropriate drugs, supplies, equipment, facilities and transport was found to be adequate. Missing items were syphilis tests and health education materials. Essential elements of antenatal care, e.g., providing supplements and recording risk factors, all scored over 90%. The skills and abilities of the staff exceeded minimum standards, except for bladder care (19.3% catheterisation during labour), perineum care (episiotomy rate of 48.6%) and checking if placenta was complete (only 46.0%). Management of obstructed labour was done when reaching the action line of the partogram, although augmentation was done with delay in 30% of cases.
Discussion: While SMRU staff appeared accurate on following protocols and recording in patient files, direct observations put this in perspective. Knowledge of complicated deliveries and obstetric emergencies was adequate, but team performance in the delivery room was chaotic at times and variable delays between observation, decision and action were observed.
Conclusion: Overall performance was adequate for the majority of SMNA items despite high staff turnover and junior staffing levels. Certain aspects of perinatal care require improvement preferably by a supervising doctor with obstetric skills.

1. Introduction

While working as an all round medical officer in Malawi I was struck by the quantity and impact of maternal deaths. Aspiring to a career in international health my interest was naturally drawn to reproductive health (RH) and emergency obstetric care (EmOC). When Shoklo Malaria Research Unit (SMRU) offered me a position in clinical obstetrics in Mae La refugee camp on the Thai-Burmese border and simultaneously perform research in the field of RH, I immediately packed my bags. When working as supervisor and clinical teacher of the midwives at the SMRU clinic in the camp, I observed some substandard care. In my first few weeks at SMRU my interest in this subject was stimulated by questions raised by a Bangkok based University Ethical Committee evaluating an ongoing study at Mae La clinic which questioned the quality of maternal health care and reported neonatal death rates. With my experience in Africa I felt eager to look into this subject, to assess the quality of perinatal care and to find ways to improve any shortcomings. Compared to the standard of care in Malawi, the SMRU clinic seemed reasonable to me initially and this is how the first study questions arose: What is the quality of maternal and neonatal health care compared to: a minimum standard; to other countries and refugee settings? How does the availability of drugs, supplies, equipment and facilities influence the quality of perinatal care? What are the abilities and skills of the staff that provide the care? What opportunities are there to improve substandard care? These questions led to an evaluation using a tested method: the Safe Motherhood Needs Assessment (SMNA) of the World Health Organization (WHO). Although employed by SMRU, I was not involved as a researcher in any of the clinical trials so I had no personal bias in how I wanted the SMRU assessment to appear to others. My assignment at SMRU was in clinical obstetrics and with my prior experience in obstetrics in Malawi and as a newcomer to SMRU I was in a good position to assess the quality of care.

Obstetric care must meet a minimum standard if it is to succeed in reducing maternal and neonatal morbidity and mortality. Maternity units must also be a place that women want to attend, can easily access and where care is given by people who understand and respect the local culture. This type of care is obviously best provided by local people. However in resource poor areas and those affected by conflict it can be difficult to obtain a basic level of education. As a result finding local people who can provide complicated obstetric care may be difficult. The refugee camps, established in 1984 on the western border of Thailand with Burma, have provided local antenatal and delivery care from the outset. Maternal and neonatal death rates have reduced markedly since the early years of the camps, which is encouraging, but these remain coarse indicators of the quality of care. The WHO SMNA is a tool that allows for an in depth assessment of the quality of perinatal care compared to a minimum standard.

This thesis is written to objectively measure the level of obstetric care in Mae La refugee camp and to tackle identified shortcomings. The findings of the SMNA will be used to explain to the local staff where the standard of care is acceptable and where there are gaps. Education sessions on expected standards of care will be provided. A joint action plan with local staff involvement will be used to implement changes. After a period of monitoring the standards will be reassessed (not part of this thesis) as part of a quality of care cycle. The level of care in Mae La will be discussed with other RH providers on the Thai-Burmese border, at the border wide health meeting of non-governmental organisations (NGOs). Ethical committees and donors will be free to review this document. The recommendations of this study will be carried out by the current supervising doctor at SMRU Mae La clinic or a

successor, to guard and improve the described quality of care. A modified SMNA document for SMRU will allow for easy repeat cycles for ongoing evaluation of quality of care.
The content of this thesis follows the standard structure of scientific documents. In chapter 2 the background of the Thai-Burmese border situation, the SMRU, the health service provision in Mae La refugee camp and a description of the staff are given. This chapter ends with an account of the recent maternal and neonatal mortality figures on the Thai-Burmese border. Chapter 3 describes the problem and chapter 4 lists the objectives. Chapter 5 contains a literature review that gives a summary of how one has tried to measure quality of health care and catch this in indicators for certain aspects of RH care. It also gives a rationale why the WHO Safe Motherhood Needs Assessment was the chosen tool for this study. The research methods are described in chapter 6 and the results follow in chapter 7. Chapter 8 contains the discussion of the findings including the limitations of the study. Chapter 9 presents the conclusions and ends with the recommendations of the author. Chapter 10 is reserved for acknowledgements and chapter 11 contains the reference list. Six annexes are added, which are referred to throughout the text and are listed on page vi.

2. Background

2.1 The Thai-Burmese border situation

Mae La refugee camp is situated in Tak Province, Thailand, about 3-4 km from the border with Burma and 60 km north of Mae Sot, the main regional town (Figure 1). With a population up to 50,000[1] it is the largest of the 10 refugee camps along the Thai-Burmese border. Over 50 years of isolation, totalitarian rule and civil war in Burma has resulted in the displacement of hundreds of thousands of Burma's inhabitants, mostly to its borders. In 2009, there were approximately 500,000 internally displaced persons (IDPs) in Eastern Burma alone. The 10 border camps provide shelter for approximately 150,000 refugees while another 200,000 are living in refugee-like circumstances outside the camps. An estimated two million live in Thailand as (illegal) migrant workers.[2]

Eastern Burma:	
IDPs (including 12,000 Mon in resettlement sites)	500,000
Thailand:	
Refugees in camps	150,000
Refugees outside camps (including Shan)	200,000+
Migrant workers	2,000,000+

Figure 1. Map of displaced Burmese, June 2009[2]

Karen and Burmese are the predominant ethnic groups in the camp. Since 2005 the ethnic proportions have changed as around 46,000 refugees have left the border camps to third countries under the United Nations High Commissioner for Refugees (UNHCR) resettlement program and there has been a steady influx of an estimated 42,000 newcomers. The Karen are the largest ethnic minority in Thailand and Burma. They live on both sides of the border. In Burma the Karen National Union (KNU) has been fighting the Burmese government for autonomy since the British left Burma at the end of World War II. Attacks on the KNU have been followed by a flow of refugees across the border. When the 1988 democracy uprising was crushed by the Burmese army around 10,000 activists fled to the border, followed over the years by other Burmese seeking economic security, access to basic education and health care.[2]

2.2 The Shoklo Malaria Research Unit

The SMRU was established in 1986 and has its base in Mae Sot. SMRU activities extend to the population living in the border region, including refugees and migrants. The unit is a field station attached to the Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand and is part of the Mahidol - Oxford Research Unit (MORU) funded by the Wellcome Trust. The objectives of the SMRU research program are: 1) To treat and care for patients with malaria, 2) To define the epidemiology, entomology, and clinical features of malaria in this area of low (unstable) transmission, and to determine the best methods of prevention and treatment, 3) To advise the Thai medical institutions and the NGOs involved in the treatment and the control of malaria in the South East Asia region. SMRU projects are designed to be of direct benefit to the local community. Although SMRU is a research organisation approximately 90% of patients attending clinics are treated free of charge without entering research studies. As well as the clinic in Mae La refugee camp it runs several migrant clinics along the border.[3]

2.3 Health service provision in Mae La refugee camp

Since Mae La camp was established in 1984 the main health provider in the camp has been Médecins Sans Frontières (MSF) who handed over to Aide Médicale International (AMI) in May 2005. SMRU antenatal care (ANC) clinics were established in Mae La camp in 1995 after several camps where SMRU had activities were attacked and were merged into Mae La camp by the Thai authorities. As SMRU has a particular interest in malaria in pregnancy, the SMRU provides antenatal care, delivery, postpartum and neonatal care services in Mae La camp. Planned Parenthood Association of Thailand (PPAT) took over family planning (FP) from SMRU in 2001. More than 90% of pregnant women living in Mae La camp attend the ANC consultations of SMRU[4] and approximately 1000 deliveries per year (75% of all births)[5] occur in the SMRU delivery room with trained Karen and Burmese midwives. The remainder takes place at home with traditional birth attendants (TBAs). All obstetric and medical problems are taken care of within the ANC structure. Women who need a caesarean section are referred to the local Thai hospital one hour drive from Mae La camp.

2.4 SMRU midwives

SMRU midwives are not qualified midwives according to international midwifery standards. Few have a diploma of nursing and/or midwifery from Burma and have worked some years as a community midwife there. Most of them have finished high school or have done a few years of university before leaving Burma, but do not have any midwifery experience before starting in SMRU. In 2007 a part-time basic midwife training of 6 months with theory lectures and practical skills during work time was given by a Burmese surgeon who was supervising the obstetric activities in SMRU Mae La clinic during 2006 and 2007. All other

education was done by bed-side-teaching and on-the-job-training by the supervising doctor and the midwife in-charge. Academic standards, background knowledge and understanding of SMRU midwives will probably be lower than a final year midwife student, but the practical skills of the senior midwives are much more advanced through experience and a high exposure to emergency situations. Senior midwives working for SMRU are performing highly skilled procedures that in many Western countries are restricted to qualified obstetric doctors, e.g., vacuum extraction, breech deliveries and management of severe pre-eclampsia. This is a widespread, common situation for health workers in poor resource settings.[6] Since the start of the Safe Motherhood Initiative of the WHO in 1987 to prevent maternal deaths during childbirth, there has been a shift from delivery with TBAs to delivery with skilled birth attendants (SBAs). This was reaffirmed when the United Nations (UN) adopted 'improving maternal health' as the fifth Millennium Development Goal (MDG) in September 2000,[7] which has the proportion of births attended by skilled health personnel as an indicator to monitor progress. This is what SMRU offers with its trained midwives.

2.5 Maternal and neonatal mortality on the Thai-Burmese border

MDG 5 has put reducing maternal mortality high on the political agenda in many developing countries. The maternal mortality ratio (MMR) on the Thai-Burmese border has been reported by the Committee for Coordination of Services to Displaced Persons in Thailand (CCSDPT) as 102.5, 50.7 and 73.1 per 100,000 live births for 2003, 2004 and 2005 respectively.[1] This is significantly lower than Burma's rate of 230 per 100,000 live births but higher than Thailand's rate of 24 per 100,000 live births, both in 2003.[1] The MMR of women who had at least one ANC consultation at the SMRU clinic in Mae La camp was on average 133 [0-204] per 100,000 live births per year in the 5-year period from 2002 to 2007 (personal communication R. McGready). The neonatal mortality rate was 30 per 1,000 live births from October 2007 until September 2008 (personal communication C. Turner). While still poor, these figures show a large improvement compared with those two decades ago. Maternal mortality from malaria alone was 1000 per 100,000 live births in Mae La camp in 1984.[8] The neonatal mortality rate has been reduced from 160 in 1984 to 43 per 1,000 live births in the mid-90s.[9]

3. Problem statement

Due to the UNHCR resettlement scheme to a third country in the border camps many organisations lost 50% or more of their staff, often their most experienced staff members.[10] In SMRU Mae La clinic all experienced midwives have departed and the midwives currently in the clinic are very young and inexperienced. Since the Burmese surgeon left in December 2007 these inexperienced midwives have been without the supervision of a doctor in the delivery room. In August 2008 a new volunteer doctor (G.H.) started working and observed cases of substandard care. G.H. commenced efforts to improve the performance of the midwives by teaching and supervision and an overall assessment was suggested to objectively determine the standard of care and identify the problems.

Mortality data alone do not present the complete picture of safety during childbirth. Additional information on the numbers of maternal morbidity, delivery related complications and neonatal outcomes compared to the overall number of deliveries are needed to assess the quality of perinatal care.[11] Moreover information about the system, management, services and infrastructure that influence these numbers are required. These components form a complex framework that needs to be in place to ensure safe obstetric care (Figure 2).

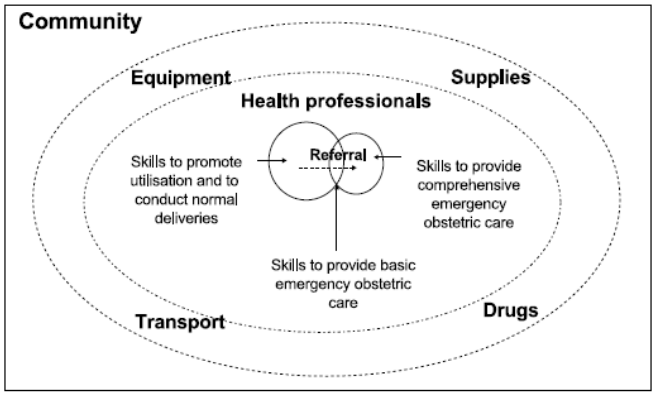


Figure 2. Schematic representation of skilled attendance at delivery[10, 11]

Several assessment tools exist to analyse RH care needs and to evaluate maternal and neonatal care services.[12-15] The WHO has developed the Safe Motherhood Needs Assessment[12] as a tool to systematically describe the availability and quality of maternal and neonatal health care and to identify gaps in the provision of this care. As a minimum standard it uses the Mother-Baby Package[16] which describes all interventions needed to achieve safe motherhood in a low resource setting in the short term. By using the SMNA with structured and standardised methods, the results could be compared with the WHO standard of minimum care as described in the Mother-Baby Package and with results of neighbouring countries that have carried out the assessment. The SMNA has been completed on a national level in Asia previously, in the Philippines and Laos,[12] in many countries in Africa[17-21] and in a refugee camp in Tanzania.[22] It has not been used in a refugee setting in Asia as far as can be ascertained from the published literature and internet searches (search terms including: Safe Motherhood Needs Assessment, Asia, individual country names, refugee, displaced, conflict). The local adaptation could potentially be used for other clinics providing delivery services along the Thai-Burmese border and as a monitoring and evaluation tool after improvements have been implemented.

4. Objectives

The overall objectives of this study were 1) to describe the availability, use and quality of antenatal, delivery, postpartum and neonatal care provided to women and newborn babies in the SMRU clinic of Mae La refugee camp; and 2) to identify gaps in the provision of care.

Specific objectives were:

- To assess the skills and abilities of the staff to provide the minimum standard of care as described in the Mother-Baby Package.

- To assess the availability of appropriate drugs, supplies, equipment, facilities and transport.

- To assess delivery related complications like the rate of episiotomies, urine catheter insertion during labour, pushing on the belly during labour (a local custom), postpartum haemorrhage, postpartum infections, incomplete placenta's and postpartum interventions needed.

- To compare the results with those of neighbouring countries and facilities in similar low resource settings.

- To give recommendations for improvements.

- To perform a critical appraisal of the SMNA as a WHO tool in a refugee setting.

5. Literature review

Quality of health care has traditionally been evaluated through morbidity and mortality data. In 1988, Donabedian presented a different system of health care evaluation.[11] Before trying to assess the quality of health care, in general terms or at a specific site, it is important to define quality and to determine the elements that compose care. These components can be classified under structure, process and outcome. Structure refers to resources, equipment and health care providers. Process is the way a procedure is performed. Outcome concerns the results, complications and costs of a procedure. As a good structure increases the likelihood of a good process, which in turn increases the chance of a good outcome, all three should be included in a quality assessment. Donabedian also defined an indicator as a measurable variable relating to the structure, process or outcome of health care. The common tools used to measure the quality of health care are now clinical indicators, evidence-based practice guidelines and audits.

A literature search on quality care was performed using the following terms alone or in combination: "quality of care", "quality management", "evidence-based practice", "clinical audit", "obstetrics", "reproductive health", "safe motherhood", "emergency obstetric care", "reducing maternal mortality", "reproductive health indicators", "monitoring", "needs assessment", "minimum standards", "refugee population", "displaced persons", "war-effected women", "emergency settings", "crisis settings", "Thailand", "Burma", "Myanmar" and "Thai-Burmese border" of Medline, Scirus and Scopus databases and Google. Peer reviewed journal articles, reports from WHO and other UN agencies, NGOs and government agencies, and a few books were reviewed. The references of relevant articles and reports were screened for additional information.

5.1 Reproductive health indicators

Since the International Conference on Population and Development (ICPD) in 1994 there has been an increasing demand for reproductive health indicators (RHIs) to monitor goals and targets in RH.[23] The WHO, United Nations Population Fund (UNFPA) and others have defined a variety of indicators (process and outcome) for different purposes (planning, implementation, program and policy monitoring) on different levels (district, national and global). In 1997 WHO took the lead in organising an interagency meeting to reach consensus on a shortlist of RHIs. Fifteen indicators for global monitoring progress towards RH targets were selected using criteria such as feasibility, usefulness and scientific soundness.[24] In a second consultation in 2000, two HIV/AIDS-related indicators were added[23] making a complete list of 17 'traditional' RHIs (Annex 1). In 1998, UNFPA produced a comprehensive document on indicators for RH targets, ICPD goals and population programs.[25] Although RH was initially not included in the MDGs, the World Health Assembly declared in a 2002 resolution that "increased access to good quality primary health care information and services, including reproductive health, is critical for attainment of the development goals contained in the United Nations Millennium Declaration".[26] Measuring access to RH services thus became the focus of a joint WHO/UNFPA consultation in 2003. From the original 17 indicators, 4 appropriate indicators for universal RH access were selected, 3 of which were already in the MDG framework.[27] In a 2005 consultation, adding 'to achieve universal access to RH services by 2015' as a second target of MDG 5 was discussed and recommended. Three additional indicators were submitted to be included in the MDG framework.[28] At the UN General Assembly of 2007 these indicators and the target 'to achieve universal access to RH' were formally incorporated under MDG 5.[29] In 2006, WHO published guidelines on the original 17 RHIs for national public health coordinators. They

stress that the awareness of an indicator's inherent limitations is crucial for its effective use. Indicators might be just suggestive of issues or indirect estimates for lacking information. But with a consistent method of data collection progress can be measured over time and towards agreed goals.[30] Finally in 2007 another joint WHO/UNFPA meeting concluded that some of the five key aspects of RH (FP, maternal and perinatal health, eliminating unsafe abortion, sexually transmitted/reproductive tract infections including HIV/AIDS and promoting sexual health) are better represented by indicators than others and that the focus of the original 17 global indicators is too much on RH and not enough on access to health. The range of indicators should include social determinants, process indicators and measures of equity, utilisation and quality in all areas of RH. An extensive framework of indicators was developed to be used for national-level monitoring.[31]

This history shows that variations occurred over time, but at present the 17 WHO RHIs remain the most widely used. Since 2000, the Department of Reproductive Health and Research of the WHO manages a Reproductive Health Indicators Database with the 17 RHIs, a few additional ones for interest and some socioeconomic and demographic indicators.[32] Other UN agencies, NGOs and gynaecology associations have published on RHIs as well. Many of them overlap partly with the 17 of the WHO. They range from very few and basic, like the Minimal Initial Service Package (MISP) indicators for emergency settings[33] to almost 40 and comprehensive as in the field manual of the Inter-Agency Workgroup on Reproductive Health in Crisis Situations (IAWG).[34] The UNHCR has developed a Health Information System (HIS) to monitor health services to camp-based refugees. Its section on RH is mainly based on IAWG indicators.[35] Some indicators are narrowed down to a small sub-area of RH like the UN process indicators for EmOC to reduce maternal mortality.[36] Others use a comprehensive approach reduced to a manageable framework, like Population Action International (PAI) that merges 9 RHIs into a Reproductive Risk Index (RRI), to rank countries and use these figures in advocacy activities.[37]

All these RHIs are mainly used in low resource settings, crisis situations and refugee populations and figures of developed countries just serve as comparison. If mortality in babies and women at birth has decreased to recommended levels, quality indicators shift to morbidity and complications, state-of-the-art policies, risk behaviour and patient satisfaction. To identify the needs of sexual and reproductive health (SRH) of European Union citizens the RETROSTAT project took the WHO indicators as their starting point, but only three remained on their final list.[38] Indicators such as acceptance of HIV testing among pregnant women, maternal age at first childbirth, proportion of deliveries associated with assisted reproductive technology, frequency of induced abortions and proportion of women aged 50 or above who have had a hysterectomy, show different concerns when compared to developing countries. In Australia clinical obstetric indicators are used for quality programs, standardised care and review of practice.[39] Indicators such as vaginal delivery following caesarean section, major perineal tears, general anaesthesia, antibiotic prophylaxis and pharmacological thromboprophylaxis during caesarean section and admission of term babies to neonatal intensive care units are of a different order to the WHO indicators. In a study in Northern California, obstetric indicators were evaluated for use in a quality improvement program.[40] Data on intra- and postpartum complications as induction, episiotomy, 3rd/4th-degree laceration, caesarean section rate, haemorrhage and endometritis were collected and assessed by a set of criteria. This narrow range of clinical indicators used in Northern California could be used more universally, including low resource settings.

5.2 Needs assessments and clinical audits

As RHIs are designed to be calculated from available data, these should theoretically be obtained from existing information systems of national statistics. They are useful to show trends or to compare different countries, but they do not reflect the quality of RH care in a certain area or a specific facility. For this objective RH needs assessments are developed. They do make use of existing data, often on a more local level, but also of questionnaires, observations and facility visits executed by an assessment team. In contrast to RHIs, which should be published annually, a RH needs assessment is often a one-time event, as part of a quality or monitoring program or before the introduction of new services. Several RH needs assessments have been developed by academics, NGOs and government agencies for use in low resource countries, conflict settings and refugee camps.

The WHO's Safe Motherhood Needs Assessment was first published in 1995 to carry out a rapid survey of a health system at the district level.[12] It is based on the Mother-Baby Package as a minimum standard of RH services in a low resource setting.[16] It provides the tools for managers and policy-makers to evaluate the availability, quality and use of RH care services and to identify the gaps in the care in order to improve these. It has been applied in a variety of settings, mainly at district level in African countries but also in Asia and refugee settings. Some of these assessments have been published as reports[19, 41, 42] or in journals.[17, 20, 22, 43] In 1997 the Reproductive Health for Refugees Consortium (RHRC) developed Refugee Reproductive Health Needs Assessment Field Tools[13] that can be used together with the IAWG field manual.[34] Both tools are based on the MISP that contains basic RH services for emergency settings without diverting resources from major killing diseases in such situations. The MISP can be implemented without a needs assessment as the well-documented demand justifies its use. After the initial stage of the emergency the needs assessment should be done before the implementation of more comprehensive services. The RHRC needs assessment makes use of participatory techniques. Several assessments of refugee populations have been published.[44-47] In 2007 United States Agency of International Development (USAID) and Centers for Disease Control and Prevention (CDC) published a Reproductive Health Assessment Toolkit for Conflict-Affected Women.[15] It enables field agencies to identify RH problems, needs or gaps among conflict-affected women to enhance and improve RH programs and services. It has been piloted in Ethiopia, Congo and Columbia, but until now (November 2009) these assessments are not available in the scientific literature or as reports accessible on the web.

Besides RHIs and RH needs assessments, clinical audits are a commonly used method to measure and improve RH services, especially obstetric care. There is still much confusion about what the word audit actually means and perhaps the only consensus is that it should lead to improvements in patient care. The most commonly quoted definition of audit is: "The systematic and critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and the resulting outcome and quality of life for the patient".[48] The audit process is generally represented in the form of a closed circle, called the audit cycle (Figure 3). All three components of care (structure, process and outcome) can be audited. Adverse outcomes, particularly mortality, have been the focus of obstetric audits. The Confidential Enquiries into Maternal Deaths, introduced as early as 1952 in the United Kingdom, is one of the first examples of audits.[49] As maternal deaths became a rare event in developed countries severe obstetric morbidity or 'near miss cases' became the subject of audits, recently also in developing countries.[50]

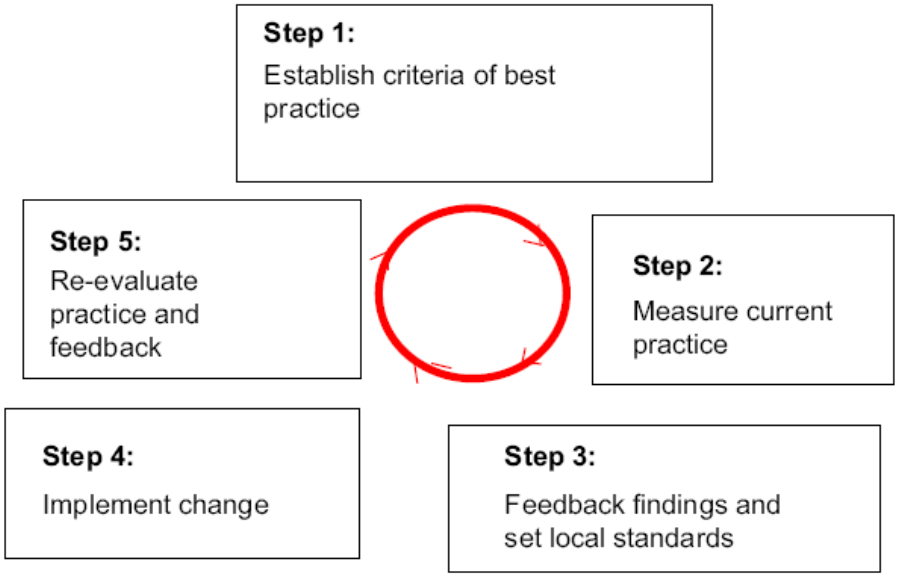


Figure 3. Clinical audit cycle [50]

The use of defined standards is crucial in an audit. The development of evidence-based practice guidelines based on scientific literature has led to criteria of quality of obstetric care that lead to an improvement in health. Several forms of audits exist. Individual case reviews of maternal deaths (and near misses) are part of routine practice in many maternity units. Many Ministries of Health perform confidential inquiries into maternal deaths at the national level, whereby a team of experts reviews all cases and determines which have received substandard care. In criterion-based clinical audits (CBCA) the standards of care are made explicit and a large number of cases are reviewed. The main hypothesis is that knowledge on (not) meeting the agreed levels of care will lead to improvements in clinical practice.[51] The Initiative for Maternal Mortality Program Assessment (IMMPACT) is the first CBCA in low resource countries (Ghana and Jamaica),[14] later followed by Kenya[52] and more recently Thailand.[53] Unfortunately rigorous evidence that audits work is missing because doing a randomised controlled trial with an audit is difficult. Audits have been evaluated by documenting whether the expected changes have occurred over time ('before-and-after studies') but without a proper control group it is never really possible to isolate the effects due to the audit from other changes that occurred at the same time.[51]

Considering the advantages and disadvantages of RHIs, RH assessments and clinical audits, the choice was made to use the WHO SMNA to evaluate the quality of RH care services at SMRU clinic in Mae La refugee camp, in addition to comparing local RHIs to national ones and to that of other world regions. RHIs alone would not portray the situation completely as they do not take into account local circumstances. For this reason a RH needs assessment was performed. The SMNA was chosen for this purpose, despite the existence of other RH needs assessments specifically developed for refugee situations. The design of the Refugee Reproductive Health Needs Assessment Field Tools of the RHRC focuses on emergency settings, while the Thai-Burmese border situation is one of protracted refugees, the second longest in Asia after Afghanistan. The Reproductive Health Assessment Toolkit for Conflict-Affected Women of USAID/CDC is suitable for both, but was issued recently and no other publications are available to compare it with. Although the SMNA is developed for district health systems, it has been used in refugee situations before and on national or district level in many African and Asian countries.[12]

5.3 Results from other Safe Motherhood Needs Assessments

Despite the list of countries that performed the SMNA,[12] comparison possibilities fall short. Many reports were not published nor made available to the public and the SMNA studies done in the Philippines and Laos were only mentioned in other reports.[42, 43] Enquiries with WHO have not been helpful in obtaining more information. All other available SMNA studies were done in a district setting, which means the quality of health care of several facilities can be compared within the survey. Even in the refugee setting in Tanzania, health services at 10 different camps were evaluated.[54] In Nigeria only the ANC exit interview was used to assess the content of ANC services,[21] while this survey form was not used in the SMRU evaluation. In Uganda several survey forms were used, but only information about abortions was extracted,[18] which was not a focus in the SMRU evaluation.

In Zambia the SMNA was performed twice in 1996 and 2001. In 1996 substantial gaps in availability and quality of maternal health care were found. Although all 96 health centres that were assessed provided ANC, only 43% had midwives available, only 37% had a delivery room available, only 20 % had transport available for referral and in only 2 health centres a vacuum delivery could be done. From the ANC records was found that 71% had blood pressure (BP) measurement done, 42% received iron supplementation and 17% had syphilis tested. Availability of essential drugs like oxytocin, antihypertensives and antibiotics ranged from 4 to 56% and partographs and neonatal resuscitation were only available in 10 health centres. Of the staff 40% never had any refresher training or supervision.[17] Following the SMNA in 1996 the Essential Obstetric Care (EOC) Project was set up as a continuation and improvement of an earlier Safe Motherhood Project. In 2001 a second SMNA was carried out in 49 health centres. Then 83% had a delivery room available and although most health centres had delivery sets, only 20% were complete. 61% had partographs, but very few health workers used them as they lacked the necessary knowledge. Vacuum deliveries were only performed in hospitals. Of all posts for midwives, 50% were not filled and there were no doctor posts filled. In the ANC 69% of pregnant women came for three visits or less, only in 46% of the visits the gestational age was recorded, BP was usually just recorded once (35%) and iron supplementation was done in 63% of the health centres. Syphilis test kits were available in all health centres, but a test was only recorded in 1% on the ANC card. Supply of drugs and consumables was generally good, ranging from 80% for intravenous antibiotics to 98% for oxytoxics, but only 7% of the health centres had transport available for referral. Two of the three districts were involved in EOC training of health workers in the previous 6 months. Most deliveries (84%) were conducted at home by relatives.[19]

In 1998, RH services in ten refugee camps in Tanzania were reviewed using SMNA. All camps had ANC services, although not all of them were open daily depending on the numbers. Eight camps had a delivery room, which were staffed 24/7 with a professional Tanzanian midwife capable of handling obstetric emergencies, but the knowledge and skills of the refugee midwives was much lower. Partographs were available in all camps but were used in different ways. Vacuum delivery was performed in only two camps. Referral transport was available, but at the time of the study the ambulance of one camp was under repair. Although all delivery rooms lacked sufficient lighting and water supply, most of them were clean and well organised. None of the camps had clinical guidelines. Six camps did not have pregnancy test kits, three camps did not have HIV test kits, but all camp had syphilis test kits available. Basic drugs and supplies were generally available; oxytocin 80%, hydralazine 50% and intravenous antibiotics 100%, but magnesium sulphate was not available in any of the camps. Only two camps had an adult ventilation bag and mask, but neonatal resuscitation equipment was available and working in all but one camp.[54]

The most recent SMNA study was performed in 70 basic government health institutions (health centres and dispensaries) in Dar Es Salaam, Tanzania. Two out of five health centres and 83% of the dispensaries did not provide delivery services. Even the ones that did offer delivery services, did not perform all 6 basic EmOC functions. In only two health centres and in none of the dispensaries could a vacuum delivery be performed. Two health centres lacked neonatal resuscitation equipment. ANC guidelines were available in 31% and intra-partum guidelines in 6% of the facilities. Partograms were found in 81% and syphilis tests in 94% of the institutions. Most essential drugs and supplies were available in all health facilities. While most intravenous antibiotics were available in most facilities (69-88%), gentamycin was found in only 40% of them. The basic health facilities did not have referral transport, but had to call the hospital to send an ambulance, which often would come late or not at all.[20]

5.4 Reproductive health indicators on the Thai-Burmese border

Collecting data for disease surveillance in the border camps is the responsibility of the CCSDPT, which coordinates humanitarian and protection activities for the camps on the Thai-Burmese border. The CCSDPT Health Sub Committee, which includes all medical agencies working in the refugee camps on the Thai-Burmese border, has collected disease surveillance data for a HIS since 2002. This incorporates several internationally used standards and indicators to measure improvement in health, including 48 MDG indicators.[1] Considerable overlap between HIS indicators and RHIs makes it possible to compare data of Mae La refugee camp and all border camps with data of Thailand and Burma or any other country or region in the world.

Table 1. Reproductive health indicators*

	Reproductive Health Indicator[a]	*Mae La 2006*[55]	*Camps 2006*[1]	*Thailand*[32]	*Burma*[32]	*SE Asia*[32]	*Africa*[32]	*Developed regions*[32]
1	Total fertility rate			1.9	2.5	2.5	5	1.6
2	Contraceptive prevalence (%)	40.9	29.9	79	34	59.8	27.4	68.9
3	Maternal mortality ratio (per 100000 live births)	0	97.5	44	360	210	920	24 (Europe)
4	Antenatal care coverage (%)		97.23	92	76	65[b]	63[b]	95[b]
5	Births attended by skilled health personnel (%)	77.63	83.8	99	57	69.1	46.7	99.1
8	Perinatal mortality rate (per 1000 total births)			20	65	62	33	10
9	Prevalence of low birth weight (%)	16.7	6.2	9	15	11.6	14.3	7
10	Prevalence of positive syphilis serology in pregnant women (%)	0.4		0.2	9.1			
11	Prevalence of anaemia in women (%)	34.8[c]	13.12			57[b]	52[b]	18[b]
16	Prevalence of HIV infection in pregnant women	0.4[d]		1.56	2.05			
	Population size (x 1000)	46.9	132.9	50,519	64,233	555,815	905,936	1,211,265
	Population growth rate (%)	20.3[e]	10.1[e]	1.5	1.1	1.38	2.18	0.3
	Crude birth rate	31.5	30.9	16	20	21.4	37.6	11
	Tetanus vaccination coverage (%)	87.1	98.2		85	49[b]	46[b]	

* Defined in Annex 1

[a] Numbers refer to WHO RH indicators as defined in Annex 1, regions as defined in the WHO Reproductive Health Indicator Database[32]

[b] Estimates from Reproductive Health in refugee situation; an Inter-agency Field Manual[34]

[b] Calculated from SMRU ANC database

[d] From Plewes et al., 2008[56]

[e] Includes new arrivals to the refugee camp(s)

Mae La camp does not lie at the extreme ends on any of the 10 RH indicators compared to all camps on the Thai-Burmese border, guest and host countries and some other regions in the world (Table 1). Data on the other 7 RH indicators were not available in any of the camps, countries nor regions.

5.5 Reproductive health studies in Mae La refugee camp

Most of the published data on treatment of malaria in pregnancy in the world comes from SMRU activities in Mae La,[57, 58] but there are few studies specifically on RH in Mae La refugee camp. In 2001 MSF wrote an evaluation report on the obstetric care in Mae La camp (only in French), which led to a complete hand over all of obstetric activities to SMRU, who was already doing the majority.[59] Before PPAT took over the FP activities of SMRU in 2001, they performed a baseline survey on the need for RH, FP and HIV prevention services in Mae La and Umpiem camps.[60] Focus group discussions to evaluate the knowledge of a range of RH issues[61] resulted in a project plan to establish RH services for prevention, FP and health education.[62] In 2002 an independent consultant assessed these RH projects and found them to be accessible, efficient and friendly. The recommendations were to include gender-based violence (GBV) to their training courses and to pay more attention to diagnosing and treating sexual transmitted infections (STIs),[63] although a SMRU survey in 1997-1998 found very low rate of STIs. No cases of syphilis (0/404) or gonorrhoea (0/93) were detected and only 3 cases of chlamydia (3/90, 3.3%).[64] In 2005 Plewes at al. found the seroprevalence of HIV and syphilis among pregnant women in Mae La camp to be 0.4% (2/500) and 0.4% (3/741) respectively.[56] The most recent RH service evaluation done by PPAT included four refugee camps and 20 Thai Karen villages, but the overall, not Mae La specific data was reported.[65] CDC conducted a survey to provide data to inform RH care services in 2002. In three refugee camps, including Mae La they assessed unmet need for FP (7%), knowledge of HIV/AIDS (87%) and prevalence of GBV(20%). In 2003 the Women's Commission for Refugee Women and Children conducted a second RH assessment on the Thai-Burma border, the first one being part of a global evaluation of RH services available to refugees and IDPs in 1994. This assessment was based on desktop research and site visits of 6 refugee camps, but not including Mae La. For RH care in Mae La only secondary data was used and no actual observations were done.[66] A UNHCR report in 2007 concluded that barriers to further improve the uptake of contraceptive services were lack of knowledge, cultural and religious beliefs and lack of support of community leaders. It recommended long-term programs with a human rights-based and gender sensitive approach and promoting support of community leaders through advocacy and dialogue.[67]

Within SMRU two student projects examined obstetric issues. In 2004 the use of the partogram was evaluated using WHO guidelines.[68-71] Findings included adequate plotting of labour in the partograph and action taken when the action line was reached. When the alert line was passed, artificial rupture of membranes (AROM) was not always done, which could prevent augmentation later on. Starting oxytocin was often delayed.[72] In 2007 supportive care was evaluated using WHO criteria.[73] Observations showed good practice on having a birth companion during labour, encouraging mobility and reminding the women to drink and pass urine frequently. Only one third of the midwives consistently washed their hands before and after each vaginal examination (VE). Cleaning up of blood or bloody items was not done immediately in one third of the deliveries. Communication could be improved at each stage of the delivery.[74]

6. Research methods

6.1 Survey forms

This study was performed from September 2008 until February 2009, using the WHO's Safe Motherhood Needs Assessment and following it's guidelines.[12] A core team of two obstetric doctors and two staff managers were appointed to conduct a policy and management assessment and to select and adapt the provided survey forms to the local situation of the SMRU clinic in Mae La refugee camp. The policy and management assessment consisted of a list of questions to guide a search for existing information. By considering important issues beforehand data collection could be focused upon the most important areas. As focus was on quality of care within Mae La clinic with its inherent facilities, equipment, supplies and staff the following survey forms were selected: district health team interview (DHT), facility management interview and observation (FAC), midwife interview (NMW), antenatal record review (ANR), normal delivery record review (NDR), complicated delivery (eclampsia) record review (CDE), complicated delivery (obstructed labour) record review (CDO) and surveyors observations (SOV) of deliveries. Antenatal and postpartum client interviews were left out as the primary interest was not patient satisfaction and the language barrier would cause major difficulties. The TBA interview was also excluded as TBAs in Mae La are not associated with nor supported by SMRU, although they have never been excluded (rather, encouraged to attend women at delivery if that is according to the woman's wish). The questions on the selected forms were examined by the core team for usefulness and appropriateness and missing questions with direct operational relevance were added. See Annex 2 for the complete set of adapted survey forms used for this study.

6.2 Samples

All samples for the record reviews were taken from August 1st 2007 until July 31st 2008, the year before the arrival of the principal investigator (G.H.) and include the period without a supervising doctor in the delivery room. To calculate the sample size for the record reviews the recommendations in the SMNA guidelines were followed. As the incidence of eclampsia and obstructed labour in Mae La clinic were not available, the global estimates were used to calculate the sample size for CDE and CDO, 6 and 60 records respectively. As expected numbers with eclampsia and obstructed labour are less than these numbers, all records found were included. See Annex 3 for the applied sample size calculations. The samples were taken by using the SMRU ANC database of Mae La. All pregnancy outcomes were assigned random numbers using Microsoft Office Excel 2003 and the first 200 files were searched for ANR. The same was done for the selection of all normal vaginal deliveries in that year for NDR. To find all (pre-)eclampsia and obstructed labour cases for CDE and CDO the database was searched for high BP, AROM, augmentation with oxytocin and long second stage and the medical files were searched for (pre-)eclampsia. A few questions of DHT were used at maternity department level, facility level and management level. The FAC was done with the midwife in-charge and the NMW with all the midwives employed at Mae La clinic at the time of the study. As a rule of thumb 20 observations will identify 90% of existing problems (personal communication C. Biesheuvel), so 20 SOV were performed in the delivery room.

6.3 Data collection and analysis

In mid-October 2008 a small pilot study was carried out at another SMRU clinic for Burmese migrants in Wang Pha to test the survey forms and find any difficulties. The observations and interviews at the clinic were conducted by one of the staff managers of the core team and the record reviews by the principal investigator. Subsequently a few adaptations were made to the forms. The final forms were printed. A surveyor manual and training sessions were developed from the example in the SMNA guidelines. Early November 2008, surveyors were trained in using the survey forms and conducting the interviews. The records from the Wang Pha pilot were used as exercises to practice and the results were discussed together to minimise intra- and inter-observer variability. The DHT questions and FAC were done by the same staff manager of the core team. The NMW were conducted by the SMRU ultrasound technician, as she speaks Karen, Burmese and English well and is trusted by, but independent of, the midwives. All the record reviews and SOV were performed by two Dutch midwife students who were doing their internship for a public health module at SMRU. The remainder of November was used to collect the data by performing the interviews, observations and record reviews. During December 2008 and January 2009 data was entered, validated, analysed and interpreted using Epi-Info statistical software[(75)] following SMNA guidelines.

6.4 Ethical considerations

The records review was a retrospective, anonymous study of routinely obtained information, which is continuously collected and recorded by SMRU for research purposes. A special consent to use information from the database for this project was therefore not required. Because the principal investigator (G.H.) was at the same time the supervisor of the midwives, a written consult for the interviews could lead to pressure due to perceived negative consequences when not giving consent. To avoid this, a group explanation of the research project was done, in which the researcher explained the objectives and methods of the research project (Annex 4). The midwives could refuse the questionnaire by telling the interviewer, who was independent of the researcher and the maternity unit. As the interviews were anonymous, the researcher would not know which midwives consented and which ones refused. They could refuse the observations by asking a colleague from the ward to exchange with them in the delivery room. Recruitment of mothers for the observations of the deliveries was done by the two Dutch midwife students who performed the observations. The observations were anonymous and no personal information of the mother was recorded. As no interventions were involved and 50% of the mothers are illiterate verbal consent was asked by the midwife students, which was translated into Karen or Burmese by a local midwife. A second local midwife signed the consent form (Annex 5) as a witness. Ethical approval was granted by the Research Ethics Committee of the Royal Tropical Institute (KIT), Amsterdam, The Netherlands (Annex 6).

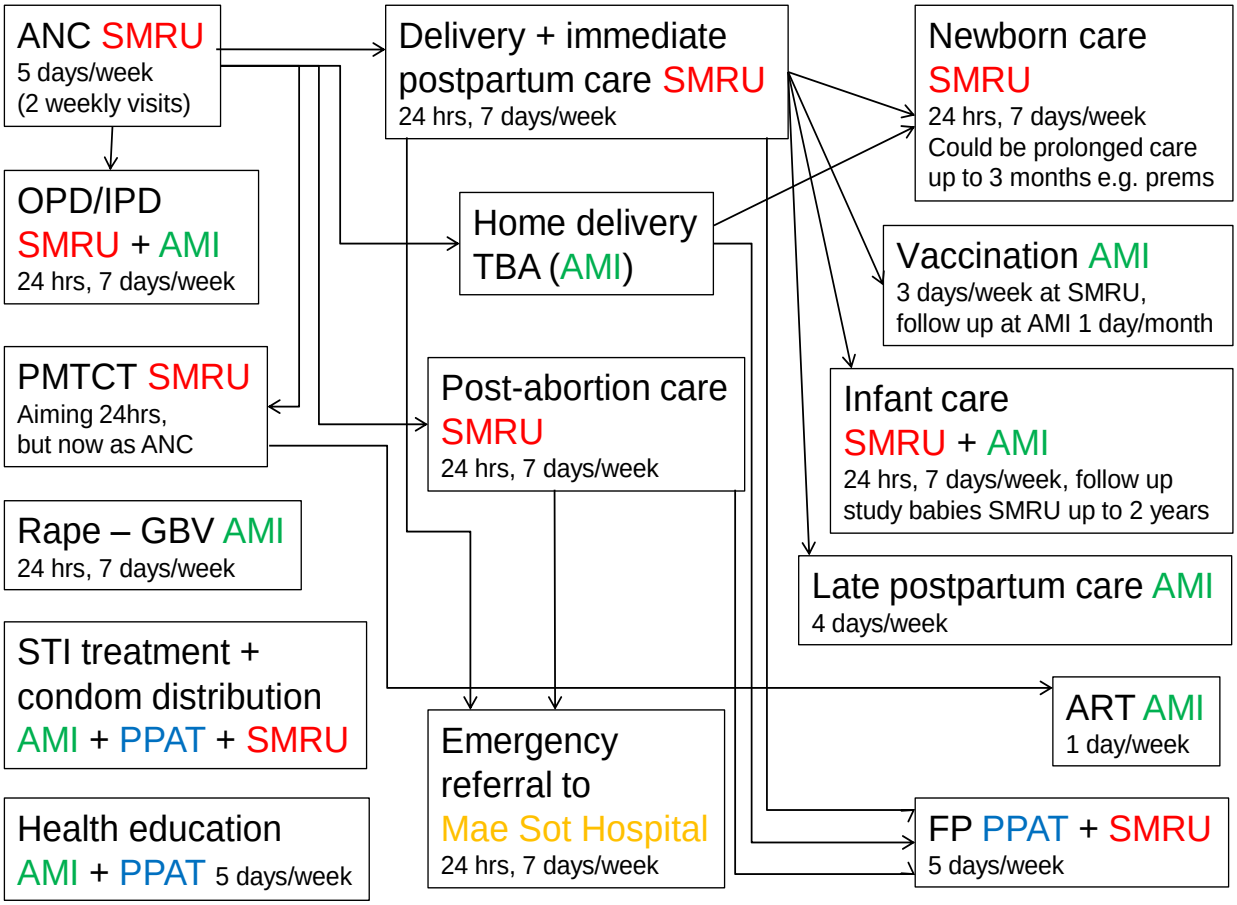
7. Results

Although the data was collected with the policy and management assessment, record reviews, interviews and observations the results are not structured according to the data collection methods. Every paragraph covers one aspect or a cluster of related aspects of maternal health care at SMRU Mae La clinic with data obtained by one or more of the survey forms.

7.1 Availability of reproductive health services

RH services in Mae La camp are shared between SMRU, AMI and PPAT (Figure 4). Together they provide almost all RH care within the camp. Only antenatal syphilis screening is not routinely available and caesarean section and intensive care need to take place outside the camp at Mae Sot Hospital. As this division has historical roots allocation of tasks is clear and referrals are easy. All three organisations provide free services and AMI pays for the hospital referrals. Within Mae La camp everyone can reach the clinics, but transport costs and police roadblocks might be obstacles for people from Thai and Burmese villages. Other barriers include Thailand's restrictive law on abortion (only legal to save the life of the mother, to preserve physical or mental health and in case of rape), costs (no budget for syphilis screening, elective surgery or cancer treatment) and more than 50% illiteracy rates among pregnant women in the camp.

Figure 4. Shared reproductive health care in Mae La refugee camp



Health education is done by AMI and PPAT, mainly by home visitors. AMI does home visits for postpartum women and their newborn babies when they do not show up for their follow-up. During these visits they also provide general health education. PPAT does RH promotion by home visits of postpartum and post-abortion women. They are able to target these women by the monthly pregnancy outcome list provided by SMRU. A list from camp authorities allows them to identify new arrivals. The main focus is FP, but it includes education on quality of life improvement, empowerment of women, access to HIV/AIDS prevention services by youth and promoting male responsibility.

Manuals relevant for maternal and newborn care include SMRU Obstetric Manual, Protocol & Guidelines,[76] SMRU Paediatric Guidelines,[77] SMRU Infection Control Manual,[78] SMRU Malaria Handout,[79] Burmese Border Guidelines[80] and Guidelines for Clinical Management of PLWHA, PMTCT and ART by AMI Thailand.[81] They are all in English, except for the Burmese Border Guidelines and the SMRU Malaria Handout which are translated into Burmese. The SMRU Obstetric Manual is published and disseminated within SMRU. Of all four "pillars" of the Mother-Baby Package (ANC, clean and safe delivery care, EOC and FP) it includes ANC protocols, universal precautions and mainly emergencies, procedures and drills. Besides the use of the partogram it contains very little about normal labour and delivery care as it was principally written to have common, quickly accessible guidelines for emergencies. It does not cover FP. All mentioned guidelines are present at a central place in the maternity unit of Mae La clinic and a copy of the SMRU Obstetric Manual is at hand in the delivery room.

The structure of ANC care at SMRU resembles closely and is slightly more comprehensive than the WHO ANC model.[82] The main shortcoming is syphilis and blood group screening at the first visit. Blood group determination is only done on indication. The Thai ANC system routinely checks for diabetes and thalassaemia as well, but these are only done on clinical indication in the camp. For deliveries universal precautions are followed and an adapted version of the WHO partograph is used. All basic EmOC functions (intravenous/ intramuscular antibiotics, oxytoxics and anticonvulsants, manual removal of placenta, assisted vaginal delivery and removal of retained products) can be managed at SMRU clinic, except for manual removal of placenta only when the obstetric doctor is available. All obstetric complications can be taken care of, except for ectopic pregnancy and ruptured uterus which need surgery and will be stabilised and referred. Although an operating theatre is available at SMRU clinic, comprehensive EmOC functions (caesarean section and blood transfusion) are not routinely carried out. Staff is insufficiently trained in anaesthesia techniques and postoperative care to perform major abdominal surgery. Blood transfusions can be done if a donor is readily found but no blood bank facilities are available. Maternity services are open 24/7. At night and during weekends a doctor on call is available to give instructions for complicated deliveries. A car is always ready on site for emergency referrals to Mae Sot Hospital which is 60 km away. SMRU provides FP information and counselling for postpartum and post-abortion women. It offers female and male sterilisation when a doctor is available and refers patients to PPAT who provide oral and injectable contraception, intra-uterine devices (IUDs), implants and condoms.

7.2 Supplies, equipment and infrastructure

All essential equipment for standard ANC, basic EmOC and essential care of obstetric complications is present at SMRU clinic in Mae La, except for syphilis testing kits. All supplies are available from a routine procurement system or special (international) orders. For comprehensive EmOC the essential materials for the provision of donor blood for transfusion are available, but storage facilities for blood bank services are not in place. For FP only equipment for vasectomy and female sterilisation by mini-laparotomy are available. During the facility observation no educational materials were found except for a few posters on FP and HIV/AIDS.

Drugs are ordered weekly based on consumption and staff in the line of order does not encounter any problems. The local drug list used within SMRU contains almost all drugs of the essential drug list in WHO's Mother-Baby Package. Some essential drugs are on the SMRU list, but missing in the list of the Mother-Baby Package which is 15 years old (Table 2). Two medicines that are not available in SMRU have been deleted from the WHO Model List of Essential Medicine.[83] Many drugs that are available in SMRU but not on the essential drug list in the Mother-Baby Package are included in The Interagency of Essential Medicine for Reproductive Health which was last revised in 2006.[84] SMRU has difficulties to obtain ketamine as it is not recognised as an official hospital within the Thai health system. Hydralazine is difficult to get in Thailand, but is imported from the UK.

Table 2. Essential drugs

Drug group	*Not available in SMRU*	*Available in SMRU, but not on list Mother-Baby Package (1994)*	*Remark*
Analgesics	Morphine, pethidine[a]	Diclofenac, tramadol	
Antibiotics & antifungals	Benzylpenicillin, chloramphenicol, miconazole, kanamycin, sulfamethoxazole + trimethoprim	Ciprofloxacin[b], clindamycin, cloxacilline[b], fluconazole[b], itraconazole[a], nalidixic acid, nitrofurantoin[b], nystatin[b], tinidozole[a], ketoconazole[a]	
Antimalarials	Sulfadoxine + pyrimethamine, proguanil	Artemether[b], artesunate[b], mefloquine[b], primaquine[b]	
Anticoagulants	Heparin, protamine sulphate	Vitamin K[b]	Thrombosis rare
Antidiabetics	Insulin		AMI
Contraceptives	OCP, injectable, IUD, implants		PPAT
Immunologicals	Anti-D, antitetanus immunoglobin		
Oxytocics		Misoprostol[b]	
Tocolytic		Nifedipine[b], terbutaline	
Vaccination	All, except for tetanus vaccine		AMI
Others	Iron dextran injection[a]	Calcium gluconate[b], metoclopramide, dexamethasone[b], vitamin B1	

[a] Deleted from the WHO Model List of Essential Medicines[83]
[b] On the Interagency List of Essential Medicines for Reproductive Health (2006)[84]

7.3 Staff, training and supervision

At the time of the study 20 midwives worked at the maternity unit and all were interviewed and they answered all questions of the interview. Within SMRU five different levels exist (volunteer, midwife-assistant (mw-assistant), junior midwife, senior midwife and midwife in-charge) which change with mounting experience, former and internal training, skills and responsibilities. Basic job descriptions exist and identification of competencies for each level is being worked on. Work schedules are such that midwives of each level form one shift and a senior midwife is on duty at all times with an obstetric doctor available 5 days and 2 nights

on site and 24/7 on call. The turnover of staff is high due to the resettlement program and continuous training is needed for newly hired staff and to upgrade existing staff. Expat doctors are responsible for (on-the-job) teaching. In July 2008 SMRU organised an Advanced Life Savings in Obstetrics (ALSO) course assisted by ALSO Asia-Pacific from Australia which is intended to be repeated yearly. A part-time nurse training was being conducted at the time of the study. The next training planned is a basic midwifery training. SMRU recruits staff with suitable former education in Burma (midwife or nurse school) or motivated, bright, young girls (with high school or university) for internal training (Table 3).

Table 3. Former education SMRU midwives

Current level	*Former education*			
	High school	*Nurse school*	*Midwife school*	*University*
In-charge (1)	1			
Senior (3)			2	1
Junior (9)	3	1	2	3
Mw-assistant (3)	1	1		1
Volunteer (4)	2	1		1
Total % (n)	35 (7)	15 (3)	20 (4)	30 (6)

Source data: NMW (n=20)

The number of staff working in maternal health care is small in Mae La refugee camp compared to Thailand and Burma, both for registered and qualified staff, even when locally trained midwives are included (Table 4).

Table 4. Number of maternal health personnel*

Posts occupied	*Mae La* [a]		*Burma* [b]		*Thailand* [c]	
Position	Number	Number per 100,000 population[d]	Number	Number per 100,000 population[e]	Number	Number per 100,000 population[f]
Registered midwives (fully qualified)	2	1	14,094	27	122,336[g]	183
Registered nurses (fully qualified)	2	1	15,482	30	23,017[h]	35
Physicians (generalist)	2	1	16,570	32	37,837	57
Obstetrician/ Gynaecologists	1	0.5			2306[i]	3
SMRU midwives (all levels)	20	10				

*(only SMRU, AMI and PPAT staff not included)
Source of data: [a] FAC, [b] Myanmar MoH (2003), [c] Thailand Nursing and Midwifery Council (2008) and [i]The Royal Thai College of Obstetricians and Gynaecologists (2008)
[d] based upon 50,000 inhabitants of Mae La(1)
[e] based upon 52.4 million inhabitants of Burma (Myanmar Ministry of Foreign Affairs, July 2003)
[f] based upon 66,7 million inhabitants of Thailand (Ministry of Foreign Affairs Kingdom of Thailand, 2008)
[g] all registered nurse/midwives, not necessarily working as midwife
[h] all qualified nurses, not necessarily working in maternity units

All staff attends deliveries regularly, a requirement to maintain skills. When asked directly all but 10% (2) did their last delivery within 1 month and 60% (12) of them within 1 week. Obstetric complications that need life-saving skills (postpartum haemorrhage (PPH), obstructed labour, puerperal sepsis, eclampsia and abortion complications) occur often enough as well. Only six midwives did not manage an eclampsia case in the last six months before the interview. Two thirds of all midwives do not feel confident doing their work, which is reason for concern (Table 5).

Table 5. Proportion of midwives who agree to statements on working conditions

Midwife agrees with statement	*Midwife level*					
	In-charge (1)	Senior (3)	Junior (9)	Mw-assistant (3)	Volunteer (4)	Total % (n)
Always enough midwives on duty	1	1	6	1	3	60 (12)
Too long hours at night		2	5		1	40 (8)
Enough days off		2	2		1	25 (5)
Feel safe/confident doing work	1	2	2	1	2	40 (8)

Source data: NMW (n=20)

The midwives were asked to identify spontaneously which danger signs and symptoms in patients would prompt them to inform the doctor (Table 6). In general they recognise danger signs well, except for sepsis/endometritis. Other issues that were often mentioned were chronic disease (14 times), prolonged rupture of membranes > 18 hours (9 times), intra-uterine growth retardation (9 times), post term (6 times) and having risk factors in general (6 times).

Table 6. Recognition of danger signs and symptoms

	Midwife level					
Danger signs and symptoms to be discussed with doctor	In-charge (1)	Senior (3)	Junior (9)	Mw-assistant (3)	Volunteer (4)	Total % (n)
Previous bad obstetric history / caesarean section / stillbirth	1	3	8	3	2	85 (17)
Hypertension / headache / oedema / seizures	1	3	8	3	4	95 (19)
Anaemia / pallor / fatigue / dyspnoea		2	6	3	3	70 (14)
Foetal distress / no foetal movement	1	3	8	3	4	100 (20)
Abnormal lie / position of foetus	1	3	8	2	4	90 (18)
Sepsis / smelly discharge / postpartum abdominal pain	1	2	2	1		30 (6)
Slight bleeding / spotting		3	5	2	3	65 (13)
Haemorrhage / heavy bleeding	1	3	7	3	3	85 (17)
Twins / large abdomen	1	2	6	3	2	70 (14)
Obstructed / prolonged labour / indication for vacuum	1	3	9	3	4	100 (20)
Asthma / fever / malaria / HIV+ve	1	3	9	3	3	85 (17)
(Grand)multiparity / premature labour / abnormal baby	1	3	7	3	4	95 (19)

Source data: NMW (n=20)

All midwives acknowledge receiving training and supervision (Table 7). Training on FP has been long ago for half of the midwives and the other half never received any training on this subject.

Table 7. Training

Last training	*Midwife training % (n)*	*Including 'hands-on' % (n)*	*FP training % (n)*	*Personal supervision % (n)*
In the past week	75 (15)	100% (20) Yes		55 (11)
In the past month	25 (5)			30 (6)
In the past 6 months				15 (3)
In the past year			55 (11)	
Never			45 (9)	

Source data: NMW (n=20)

At the end of the interview all midwives were asked about the two greatest problems of maternal and neonatal health care in SMRU and their solution for these problems. Surprisingly they hardly mentioned medical difficulties or lack of skills to give proper care, but mainly staff issues and problems in work relations. Five midwives were worried about the current doctor leaving again and expressed the need for continuous training and supervision. Five midwives made a comment on salary and recognition. They did not complain about the amount, but said it is unfair in comparison with other departments. Some argued hard working midwives should get more than lazy ones and volunteers should get paid. Sixteen midwives mentioned problems concerning work relations, with each other, with medics (locally trained staff that diagnoses and treats medical conditions) and with other departments. The mw-assistants and volunteers complained about the juniors and seniors that they do not teach them, that they are not allowed to do things, even under their supervision and that they are only ordered to do the simple tasks. As solutions they proposed that they should encourage and teach them, instead of shouting and complaining if they do not know what to do. Juniors and seniors made similar complaints about the medics and the in-charge of other departments: that they are ordered what to do and that they have no understanding for the ANC team. As a solution they want to be considered as co-workers and are in need of an assertive in-charge to stand up for the ANC team. Four midwives identified communication as a problem. The language barrier between them and the doctor makes them unable to express themselves. As a solution they ask for patience from the doctor and not being regarded as unwilling. The handover of information (about patients, the content of a lesson or the time of a meeting) among themselves also causes problems and according to them the importance of this should be stressed. Finally three midwives complained about old, broken and missing equipment and asked for new equipment and repair and two midwives mentioned long waiting hours for patients and suggested changes in work routine.

7.4 Quality of care - record reviews

From the initial sample of 200 ANR files, 15 were missing and 9 had their first ANC consultation on the day of delivery, so actually did not have any ANC, which is an exclusion criterion in the SMNA guidelines (Table 8). The next 24 on the list with randomised numbers were included to make 200. Of the 200 NDR files 8 were missing and 17 were excluded because no partogram was made, often due to a very quick delivery (12) or because they complied with the inclusion criteria of pre-eclampsia, so they were included in CDE (5). The next 25 on the list with randomised numbers were included to make 200. After searching the database 10 files were identified for CDE. One of them was missing and five were excluded because they did not fulfil the criteria of pre-eclampsia. The five pre-eclampsia files that were found among the NDR were included which made nine CDE in total. For the CDO initially 62 were selected of which 8 were missing and 28 did not fulfil the criteria defined on the CDO form, which made a total of 26 CDO.

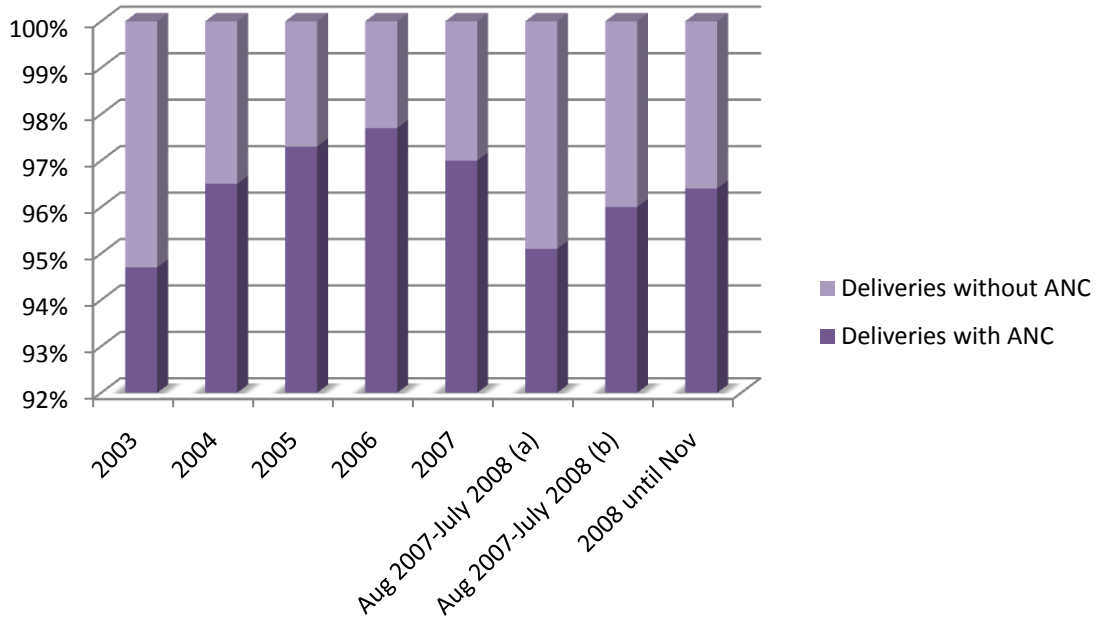
Table 8. Sample size, by survey form

Survey form		Planned number	Missing	Excluded	Extra included	Actual number
DHT	District health team interview	3	-	-	-	3
FAC	Facility management	1	-	-	-	1
NMW	Interview with midwife or maternity nurse	20	-	-	-	20
ANR	Antenatal record review	200	15	9[a]	24	200
NDR	Normal delivery record review	200	8	17[b]	25	200
CDE	Complicated delivery (eclampsia) record review	10	1	5[c]	5[d]	9
CDO	Complicated delivery (obstructed labour) record review	62	8	28[e]	0	26
SOV	Surveyor observations	20	-	-	-	20

[a] first ANC on day of delivery, so actually no ANC
[b] 12 no partogram, 5 pre-eclampsia (included in CDE)
[c] pregnancy induced hypertension instead of pre-eclampsia
[d] from NDR
[e] 17 because head static < 3 hours, 2 AROM done to proceed from latent to active phase, 2 AROM and augmentation done to proceed from latent to active phase, 5 AROM with normal progress and 2 incomplete partograms

According to WHO requirements, all pregnant women should have a minimum of 4 ANC visits and ideally the first antenatal visit should occur before week 12 of pregnancy.[82] Out of the 200 CRFs 87.5% had at least 4 ANC visits recorded; 62.0% had 13 ANC visits or more. No ANC at all was an exclusion criterion for ANR, so this cannot be calculated from the sample, but 9 were found among 185 files (4.9%). From the 200 files used for NDR, 8 (4.0%) had no ANC. These proportions of deliveries with and without ANC for the SMNA were not significantly different from previous years (Chart 1). No trend can be seen in the small variations between 5.3% in 2003 and 2.3% in 2006.

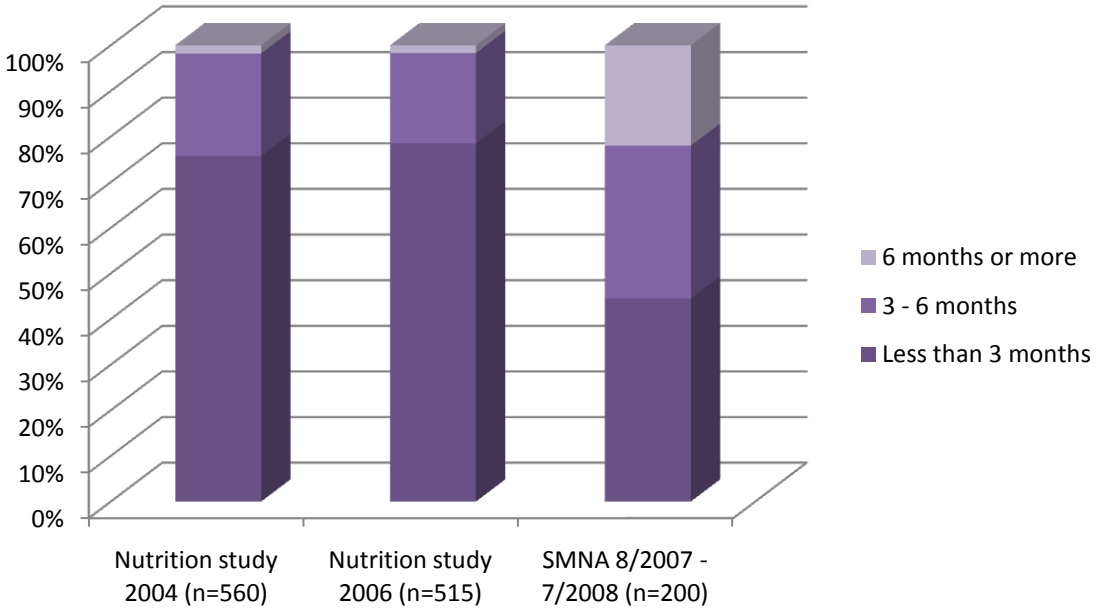
Chart 1. Percentage of deliveries, with and without ANC



Source of data: all calculated from SMRU ANC database, except (a) ANR and (b) NDR

Another way to verify late attendance was to compare the timing of the first antenatal visit over time (Chart 2). The proportion of women in each trimester attending for their first visit was compared for cohorts in 2004, 2006 and SMNA. In the period of the SMNA the proportion of women attending for the first time in the first trimester had fallen by half while those attending in the third trimester had increased 10 times.

Chart 2. Timing of first ANC visit



Source of data: ANR and personal communication V. I. Carrara

The essential elements of ANC according to WHO (first 7 items) and SMRU (last 3 items), all indicators of quality, were performed well with all scores over 90% except for syphilis testing (Table 9).

Table 9. ANC

Recorded on the ANC card	*Percentage % (n)*
Gravida	94.5
Results of at least one urine test	96
Results of haematocrit test	99.5
Results of syphilis test	0
Supplementation with iron/folic acid	100
Results of malaria test	100
Provision of malaria treatment (if test positive)	100 (10)
Riskfactors	100
PMTCT[a] test	97.5
PMTCT[a] post test counseling	94.0

Source of data: ANR (n=200)
[a] Prevention of mother-to-child transmission of HIV

NDR assessed 200 partograms to determine if tasks were done according to the norm. BP monitoring received a substandard result (Table 10).

Table 10. Monitoring during delivery

Action	WHO norm	Percentage (%) according to norm	Percentage (%) substandard practice
Vaginal examination	4 hourly	100	0
Foetal heartbeat monitoring	hourly	95	5
Blood pressure monitoring		44.5	55.5
Birth weight recorded on card	always	100	100
Apgar score recorded on card		100	100

Source of data: NDR (n=200)

NDR recorded other items concerning delivery and postpartum care (Table 11). There is a notably high proportion of women that had an urine catheter inserted during labour, delivery and immediately postpartum. Estimated blood loss, time of placenta and placenta complete were omitted tick boxes on the partogram at the time of the sample. Nevertheless on almost half of the partograms 'placenta complete' was handwritten spontaneously by the midwife. Only in one case (0.5%) was it recorded as incomplete.

Table 11. Delivery and postpartum care

Recorded on partogram / in file	Percentage (%)
Urine catheter inserted	19.3
Postpartum haemorrhage	5.6
Estimated bloodloss	4.0
Time of placenta	0
Placenta complete	46.0
Postpartum infection	5.1[a]
Postpartum operation	3.5[b]

Source of data: NDR (n=200)
[a] 3 cases of endometritis, 3 cases of puerperal sepsis, 1 case of UTI, 1 case of mastitis, 1 case of chorionamnionitis and 1 case of fever of unknown origin
[b] 1 case of manual placenta removal, 1 removal of placenta fragments and 5 cases of female sterilization

Perineal damage and repair of the perineum was related to the parity of the women (Table 12). In almost half of nulliparae (mediolateral) episiotomy was done. Two-third of multiparae had an old tear that was unrepaired, likely to be the result of past home deliveries by TBAs. In one nullipara an old tear was found, probably a mistake or she was not really a nullipara.

Table 12. Perineum damage and repair

Perineum	Para (P)				
	P0	P1	P2	P>3	Total (%)
Intact	12	8	2	1	23 (11.7)
Old tear & intact	1(?)	22	23	41	87[b] (44.2)
Minor tear (no repair)	0	3	0	0	3 (1.5)
Tear & repair	23	17	3	2	45 (22.8)
Epi & repair	34[a]	5	0	0	39 (19.8)
Number of files sampled (n)	70	55	17	44	197 (100)

Source of data: NDR [a] Episiotomy rate of 48.6% in nulliparae [b] Unrepaired old tear in 67.7% of multiparae

CDE was used to assess the quality of care in pre-eclampsia and eclamptic cases (Table 13). Out of nine cases two women had convulsions. The use of drugs section mostly has values less than 50% which indicates that severe pre-eclampsia is undertreated. This is however a matter of definitions. The inclusion criterion for CDE is diastolic BP ≥100 mm Hg, without distinguishing pre-eclampsia from severe pre-eclampsia. In the template results table provided, all included cases were subsequently called severe pre-eclampsia. Re-analysis of the nine files identified two cases of severe pre-eclampsia, of which one developed convulsions and was included as an eclamptic case. This means only one case had severe pre-

eclampsia and all other cases were (mild) pre-eclampsia. Despite this obscurity in definitions, intra-partum monitoring was clearly suboptimal as in more than half of the cases either BP or foetal heart beat (FHB) were not checked hourly.

Table 13. Management of (pre-)eclampsia

Indicator	*Percentage (%)*
Use of drugs in managing severe pre-eclampsia	
Antihypertensive administered	77.8
Sedative or anticonvulsive administered	44.4
Antihypertensive and sedative or anticonvulsive	44.4
No drugs administered	22.2
Use of drugs in managing eclampsia cases	
Antihypertensive administered	100
Sedative or anti-convulsive administered	100
Antihypertensive and sedative or anti-convulsive	100
No drugs administered	0
Monitoring of eclampsia and severe pre-eclampsia cases	
Blood pressure checked hourly	55.5
Foetal heart beat checked hourly	77.8
Both blood pressure and foetal heart beat checked hourly	44.4
Neither blood pressure nor foetal heart beat checked hourly	11.1
Proteinuria checked	100
Symptoms and danger signs checked	66.7

Source of data: CDE (n=9)

For CDO, 26 cases of prolonged labour were reviewed (Table 14). In managing obstructive labour AROM was done well, 100% when indicated and without delay. In 38.5% of cases spontaneous rupture of membranes (SROM) had already occurred. In almost a quarter of women augmentation with oxytocin was not performed, and if performed 30.0% was not in time. Unfortunately when a woman was referred to Mae Sot Hospital, feedback was minimal and no Apgar scores were provided in the discharge summary, which made it impossible to evaluate the outcome.

Table 14. Management of prolonged labour

Indicator	*Percentage (%)*
Taking action	
When action line reached	42.1
AROM	61.5[a]
Augmentation with oxytocin	76.9
AROM and oxytocin	42.3
Timing of action	
AROM done in time	100.0
Augmentation with oxytocin done in time	70.0
AROM and oxytocin done in time	70.0
Mode of delivery	
Normal vaginal delivery	65.4
Vacuum	11.5
Caesarean section	23.1
Outcome	
Baby alive, condition good (Apgar score 7-10)	61.5
Baby alive, condition not recorded.	38.5

Source of data: CDO (n=26) [a] Other 38.5% already SROM

7.5 Quality of care - observations

The first twenty deliveries were observed as they happened when the observers were available. These took place during day and night and were conducted by different shifts of midwives. In one third of the deliveries the supervising doctor was (partly) present. The aim of the observations was to collect qualitative data. Although the observers tallied many essential actions of obstetric practice, these observations will be conveyed in descriptive language as the sample is too small to be used as quantitative data.

Almost all women had a support person present during the delivery. Half of the time this was a TBA, often a female relative and in a few cases the husband. The TBA did most of the mental and physical support during the first stage of labour and SMRU midwives restricted themselves to actions as required by protocol. When the woman did not have a support person one of the midwives took this role, most often a volunteer. During the second and third stage generally two or three midwives stayed with the woman and performed the delivery. The TBA or relative often did not stay for the whole third stage, but left as soon as the baby was ready to be shown to the family.

The midwives were strong in following protocols. But they had difficulties using correct technique, common sense and interpreting the meaning of findings. Taking vital signs was generally done according to protocol, although often the second stage was too short for any measurements. When doing abdominal palpation midwives generally felt adequately for quality, frequency and duration of the contractions, but often recorded more and stronger contractions on the partogram than observed. If short and/or weak contractions were observed often no action was taken. Abdominal palpation using Leopold to feel for the baby was not done during labour, so the midwives did not know where to find the FHB and some midwives had trouble using the foetal stethoscope. Occasionally a midwife was observed using a normal stethoscope to listen to the FHB. Listening to the FHB seemed to be more structured during second stage than in first stage, as if it was easier to forget if you need to listen every hour instead of every 5 minutes. But the FHB was not listened to after every contraction, especially if the Doppler device was not available. Regularly they started listening too late, only 30 to 40 seconds after the contraction. As the foetus descended the midwives often still tried to find the FHB at the same spot. Counting and especially interpreting the FHB was hard for them. Some midwives called a single low FHB already foetal distress, while recovering decelerations were not recognised as the average FHB was just high enough. They never encouraged the women to push harder and sometimes wrote down the low frequencies without taking any action. The aim of listening to the FHB after every contraction did not seem to be understood; on one occasion the only Doppler device was taken away from a delivery to listen to the FHB of a pregnant woman in another department without protest of any midwife. VEs were strictly done according to protocol. Hardly ever any extra VE was done, even when the woman had the urge to push, which they did not seem to recognise. So these women started to push passively or actively without VE to check if the cervix was fully dilated. When doing a VE the midwives generally felt for and recorded dilatation of the cervix, membranes intact or not and descent of the foetal head. Moulding, caput and position of the presenting part were usually not felt for nor recorded and were only discussed when the doctor was supervising. The midwives were ignorant of the influence of a full bladder to cervical dilatation, contractions and blood loss. So they did not check if the woman in labour would regularly pass urine nor make the woman pass urine before pushing. Only when complications arose or the bladder was distended and the woman unable to urinate they would take action. Catheterisation in labour and immediately postpartum seemed like a standard procedure, where some midwives asked permission of the doctor and others did not.

The midwives generally addressed the patient before doing a VE, but hardly did so for any other procedure, like taking temperature or BP, breaking the membranes or giving anaesthesia for episiotomy. During third stage they did not talk or explain much either. Painful actions like rubbing the uterus, inspecting for tears and inserting a vaginal tampon were done without any explanation. Hand washing happened quite randomly, the observers could not find any real pattern in it. The midwives seem to wash their hands when they think of it and some of them washed their hands more often than others. The only consistency they found is that most of the midwives washed their hands after the third stage. The midwives always wore sterile gloves during the delivery, not always putting them on correctly. Often the midwife who would cut the cord also put on her sterile gloves when the woman started pushing. In case of primigravidae she would have to wait for more than an hour not being able to do any other tasks. Few midwives changed their gloves before suturing.

The general observed technique for the actual childbirth was as follows; stretching the perineum when a large segment of the head is visible and flexing the head digitally by pushing it downward and trying to grasp it. When the head is born they stop encouraging the woman to push and the restitution of the head was done manually, while often ignorant about which side the back of the baby was located. When delivering the body the baby was often not moved upwards while guarding the perineum, but straight forward or even downwards. Pushing on the belly was seen twice by a TBA and once stopped by a midwife and once by the observer. The care of the neonate was generally done well, they immediately dried and stimulated the baby without unnecessary suction. Active management of third stage was always done, but in half of the cases the oxytocin was given too late, varying from just after birth of the baby instead of at birth of the anterior shoulder to still having to prepare the injection after the baby was born. Controlled cord traction was generally performed well, although sometimes the cord was pulled very hard while the placenta was still stuck and a few times the cord was pulled up and down too much. Much care was given for the membranes to come out completely. After two-third of the deliveries they checked the placenta carefully for completeness, but in one-third they did not check. They did not always remove blood clots on the placenta to judge the surface below. In almost all cases they measured the blood loss in the bucket and in the sarongs. Blood on the floor or elsewhere was not added. Stimulating the uterus to make it contract was done in all women, but they did not seem to recognise the relation between a high fundus and more than average blood loss. In women with a high risk of PPH they rubbed the uterus too gently, not long enough and they did not press blood clots from the uterus. They did check the uterus and bleeding more often than usual. The quality of the suturing differed per midwife. Some were precise and showed good insight. Many hurt the women unnecessarily by putting their fingers in the tear when spreading for inspection (twice even very roughly with a forceps) and standard use of a vaginal tampon, also when not bleeding from the uterus. Often they injected the anesthesia in the skin instead of in the wound creating another porte d'entrée. Often too many and unnecessary sutures were made. They never checked the anus for sutures through the rectum. As they touched the suturing needles with their hands and recapped injection needles with two hands they were at high risk for needle stick injuries.

Generally three midwives were present performing the delivery and if so the division of tasks was clear; midwife A would do the VEs, the delivery of baby and placenta and the suturing, midwife B would support the mother, cut the cord and take care of the newborn and midwife C would do vital signs and scribe. Midwife A would often be a senior and midwife B a junior midwife, while often midwife C would be a volunteer. If everything went normally this division of tasks went quite well, but as soon as more midwives would get involved and/or

additional tasks arose it would get more chaotic. As they did not handover or discuss, everybody started helping with / taking over each other's tasks. The more stressful the situation the more chaotic. The senior midwives were not able to be team leaders and order the other midwives what to do in such situations. As soon as the doctor would arrive they would stop leading whatsoever. The seniors did not supervise and teach much. Juniors or mw-assistants were allowed to do deliveries, but as soon as complications arose the senior would take over instead of helping or giving instructions.

Almost always the midwives had their materials ready in time. Often the trolley with materials would be next to the delivery bed for a long time with sterility at risk. The time that elapsed between observation, decision and action ranged from less than 5 minutes to 4½ hours. In a case of PPH an intra-venous line was inserted quickly and when a FHB was not found in sitting position the woman was laid down after 10 minutes. Often it took 30 to 40 minutes to realise the observations were abnormal (e.g., no progress and weak contractions), to discuss this among the midwives and inform the senior and to call the doctor with a plan of action (augmentation with oxytocin in this example). Often the doctor had to intervene or the observer urged the midwives to call the doctor. At night the senior midwife was more reluctant to call the doctor even if indicated, possibly influenced by their insecurity in English. This delayed action several times. The partogram was usually filled in completely, although this was often done after the delivery, sometimes even at the end of the shift. The FHB filled in on the partogram was not always the FHB heard in reality. The frequency of contractions was filled in well, but the strength was often not reflected.

8. Discussion

Despite sharing RH care with other organisations, working in a location that mainly consists of bamboo and with only locally trained midwives, SMRU Mae La clinic manages to offer comprehensive maternal and newborn care and safe deliveries. Strengths are a well equipped clinic with most essential diagnostics and treatment available and a hard working, motivated staff, which is very precise in following protocols. Weaknesses are the implementation of care, to recognise high risk situations and take timely, appropriate action.

The facility observation found all essential drugs and equipment for standard ANC, basic EmOC and essential care of obstetric complications present at SMRU clinic. Especially for a low resource refugee setting, the range of available drugs is very complete with no temporary out-of-stocks reported. The main missing items were syphilis testing kits, due to the very low seroprevalence, 0.4%[56] and lack of funding. One can argue that from a public health perspective it is better to spend the necessary money for these kits on other, more prevalent health problems. Women who are HIV-positive are routinely tested for syphilis. Educational materials were scarce, which should be improved especially in the ANC which has a preventive character. The structure of ANC is comprehensive and the ANR record review (Table 9) showed the quality is high. But performing well in doing tests and recording results in the patient file does not necessarily mean that taking history and doing abdominal examination are being done correctly and high risk pregnancies being recognised. In the ANC no structural observations have been done as in the delivery room and it has been a while since the last quality control. Another concern is that although the proportion of deliveries that never had ANC remains constant (Chart 1), more women now come later in pregnancy (Chart 2). This will be a difficult problem to tackle as one has to address the whole pregnant population of Mae La camp to encourage pregnant women to start earlier with ANC. A possible explanation for this tendency is that more pregnant women come from inside Burma to deliver at SMRU clinic. This phenomenon called 'medical refugees' is due to expensive, low quality health care in Burma, or no health facilities at all. These women present late and come just to deliver, sometimes have a sterilisation and return to Burma postpartum.

All basic EmOC functions can be managed at SMRU clinic, except for manual removal of placenta, which is only possible when the obstetric doctor is available. Transport for referral to Mae Sot Hospital, that provides comprehensive EmOC functions is available 24/7. Guidelines are available but are too much focussed on emergencies procedures. The SMRU Obstetric Manual is currently being revised and guidelines on normal labour and delivery care and FP will be added to the next version. A partograph is used for every delivery, although sometimes it is filled in afterwards especially with quick deliveries. The observations in the delivery room showed that the delivery care still needs improvement in many aspects. The method that is used for delivering the baby, with digitally stretching the perineum and manipulating the head is likely to increase the risk of perineum tears as the perineum does not get the time to slowly stretch. Manual restitution of the baby's head might lead to nerve damage. Although the NDR record review showed 95% adequate FHB monitoring (Table 10), the observations proved it was often done or timed incorrectly. Table 10 shows substandard care on BP monitoring, but this is caused by the SMRU protocol in which the standard for FHB monitoring is every 30 minutes and BP monitoring is 2 hourly. This protocol was based on the staff/workload ratio at the time of writing. Urine catheter insertion was too high (19.3%) and PPH (5.6%) is definitely underestimated with estimated blood loss recorded in only 4.0% (Table 11). All incidences of catheterisation in labour in the literature are with epidural anaesthesia or instrumental delivery, but one out of five women

with a normal vaginal delivery is very high in the experience of the researcher. At the time of the SMNA sample PPH, infection and operation were entries in the patient file that had to be recorded, but were suspected to be underreported. Firstly because everything is usually filled in immediately after the delivery and these complications arise later and are then forgotten to be added. Secondly because the blood loss was at that time not measured or estimated and incomplete placenta was not identified nor had to be recorded. The observations show this has already improved with buckets to measure the blood loss and an obligatory entry for the blood loss and placenta completeness in the patient file (introduced September 2008). The NDR showed an episiotomy rate of 48.6% in nulliparae, while good and consistent scientific evidence (level A) is available that restricted use of episiotomy is preferable to routine episiotomy.[85, 86] This is probably the inheritance of a surgeon supervising in the delivery room. The sample of observations was too small (n=20) to show this percentage has already been reduced. Hand washing was not much better than in the supportive care project in 2007 and very much at random. This will need continuous attention. Management of prolonged labour with use of the partogram has been improved since the student project in 2004.[72] At that time AROM was done with delay in 23.3% of cases, while the SMNA found AROM done in time in 100% of the cases where it was needed (Table 14). In 2004 66.7% of augmentation was done with delay, while in the SMNA sample this was reduced to 30%. The mode of delivery in 2004 (n=60) was 92% normal vaginal delivery, 7.5% vacuum delivery and 5.7% caesarean section. In the SMNA (n=26) this was 65.4%, 11.5% and 23.1% respectively. These differences could be caused by the small sample size in the SMNA or by unknown differences in patient variables or doctor's decisions. The management of pre-eclampsia, severe pre-eclampsia and eclampsia is difficult to evaluate with the results from the SMNA. The sample size was very small (n=9) and inconsistency with definitions were observed in SMNA materials, which makes the treatment of (severe) pre-eclampsia difficult to interpret. Both cases of eclampsia were correctly treated. The monitoring of all these cases was clearly suboptimal (Table 13) and needs to be improved.

Although the midwives do enough deliveries and see enough obstetric emergencies to maintain their skills, 60% of them do not feel confident doing their work (Table 5), despite many of them had attended the ALSO-course during the year before the SMNA. Some midwives identified part of the problem during the interview; the seniors do not teach the younger midwives, but use them to do the odd jobs while complaining about their lack of skills. Furthermore the midwife-in-charge did not supervise or teach the seniors either when they would call her for an emergency. She would just take over and do it herself. As a result none of the seniors had ever done a breech or vacuum delivery. While there has been teaching, there was no on-the-job training and supervision since the Burmese surgeon left.

8.1 SMRU performance compared to other SMNA studies

Although the SMNA studies described in the literature review (section 5.3) are comprehensive and have used the same survey forms as SMRU, not all data was recorded in the reports and publications.[17, 19, 20, 54, 87] Despite this drawback, the broad picture is one of high quality in SMRU clinic compared to health centres in Africa. Water, electricity, drugs, equipment and consumables are present and the supply is constant, in contrast to many of the facilities in Zambia and Tanzania. Equipment, knowledge and staff are available to perform complicated deliveries and obstetric emergencies, while some of the health centres did not even have a delivery room or a midwife present. A rough comparison of some indicators (Table 15) demonstrates that SMRU would be considered as a well performing health centre in an African district or refugee setting, with high availability of services, drugs and supplies.

Table 15. Availability of maternal health care services in 5 SMNA studies

	Sample size (n)	Delivery room	Parto-graphs	Referral transport	Vacuum delivery	ANC iron supplemen-tation	Syphilis test	Oxytocin	Intravenous antibiotics	Neonatal resuscitation
Zambia 1996[17]	96	37%	13%	20%	2%	42%	73%	4%	17%	13%
Zambia 2001[19]	49	83%	61%	7%	0%	63%	100%	98%	80%	0%
Refugee camps Tanzania[54]	10	80%	100%	90%	20%	n.a.	100%	80%	100%	90%
Dar Es Salaam Tanzania[20]	70	20%	815	0%	3%	n.a.	94%	n.a.	69-88%	70%
SMRU	1	yes	yes	yes	yes	100%	no	yes	Yes	yes

n.a. = not available among reported data

With the lack of information about practical skills of the midwives given in the other SMNA studies, this cannot be compared with the level in SMRU clinic, except in the recognition of danger signs by midwives in Dar Es Salaam (Table 16).[87] SMRU midwives appear to have a higher theoretical knowledge than that reported for Dar Es Salaam. Only recognition of sepsis is low among SMRU midwives.

Table 16. Recognition of danger signs in SMRU and Dar Es Salaam SMNA

	SMRU		*Dar Es Salaam*[87]	
Danger signs and symptoms to be discussed with doctor	midwives (n=20)	percentage (%)	midwives (n=48)	percentage (%)
Previous bad obstetric history / CS / stillbirth	17	85	20	42
Hypertension / headache / oedema / seizures	19	95	34	71
Anaemia / pallor / fatigue / dyspnoea	14	70	20	42
Foetal distress / no foetal movement	20	100	5	10
Abnormal lie / position of foetus	18	90	11	23
Sepsis / smelly discharge / postpartum abdominal pain	6	30	3	6
Slight bleeding / spotting	13	65	9	19
Haemorrhage / heavy bleeding	17	85	25	52
Twins / large abdomen	14	70	16	33
Obstructed / prolonged labour / indication for vacuum	20	100	13	27

Source: NMW

The observations in the SMRU delivery room tell quite a different story with variable delays between observation, decision and action. The more complicated a delivery, the more chaotic the midwives and then the senior midwives were not able to be a team leader. Clearly a gap exists between theoretical knowledge and practical skills in daily work situations.

8.2 Problems with SMNA survey forms

As the SMNA tool was last revised in 2001[12] and the Mother-Baby Package was developed in 1994[16] and has not been revised since, some issues are missing in the SMNA survey forms and some parts are obviously outdated. In the past 3 decades HIV/AIDS has become a growing problem especially in Africa where most SMNA studies have been done. Prevention of mother-to-child transmission of HIV (PMTCT) has become an important, integrated part of ANC and delivery care, but it is still completely absent from the SMNA survey forms. GBV is partly related to HIV/AIDS as victims of rape need post-exposure prophylaxis (PEP). Comprehensive RH services should contain a GBV program, including provision of emergency contraception (EC), which is neither mentioned in the Mother-Baby Package nor in the SMNA. In Mae La refugee camp AMI takes care of this, following their GBV

protocol.[88] Another issue that is missing in both WHO documents is female genital mutilation (FGM). On the Thai-Burmese border this is not a local custom, but in many countries in Africa it is still practiced. It is included in the 17 WHO RH indicators. As the Mother-Baby package is 15 years old, some of its minimum standards need updating. The essential drug list published in it, has been updated in other publications[83, 84] but has not been adapted. Furthermore the SMNA uses an old version of Epi-Info[75] to enter, clean and analyse the data. The templates are not compatible with the Epi-Info version that works under Windows and which is much more user friendly. One error in the SMNA materials has been observed. The CDE survey form does not give clear definitions of pre-eclampsia and severe pre-eclampsia and all cases are included. In the template results table only severe pre-eclampsia is used, which is incorrect as part of those cases will be mild pre-eclampsia.

The results of this SMNA study demonstrate that RH indicators alone (Table 1) are insufficient to draw conclusions about the quality of maternal health care in Mae La refugee camp. The structure of RH services shared by SMRU, AMI and PPAT has an influence on this as well. As FP is provided by PPAT and SMRU, only a shared effort can increase the contraceptive rate. The meetings with PPAT for this study has led to more cooperation. PPAT is now funding again the ketamine for female sterilisations, supplying IUDs for postpartum and post-abortion insertion and they can once more refer men for vasectomy to SMRU instead of to a Thai hospital. As AMI is supporting TBAs in doing home deliveries, it is difficult to increase the percentage of births attended by skilled health personnel. SMRU currently has a project to ask pregnant women where they plan to deliver and why and if they deliver elsewhere why, to find clues to increase the percentage of births attended by SBAs. As AMI takes care of the postpartum follow-up, SMRU has little influence on and insight in the quality of these visits. Contacts for this study did lead to teaching AMI medics how to do VEs and speculum examinations by SMRU staff.

8.3 Limitations

Although the interviews and observations were done in a few weeks, the SMNA only shows one moment (short period) in time and not an average of a longer time span. This can cause considerable bias as problems can be unnoticed. For example during the interviews and observations no problems in drugs supply were reported, while a few months later staff discussed concerns and daily consumption sheets were introduced. Another limitation was that the record reviews were not from the same period as the observations and interviews. To exclude the influence of the new supervising doctor the record reviews were taken from the year before her arrival, but at the time of the observations and interviews three months with her presence had already passed. Changes had already taken place in practice, e.g., the introduction of buckets to measure the blood loss. The supervising obstetric doctor being the principal investigator could be a source of bias, as objectivity could be at risk. For these reasons the record reviews and especially the observations were done by Dutch midwife students, who did not have a working relationship with the local midwives. For the same reason the interviews were done by the local ultrasound technician, who is trusted by the midwives but has an independent work relationship and can speak all three necessary languages (Karen, Burmese and English). For the interviews language has thus not been a barrier, neither for the record reviews which were all in English, but for the observations the language barrier was a limitation. As the Dutch midwife students did not speak the local languages some aspects of care were difficult for them to observe and report correctly. Especially when communication was involved, like addressing the patient, being supportive or unfriendly and giving advice, it was difficult for them to interpret. A limitation in the record reviews is the small sample size of CDO and especially CDE.

9. Conclusions

The SMNA shows that the availability of appropriate drugs, supplies, equipment, facilities and transport is adequate to provide antenatal, delivery, postpartum and neonatal care to women and newborn babies in the SMRU clinic of Mae La refugee camp. Missing items were syphilis test kits and health education materials. As RH services are shared by SMRU, AMI and PPAT collaboration is needed to ensure all services are offered but not doubled and referrals happen smoothly. A major concern identified by the data review for the SMNA was that in ANC more pregnant women start later in their pregnancy compared to a few years ago. This needs investigation and joint action of RH service providers and community organisations. The skills and abilities of the staff to provide the minimum standard of care as described in the Mother-Baby Package were found to be adequate in most areas of care, but especially lacking in some basic practical midwifery skills like FHB monitoring, bladder care during labour, delivery techniques and recording of placenta completeness and blood loss. Using their strengths of following protocols and patient file recording, adding the necessary entries in the patient file already improved some of these. Urine catheterisation and episiotomy rate were absolutely too high and need continuous attention. Knowledge of complicated deliveries and obstetric emergencies is adequate, but team performance in the delivery room can be chaotic and delays between observation, decision and action are variable. Vacuum and breech deliveries are only performed by the midwife-in-charge. Seniors in their turn do not teach younger midwives but treat them as runners and complain about their lack of skills. It is the task of the supervising doctor to teach the seniors complicated deliveries and obstetric emergencies in the safe presence of the doctor and to show them how they can convey their skills to the juniors and mw-assistants, without completely taking over from them. Despite these shortcomings, quality of maternal health care at SMRU clinic in Mae La refugee camp is high compared to health centres and refugee camp clinics in Africa where SMNA has been completed.

The WHO Safe Motherhood Needs Assessment is a useful tool to evaluate the quality of maternal health care in a low resource setting. Using it in a single clinic in a refugee camp did not cause any difficulties, except in finding comparative SMNA studies. The Mother-Baby Package is outdated by 15 years and although the principles are still valid, it needs to be revised if it is still to be used. The SMNA guidelines from 2001 are mainly missing PMTCT and use the old Epi-Info software which is very user unfriendly. As SMNA looks at safe motherhood it is more comprehensive than EmOC, including FP and health education. Unfortunately it does not cover all aspects of RH including GBV, EC and FGM which are important in refugee and conflict settings. With some adjustments it could be used as a comprehensive RH assessment, which should also include gynaecological problems like infertility and cancer screening and youth friendly services. The strengths of the SMNA are the possibility to adapt the survey forms to local needs and the combination of record reviews with observations (and patient interviews which were not done in SMRU). As the record reviews and observations give different information on the same subject it gives a more complete view on the quality of care. While the SMRU staff appeared very accurate on following protocols and recording in the patient files and the record review showed high quality of care, the observations put this in perspective.

9.1 Recommendations

- The funding and purchase of syphilis test kits and the screening of syphilis in all pregnant women should be (re)considered. In this decision the low prevalence of syphilis among pregnant women must be taken into account.

- Health education materials have to be made available to the pregnant women especially in ANC. This can be done by posters with many pictures, by verbal group sessions for the women waiting or by using the television in the waiting area.

- Ongoing collaboration and communication between SMRU, AMI and PPAT is needed to ensure comprehensive RH services in Mae La refugee camp. As the turnover of AMI coordinating staff is high, new staff should be informed about SMRU's part in RH services.

- The timing of the first ANC visit should be investigated to find the reasons for the recent increase in delay. Interventions should be initiated to make pregnant women come to ANC in the first trimester again.

- The obstetric guidelines need to be complemented by sections on normal labour and delivery. Adding the basics on FP is also recommended. SMRU protocols should be made compatible with WHO minimum standard and patient files should include all necessary entries to encourage correct monitoring and measurements of the midwives.

- Continuous (bedside-) training and supervision are needed to teach and do quality control on basic midwifery skills. Emphasis should be on practical performance in daily work situations. Continuous (bedside-) training and supervision are also recommended for complicated deliveries and obstetric emergencies. Senior midwives should practice vacuum and breech deliveries under supervision of the doctor to gain experience and be able to perform these safely themselves.

- The senior midwives should be encouraged and supported to share their skills with less experienced midwives. As they do not have didactic skills this should be guided by the supervising doctor. Creating an atmosphere of sharing skills, helping each other in learning and professional growth for all levels is recommended.

- Funding should be made available for a permanent supervising doctor with emergency obstetric skills at SMRU Mae La clinic to maintain and improve the quality of maternal care.

- Monitoring and evaluating efforts should be made to assess if current levels are maintained and improvement has been made where gaps were identified. The locally adapted SMNA survey forms could be (partly) repeated for this purpose.

Many of these recommendations have already been (partly) implemented or are being implemented at the time of writing. The bedside teaching and supervision by the supervising doctor commenced immediately after the observations for this study were completed and weekly teaching sessions cover the skills that are not well performed. Another ALSO-course

has been conducted and one senior midwife has become an ALSO instructor, which includes learning how to give feedback. The atmosphere of adult learning, teaching each other and giving feedback (as for ALSO) has entered the delivery room and senior midwives have started to support the mw-assistants in improving their practical skills. A new basic midwifery training program commenced in October 2009 with students from all SMRU clinics, which will provide guidance for the senior midwives on supervising and giving feedback as well. The ALSO-course and the start of an ANC outpatient department (OPD) have contributed to better cooperation and communication between medics and midwives. Partly repeating the SMNA to assess progress is planned for May 2010.

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"Knowing is not enough; we must apply. Willing is not enough; we must do."
-Goethe-

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