



**Basic Emergency Obstetric and
Neonatal Care Assessment
Manufahi and Ainaro Districts**

Final Report

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Abbreviations:

Demographic and Health Survey (DHS)
National Reproductive Health Strategy (NRHS)
Health Alliance International (HAI)
Averting Maternal Death and Disease (AMDD)
United National Population Fund (UNFPA)
Ministry of Health (MOH)
Community Health Centers (CHCs)
Family Health Promoters (PSFs)
Integrated Community Health Services (SISCa)
Emergency obstetric care (EmOC)
Emergency obstetric and neonatal care (EmONC)
Basic emergency obstetric care (BEmOC)

Executive Summary

The Timor-Leste government has fought to reduce maternal mortality using safe motherhood strategies on a national scale. Despite efforts to reduce maternal deaths, the 2009/10 Demographic and Health Survey (DHS) found that the maternal mortality ratio remains high at 557 per 100,000 live births. In January and February of 2012, Health Alliance International (HAI) assessed basic emergency obstetric care in mid-level health facilities in the districts of Ainaro and Manufahi. The purpose of the assessment was to monitor the scale-up of basic emergency obstetric care in rural areas and to assist the development of *Mobile Moms*, a maternal health project aiming to improve health and care-seeking behaviors of pregnant women and their newborns.

A United National Population Fund survey tool enhanced with additional interview questions was used to assess seven district and sub-district level health facilities and seventeen midwives. Results were compared between facilities and World Health Organization emergency obstetric care (EmOC) policies and recommendations.

The findings show that:

- Service availability varies throughout the two districts, with the most remote facilities having the fewest staff members available inhibiting 24 hours per day coverage. Supervisory physicians are often temporarily placed in facilities, causing inconsistencies in technical support and team management styles.
- There continue to be weaknesses within the government surveillance system. Within facilities' monthly records there were inconsistencies in case numbers and missing data. A majority of the health facilities managed few obstetric complications and midwives lack an adequate caseload to practice and maintain basic EmOC skills.
- Other than the Maubisse Referral Hospital, midwives from the Prince of Monaco II Maternity House were the only interviewed who performed all basic EmOC signal functions in the past three months. Skill confidence varied across facilities, with some midwives acknowledging increased confidence with team care management approaches.
- Equipment is not consistently available to provide high quality basic EmOC. Basic equipment to monitor and detect early complications was missing from numerous facilities. Equipment to perform basic EmOC function was missing or staff lacked knowledge on proper maintenance. At the time of assessment, medicines were well distributed, but staff admitted to experiencing frequent shortages.

While improvements have been made since the 2009 national EmOC assessment, the Manufahi and Ainaro district and sub-district facilities have yet to meet World Health Organization recommendations for providing high quality basic emergency obstetric care. Before additional emphasis is focused on quality improvement, efforts need to target health system improvements based on district and individual facility level need.

Key Recommendations:

Immediate

1. **Ensure that facilities have equipment to provide basic care management.** Revamp the MOH equipment and supply request process to decrease waiting periods. Supervisory staff should be knowledgeable in and oversee equipment maintenance.
2. **Increase team approaches to care management.** Inter-professional approaches to managing maternal health care have shown to be more effective to improving quality of care. Prenatal and delivery care staff and records should be located within the same health facility increasing continuity of care.
3. **Improve government monitoring systems** by mentoring health staff through routine Safe Motherhood and EmOC supervision and reviewing case summary reporting.

Long-term

4. **Support the renovation and upgrading of existing facilities** to improve power supplies and water and sanitation systems.
5. **Ensure all providers (midwives and physicians) maintain their basic EmOC certification.** All midwives should complete the certification, prioritizing district health facility staff. Routine refresher trainings should integrate physician and midwives together to reinforce team care management approaches and maintain skill levels. Upon basic EmOC certification, all providers should be universally approved to independently perform functions as described by MOH policy.
6. **Facilitate the timely distribution of UNFPA EmOC kits,** ensuring that all facilities have the equipment necessary to perform basic emergency obstetric care. Kits should be reviewed with receiving staff to ensure proper maintenance of equipment.
7. **EmOC supportive supervision** should be integrated in safe motherhood visits to sustain longevity of skill quality after training completion. Measures that can preserve skill quality include hands-on practice, team approaches, and follow-up training, which can be provided during supervision visits.
8. **Research methods to preserve skill level of remotely placed providers that assist with few obstetric complications.** Consider developing a rotation for remote midwives to practice obstetric skills within facilities with a higher number of abnormal obstetric cases providing them the hands-on practice. Alternatively, the MOH can consider a trial of low technology simulation-based EmOC practice, such as that available at the University of Washington's PRONTO project.
9. **Increase resources to transport patients,** ensuring that timely care is accessible. Increase fuel supply for emergency transportation and primary care SISCa's. Consider monitoring the referral transportation system to ensure that an appropriate number of vehicles are available to serve population needs

Background

Timor-Leste has been invested in health system strengthening since independence in 2002. Efforts by the Ministry of Health and non-government agencies have targeted numerous sectors, but have largely focused in maternal health. Yet the 2009/10 Demographic and Health Survey (DHS) found that the maternal mortality ratio remains high at 557 per 100,000 live births.¹ Behind this statistic, it also found that 70 percent of births are not assisted by a skilled attendant and only 22 percent of deliveries occur within a health facility.

The 2004 Timor-Leste National Reproductive Health Strategy (NRHS) provides a four-strategy approach to make pregnancy safer.² These Safe Motherhood approaches included 1) increasing the knowledge level in the general population on issues related to pregnancy and childbirth; 2) improving the quality and coverage of prenatal, delivery, postnatal, and perinatal health care; 3) improving emergency obstetric care (EmOC) through recognition, early detection, and management or referral of complications of pregnancy and delivery; and 4) integrating effective detection and management of STI cases into maternal and perinatal care.

Health Alliance International (HAI) is currently launching a four-year project aimed at supporting the Safe Motherhood component of the NRHS. The *Mobile Moms* project uses an integrated approach in working with district and sub-district MOH health facilities down to Family Health Promoters (PSFs), who provide access to the individual households. The health staff strengthening component of the *Mobile Moms* project aims to improve skills of health teams to provide quality maternal care services through supportive supervision of midwives in maternal care services and training in basic emergency obstetric and neonatal care.

Problem Statement

The overall goal of the Health Alliance International project *Mobile Moms* is to improve the health and care-seeking behavior of pregnant women and their newborns. As a part of this effort, HAI aims to support government health facilities to ensure that pregnant women and their newborns receive high quality care. This aim will be accomplished through technical support in Safe Motherhood and emergency obstetric and neonatal care (EmONC).

In 2008, the United National Population Fund (UNFPA) conducted a national EmOC needs assessment. This assessment found multiple limitations to providing quality EmOC in Timor-Leste, such as poor infrastructure, lack of maternity space, inadequate equipment and supplies, poor transportation and communication schemes, weak

¹ National Statistics Directorate (NSD) [Timor-Leste], Ministry of Finance [Timor-Leste], and ICF Macro. 2010. Timor-Leste Demographic and Health Survey 2009-10. Dili, Timor-Leste: NSD [Timor-Leste] and ICF Macro.

² Ministry of Health [Timor-Leste]. 2011. *National Health Sector Strategic Plan. 2011-2030: Towards a Health East Timoree People in a Health Timor-Leste.*

logistic system, and lack of confidence of trained midwives to perform some signal functions.³

In 2010, HAI field-tested a basic EmOC supervision assessment form with the Ministry of Health (MOH) in Manatuto and Ainaro district centers.⁴ In 2012, UNFPA and the MOH initiated EmONC supervision visits in all district and sub-district Community Health Centers (CHCs) with a focus on basic EmONC identified sites. See Appendix 1 for a list of EmOC sites.

To appropriately support the Ainaro and Manufahi midwives within the *Mobile Moms* project, HAI assessed current basic EmONC conditions within the two districts. Results from the assessment will be used to increase EmONC capacity within the two districts and can be applied nationally.

Methods

This baseline assessment targeted government health facilities within the Manufahi and Ainaro districts. To measure the availability of BEmONC throughout this geographic region, district and sub-district CHCs and Maternity Houses were targeted for assessment. District and sub-district health facilities have been identified by the Ministry of Health and UNFPA to be developed into BEmONC facilities by 2015.

A University of Washington graduate nursing student, assisted by HAI technical staff, visited eight sites between January 17th and March 2nd 2012. Those sites included health facilities in all four sub-districts in Manufahi, and three sub-districts in Ainaro (see Table 1). Approval from district government staff and individual consent was received prior to survey initiation.

The BEmONC assessment was conducted using a mixed method approach. Multiple indicators were gathered from health facilities using a MOH approved UNFPA questionnaire; indicators included staffing, case summary reports, service availability, staff knowledge levels, equipment, supplies, and drugs.⁵ These quantitative results were compiled into an excel database.

Table 1. BEmOC Assessment Sites	Number of Midwives	Number of EmOC Certified Midwives	Completed Facility Assessments	Number of Completed Midwife Assessed
Manufahi				
CHC Same	2	x	-	-
Prince of Monaco Maternity House	7	5	1	6
Turiscaí Maternity House	1	0	1	1
Fatuberlihu Maternity House	3	2	1	1
CHC Alas	1	0	1	1
HP Betano	1	1	-	1
Ainaro				
CHC Ainaro	3	2	1	3
CHC Hatudu	1	1	1	1
CHC Maubisse	1	0	-	-
RSU Maubisse	5	4	1	3
CHC Hatubelico	1	1	-	-
Total:	26	15	7	17

³ Ministry of Health [Timor-Leste]. 2004. National Reproductive Health Strategy 2004 – 2015. Dili, Timor-Leste: Ministry of Health.

⁴ Ministry of Health [Timor-Leste], and United Nations Population Fund (UNFPA). 2008. Emergency Obstetric Care (EMOC) Needs Assessment. Dili, Timor-Leste: NSD [Timor-Leste] and UNFPA.

⁵ Ministry of Health [Timor-Leste], and United Nations Population Fund (UNFPA). 2008. Emergency Obstetric Care (EMOC) Needs Assessment. Dili, Timor-Leste: NSD [Timor-Leste] and UNFPA.

Midwife capacity was assessed using a UNFPA individual staff knowledge level questionnaire enhanced with additional interview questions. This tool aimed to measure the frequency and confidence of treating obstetric cases while gathering additional background information. Qualitative questions inquired on barriers to providing BEmONC, quality of home delivery assistance, and early complication identification and care. See Annex 2 for the interview supplement.

This individual assessment was distributed to seventeen midwives in the Ainaro and Manufahi districts, from every level of MOH facilities ranging from the Maubisse Referral Hospital to a Manufahi health post. The number of midwives interviewed at one facility ranged between one and six midwives. Midwives' names were not used, however survey identification numbers were linked to facility assessments allowing staff and facility data to be combined.

Results

The facility and midwife assessment results were collected and entered into separate excel databases. Data gathered provide a geographic representation of the two districts, with survey sites distributed over seven of the eight sub-districts. One planned Ainaro sub-district CHC was not visited due to time constraints.

The following results are separated into staffing, case summary reports, service availability, staff knowledge levels, equipment, supplies, and drugs.

Staffing

Facilities ranged in human resource support. Four of the sub-district health facilities (CHCs and Maternity Houses) have only one midwife providing obstetric services. Only two of the facilities admitted to having midwives present twenty-four hours a day, everyday. On average, midwives interviewed assist with only seven births a month.

While physicians were not included in the MOH questionnaire, midwives commented on their presence within health facilities due to their supervisory role. The Maubisse Referral Hospital is the only facility with a permanent obstetrician physician position. District CHCs have general physicians, however, most positions are filled with internationals under contract that leave the facility after a year or two.

Case Summaries

Table 2. 2012 Facility Case Summaries (#)	Obstetric cases							Complications					Referral	
	Antenatal care consultations	Total deliveries	Live births	Newborns with normal birthweight	Home births	Facility births	Total obstetric admissions	Hemorrhage cases	Dystocia or prolonged birth cases	Post-partum infection cases	Eclampsia cases	Abortion cases	Referred obstetric cases	Received obstetric cases*
Prince of Monaco Maternity House	2339	329	329	319	12	317	396	27	1	1	7	18	49	x
Turiscas Maternity House	402	95	92	92	85	7	7	0	0	0	0	0	1	0
Alas Maternity House	438	63	63	62	33	30	30	0	0	0	0	2	10	0
Faterberlihu Maternity House	514	108	108	108	31	77	77	5	3	0	0	6	2	0
Maubisse Referral Hospital	1567	188	184	163	13	175	194	9	6	11	2 3	15	4	137
Ainarao CHC	844	186	186	177	64	122	122	0	1	0	1	8	2	x
Hatudo CHC	686	89	89	87	37	52	52	1	0	0	0	1	1	0

*x = these facilities did not record the number of obstetric cases received

2011 case summary data was collected from seven facilities (see Table 2). The Prince of Monaco II Maternity House performs a notably higher number of births, even when compared to the referral hospital or Ainarao district CHC. The Turiscas Maternity House is the only facility that performs substantially more home than facility-based births. It is a new addition to that sub-district, so facility-based births are expected to rise in 2012. While the maternity houses have increased access to facility-based deliveries across the two districts, there has been no evident shift of home to facility-based births during 2011.

Additionally, the frequency of reported obstetric complications remains low in most facilities. Few obstetric patients were referred from the Turiscas, Alas, and Hatudo facilities, reinforcing the infrequency of complication cases managed by health professionals. Indications of obstetric referrals were difficult to monitor as many referrals were excluded from facility complication case reports. Also, records did not uniformly document cause of referral. Referral cases were difficult to track through facilities and inconsistencies within facility forms suggested some erroneous reporting.

Service Availability

All facilities reported having midwives available on-call as needed. Midwives lived in varying proximities to health facilities and inconsistent transportation sometimes caused a delay of services. The Maubisse Referral Hospital and the district CHCs had other health staff (nurses, midwives and nurse assistants) available twenty-four hours a day if skilled assistance was required during evening or night hours. Medicines are available during evening hours at all monitored facilities, faulting Turiscas, which was not measured. Maubisse Referral Hospital was the only facility with laboratory technicians available at night, however numerous midwives claimed to independently

test for malaria if needed. Overall, very few laboratory tests are conducted at rural sites. See Annex 3 for a complete list of service availability and staffing.

Staff Knowledge Levels

Sixteen of the seventeen midwives interviewed assisted with deliveries in 2012. Quantitative data is based on the sixteen midwives currently providing maternity care. Qualitative data includes the seventeenth midwife who provides antenatal in the Maubisse Referral Hospital.

	#	%
EmOC certified	12	70.6
Incomplete EmOC training	5	29.4

Eight (47.1%) of the midwives interviewed work in Maternity Houses. Five (29.4%) midwives work in CHCs, one in a health post, and three (17.6%) in a hospital. Seventy one percent of the midwives interviewed are EmOC certified by the Ministry of Health.

	#	%
Administered parenteral antibiotics	11	68.8
Administered uterotonic drugs	16	100.0
Administered parenteral anticonvulsants	5	31.3
Performed manual removal of placenta	8	50.0
Remove retained products	9	56.3

WHO categorizes a BEmONC facility by determining if all signal functions were performed in the last three months.⁶ Every midwife who assisted with deliveries administered uterotonic drugs within the last three months. Eleven (68.8%) administered parenteral antibiotics, nine (56.3%) removed retained products, eight (50.0%) performed a manual removal of placenta, while only five (31.3%) administered parenteral

anticonvulsants. Assisted vaginal delivery and newborn resuscitation was assessed during a six-month duration and not included in Table 4.

Additionally, midwives were given a questionnaire on forty-five obstetric skills, inquiring whether they were conducted in the last six months and if the practitioner felt confident in performing that function. Skills varied for normal assessments, treating abnormal cases, and BEmONC skills. While many midwives reported that they had not conducted numerous functions in the last six months, they claimed to feel confident in performing them.

	#	%
Managed bleeding in early pregnancy	12	70.6
Confident in managing bleeding in early pregnancy	14	87.5
Manage bleeding in late pregnancy and labor	7	43.8
Confident in managing bleeding in late pregnancy and labor	15	88.2
Manage pre-eclampsia	11	68.8
Confident in managing pre-eclampsia	14	87.5
Manage fever before delivery (amnionitis)	10	62.5
Confident in managing a fever before delivery (amnionitis)	15	93.8
Performed vacuum delivery†	8	57.1
Confident in performing vacuum deliveries†	6	42.9
Performed newborn resuscitation	9	56.3
Confident in performing newborn resuscitation	15	93.8

†Statistic based off of 14 midwives

⁶ World Health Organization (WHO). 2009. Monitoring Emergency Obstetric Care: a Handbook. WHO Press, Geneva, Switzerland.

From the qualitative interviews, midwives listed multiple barriers to providing BEmONC. The most common theme found was the lack of support. It was frequently linked to the limited number of health professionals (obstetricians and midwives) available to assist with abnormal obstetric cases. Another issue that they presented was inconsistencies in the supervision styles of contract physicians. Some midwives reported that facility policies determining whether functions could be independently managed by a midwife changed under different physicians depending on their obstetric experience level. Midwives claimed to have referred numerous obstetric cases that they were trained in and felt confident in managing because the supervising physician was not confident of his or her skills.

The second most common theme identified was inadequate equipment or supplies to provide BEmONC functions. Many facilities reported having requested replacement equipment, but are subject to lengthy wait periods.

The third barrier commonly listed was limited emergency transportation. Reasons behind this barrier included a limited number of emergency vehicles available, limited access due to poor road conditions, and inadequate fuel availability.

When asked about their ability to provide quality of BEmONC during home deliveries, midwives overall reported limited ability. Most midwives reported transferring patients to a facility prior to providing BEmONC. They reported that intravenous fluids would be placed in the home if necessary; however, all other complications are treated at a health facility. Additionally, when midwives were requested to provide skilled assistance during a normal, early-stage home delivery, they consistently transferred the patient to a facility to give birth. Very few “home births” assisted by facility staff actually delivered within the home.

When asked how the midwives manage obstetric complications during the prenatal period, the most common response was a list of diverse factors taken into consideration to develop a care plan. Midwives commonly listed acuity, gestation, previous medical history, and geographic location of the patient’s home as factors. Few mentioned resources used to develop a birth plan, which included team approach or EmOC materials. Midwives also listed various care strategies, such as providing inpatient care, additional consultations, and requesting pregnant mothers in their ninth month gestation to stay within a short distance from a health facility. However, no universal protocol was mentioned.

Almost all midwives requested continuation of EmONC training, either initial certification or refresher training. One midwife received EmOC training as early as 2006, and many requested routine updates to ensure skill quality.

Equipment and Supplies

The original equipment and supply questionnaire included 172 items, with sections on facility, equipment and supplies, staff transportation, referral system, laboratory equipment, infection prevention, basic medical items and supplies, records and forms, registries, drugs, and delivery equipment. Items pertinent to general facility condition

and performing direct BEmONC functions were reviewed first. Some items were not assessed due to a lack of time or availability of staff during site visits.

These findings show that the general conditions of the district and sub-district facilities were not ideal for providing high quality BEmOC. Only the Maubisse Referral Hospital had access to electricity 24 hours a day. Three facilities had access to electricity during limited hours of the day. Two facilities only had electricity for specific electronics. One facility, Alas Maternity House, had no electricity.

The only facilities with a reliable water supply directly to the clinic were the Maubisse Referral Hospital and the Ainaro CHC. Additionally, only three facilities had an oxygen supply (Maubisse Referral Hospital, Ainaro CHC, Prince of Monaco II Maternity House). See Annex 4 for a list of facility conditions and basic medical equipment by facility.

World Health Organization policies for managing pregnancy complications were used to develop an abbreviated list of equipment used to perform BEmONC functions (see Annex 6). This list of necessary items was developed from the 2007 WHO provider manual, *Managing Complications during Pregnancy and Childbirth: A Guide for Midwives and Doctors*.⁷ This manual is used as a training resource in Timor-Leste.

This equipment list does not include basic care management supplies or equipment needed to address complications that may arise while performing BEmONC. This list was used solely for analysis of BEmONC equipment. Equipment within Timor-Leste varies slightly from the WHO recommendations, so some variation exists.

Table 6 depicts the percentage of equipment currently available at facilities during the 2012 site visit to complete BEmONC functions. See Annex 6 for a breakdown of equipment by BEmONC function and facility. Table 6 shows that no facilities had a complete set of equipment to provide high quality care. Rural sub-districts of Turisca, Alas, and Hatudu lacked the most equipment.

Table 6. Basic EmOC Equipment and Supplies (percentage available)		Maubisse Hospital	Monaco Maternity House	Turisca Maternity House	Alas Maternity House	Faterberlihu Maternity House	Ainaro Maternity House	Hatudu Maternity House
1	Administer parenteral antibiotics	100.0%	100.0%	81.8%	81.8%	90.9%	100.0%	90.9%
2	Administer uterotonic drugs (i.e. parenteral oxytocin)	91.7%	91.7%	66.7%	75.0%	83.3%	91.7%	91.7%
3	Administer parenteral anticonvulsants for pre-eclampsia and eclampsia	81.8%	81.8%	63.6%	54.4%	63.6%	81.8%	72.7%
4	Manually remove the placenta	100.0%	87.5%	62.5%	87.5%	93.8%	100.0%	87.5%
5	Remove retained products (vacuum extraction, dilation and curettage)	90.0%, 93.8%	90.0%, 87.5%	60.0%, 62.5%	65.0%, 81.3%	75.0%, 68.8%	90.0%, 93.8%	55.0%, 62.5%
6	Perform assisted vaginal delivery (i.e. vacuum extraction)	83.3%	83.3%	33.3%	50.0%	50.0%	100.0%	33.3%
7	Perform basic neonatal resuscitation (i.e. with bag and mask)	100.0%	100.0%	75.0%	87.5%	100.0%	100.0%	0.0%

Based on World Health Organization's provider manual "Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors"

⁷ World Health Organization (WHO). 2007. *Managing Complications in Pregnancy and Childbirth: A guide for midwives and doctors*. WHO Press, Geneva, Switzerland.

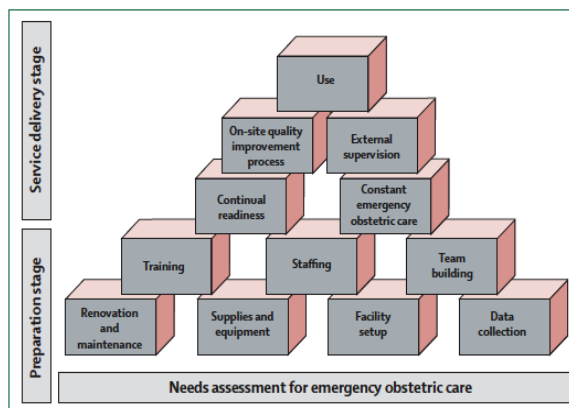
Conclusion

In 2002, the National Planning Committee elegantly summarized the state of maternal health, stating that “women bear an unacceptable burden of mortality and morbidity, with maternal mortality rates at 350-800 per 100,000 live births”.⁸ Eight years later, women continue to be subject to this heavy burden.

Since 2002, emergency obstetric services have improved. However, Ainaro and Manufahi facilities provide incomplete basic services, especially at rural sub-district sites. Identifying and targeting individual facility weakness is the most effective strategy to increasing district BEmONC capacity.^{9,10} This assessment found many of the limitations listed in the 2008 UNFPA *EmOC Needs Assessment* still exist and require additional focus and resources.

The framework on the right is Columbia University’s “Averting Maternal Death and Disability” (AMDD) tool to measure EmOC implementation.¹¹ This building block framework breaks down how each activity relates to the others and in what sequence they must be initiated.

The bottom two rows are the foundation to providing sustainable, high quality emergency obstetric care and make-up the preparation stage. AMDD and UNFPA agree that developing strong health systems precludes EmONC quality improvement interventions.¹²



Focusing on the framework’s bottom level: while the health facilities have made improvements in renovations, facility setup, supplies and equipment since the 2008 EmOC assessment, many weaknesses are still evident. Additional effort is still needed to improve facility conditions, equipment maintenance, supplies and equipment, and improve the accuracy of data collection.

Equipment and supplies were well stocked and functioning in the Maubisse Referral Hospital. However, other facilities are subject to long waiting periods for equipment and supply replacement and restock. Basic medical equipment needed for care of routine and emergency conditions were missing from numerous facilities, especially the most remote sites. Better maintenance and supply of equipment is needed to detect and confirm early obstetric complications.

⁸ National Planning Committee. 2002. *National Development Plan*. Dili, East Timor.

⁹ Freedman, L. P., Graham, W. J., Brazier, E., Smith, J. M., Ensor, T., Fauveau, V., Themmen, E., Currie, S., Agarwal, K. 2007. Practical lessons from global safe motherhood initiatives: time for a new focus on implementation. *Lancet*, 370:1383–91.

¹⁰ Averting Maternal Death and Disability. 2006. Averting Maternal Death and Disability Program Report 1999-2005. Columbia University, New York, USA.

¹¹ Campbell, O.M.R. and Graham, W. J. 2006. Strategies for reducing maternal mortality: getting on with what works. *Lancet*, 368: 1284–99.

¹² Freedman et al. 2007.

These first-layer activities within the tool support the subsequent preparation stage layer. Routine refresher trainings on EmONC and safe motherhood need to be integrated into health professional's careers. Increasing staffing would provide midwives support to provide BEmONC in rural sites during 24 hours per day. Team building trainings and exercises would increase inter-professional approaches and quality of care.

Using the AMDD's framework shows a need for the MOH to focus on improving health system issues before BEmONC quality can be fully addressed. While working on these foundational issues, the MOH can plan how to augment the first layer of the service delivery stage, consisting of continual readiness and constant emergency obstetric care. Obstetric complications at sub-district facilities are infrequent and these cases are often referred to the district or referral hospital level based on acuity. With current levels of health care utilization, remotely placed midwives lack a sufficient number of opportunities to practice their BEmONC skills.

Recommendations

Many interventions addressing maternal mortality were integrated into the national plan from the Safe Motherhood initiative. Community outreach efforts, such as SISCa (Integrated Community Health Services) and PSFs increased the use of health facility and trained staff services. While quality of care has been supported through specialty trainings and supervision visits, further health system improvements are needed to provide a universal standard of care across facility levels.

Globally, there has been an increased focus on the implementation of interventions with evidence-based scale-up strategies.¹³ Due to inconsistencies in facility conditions, supplies, service availability, and staffing, basic system level factors at the district and sub-district level health facilities have to improve as a condition of expanding EmOC services. Additionally, by addressing system level issues, benefits will occur across a broad spectrum of health conditions including preventive care. The following is a list of immediate system level changes suggested and long-term recommendations focusing on EmOC. Recommendations were developed from assessment results, a literature review, and interviews with field experts.

Immediate Recommendations

1. **Ensure that the facilities have the basic equipment necessary to provide care management.** Revamp the MOH equipment and supplies request process to decrease waiting periods. Frequent equipment allotment should be anticipated and distributed in a timely manner. Equipment must be available for complications to be detected early and appropriate managed.
2. **Ensure staff is knowledgeable in equipment maintenance,** i.e. sterilization of manual suction machine. Supervising staff should be responsible for ensuring equipment maintenance and standards of care. Adequate care of equipment increases its longevity and quality of care.

¹³ Freedman et al. 2007.

3. **Encourage team approaches to patient care management** during supervision visits and trainings. Inter-professional approaches to managing maternal health care have shown to be more effective to improving quality of care.¹⁴
4. **Improve government monitoring systems** by mentoring health staff through routine Safe Motherhood and BEmONC supervision in district and sub-district health facilities and reviewing case summary reporting.¹⁵ WHO, UNFPA, UNICEF and AMDD promote the integration of the EmONC indicators into health management information systems as an efficient way of monitoring the availability and use of such care over time.¹⁶ Additionally, it establishes the capacity of a facility to track its own progress and to focus attention on problem areas.¹⁷
5. **Provide a four-wheel drive emergency vehicle to the Ainaro district health facility.** Despite this facility serving a large geographic region with rough terrain, it lacked a vehicle that could navigate roads during heavy rains.

Long-term Recommendations

1. **Support for renovation and upgrading of existing facilities** to improve water and sanitation systems and power supply.
2. **Ensure all midwives are certified in BEmONC**, prioritizing district health facility staff. Upon BEmONC certification, all midwives should be universally approved to independently perform functions as described by MOH policy. Inconsistencies in midwife's independence levels results in confusion.
3. **MOH should continue training physicians to understand midwife capacity** and which procedures they can and are authorized to independently perform according to MOH policy. Any physicians not already competent in EmONC procedures should be trained for those skills.
4. **Facilitate the timely distribution of UNFPA EmONC kits**, ensuring that all facilities have the equipment necessary to perform basic emergency obstetric care. Kits should be reviewed with receiving staff to ensure proper maintenance of equipment.
5. **Develop and implement a policy on routine refresher trainings** to maintain skill level of obstetric care (EmONC and Safe Motherhood). This hands-on practice and follow-up trainings increase quality of skill level over time.¹⁸
6. **EmONC supportive supervision** should be integrated in Safe Motherhood visits to sustain longevity of skill quality after training completion. Measures that can preserve skill quality include hands-on practice, team approaches, and follow-up training, which can be provided during supervision visits.¹⁹
7. **Develop a rotation for remote midwives to practice obstetric skills** within facilities with a higher number of abnormal obstetric cases providing them the hands-on practice. Alternatively, the MOH should consider a trial of low-

¹⁴ Freedman et al. 2007.

¹⁵ Campbell, O.M.R. and Graham, W.J. 2006.

¹⁶ World Health Organization. 2009

¹⁷ Averting Maternal Death and Disability. 2006.

¹⁸ van Lonkhuijzen, L., Dijkman, A., van Roosmalen, J., Zeeman, G., Scherpbier, A. 2010. A systematic review of the effectiveness of training in emergency obstetric care in low-resource environments. *International Journal of Obstetrics & Gynaecology* 117:777-787.

¹⁹ van Lonkhuijzen et al. 2010.

technology simulation-based EmOC practice, such as that available at the University of Washington in the PRONTO project.

8. **Integrate prenatal care into Maternity Houses** to facilitate record sharing and continuity of care. Midwives practicing prenatal care should be based out of the maternity houses.
9. **Increase resources to transport patients**, ensuring that timely care is accessible. Increase fuel supply for emergency transportation and primary care SISCa's. Monitor the referral transportation system to ensure that an appropriate number of vehicles are available to serve population needs.

Annex 1: Government Health Facilities providing Emergency Obstetric Care Services in East Timor

Basic EmOC Service Facilities; Functioning in 2008

1. Los Palos District CHC
2. Viqueque District CHC
3. Manatuto District Maternity House
4. Same Prince of Monaco II Maternity House

Basis EmOC Service Facilities; Planned for 2015

1. All district and sub-district maternal health facilities

Comprehensive EmOC Service Facilities; Functioning in 2012:

1. Baucau Referral Hospital
2. Maubisse Referral Hospital
3. National Dili Hospital

Annex 2: Midwife Assessment Supplement

Please answer the following questions about EmOC in your health facility?

What do you perceive as barriers to providing quality basic emergency obstetric care?
How well can you provide basic emergency obstetric care while managing home births?
Are special care plans used for pregnant women with known complications?
Comments

Annex 3: Service Availability and Staffing Table

Service Availability & Staffing	Monaco Maternity House	Turiscail Maternity House	Alas Maternity House	Faterberlihu Maternity House	Maubisse Referral Hospital	Ainaro Maternity House	Hatudu Maternity House
Immediate Service Availability During 24 Hours a Day							
Labor and delivery service by midwife	√	-	-	-	√	-	-
Labor and delivery services by other health staff	√	-	-	-	√	√	-
EmOC medications	√	x	√	√	√	√	√
Laboratory services	-	-	-	√	√	-	-
Staffing							
Midwives							
Total	6	1	1	3	5	3	1
Present 24 hours per day	1	0	0	0	2	0	0
EmOC certified	4	0	2	2	5	2	1
Pharmacist							
Total	1	1	1	1	3	2	x
Present 24 hours per day	0	0	0	0	1	0	x
Lab technician							
Total	1	1	1	1	4	1	1
Present 24 hours per day	0	0	0	1	1	0	0
Midwife Assistant or Nursing Assistant							
Total	0	1	0	0	6	x	x
Present 24 hours per day	0	0	0	0	x	x	x
Physician							
Total	5	x	x	x	4	2	x
Present 24 hours per day	0	x	x	x	x	0	x
Ambulance Driver							
Total	2	1	1	1	x	2	1
Present 24 hours per day	1	0	0	0	x	2	0
Cleaner							
Total	3	1	1	1	17	5	1
Present 24 hours per day	0	0	0	0	2	0	0
<i>x= not reported by facilities</i>							

Annex 4: Facility Condition and Basic Equipment Supply

Facility condition	Clean water supply directly inside clinic	Electricity and/or power source			Radiant warmer/work surface for newborn resuscitation	Operating oxygen source with flow meter	Clock with second hand visible from the delivery table	Working refrigerator
		24 hrs daily	Only a few hours daily	Only for specific appliances				
Prince of Monaco II Maternity House	-	-	√	-	√	√	√	√
Turiscail Maternity House	-	-	-	√	-	-	-	√
Alas Maternity House	-	-	-	-	-	-	-	√
Faterberlihu Maternity House	-	-	-	√	√	-	-	√
Maubisse Referral Hospital	√	√	-	-	√	√	√	√
Ainaro CHC	√	-	√	-	√	√	√	√
Hatudo CHC	-	-	√	-	-	-	-	-

Basic Equipment	Blood pressure apparatus	Stethoscope		Therm -o- meter	Ambubag with mask		Scales		Plastic or rubber aprons	Povidone iodine 10% antiseptic (Betadine)	Sterile gloves (fitted)
		Adult	Fetal		Adult	Neo-nates	Adults	Infant			
Prince of Monaco II Maternity House	√	√	√	-	√	√	√	√	√	√	√
Turiscail Maternity House	-	√	√	√	-	√	√	√	√	√	√
Alas Maternity House	-	√	√	-	√	-	-	√	√	√	√
Faterberlihu Maternity House	√	√	√	√	-	√	√	√	√	√	√
Maubisse Referral Hospital	√	√	√	√	√	√	√	√	√	√	√
Ainaro CHC	√	√	√	√	√	√	√	√	√	√	√
Hatudo CHC	√	√	√	√	-	-	√	-	√	√	√

Annex 5: Midwife Knowledge Survey

Obstetric skills (last six months)*	#	Total Inter-viewed
Managed bleeding in early pregnancy	12	16
Confident in managing bleeding in early pregnancy	14	16
Manage bleeding in late pregnancy and labor	7	16
Confident in managing bleeding in late pregnancy and labor	15	16
Manage pre-eclampsia	11	16
Confident in managing pre-eclampsia	14	16
Made a referral for eclampsia	6	16
Confident in referring eclampsia cases	13	16
Managed a fever before delivery	10	16
Confident in managing a fever before delivery	15	16
Managed a fever after delivery	9	16
Confident in managing a fever after delivery	14	16
Assessed the fetal position	12	12
Confident in assessing fetal position	12	12
Assessed progress of labor	12	12
Confident in assessing labor progress	12	12
Use a partograph correctly & completely up to phase 4	14	16
Confident in using a partograph	16	16
Managed a normal labor	12	12
Confident in managing a normal labor	12	12
Managed abnormal early labor	13	15
Confident in managing abnormal early labor	14	15
Managed abnormal active labor (first stage)	11	16
Confident in managing abnormal active labor (first stage)	15	16
Managed abnormal active labor (second stage)	11	16
Confident in managing abnormal active labor (second stage)	7	16
Managed abnormal active labor (third stage)	7	16
Confident in managing abnormal active labor (third stage)	14	16
Induced labor	11	16
Confident in inducing labor	13	16
Managed a normal birth	12	12
Confident in managing a normal birth	12	12
Performed vacuum delivery	8	16
Confident in performing a vacuum delivery	6	16
Performed forceps delivery	1	16
Confident in performing forceps delivery	1	16
Removed of placenta	8	12
Confident in removal of placenta	12	12
Performed manual vacuum aspiration in last 6 months	11	14
Confident in performing manual vacuum aspiration	13	16
Recognized breech position	12	16
Confident in identifying breech position	12	16
Managed prolapsed umbilical cord	6	16
Confident in managing a prolapsed umbilical cord	5	16
Managed malaria during labor & delivery	8	12
Confident in managing malaria during labor & delivery	12	12
Performed an amniotomy	12	15

Confident in performing an amniotomy	13	15
Sutured an episiotomy with absorbable stitches	12	14
Confident in suturing an episiotomy	14	14
Repaired first degree episiotomy tear	12	14
Confident in repairing first degree episiotomy tears	14	14
Repaired second degree episiotomy tear	10	14
Confident in repairing second degree episiotomy tears	10	14
Repaired third degree episiotomy tear	3	14
Confident in repairing third degree episiotomy	3	14
Repaired a cervical tear	5	14
Confident in repairing a cervical tear	7	14
Performed maneuvers for shoulder dystocia	9	16
Confident in performing maneuvers for shoulder dystocia	16	16
Managed a twin delivery	9	16
Confident in managing twins deliver	16	16
Performed manual removal of placenta	10	14
Confident in manual removal of placenta	11	12
Performed curettage or exploration	9	16
Confident in performing a curettage or exploration	13	16
Perform bimanual compression	14	16
Confident in performing a bimanual compression	14	16
Performed abdominal aortic compression in last 6 months	3	16
Confident in performing abdominal aortic compression	12	15
Do postpartum care visits at day 1,3,7 (BSP) & day 3, 7 and week 6 (lisio)	5	5
Confident in postpartum care	5	5
Performed an IUD insertion after delivery or abortion	4	4
Confident in inserting IUD	4	4
Provided contraception pills (COC/POP)	4	4
Confident in providing contraception pills	4	4
Injected depo-provera	4	4
Confident in injecting depo-provera	4	4
Inserted norplant implant	2	3
Confident in inserting norplant	3	3
Performed newborn resuscitation	9	16
Confident in performing newborn resuscitation	15	16
Conducted rapid initial assessment for emergencies	13	16
Confident in conducting rapid initial assessment for emergencies	13	16
Managed shock from bleeding	10	16
Confident in managing shock from bleeding	15	16
Managed shock from sepsis	13	16
Confident in managing shock from sepsis	13	16
Implemented infection prevention measures	13	13
Confident in implementing infection prevention measures	13	13

Annex 6: Equipment List to Perform Basic Emergency Obstetric Care Services by Facility (Developed from the WHO provider manual.)

BEmOC Signal Functions and their Equipment According to WHO standards	Monaco Maternity House	Turisca Maternity House	Alas Maternity House	Faterberlihu Maternity House	Maubisse Referral Hospital	Ainaro Maternity House	Hatudu Maternity House
Administer parenteral antibiotics							
Ampicillin 1 gram/vial	√	-	√	√	√	√	√
Gentamicin 80mg/ampule	√	√	-	√	√	√	√
Metronidazole 500mg/vial	√	√	√	√	√	√	√
IV tubing	√	√	√	√	√	√	√
IV cannula g16 and/or g20/22/24/28	√	√	√	√	√	√	√
Ringer's Lactate	√	√	√	√	√	√	√
Normal saline 0.9%	√	-	√	√	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Sterile cotton or gauze	√	√	√	√	√	√	√
Ring forceps	√	-	-	-	√	√	-
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√
Administer uterotonic drugs (i.e. parenteral oxytocin)							
Oxytocin 10 Units/ampule	-	√	√	-	√	√	√
Methylergometrine 0.2mg/ampule	√	-	-	√	√	√	√
Salbutamol 4mg/tablet	√	√	√	√	√	√	√
Salbutamol 1mg/ampule	√	-	-	√	-	-	√
IV tubing	√	√	√	√	√	√	√
IV cannula g16 and/or g20/22/24/28	√	√	√	√	√	√	√
Ringer's Lactate	√	√	√	√	√	√	√
Normal saline 0.9%	√	-	√	√	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Sterile cotton or gauze	√	√	√	√	√	√	√
Ring forceps	√	-	-	-	√	√	-
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√

Annex 6: Continued - Equipment List to Perform BEmOC by Facility

BEmOC Signal Functions and their Equipment According to WHO standards	Monaco Maternity House	Turiscail Maternity House	Alas Maternity House	Faterberlihu Maternity House	Maubisse Referral Hospital	Ainaro Maternity House	Hatudu Maternity House
Administer parenteral anticonvulsants for pre-eclampsia and eclampsia							
Magnesium sulfate 50% solution	√	√	-	-	√	√	√
Magnesium sulfate 20% solution	-	√	-	-	-	-	-
Diazepam 10mg/2ml	√	-	√	√	√	√	√
Calcium gluconate 10%	-	-	-	-	√	-	-
IV tubing	√	√	√	√	√	√	√
IV cannula g16 and/or g20/22/24/28	√	√	√	√	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Sterile cotton or gauze	√	√	√	√	√	√	√
Ring forceps	√	-	-	-	√	√	-
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√
Blood pressure apparatus	√	-	-	√	√	√	√
Manually remove the placenta							
Diazepam 10mg/2ml	√	-	√	√	√	√	√
Ampicillin 1 gram/vial and Metronidazole 500mg/vial	√	-	√	√	√	√	√
Umbilical clamp (artery clamps)	√	√	√	-	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Plastic or rubber aprons	√	√	√	√	√	√	√
Oxytocin 10 units	-	√	√	√	√	√	√
Normal saline 0.9%	√	-	√	√	√	√	√
Ringer's Lactate	√	√	√	√	√	√	√
IV tubing	√	√	√	√	√	√	√
IV cannula g16 and/or g20/22/24/28	√	√	√	√	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Sterile cotton or gauze	√	√	√	√	√	√	√
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√
Ergometrine 0.2 mg IM or prostaglandins	<i>Medicine</i>	<i>not</i>	<i>included</i>	<i>on</i>	<i>Question-</i>	<i>naire</i>	
Ovum forceps	-	-	-	√	√	√	-
Wide curette (Curette small, medium, postpartum)	√	-	√	√	√	√	-
Blood pressure apparatus	√	-	-	√	√	√	√

Annex 6: Continued - Equipment List to Perform BEmOC by Facility

BEmOC Signal Functions and their Equipment According to WHO standards	Monaco Maternity House	Turiscail Maternity House	Alas Maternity House	Faterberlihu Maternity House	Maubisse Referral Hospital	Ainaro Maternity House	Hatudu Maternity House
Remove retained products (i.e. vacuum extraction, dilation and curettage)							
Vacuum extraction							
MVA syringe	√	√	-	√	√	√	-
MVA adaptors for size 6,7,8,9,10	√	-	-	√	√	√	-
Paracetamol 500mg/ tablet	√	√	√	√	√	√	√
Oxytocin 10 Units/ ampule	-	√	√	√	√	√	√
IV tubing	√	√	√	√	√	√	√
IV cannula g16 and/or g20/22/24/28	√	√	√	√	√	√	√
Ringer's Lactate	√	√	√	√	√	√	√
Normal saline 0.9%	√	-	√	√	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Sterile cotton or gauze	√	√	√	√	√	√	√
Ring forceps	√	-	-	-	√	√	-
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√
Vaginal speculum or vaginal retractor	√	√	√	-	√	√	√
Ring or sponge forceps	√	-	-	-	√	√	-
Cannulae size 6,7,8,9,10,12	√	√	-	√	√	√	-
Curette: small, medium, postpartum	√	-	√	√	√	√	-
Vulsellum or single-toothed tenaculum	√	-	√	√	√	√	-
Small bowl	√	√	√	√	√	√	√
Dilators	-	-	-	-	-	-	-
Dilation and Curettage							
Oxytocin 10 units IM	-	√	√	√	√	√	√
IV tubing	√	√	√	√	√	√	√
IV cannula g16 and/or g20/22/24/28	√	√	√	√	√	√	√
Sterile gloves	√	√	√	√	√	√	√
Sterile cotton or gauze	√	√	√	√	√	√	√
Ring forceps	√	-	-	-	√	√	-
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√
Vaginal speculum OR vaginal retractor	√	√	-	-	√	√	√
Povidone iodine 10% Antiseptic (Betadine)	√	√	√	√	√	√	√
Ring or sponge forceps	√	-	-	-	√	√	-
Vulsellum or single-toothed tenaculum	√	-	√	√	√	√	-
Wide curette	√	-	√	√	√	√	-
Dilators	-	-	-	-	-	-	-
Ring forceps or a large curette	√	-	-	√	√	√	-
Paracetamol 500 mg	√	√	√	√	√	√	√

Annex 6: Continued - Equipment List to Perform BEmOC by Facility

BEmOC Signal Functions and their Equipment According to WHO standards	Monaco Maternity House	Turiscai Maternity House	Alas Maternity House	Fater-berlihu Maternity House	Maubisse Referral Hospital	Ainaro Maternity House	Hatudu Maternity House
Perform assisted vaginal delivery (vacuum extraction only since forceps are rarely performed)							
Tubings/rubber hose for suction	√	-	-	-	√	√	-
VE plastic suction cup	√	-	√	√	√	√	-
Vacuum pump with pressure gauge	√	-	-	-	√	√	-
Manual pump	-	-	√	√	√	√	-
Sterile gloves	√	√	√	√	√	√	√
Mayo/episiotomy scissor	√	√	-	-	-	√	√
Perform basic neonatal resuscitation (i.e. with bag and mask)							
Suction machine (manual or electric)	√	√	√	√	√	√	-
Ambubag for neonates	√	√	√	√	√	√	-
Oxygen mask and tubing for neonates	√	√	√	√	√	√	-
Mask for neonates No.0	√	√	√	√	√	√	-
Mask for neonates No.1	√	√	√	√	√	√	-
Blankets/linen	√	√	√	√	√	√	-
Clock with second hand in delivery room	√	-	√	√	√	√	-
Radiant warmer/Work surface for NBR near delivery area	√	-	-	√	√	√	-

