



AVERTING MATERNAL DEATH AND DISABILITY

# Making EmOC a reality—CARE's experiences in areas of high maternal mortality in Africa

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Received 5 April 2005; accepted 3 December 2005

## KEYWORDS

Maternal mortality;  
Emergency obstetric  
care (EmOC);  
Facility interventions;  
East Africa;  
Rwanda;  
Ethiopia;  
Tanzania

## Abstract

*Objective:* This paper describes the package of interventions undertaken by the CARE/AMDD program collaboration to increase the availability and quality of emergency obstetric care for 3 high maternal mortality countries in Africa. *Methods:* Project implementation over 4 years focused on enhancing the capacity of 10 district hospitals in 3 countries—Tanzania, Rwanda and Ethiopia. Interventions were designed to create functional health facilities with trained and competent staff, working in an enabling environment supporting EmOC service delivery. *Results:* By keeping a clear focus on EmOC, the project achieved modest improvements in services, even in the face of the considerable constraints of rural district hospitals. Availability and utilization of EmOC increased in Tanzania; the met need for EmOC increased slightly from 14% in year 1 to 19% in year 4, while in Rwanda it increased from 16% to 25% over 4 years. Case fatality rates (CFR) declined by 30–50% in all 3 countries. While still well below UN recommendations, in all 3 countries there was also a progressive increase in the cesarean section rates, a life saving obstetric intervention. *Conclusions:* The

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increases in met need and decreases in case fatality suggest that project interventions improved the quality and use of EmOC, a critical component for saving women’s lives.  
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## 1. Introduction and background

Africa has some of the highest maternal mortality ratios (MMR) in the world, often double the globally estimated MMR of 400 per 100,000 live births [1]. Because of high fertility and poor access to health care, African women face an extremely high lifetime risk of maternal death; 1 in 20 for Sub-Saharan African women compared with 1 in 2400 for women in developed countries such as the USA. This paper describes CARE’s work to promote EmOC, an essential component of maternal mortality reduction, in 3 of the countries with the poorest maternal health indicators in Africa—Ethiopia, Rwanda and Tanzania.

In April 2000 CARE initiated the *Foundations to Enhance the Management of Maternal Emergencies* (FEMME) project, in collaboration with the Averting Maternal Death and Disability (AMDD) Program at Columbia University [2]. The program was implemented in 5 countries—Ethiopia, Rwanda, Tanzania, Tajikistan and Peru. The 3 country projects in Africa are described here.

As Table 1 shows, the maternal health indicators were poor in all 3 countries with high maternal mortality ratios (MMR) [1], low deliveries with skilled attendants, high fertility rates, and significant poverty [3–6]. The capacity of maternal health facilities was also limited. However, the challenges in Ethiopia were exaggerated. The poverty was more extreme with 31.3% of the population living on less than \$1 a day [7], and the catchment population for the available facilities was excessive. In spite of the reportedly higher MMR [1], the conditions of the health facilities in both Rwanda and Tanzania were less extreme. Rwanda was reestablishing its health system after the 1994 genocide, but had an existing infrastructure upon which to build. Accessibility to services was constrained as much by ethnic and cultural concerns as by the geographical and cost barriers. On the other hand, Tanzania primarily suffers from a poor and very rural health system with inadequate technical and financial support. In addition to health system barriers, women in the project sites (north western region) also experience some of the more universal barriers such as cost, distance from services and poor transportation [8].

In all 3 countries, the program goal was to improve the availability and quality of emergency

obstetric care services by addressing barriers occurring at both the health facility level, and district health systems. CARE had previously established health programs in these countries to promote maternal health through community based approaches or other integrated health programs. The introduction of the EmOC program provided the opportunity to complement the community mobilization interventions in progress with quality improvement interventions at the facility level.

### 1.1. Project interventions

#### 1.1.1. Baseline assessments

An initial facility assessment was conducted to identify and prioritize constraints in the delivery of EmOC services in the 10 project hospitals. The assessment provided baseline information on requirements to strengthen delivery of obstetric care. The main components of the assessment included:

- functional capacity of the facility in terms of infrastructure;
- availability of essential equipment and drugs;
- existence of policies, protocols and service delivery guidelines for EmOC service delivery;
- technical competency and training needs of the providers in EmOC;
- district/facility management systems affecting the overall effectiveness of health care delivery.

Overall, the results of the assessments in the 3 countries were similar. They showed that most of the hospitals did not perform many of the signal functions for EmOC such as cesarean sections due to lack of a functional operating room, or blood transfusions due to the unavailability of blood. Moreover, the health facilities were rundown, poorly maintained, and inadequate in responding to common maternal complications. There were problems with electricity and water supplies. Providers were insufficiently trained and lacked capacity to manage some of the more common obstetric complications. Equipment and consumable supplies were always in short supply and facilities had few management systems to support quality health care [9,10]. Another universal limitation was the lack of use of maternal health data. Registers were

**Table 1** Summary of project sites at baseline assessment

Project sites country and region	Description of project sites (district hospitals)	Ongoing CARE programs	Maternal mortality ratio <sup>a</sup>	% of births with skilled attendant (SAB) <sup>b</sup>	Target population	Crude birth rate (CBR) <sup>c</sup>	Expected deliveries <sup>d</sup>	Expected complications <sup>e</sup>
Tanzania Mwanza Region	<i>Missungwi District</i>	1. Family planning/RH	1500 per 100,000 LB	35.8	650,000	41	26,650	3998
	Missungwi Hospital (govt.)	2. Perinatal/ maternal health						
Rwanda Gitarama Region	Bukumbi Hospital (mission)	3. Malaria control	1400 per 100,000 LB	31.3	810,000	45	36,450	5468
	<i>Kwimba District</i>	4. Food security						
	Sumve Hospital (mission)	1 HIV/AIDS prevention						
	Ngudu Hospital (govt.)	2. Family planning/RH						
Ethiopia Oromiya Region	Kabgayi Hospital (Catholic mission)	3. Support and care for (OVC) orphans and vulnerable children	850 per 100,000 LB	5.6	4,000,000	41.3	165,200	24,780
	Rumera Rukoma Hospital (mission)	1. HIV/AIDS prevention						
	Gitwe Hospital	2. Family planning/RH						
	<i>East Shoa Zone</i>	3. Food security						
	Adama (Nazareth) Hospital	4. Nutrition and health						
	<i>West Hararhge Zone</i>							
	Gelemso Hospital							
	Chihiro Hospital							

<sup>a</sup> WHO.UNICEF, UNFPA maternal mortality estimates, 2000.

<sup>b</sup> Skilled attendant at birth (country specific DHS, 2000).

<sup>c</sup> Crude birth rate (number of births per 1000 population, 2000).

<sup>d</sup> Expected number of deliveries is the crude birth rate multiplied by the target population.

<sup>e</sup> Expected number of complications is calculated using the WHO estimation that 15% of deliveries will develop complications.

filled out sporadically, if at all, and were never internally analyzed.

In Tanzania only 3 of the 4 facilities had surgical capacity. One of the facilities designated by the government as a district hospital was functioning as a basic EmOC site without an operating room. However, the degree of need with respect to most of these variables was most acute in Ethiopia. Of particular note is Gelemso hospital in Ethiopia. Despite having recent renovations, this hospital was not functioning, because of lack of competent staff, essential supplies and appropriate management systems.

## 2. Project activities

Following the assessments, project activities began in late 2000 in Tanzania and Ethiopia, but were delayed in Rwanda due to difficulties with recruitment. As a guide to implementation, the project used the “Implementation Stages Framework” developed by AMDD [11]. This framework provides a model for strengthening EmOC service delivery consisting of 2 stages:—preparation and service delivery, each with several elements that serve as building blocks for improving the quality and efficiency of EmOC services (Box 1).

In addition to these activities, the project also advocated for improving safe motherhood policies at the regional and national levels.

Many of the interventions were similar in all 10 hospitals:

- provision of equipment, essential supplies and drugs;
- training in case management for obstetric complications including emergency life saving skills;
- strengthening of the information systems to monitor change and identify gaps in quality;

- introduction of internal quality review systems;
- advocacy with technical leaders and policy makers to develop nationally acceptable standards and guidelines.

We were particularly excited to note in Gelemso Hospital in Ethiopia that these were exactly the interventions needed to get the newly renovated hospital functioning.

In contrast to the needs for training and systems strengthening which were universal, needs for infrastructure development and provision of equipment and supplies varied widely from one facility to the next.

### 2.1. Infrastructure upgrades—renovations and equipment

An important contribution of the FEMME project was to upgrade health facilities. The project balanced material inputs with training and systems strengthening. This addressed some of the more serious constraints and simultaneously provided credibility to the project. Because of the variation in needs among the different facilities in each country, resources were allocated in response to local needs and priorities, as identified by the facility staff and other project partners at the field level.

As noted in Table 2, the most significant renovations were done in Ethiopia at Adama and Chiwo hospitals and in Tanzania at the Missungwi District Hospital. In Ethiopia, the Adama hospital serves a population of over 2 million people. The renovations were extensive and involved expansion and reconstruction of the maternity units to address high caseloads. In Tanzania, Missungwi district hospital, initially a health center, with support from the district council, was upgraded to a comprehensive EmOC site by constructing and equipping a new operating room. The hospitals in Rwanda had less need for facility upgrades, so our focus was to improve the overall function of the facilities.

Box 1  
Implementation stages framework

Preparation stage	<ol style="list-style-type: none"> <li>1. Renovation and facility upgrades</li> <li>2. Provision of essential supplies and equipment</li> <li>3. Review and development of EmOC protocols and guidelines</li> <li>4. Training and placement of key staff</li> <li>5. Record keeping, data collection and analysis</li> </ol>
Service delivery stage	<ol style="list-style-type: none"> <li>6. Team building and creation of emergency response teams</li> <li>7. Quality improvement approaches</li> <li>8. Ongoing readiness and preparedness</li> <li>9. External and supportive supervision</li> </ol>

**Table 2** Comparison of the Main Interventions across countries

	Key activities	Ethiopia	Rwanda	Tanzania
Preparation stage	1a) Infrastructure developments	–Major renovations of two maternity units at Adama and Chihiro Hospitals –Repair of water supply systems	–Minor renovations to maternity units –Created ramps to emergency rooms	–Less extensive reconstruction –Missungwi Hospital focus of major upgrades from basic to comp. EmOC site –Main support to the laboratories to equip for blood transfusion
		–Provided small generators –Repair of waste management systems	–Placement of doors, shelves, lighting and beds –Re-arrangements of wards to create organized working spaces	
	1b) Key partners for hospital support	–Government provided extensive support for Gelemso Hospital		–Further support from Netherlands govt. (Sumve Hospital) and Italian govt. (Bukumbi Hospital) –OR equipped with beds, instruments, etc. –Adapted international standards
	2. Equipment and supplies	–Provision of equipment with special focus on operating room (OR)	–Provided essential equipment, drugs and supplies	
	3. EmOC protocols and guidelines	–Developed in collaboration with key national partners	–Developed with national partners	
Service delivery stage	4a) Developing staff capacity	–LSS training conducted with ACNM  –On-the-job trainings conducted with local professionals	–LSS training conducted with ACNM  –Refresher and on-the-job trainings conducted by national professionals	–Professionals from Bugando Medical Center with local MOH staff conducted most of trainings
	4b) Key partners	–Health officials from the Making Pregnancy Safer Program	National referral hospital (CHUK) was key partner	
	5. Record keeping and data collection	–New obstetric registers created to serve as main data source –Improved date collection on key variables –Training on UN process indicators	New obstetric registers created to serve as main data source –Improved date collection on key variables –Training on UN process indicators	New obstetric registers created to serve as main data source –Improved date collection on key variables –Training on UN process indicators
	1. Quality Improvement approaches	–Created emergency response teams  –Introduced maternal death audits as critical process –Training on COPE methodology	–Trained staff in COPE methodology  –Created emergency response teams	–Main methodology used was the Criterion Based Audit, as a Q.I. strategy –Hospitals developed “EmOC ”teams that monitored Q.I. efforts
	2. Team building and ongoing preparedness	–Team training approach used  –Midwives, doctors and anesthetic assistants formed the supervision teams	–Team training approach used  –Study tours conducted to encourage cross learning and sharing	–Various cadre of staff—including both support staff and medical professionals trained in teams
	3. External and supportive supervision	–Conducted mainly by OBGYNs specialists and midwives	–Cross supervision teams conducted by hospital staff and members of district health council –Local specialists conducted supervision	–Created a project advisory committee that monitored activities
	–Zonal/regional health officials also involved			

Facility reconstruction was also supported by other partners and donors. In the case of Gelemso Hospital in Ethiopia and Sumve and Bukumbi Hospitals in Tanzania, resources from other partners (Ethiopian government, The Netherlands, and the Italian government, respectively) contributed significantly to renovations and provision of equipment complementing CARE’s activities and allowing the project resources to go further.

## 2.2. Data collection and analysis for program monitoring

The introduction of the UN process indicators [12,13] at the hospital level allowed the project to track and to analyze information on the progress of key activities. CARE worked with hospital staff in each site to develop new or revised obstetric registers, ensuring that these tools accurately captured key information (obstetric admissions, numbers of deliveries, complications, maternal deaths, etc). In both Ethiopia and Tanzania, different information was captured in different registers all over the hospitals. The project created one register that consolidated essential information in one place, thereby improving the staff’s ability to compile and review their data. With accurate delivery data, hospital staff can now calculate the process indicators and determine where more effort is needed. The data review process also helped to highlight the impact of interventions.

## 2.3. Human resources development

Training to improve technical competence of health providers in the management of obstetric complications was a core intervention of the project. CARE worked with both international and local partners to conduct competency-based training of EmOC teams in management of deliveries and complications. While the content was consistent, the training methodology varied across countries, based on need and availability of local resources. In Tanzania, for example, we worked with local partners from the Bugando Medical Center, a regional referral center. Obstetricians, midwives and MCH tutors from this center conducted the training, modeled after *JHPEIGO’s* Competency Based Training curriculum and used *WHO’s Managing complications in pregnancy and childbirth* [14] as the primary reference.

In the other 2 countries, consultants from the American College of Nurse Midwives provided training using the Life Saving Skills (LSS) curriculum. In Rwanda, local trainers came from the Central

University and national referral hospital in Kigali (CHUK). The national specialists subsequently conducted refresher training and supervision.

Another cornerstone of the training approach was the training of a full “emergency obstetric response team”. In all 3 countries, various health professionals, including pharmacists, nurse–midwives, doctors, operating room personnel, lab technicians, and watchmen were trained together to promote a strong team of advocates for change in EmOC service provision. The training was designed to create a critical mass of trained health professionals and other staff at the facilities to maintain the momentum for change.

## 2.4. Quality and performance improvement

CARE worked closely with members of the AMDD technical team to provide on-the-job mentoring and coaching to hospital staff. Trainings and workshops were provided on quality assurance and program monitoring using UN process indicators. The project used 3 specific tools developed by AMDD and partners for performance improvement at the hospital level:

- “Quality improvement for EmOC, leadership manual and tool book”. This offers self-assessment tools for problem identification and resolution (based on the *COPE* methodology of *Engender Health*) [15].
- “Criterion based audit” [16,17]; this uses a review process to compare actual practice with set standards and performance criteria.
- “Using the UN process indicators of EmOC: questions and answers” [13].

The *COPE* methodology was used as a quality improvement approach mainly in Ethiopia and Rwanda, while the Criterion Based Audit was used in Tanzania. The project took advantage of teams that had been trained together, and involved them in self-review exercises for quality improvement. These teams oriented other hospital staff to EmOC, identifying problems, finding solutions and reinforcing changes in attitudes. In the case of Rwanda, these teams were catalyzed through regular visits by district supervisors who had also attended the training and took an active role in implementing changes for quality improvement.

In Ethiopia, CARE staff and partners also established maternal death reviews, using poor maternal outcomes as a starting point for assessing different contributing causes. Through this approach, providers better understand why deaths happen at the

hospitals and become engaged in finding ways to prevent them. The reviews helped the staff recognize sub-standard care and resulted in increased efforts by providers to address avoidable factors and improve responsiveness.

All the country projects incorporated supportive supervision by individuals involved with training. This external supervision support reinforced newly introduced procedures such as active management of the third stage of labor, and use of magnesium sulfate to treat eclampsia.

## 2.5. Policies and advocacy

CARE established and fostered close collaboration with partners at the regional and national levels for the design, implementation and evaluation of project interventions. These included staff from the referral hospitals, the Ministry of Health, and the medical or professional associations. The partners were involved in several ways including: 1) development of standards and protocols, 2) training and adaptation of training materials, 3) dissemination of new tools and practices, 4) adaptation of data collection tools, and 5) promotion of new, evidence-based practices. In Tanzania, the project also formed a Project Advisory Council as a forum for partners to contribute to the project and be included in its success. This forum helped promote new practices such as the use of magnesium sulfate and manual vacuum aspiration, both of which were significant changes in practice in Tanzania. In all cases, the involvement of these higher level partners lent credibility to the project and facilitated acceptance of new protocols.

In all 3 countries, emphasis was placed on the adaptation and adoption of internationally recognized guidelines and protocols for EmOC. The availability of publications and manuals prepared by WHO and AMDD/JHPIEGO helped to standardize and legitimize project interventions. The participation of the partners in the preparation of the clinical guidelines enhanced their acceptance and adoption in project facilities.

## 3. Leveraging resources/partnerships

The close participation of the partners consolidated the technical capacity for EmOC. Collaboration with staff from the MoH, District/Regional Health Teams, university training hospitals, and professional societies leveraged technical and financial resources. Staffs in the referral hospitals continue to be involved with promoting the new interventions and

supervising activities in the smaller hospitals in all 3 countries. Resources from other agencies such as UNFPA in Rwanda or the mission hospitals in Tanzania also contributed. The partnership with Bugando Medical Center in Tanzania offered opportunities for both the hospital and CARE to influence maternal health care at the national level. The LSS curriculum and materials developed under the project will be piloted as part of safe motherhood interventions in other regions of the country. Similarly, in Ethiopia, the national partners are now promoting LSS training nationally.

Technical support from AMDD and other partners strengthened knowledge and capacity of CARE's project staff to design and implement programs to reduce maternal mortality based on a human rights approach. Learning was enhanced through participation in the international meetings and conferences organized by CARE and AMDD. These technical meetings encouraged cross-project learning and sharing of experiences across countries.

## 4. Results

The FEMME Project identified progress qualitatively through a participatory evaluation in late 2003 [18], and quantitatively using the process indicators tracked in the project information system. Lessons learned were also extracted.

### 4.1. Availability of EmOC services

The UN recommendations on EmOC stipulate at least 4 basic EmOC sites and 1 comprehensive EmOC site per 500,000 population (Table 3). Except for Ethiopia, the project contributed significantly to meeting this level of coverage for EmOC services. At the beginning of the project even though district hospitals claimed to be "comprehensive EmOC sites", this was not actually the case. These health facilities only provided some components of care, and were not capable of performing the signal functions of quality EmOC. The health centers also provided, in varying degrees, elements of basic EmOC. By improving comprehensive EmOC services in rural hospitals, these surrounding health centers and communities had reliable referral points for women with complications—thus increasing access to EmOC. In Ethiopia however, the availability of blood was inconsistent. The problem affects many facilities nationwide, and plans are underway to improve this in collaboration with the Ethiopian Red Cross and the MoH.

**Table 3** UN process indicators on EmOC availability and utilization across three countries

Africa FEMME project data	Baseline	2001	2002	2003	2004
<i>Proportion of all births in EmOC facilities (UN process indicator 3)</i>					
Tanzania	13.1%	14.0%	16.3%	17.5%	17.9%
Rwanda*		8.9%	11.1%	7.9%	8.8%
Ethiopia	1.6%	0.8%	1.6%	1.8%	2.0%
<i>Met need for EmOC (UN process indicator 4)</i>					
Tanzania	9.1%	13.9%	22.3%	21.5%	19.3%
Rwanda		16.2%	20.8%	18.0%	24.6%
Ethiopia	2.0%	2.0%	4.2%	4.7%	4.5%
<i>Cesarean section rate (UN process indicator 5)</i>					
Tanzania	1.2%	1.4%	1.7%	1.9%	1.8%
Rwanda		1.8%	2.9%	2.4%	2.9%
Ethiopia	0.2%	0.1%	0.3%	0.3%	0.4%
<i>Case fatality rate (UN process indicator 6)</i>					
Tanzania	3.0%	3.9%	3.6%	2.4%	1.9%
Rwanda		2.0%	1.9%	1.6%	0.9%
Ethiopia	10.4%	7.8%	7.3%	5.2%	5.2%

Data source – project biennial project monitoring reports. Indicators are calculated with adjustments of population and denominator data each year based on country specific crude birth rates and population growth rates.

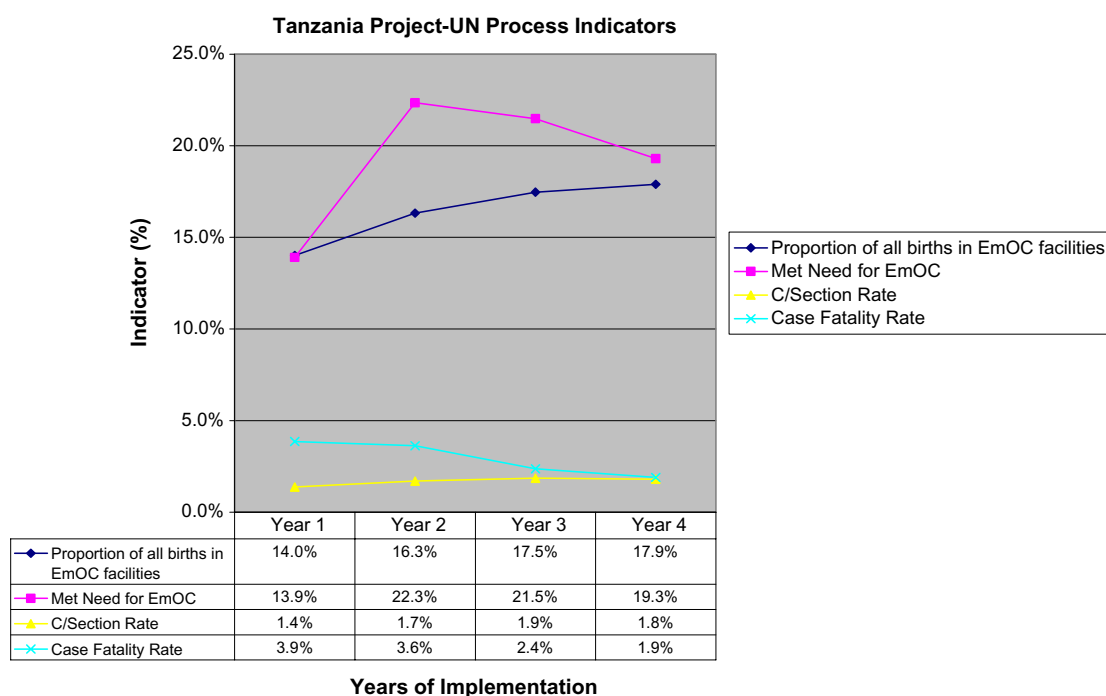
Data are restricted to project sites and do not represent all EmOC facilities in the countries under study.

\* Rwanda’s actual baseline data are unavailable.

## 4.2. Quality EmOC services

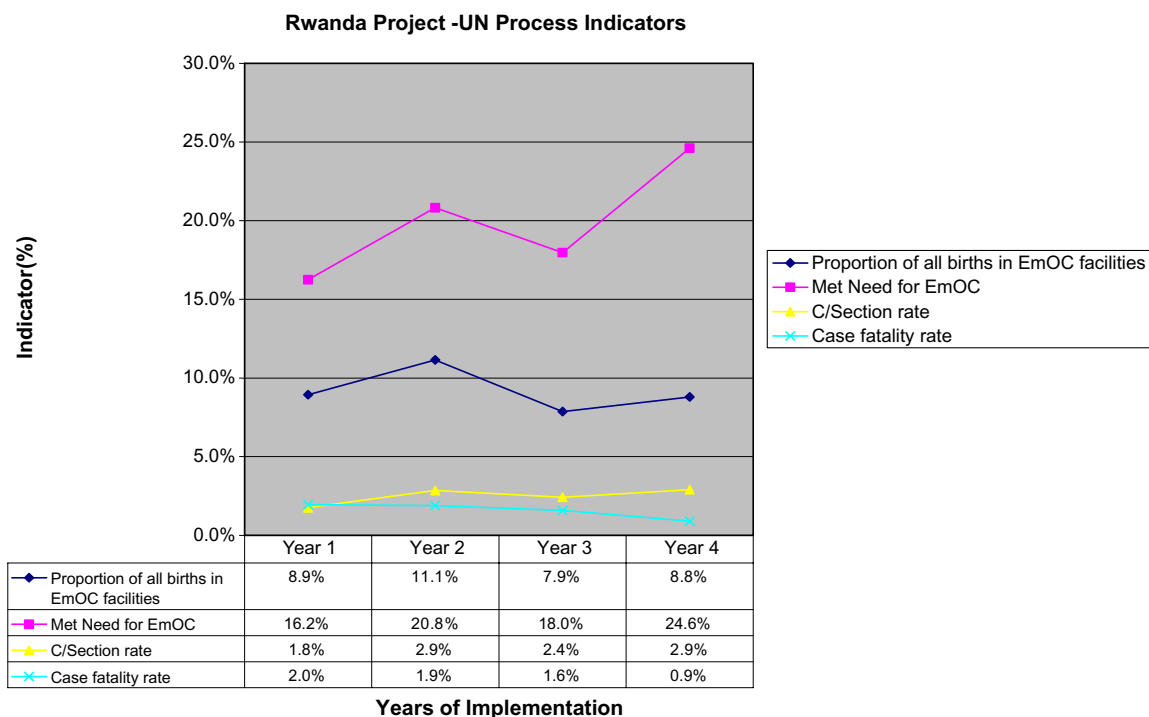
There was evidence of improved quality of EmOC service delivery in all 3 countries. Through training and implementation of the quality improvement approaches discussed earlier, the hospitals improved their technical capacity and prepared-

ness. While case fatality rates (CFR) are only a proxy indicator for the changes in quality of care, all 3 countries halved CFR over the life of the project. In Tanzania, the CFR decreased from 4% in year 1 to 2% in year 4 while in Rwanda it declined from 2% to 0.9% over the same period. The biggest decline occurred in Ethiopia where



**Figure 1** Changes in UN process indicators for Tanzania project.



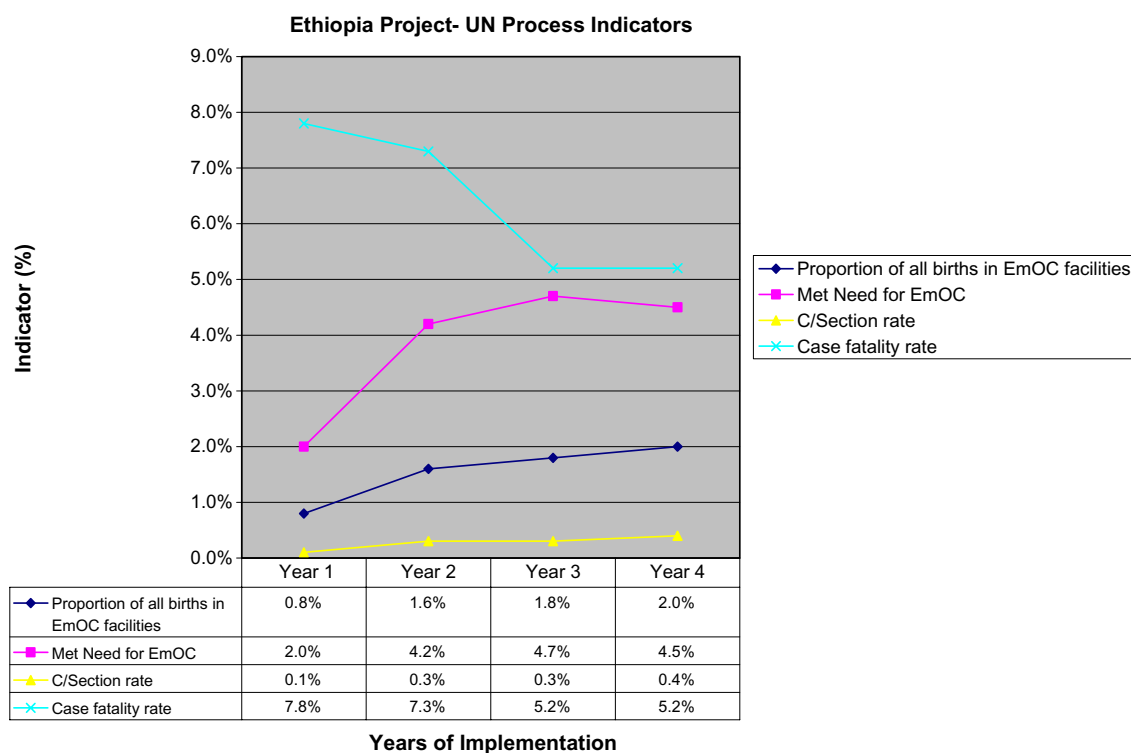


**Figure 2** Changes in UN process indicators for Rwanda project.

CFR decreased from 10.4% at baseline to 5.2% in year 4. These changes are attributed to improved efficiency of the facilities in addressing obstetric emergencies.

### 4.3. Utilization of EmOC services

The strengthening of the district hospitals also produced improvements in utilization, particularly



**Figure 3** Changes in UN process indicators for Ethiopia project. These data represent the findings from the FEMME supported facilities, and do not represent all EmOC facilities in the entire regions.

for obstetric complications. While the indicators are much lower than the UN recommendations, the progressive trends provide some insight as to the impact of project interventions. While the indicators were less positive in Ethiopia than in Rwanda and Tanzania, they still showed trends in the right direction.

For Tanzania, Fig. 1 shows the increasing trends in utilization as defined by the proportion of births in EmOC facilities, the met need for EmOC and the cesarean section rate. In comparison to the other 2 countries, the proportion of births in EmOC facilities is much higher in Tanzania at an average rate of 17% compared with <10% in Rwanda and Ethiopia. The met need for EmOC increased from 14% in year 1 to a peak of 21% in year 3, leveling off to 19% in Year 4. While met need and the cesarean section rates are still low compared with UN recommendations, the progressive increases show the impact of the project in increasing access to and use of life saving obstetric interventions.

In Rwanda, the quantitative utilization data (see Fig. 2) also show some improvements in the process indicators: the met need for EmOC increased from 16% to 25% while the cesarean section rate increased slightly from 1.8% to 3% (still below the recommended 5–15%). All indicators declined in 2003, though this did not continue into 2004. Possible reasons for these changes are discussed in detail elsewhere [19]. The cesarean rates were highest in Rwanda over the life of the project and the CFRs were much lower than in the other 2 countries. In particular the CFRs decreased from 2% to the UN recommendation of less than 1%.

While progress was made in all the quantitative indicators in Ethiopia, they are still significantly lower than in Rwanda and Tanzania. At 2%, the proportion of births in EmOC facilities is much lower than Rwanda and Tanzania. The met need for EmOC services increased from 2.0% to 4.5% which is far below that of Rwanda and Tanzania and the UN recommendation of 100%. Cesarean section rates, an indicator of the level of access to health services, remains low at <1% in Ethiopia even in comparison to the other 2 African countries. Finally, the CFR, while much higher than Rwanda and Tanzania at the start and the end of the project, still experienced a marked decline from 10.4% at baseline to 5.2% in year 4. These findings reflect the greater challenges and constraints in accessing health services in the country as a whole (Fig. 3).

## 5. Discussion

As a whole, access to and use of health services is low in Africa, and this is reflected in the poor

maternal health indicators. The project worked within challenging circumstances where the full range of barriers affecting maternal mortality and morbidity were present. Despite these limitations the final evaluation of the project, which focused on both the quantitative and qualitative aspects, showed improvements in the capacity of health facilities to manage obstetric complications. Further analysis of the country-by-country situations provides greater understanding of the impact of the project in the various sites.

The greatest strengths in the Tanzania project were the partnerships at the local level. These included both the collaboration with Bugando Medical Center, and the complementary activities of the government (in the case of Missungwi District Hospital) and the 2 European partners in the case of the 2 mission hospitals. The formation of a Project Advisory committee also contributed to local ownership of the project’s achievements. By the end of the project, the proportion of facility deliveries was the highest of any of the 3 countries.

In Rwanda, the increases in the met need for EmOC and in cesarean section rates indicated improvements in the management of complications. This observation is substantiated when the data are analyzed for the individual hospitals. At the 2 larger hospitals, Kabgayi and Rumera–Rukoma, which serve differing populations (close to 500,000 and 175,000, respectively), increases were seen in the met need for EmOC as well as the proportion of deliveries that were complicated. This suggests a better capacity of facilities to address complications, and increased use of these services by clients. The number of cesarean sections increased, particularly in Gitwe and Kabgayi hospitals. This increase was probably due to the reconstruction of the second OR in Kabgayi and the placement of trained doctors in Gitwe. These developments increased the functional capability of the 3 sites to manage complications. The 2003 evaluation, also noted that there was an increase in the commitment of the hospital leadership to maternal health and in provider confidence, as expressed by both doctors and nurses, in their capacity to manage complications. These reduced the need for referrals to other facilities. Details on CARE’s EmOC work in Rwanda are described elsewhere [19].

In Ethiopia utilization of health services remained low, even with the project. This relates to the broader contextual issues that could not be addressed by an EmOC project—distance and transport barriers, scarce resources, poor management and accountability in health care, and broad inadequacies in the health system. There is no doubt that the hospitals supported by the project still have a

long way to go to reach the minimum acceptable levels of care and utilization. Nevertheless, it is important to recognize that improvements were made within a relatively short period in the face of overwhelming challenges. For example, Adama Hospital, a 120-bed facility and the main hospital in East Shoa zone, was the largest of the project-supported hospitals. It served a population of about 2 million people from at least 3 regions. The hospital had an average patient load of 350 per day, with 105–200 deliveries per month. Staffing shortages and turnovers were prevalent especially among midwives and health assistants in the labor ward. There were 2 obstetricians who covered most obstetric complications, but this could not meet the high demand. The project therefore supported renovations, expansion and equipping of the maternity units in addition to placement of EmOC trained general practitioners. Chihiro and Gelemso hospitals also now have better capacity to address maternal health needs because of the inputs and investments of the project. The Ethiopian government is working to address the human resource challenge by creating a new cadre of staff trained in LSS that can be posted to the rural areas where access to health care is limited by staff shortages.

## 6. Wider impact and implications for sustainability

The project increased the profile of maternal mortality in all 3 countries. In Ethiopia, MoH officials recognize the contribution of the project to increasing national awareness of obstetric emergencies and maternal death. In particular, the technical advisors of the Making Pregnancy Safer program appreciate and acknowledge the lessons and the resources provided by the FEMME project. The government has started to train providers from other regions in LSS, adapted from the FEMME project. The Ethiopian government is working to promote the maternal death review as standard practice for all facilities. There have also been numerous requests for copies of the training materials, protocols and patient registration books developed by the project to support EmOC service delivery in other parts of the country. In this way, the initial project steps serve as building blocks that, through linkages with other program initiatives, facilitate greater efforts to address the high maternal morbidity and mortality in Ethiopia.

While the project was set in just one province in Rwanda, it renewed national attention to EmOC and to safe motherhood in general. The strong collabora-

tion with the national referral hospital, the department of Ob/Gyn, the reproductive health division of the MoH, as well as other partners in safe motherhood provided credibility to the project, and facilitated the adoption of new evidence-based practice on a broader scale. The presence of other health projects such as PRIME II by *IntraHealth* also enhanced this project's accomplishments.

Finally, in Tanzania the partnership with the Bugando Medical Center presented an opportunity for project interventions to achieve broader influence. At the regional level, the EmOC project, along with CARE's other community-based work in Missungwi and Kwimba districts, is credited with contributing to better health care for women, and has been cited as a learning opportunity for other districts in the region. The midwifery training curricula are being adapted for use in other parts of the country to increase provider competence in EmOC.

## 7. Conclusion

Many women in Africa, especially the rural poor, lack access to adequate care during pregnancy and childbirth. This results in a high burden of maternal mortality and morbidity. Existing health facilities are rarely used because they are frequently short of basic supplies and equipment, and providers are unskilled and/or poorly motivated to provide quality care.

The CARE/AMDD collaboration in these 3 countries in Africa responded to these challenges by investing in the strengthening of health systems to provide EmOC. The lessons learned from the project are of 2 types. First, an integrated and comprehensive package of interventions is required to address the multiple causes of poor quality and low utilization of EmOC services. Second, coordinated efforts from various partners at all levels are required. At the local facility levels, comprehensive training programs provide a strong foundation for institutional change. However these efforts should be complemented with other critical interventions that create an enabling environment for quality service delivery. On a broader scale, the active participation of a wide range of stakeholders will enhance the acceptance of new practices and procedures, and ultimately contribute to sustainability.

## Acknowledgments

CARE acknowledges the Bill and Melinda Gates Foundation that provided financial support for this

work through the Averting Maternal Death and Disability (AMDD) program at Columbia University. We recognize and appreciate the contributions of the staff from various sites in Ethiopia, Rwanda and Tanzania where the FEMME project was implemented. CARE also thanks our project partners in the field including members of the district and national health institutions, district and referral hospitals, Ob/Gyn and midwives’ associations and other partners who worked together to strengthen health systems for EmOC in the 3 countries. Special thanks go to Rachel Waxman, Therese McGinn and the AMDD staff for the editorial reviews and support provided to develop this paper.

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