

**Monitoring Safe Abortion Services in Ethiopia:  
Testing a Model to Improve Service Availability, Use and Quality**

**Prepared for the Conference of the  
International Union for the Scientific Study of Population (IUSSP)  
Marrakech, Morocco  
September 2009**

**Janie Benson**, Ipas, Chapel Hill, North Carolina USA

**Tibebu Alemayehu**, Ipas Ethiopia, Addis Ababa, Ethiopia

**Karen Otsea**, Independent Consultant, Durham, North Carolina USA

**Joan Healy**, Ipas, Chapel Hill, North Carolina, USA

**Author Contact Information:**

Janie Benson (corresponding author)

Ipas

P.O. Box 5027

Chapel Hill, NC 27514 US

Phone: 919-960-5594

Fax: 919-929-7687

Email: [bensonj@ipas.org](mailto:bensonj@ipas.org)

Tibebu Alemayehu

Ipas

P.O. Box 63001

Addis Ababa, Ethiopia

Phone: 251-11-663-3378

Fax: 251-11-662-6310

Email: [alemayehut@ipas.org](mailto:alemayehut@ipas.org)

Karen Otsea

Independent Consultant

2005 W. Club Boulevard

Durham, NC 27705 US

Phone: 919-286-3362

Fax: 919-929-7687

Email: [ktosea@earthlink.net](mailto:ktosea@earthlink.net)

Joan Healy

Ipas

P.O. Box 5027

Chapel Hill, NC 27514 US

Phone: 919-960-5596

Fax: 919-929-7687

Email: [healyj@ipas.org](mailto:healyj@ipas.org)

## Abstract

The adoption of interventions and indicators to measure improvements in services to treat emergency obstetric complications (EMoC) has been an important strategy to reduce maternal mortality. Complications of unsafe abortion, while comprising 13% of maternal deaths, are only partially addressed in the EMoC model. This paper reports on the first field application of a tools package to monitor safe abortion care (SAC) in Ethiopia. The SAC package includes a set of indicators to assess the availability, distribution, utilization and quality of services and a group of essential clinical services called “signal functions.” Findings are presented from a study of 50 public facilities in the Tigray region in which providers recorded obstetric complications and abortion cases from 2006-09 and assessed their facilities’ performance of the signal functions. Providers participated in clinical training in provision of abortion and orientation to the SAC approach, and facilities received routine monitoring visits by study team members. Availability and distribution of facilities offering SAC services increased markedly over time, and almost all indicators of utilization and service quality also improved.

## **Background**

### *Safe Abortion Care Monitoring Package*

Reducing high rates of maternal mortality in developing countries has been a major global effort for over 20 years. The adoption of the Millennium Development Goals (MDGs), which includes a reduction in maternal mortality by 75% by the year 2015, has especially underscored the need for political commitment and effective interventions to prevent such deaths. Complications of unsafely-performed abortion, which contribute to about 13% of global maternal mortality, have received much less attention than other obstetric emergencies (World Health Organization 2007).

Measurement of changes in maternal mortality over time is methodologically difficult and expensive to undertake at the population level. Calculation of proportional mortality due to abortion complications presents significant additional challenges. To improve services to treat women with pregnancy-related complications and to offer an alternative, feasible approach to maternal mortality measurement, a group of international organizations proposed a set of health facility-based tools and indicators in the 1990's (WHO et al 2009; UNICEF et al 1997).

Implemented in many countries since then, the monitoring approach assumes that if services for emergency obstetric care (EmOC) are sufficiently available, well-distributed, well-utilized, and of adequate quality, maternal mortality should decline. Although treatment of abortion complications is included in the EmOC package, other essential preventive means to reduce abortion-related mortality---provision of safe induced abortion and postabortion contraception---are not represented.

Building on the EmOC framework, three of the authors proposed a safe abortion care (SAC) monitoring package to fill this need (Healy et al 2006). The SAC model encompasses three elements that contribute to reductions in abortion-related mortality: safe induced abortion; prompt treatment of complications of unsafely-performed abortions, and postabortion contraception to reduce repeat unintended pregnancies and repeat unsafe abortion. Consisting of a set of indicators and a group of SAC signal functions (critical services that facilities must perform in order to prevent and treat abortion complications), application of the package should enable facilities to monitor progress towards achieving recommended levels for the availability and distribution of services by the size of population, utilization of services, and the quality of safe abortion care.

**Table 1** provides the list of ten signal functions which determine the availability and distribution of facilities needed for safe abortion care per population. Health facilities must have actually performed the signal functions in the prior three months to be classified as a “basic” (performed the first six signal functions) or “comprehensive” (performed all ten signal functions). The six basic signal functions are generally more consistent with the capabilities of health centers and include services for first-trimester induced abortion and treatment of abortion complications. The additional four comprehensive signal functions are generally more consistent with hospitals’ capacity and include surgery and blood

transfusion as well as second-trimester induced abortion and treatment of complications. The recommended level of facility coverage is a total of five facilities per 500,000 population, at least one of which is comprehensive.

The SAC indicators listed and defined in **Table 2** are used to monitor facility availability and distribution (as determined by performance of the signal functions), service utilization and quality of care. Recommended levels of achievement of each indicator are also provided.

### *Ethiopia and the Tigray Region*

Ethiopia has a high maternal mortality ratio, 673 deaths per 100,000 live births for the period 1998-2004 (Central Statistical Agency and ORC Macro 2006), and reproductive health experts in the country believe that the proportion due to abortion complications is also excessive, although recent population-based figures are not available. A one-year retrospective review of obstetric complications records in a large specialist hospital in the capital, Addis Ababa, in 2001-02 identified 38 maternal deaths, almost 29% of which were attributable to abortion complications (Berhan and Abdela 2004). The percentage of married women of reproductive age using modern contraception in Ethiopia is 14% (Central Statistical Agency and ORC Macro 2006).

To address the large number of maternal deaths caused by unsafely-performed abortions, the Ethiopian Parliament liberalized the indications for legal abortion in 2004. Indications for legal abortion include: cases of rape or incest, if the woman has physical or mental disabilities, to preserve the woman's life or her physical health, or if the woman is a minor who is physically or mentally unprepared for childbirth. No consent from a spouse, partner or parent is required to obtain a legal abortion and no requirements exist for legal reporting or documenting rape or incest as a prerequisite for obtaining a legal abortion. The national Ministry of Health (MOH) issued guidelines for implementation of induced abortion services in 2006. Ipas, a global reproductive health non-governmental organization (NGO) active in Ethiopia for more than a decade, works with the national MOH and Regional Health Bureaus to train clinical providers and support facilities to treat abortion complications, offer induced abortion services and provide postabortion contraception.

The study authors identified the northern region of Tigray as suitable for piloting the SAC monitoring package. The largely-rural population of 4.314 million is served by 50 public health facilities---12 hospitals and 38 health centers---and there is little out-migration to seek health care in other regions (Population Census Commission 2008). In addition to the public health system, NGO facilities offering reproductive health and abortion services in Tigray include a clinic operated by Marie Stopes International and another from the Family Guidance Associate of Ethiopia, both located in the regional capital of Mekelle. Several for-profit medical clinics also provide abortion services in the region.

**Table 1. Signal functions for Safe Abortion Care**

Signal functions for basic SAC Services	Signal functions for comprehensive SAC services
<ul style="list-style-type: none"> <li>• Administer essential antibiotics</li> <li>• Administer intravenous replacement fluids</li> <li>• Administer oxytocics</li> <li>• Perform removal of retained products for uterine sizes <math>\leq 12</math> weeks</li> <li>• Perform induced abortion for uterine size <math>\leq 12</math> weeks for all legal indications</li> <li>• Provide postabortion contraception</li> </ul>	<p><b>Perform all basic functions plus</b></p> <ul style="list-style-type: none"> <li>• Perform removal of retained products for uterine size <math>&gt;12</math> weeks of pregnancy</li> <li>• Perform blood transfusion</li> <li>• Perform laparotomy</li> <li>• Perform induced abortion for uterine size <math>&gt;12</math> weeks for all legal indications</li> </ul>

Adapted from Healy et al 2006

**Table 2: Indicators for measuring safe abortion care**

STUDY QUESTION	INDICATORS	DEFINITION	RECOMMENDED LEVEL
Are enough facilities providing safe abortion care?	1. Amount of SAC services available.	Number of facilities providing basic and comprehensive SAC	For every 500,000 population: 5 SAC facilities, at least 1 of which offers comprehensive SAC
Are safe abortion care services well distributed?	2. Distribution of SAC facilities.	Number of facilities providing basic and comprehensive SAC in sub-national areas	Minimum: 100% of sub-national areas have adequate level of SAC per recommended levels in indicator 1.
What proportion of services for women with obstetric complications is directed toward abortion complications?	3. Proportion of women treated for obstetric complications that are abortion-related.	<b>Numerator:</b> number of women with abortion complications treated at facility in a given period. <b>Denominator:</b> number of women with obstetric complications treated at facility in the same time period.	Over time, a declining percentage of women with abortion complications
How common are serious abortion complications?	4. Proportion of women treated for abortion complications that are serious.	<b>Numerator:</b> number of women with serious abortion complications treated at facility in a given period. <b>Denominator:</b> number of women with all abortion complications treated at facility in the same time period.	Over time, a declining percentage of women with serious abortion complications
To what extent are induced abortions being provided?	5. Proportion of women who received abortion services that had induced procedures.	<b>Numerator:</b> number of women receiving induced abortion procedures at facility in a given period. <b>Denominator:</b> number of women receiving abortion services at facility in the same time period.	Over time, a shift toward a higher proportion of women receiving induced abortion as a part of all abortion services in facility. Recommended level: approaching 100%
Are appropriate technologies being used?	6. Proportion of uterine evacuations performed with appropriate technology.	<b>Numerator:</b> number of uterine evacuation procedures performed with appropriate technology at facility in a given period. <b>Denominator:</b> number of all uterine evacuation procedures performed at facility in the same time period.	Over time, a shift toward a higher proportion of procedures performed with appropriate technology as per WHO recommendations. Recommended level: 100%
Are women who have received abortion care provided contraception before being discharged from the facility?	7. Proportion of women who received abortion services that obtained contraception.	<b>Numerator:</b> number of women receiving abortion services who obtain a modern contraceptive method before leaving facility in a given period. <b>Denominator:</b> Number of women receiving abortion services in facility in the same time period.	At least 60% of all women receiving abortion services

Adapted from Healy et al 2006

## **Study Objectives**

This paper reports the results from the application of the SAC monitoring package in the Tigray region of Ethiopia.

Objectives of the study are to:

1. Describe the introduction of the SAC monitoring approach in 50 public health facilities; and
2. Document the availability, utilization and quality of SAC services in these facilities over time.

## **Methods**

The study consisted of retrospective review of obstetric and abortion records and key informant interviews for the baseline period and prospective monitoring of facility performance in the provision of SAC services to women presenting for treatment of abortion complications or induced abortion following the introduction of the SAC model. The two-year pilot project began in May 2007 and concluded in May 2009 and consisted of the following components: 1). baseline assessment of SAC performance in the 50 public health facilities in the region; 2). two to three-day orientation to the SAC package for providers from the facilities; 3). routine monitoring visits to the facilities during which facility performance data were collected; and 4). analysis and reporting of facility performance findings comparing baseline to endline time periods.

### *Clinical and service delivery Interventions*

Following release of the national abortion service guidelines and prior to implementation of the SAC monitoring activities, Ipas Ethiopia and the Tigray Regional Health Bureau (TRHB) began a series of trainings in comprehensive abortion care for clinical providers in the 50 facilities. Providers primarily included mid-level practitioners such as midwives, health officers and clinical nurses who are often the lead providers in health centers, and some physicians. All hospitals and some health centers already offered treatment of abortion complications (postabortion care) and the trainings were designed to enable the facilities to add induced abortion to their services and ensure that women received postabortion contraception if they wished. The two-week courses encompassed both didactic and supervised, hands-on practice, including use of manual vacuum aspiration (MVA) for first-trimester induced abortion, instrument processing, pain management, clinical assessment of patients, pre- and post-procedure counseling, postabortion contraceptive counseling and method delivery, and recordkeeping. Along with medical abortion methods, MVA is recommended by the World Health Organization for first-trimester induced abortion (WHO 2003). The clinical trainings occurred between August 2006 and August 2008, prior to and continuing after the baseline period ended in March 2007 (see below). Provider training in second-trimester abortion did not occur during the project period.

Following the training events, the MOH and Ipas provided MVA instruments to the 50 facilities and staff from the TRHB and Ipas made periodic “facilitative supervisory” visits to talk with providers, assess availability of clinical supplies, MVA and contraceptive methods, and, if possible, observe procedures. The national MOH and Ipas had developed a standardized abortion case logbook that was implemented in public health centers and hospitals throughout Ethiopia. In Tigray, the abortion log began to be used in 2005, with providers recording clinical and other information about clients seeking postabortion care or induced abortion services. A variety of separate logbooks for recording information on cases of other types of obstetric complications (such as postpartum hemorrhage, obstructed labor and toxemia) are used in public health facilities throughout Ethiopia, including Tigray. The types and structure of these log books were not modified as part of the interventions to improve abortion care.



Medical abortion is a more recent addition to abortion services in Tigray. Although medical abortion was included in the 2006 national service guidelines, needed commodities (a combined package of two drugs, mifepristone and misoprostol) were not available in the country until late 2008 and have gradually been distributed nationally to health facilities since then. Specific training on medical abortion for providers began in Tigray region in August 2008, although at the last SAC monitoring visit in May 2009, few facilities had medical abortion commodities or services available.

#### *Baseline assessment*

A retrospective baseline assessment of all 50 facilities in the region was conducted in May 2007 (Otsea and Tesfaye 2007). Using standardized data collection instruments, interviewers visited all facilities to collect information on obstetric complications and abortion cases seen in each site for the period April 2006 to March 2007 (Otsea 2007). Obstetric and abortion logbooks were the primary source of data for indicators #3-#7. In addition, data collectors interviewed key informants such as head nurses in the obstetrics-gynecology units or midwife providers to ascertain which signal functions were available in the facility and had been performed in the three months preceding the interview (indicators #1-#2). SAC indicators for service utilization and quality were calculated for each facility and for the region as a whole for the baseline period. Facilities were also classified as meeting the signal function requirements for basic and comprehensive sites, and sites were mapped to determine if an adequate number of SAC-providing facilities were available for the region's population.

#### *SAC orientation*

To account for the training roll-out schedule and to ensure that the facilities had all received clinical training in induced abortion services prior to implementation of SAC monitoring, the 50 facilities were divided into two phases or groups. Thirty-one facilities were considered phase 1 sites, and 19 as phase 2 sites. In November 2007, providers from 28 of the 31 Phase 1 facilities sites participated in a three-day orientation to the SAC monitoring package, and to improve their skills in recordkeeping, calculating and tracking of SAC indicators, including clarification of abortion logbook category definitions, and to update them on specific signal functions that needed special reinforcement such as use of MVA for induced abortion and provision of postabortion contraception. Providers received cards for calculating and graphing quarterly indicator results and other materials. Three phase 1 facilities did not participate in the SAC orientation. A similar two-day SAC orientation was conducted in October 2008 for 18 phase 2 sites, with one site unable to attend.

#### *SAC monitoring visits*

Following the SAC orientation for the Phase 1 sites, the authors, TRHB and other project staff visited those facilities four times over an 18-month period to review quarterly logbook data, interview key informants to determine signal function performance, discuss progress in achieving the recommended indicator levels, and respond to gaps in signal functions. Both obstetric and abortion logbooks were reviewed. Due to budget limitations, only one monitoring visit was made to Phase 2 sites to review two quarters worth of obstetric and abortion log data, interview providers and problem solve on service performance issues.

As a result of questions raised about some of the baseline findings by several providers, during the first monitoring visit in March 2008 we re-examined the obstetric and abortion logs in 15 facilities. The obstetric logs presented particular challenges due to the lack of standardization of content in column headings, format or quantity of logs used. In addition, reports of cases of obstetric complications can be found in multiple records at the same facility or not at all in some health centers. In our review at the 15 facilities, we found a sizably lower number of obstetric complications from the original baseline and a recount of the same time period. We therefore conducted a recount of obstetric

complications at all 50 facilities for the one-year baseline period to better ensure that these cases were not underrepresented. A similar recount of abortion caseloads for the baseline period was not deemed necessary due to the use of the standardized abortion logbook.

#### *Data management and analysis*

Signal function and logbook data from each facility obtained at the baseline visit and at each subsequent monitoring visit were entered into Excel 2007 spreadsheets. Dates of each site's original clinical training, SAC orientation, and monitoring visits were also entered into Excel. All data were converted into SAS 9.1 for analysis. ESRI ArcInfo, version 9.3 software and geographic coordinates for each facility were used to create maps of facility coverage of safe abortion care. The 2007 Ethiopian census data provided population figures for the Tigray region (Population Census Commission 2008).

The SAC indicators were calculated quarterly over three time periods: the year-long baseline for all 50 facilities; the first six months of service delivery performance following their SAC orientation for each group of facilities (Phase 1 and Phase 2); and also for each phase, the last six months of services. For the 19 phase 2 sites that received just one monitoring visit following their SAC orientation in October 2008, the first and last six-month periods were the same.

Initial analysis of the indicators showed that, in general, facilities in both phases made their major improvements between the baseline and the first six months following their SAC orientations. Phase 1 sites maintained or only slightly changed their indicator results between the first and last six month period. To enhance clarity, therefore, we report only the indicator results from the year-long baseline period and the six month period common to both phases (October 2008 through March 2009) for all 50 sites (endline).

Signal function data were collected for each quarter in the baseline and endline periods. Because basic or comprehensive designation is based on the actual performance of signal functions in the preceding three months, we report facilities' status based on their status for the last quarter of the period. For the baseline, the quarter covered January-March 2007, for the endline, January-March 2009. The actual number of basic and comprehensive facility numbers at baseline and endline are compared to recommended levels for the region's population, along with the proportion of facility coverage achieved. Maps are also shown that demonstrate changes in the availability and distribution of facilities offering safe abortion care between the baseline and endline periods. Indicators #3-#7 are calculated for the entire baseline (12 months) and endline (6 months) periods. Obstetric and abortion case numbers and proportion of the indicator achieved in the time period are reported.

We attempted to fit adjusted regression models to determine those factors that might predict endline facility achievement as a basic or comprehensive facility, but were unable to do so due to correlation among the variables of interest and the small number of facilities in the study.

### **Findings**

#### *Availability and distribution of Safe Abortion Care (indicators #1-#2)*

**Table 3** shows the numbers of facilities achieving basic and comprehensive designation according to signal functions performed at the baseline and endline periods. The proportion of recommended facility availability achieved is also

included. For Tigray's 2007 population size, 44 SAC facilities are recommended, 35 basic and 9 comprehensive. In the 2006-07 baseline, a total of 17, or 39%, of facilities had reached the recommended level. The lack of comprehensive facilities was particularly acute, with just 3 of the desired 9 facilities achieving the designation. By the endline period, 38 facilities or 86% of the total recommended for the region had been reached. Facilities had achieved 91% (32 of 35) of basic levels and 67% (6 of 9) of comprehensive.

**Table 3. Trends in achievement of recommended levels of safe abortion care (SAC) for basic and comprehensive facilities, Tigray region, Ethiopia, 2006-09.**

Facility Designation	Recommended Number of SAC Facilities per Regional Population (2007)	Baseline Achieved April 2006-March 2007 (12 months)*		Endline Achieved October 2008- March 2009 (6 months)*	
		<i>n</i>	(%)	<i>n</i>	(%)
<b>Basic</b>	35	14	(40)	32	(91)
<b>Comprehensive</b>	9	3	(33)	6	(67)
<b>Total (Basic + Comprehensive)</b>	44	17	(39)	38	(86)

\*Designation of basic or comprehensive status is based on facilities' signal function performance for the last quarter of the referenced time period. For the baseline, the last quarter is January-March 2007, for the endline, January-March 2009.

Performance at health centers and hospitals for the last quarter of each reporting period was also assessed to further determine those signal functions that were absent most frequently, and hence, prevented the facilities from achieving basic or comprehensive status. At the baseline, lack of performance of first-trimester induced abortion was the most common missing signal function to achieve basic status. Overall, 26 of 38 health centers and four of the 9 hospitals had not provided this service. The second most common missing signal function at baseline for both health centers and hospitals was postabortion contraception. Although all hospitals provided first-trimester treatment of complications at the baseline measure, this signal function was the third most common signal function absent from health centers, tied with provision of parenteral antibiotics. A total of 18 of 38 health centers did not provide these two services.

The number of facilities not performing each signal function for basic status was much lower at endline, and the pattern of missing signal functions had changed somewhat. Performance of first-trimester treatment of complications was the top missing signal function for health centers, followed by postabortion contraception, and first-trimester induced abortion and administration of antibiotics (tied). Eight health centers did not provide first-trimester complications treatment at the endline. One hospital each was missing the treatment of complications and contraception signal functions.

No health centers achieved comprehensive status at baseline, with blood transfusion as the most commonly missed signal function. For hospitals at baseline, second-trimester induced abortion (missed by 8 hospitals) and blood transfusion (missed by 5 hospitals) were the top two absent comprehensive signal functions. By the endline, the most commonly-missed signal functions to achieve comprehensive status remained blood transfusion at almost all health centers and second-trimester induced abortion at 5 hospitals.

Figures 1 and 2 portray maps of the baseline and endline coverage of SAC facilities. The expanded distribution of basic and comprehensive between the two periods is apparent in every sub-regional area. One important example is the improved coverage in the far western area of the region, an especially remote area with difficult terrain.

We also examined changes in the location of service provision during the project, assuming that women are more likely to seek care closest to their home if the more numerous health centers are able to offer basic safe abortion care.

**Table 4** shows that at baseline, most abortion procedures (89%) were performed in hospitals. Just two years later at the endline, this figure had dropped to 64% and more than one-third (36%) of women obtained services at health centers. The marked rise in numbers of abortion cases is also evident. Overall caseload increased from 2301 annually during the baseline to an estimated annual load of 4462 (2 x 2231 for the six months of the endline), a 94% increase. Although facilities' caseloads vary due to population in their catchment area and other factors, if we assume an even distribution of cases across all facilities and all facilities able to offer abortion-related services, the caseload increase does not appear to be burdensome. Health centers would see an average of 3.5 women for abortion care per month, while hospitals would see almost 20.

**Table 4. Trends in location of service provision for abortion cases in public health centers and hospitals, Tigray region, Ethiopia, 2006-09.**

Type of Facility	Baseline Achieved, April 2006-March 2007 (12 months)		Endline Achieved, October 2008-March 2009 (6 months)	
	All Abortion Cases		All Abortion Cases	
	<i>n</i>	(%)	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	246	(10.7)	801	(35.9)
<b>Hospitals (n=12)</b>	2055	(89.3)	1430	(64.1)
<b>Total (n=50)</b>	2301	(100.0)	2231	(100.0)

*Utilization of Safe Abortion Care (indicators #3-#5)*

**Table 5** displays the proportion of cases of obstetric complications due to abortion, including actual caseload numbers for the one-year baseline and the six-month endline periods, by health center and hospital categories. For the baseline, 47% of obstetric complications (including abortion complications) were due to abortion, while at endline, the overall percentage decreased to 35%. The percentage of abortion complications at health centers remained similar over time, while the percentage dropped markedly in hospitals, where it had been especially large---50%--- at the baseline.

To assess whether this change was attributable to changes in overall obstetric complications (denominator) and/or changes in abortion complications (numerator), we compared the numbers of women with obstetric and abortion complications for the two time periods. Since the endline period consisted of six months while the baseline covered one year, we doubled the number of endline cases to obtain a rough measure of comparability. The number of obstetric complications increased by almost 13% between endline and baseline, and the number of abortion complications decreased by 16%. Non-abortion obstetric complications increased 39% between the two time periods (Baseline: 4487-2133 = 2354 non-abortion obstetric complications. Endline: 5064 [2532 x 2] – 1790 [895 x 2] = 3274 non-abortion obstetric complications).

**Table 5. Trends in percentage of cases of obstetric complications due to abortion at public health centers and hospitals, Tigray region, Ethiopia, 2006-09.**

Type of Facility	Baseline Achieved, April 2006-March 2007 (12 months)			Endline Achieved, October 2008-March 2009 (6 months)		
	Abortion Complications Cases	Obstetric Complications Cases (including abortion complications)		Abortions Complications	Obstetric Complications Cases (including abortion complications)	
	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	187	644	(29.0)	186	632	(29.4)
<b>Hospitals (n=12)</b>	1946	3843	(50.6)	709	1900	(37.3)
<b>Total (n=50)</b>	2133	4487	(47.5)	895	2532	(35.3)

In the abortion log books, providers classified patients with abortion complications as “serious, “ if they presented with clinical symptoms such as septicemia, hemorrhage or uterine or other perforation (**Table 6**). At baseline, just over 6% of abortion complications were considered serious, while at endline, 17% were considered so. In addition to a drop of 16% in the numbers of women with abortion complications (denominator), the absolute numbers of serious complications increased from 133 at baseline to an estimated 304 at endline (152 x 2), an increase of 129%. The increase in the proportion of complications classified as serious was especially marked at hospitals, from almost 6% to 19%.

**Table 6. Trends in severity of cases of abortion complications at public health centers and hospitals, Tigray region, Ethiopia, 2006-09.**

	Baseline Achieved, April 2006-March 2007 (12 months)			Endline Achieved, October 2008-March 2009 (6 months)		
	Serious Abortion Complications Cases	All Abortion Complications Cases		Serious Abortion Complications Cases	All Abortion Complications Cases	
	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	22	187	(11.8)	14	186	(7.5)
<b>Hospitals (n=12)</b>	111	1946	(5.7)	138	709	(19.5)
<b>Total (n=50)</b>	133	2133	(6.2)	152	895	(17.0)

To determine if a shift in the reasons women sought care at the facilities was underway, we calculated the proportion of all abortion cases (whether for complications treatment or induced abortion) that were induced services (**Table 7**). The proportion of induced abortion cases rose from 7% to almost 60% of all abortion services. This trend was particularly

notable at health centers, where 77% of abortion procedures were ultimately for induced services. Hospitals, however, offered very little induced abortion during the baseline period but by the endline, care was fairly evenly split between complications treatment and induced services. Almost the same number of women received abortion-related services in the six-month endline period as in the year-long baseline. This almost doubling of women served between the two time periods indicates the marked increase in provision of induced abortion.

**Table 7. Trends in all abortion-related cases that are for induced abortion in public health centers and hospitals, Tigray region, Ethiopia, 2006-09.**

Type of Facility	Baseline Achieved, April 2006-March 2007 (12 months)			Endline Achieved, October 2008-March 2009 (6 months)		
	Induced Abortion Cases	All Abortion Cases		Induced Abortion Cases	All Abortion Cases	
	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	59	246	(24.0)	615	801	(76.8)
<b>Hospitals (n=12)</b>	109	2055	(5.3)	721	1430	(50.4)
<b>Total (n=50)</b>	168	2301	(7.3)	1336	2231	(59.9)

*Quality of Safe Abortion Care (indicators #6-#7)*

**Table 8** shows the findings for the proportion of uterine evacuation procedures performed with recommended technologies, by health center and hospitals. Women receiving care with recommended technologies increased from 29% to 85%, although by the endline period, health centers demonstrated overall stronger uptake over hospitals.

**Table 8. Trends in use of recommended technologies for cases of uterine evacuation (UE) in public health centers and hospitals, Tigray region, Ethiopia, 2006-09.**

Type of Facility	Baseline Achieved, April 2006-March 2007 (12 months)			Endline Achieved, October 2008-March 2009 (6 months)		
	UE Cases with Recommended Technologies	All UE Cases		UE Cases with Recommended Technologies	All UE Cases	
	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	89	242	(36.8)	728	782	(93.1)
<b>Hospitals (n=12)</b>	494	1776	(27.8)	1084	1362	(79.6)
<b>Total (n=50)</b>	583	2018	(28.9)	1812	2144	(84.5)

This difference may be partially explained by the results seen in **Table 9** which break out recommended technologies into procedures for first- and second-trimester abortions. Overall, recommended technologies are used for most (94%) first- trimester procedures, with health centers providing almost all and hospitals a slightly smaller proportion of procedures with these methods. While the increase in recommended methods for second-trimester procedures was substantial, from less than 8% to 45%, the overall proportion was still low relative to first-trimester procedures.

**Table 9. Trends in use of recommended technologies for cases of uterine evacuation (UE) by trimester of pregnancy in public health centers and hospitals, Tigray region, Ethiopia, 2006-09.**

Types of Facilities	1 <sup>st</sup> Trimester						2 <sup>nd</sup> Trimester					
	Baseline Achieved			Endline Achieved			Baseline Achieved			Endline Achieved		
	UE Cases with Recommended Technologies	All UE Cases		UE Cases with Recommended Technologies	All UE Cases		UE Cases with Recommended Technologies	All UE Cases		UE Cases with Recommended Technologies	All UE Cases	
	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	79	161	(49.1)	713	729	(97.8)	10	81	(12.3)	15	53	(28.3)
<b>Hospitals (n=12)</b>	470	1049	(44.8)	907	989	(91.7)	52	727	(7.2)	177	373	(47.5)
<b>Total (n=50)</b>	549	1210	(45.4)	1620	1718	(94.3)	62	808	(7.7)	192	426	(45.1)

Contraceptive uptake by level of facility is seen in **Table 10**. At baseline, less than one-third of women received a modern method of contraception at the time of service but by endline, 78% had done so. Women seen at health centers during the baseline were more likely to have gotten contraception than those at hospitals and by the endline, performance of health centers had increased and exceeded that of hospitals.

**Table 10. Trends in contraceptive acceptance by women obtaining abortion care at public health centers and hospitals, Tigray Region, Ethiopia, 2006-09.**

Type of Facility	Baseline Achieved, April 2006-March 2007 (12 months)			Endline Achieved, October 2008-March 2009 (6 months)		
	Abortion Cases Receiving Contraception	All Abortion Cases		Abortion Cases Receiving Contraception	All Abortion Cases	
	<i>n</i>	<i>n</i>	(%)	<i>n</i>	<i>n</i>	(%)
<b>Health Centers (n=38)</b>	124	246	(50.4)	672	801	(83.9)
<b>Hospitals (n=12)</b>	582	2055	(28.3)	1068	1430	(74.7)
<b>Total (n=50)</b>	706	2301	(30.7)	1740	2231	(78.0)

## **Discussion and Conclusions**

### *Discussion of Key Findings*

The performance of 50 public health facilities in Tigray region demonstrated notable improvements over time in almost all measures of safe abortion care availability, distribution, utilization and quality of services. The interventions included training of clinical providers, equipping and support to service delivery infrastructure, supervisory and monitoring visits, and introduction to the SAC package for tracking facility performance. This thorough approach contributed to widespread availability and distribution of SAC services in the region by the end of the project, especially among health centers. Gaps in the number of comprehensive facilities remained, likely due to the fact that provider training in second-trimester abortion had yet to occur in hospitals in the region. Related signal functions and use of appropriate technologies for these later procedures were therefore much less likely to be available.

A marked shift in the location of abortion service delivery occurred during the pilot project. Abortion services in the baseline period were largely confined to hospitals but by the endline, just over one-third of abortion cases were seen at health centers. This likely parallels the increase in induced abortion provision, as mid-level providers working at health centers were trained and gained access to MVA and other supplies. Furthermore, some health centers missed the “basic” designation because they had not treated a first-trimester abortion complication in the preceding three months, partially reflecting the transition from abortion complications to safe, induced abortion. Of the 11 health centers that did not meet the threshold for basic SAC status at the endline, nine had not treated an abortion complication in the preceding three months, and only one of these had treated any complication in the quarter prior to that. None of the 11 were treating abortion complications or providing induced abortion at the baseline. Expanded availability of safe abortion care at health centers is particularly important in the rural environment of the region.



Abortion complications as a proportion of all obstetric complications is an especially critical indicator for Ethiopia, given the country's high maternal mortality figures, as well as the perceived large contribution of unsafe abortion to these deaths. The drop in the proportion from abortion complications over a relatively short time period is notable, from 47% to 35%, especially at hospitals. While the absolute estimated number of cases of abortion complications declined between the two periods, at the same time, non-abortion obstetric complications rose 39%. A real drop in abortion complications did occur but the spike in other obstetric complications invites a cautious interpretation of the magnitude of this indicator. Although improvements in obstetric complications recordkeeping was not a significant project activity, it is possible that facility staff placed more attention to recording this information in logbooks and caseload numbers consequently rose during the endline. In addition, the Tigray RHB has undertaken some efforts in recent years to enhance treatment of obstetric complications, including training of surgical teams comprised of health officers and operating room and anesthesia nurses, to expand provision of Caesarian section and repair of ruptured uterus, along with other emergency procedures at health centers. Addition of this capacity over time could have contributed somewhat to the rise in non-abortion obstetric complications by the endline period as more women and their families became aware of the services and sought treatment. Most importantly, however, the likely increase in these obstetric complications is worrisome and should spark further analysis of trends on the ground.

Several factors probably affected the increase in the proportion of all abortion complications considered "serious." During the SAC orientation, providers received training in recordkeeping, with a particular emphasis on the definition of serious complications as providers expressed uncertainty about the definition of the category. The project team also subsequently prepared wall charts with definitions of certain log book categories (including serious complications) that were posted in the health facilities. These interventions could have led to improved log book recording of complications by the endline period as providers were more likely to distinguish between a moderate versus serious complication than before.

In a 2003-07 study in a large specialist hospital in Addis Ababa, in which researchers reviewed the case records of abortion complications two years before and two years after the passage of abortion legislation, the number of abortion complications cases fell, however, the case fatality rate of abortion increased from 1.1% in 2003 to 3.6% in 2007 (n=773). The authors note that late gestational age, history of interference and presenting after the new abortion law were significant predictors of mortality (Gebrihiwot and Liabsuetrakul 2008). Like the increase in serious complications in Tigray, this finding could indicate that during the early period of implementation of legal, induced abortion, women who can most readily access safe care will do so. Those who are less able to obtain safe services are also the most likely to seek care later in pregnancy or turn to the most unsafe providers, and hence, have a disproportionate impact on the severity of complications seen. Abortion service delivery expansion in Tigray have also been accompanied by community outreach efforts conducted by the TRHB to inform women about the availability of safe services and the need to seek care for treatment of complications. Seriously ill women may have hence been more likely to seek care for their complications by the endline period.

The provision of safe, induced abortion increased dramatically over the two-year period, both in the percentage of all abortion cases and in absolute numbers. All facilities had begun to offer induced abortion by the endline period and health centers especially added this service to their facility's range of care offered. Furthermore, two indicators of service quality showed strong positive trends. Use of recommended technologies for uterine evacuation and contraceptive provision both increased. For first-trimester procedures, MVA has had strong uptake, especially in health centers. The need for improvements in use of recommended technologies for second-trimester abortion is especially

acute at hospitals where the vast majority of women needing this type of care are treated. National MOH policy limits second-trimester abortion treatment and induced abortion to hospitals. In addition, during this transition period as more women learn about and seek safe services, the remaining complications cases may be those who are the most difficult to treat and require specialized skills, particularly for later gestation pregnancies.

The overall improvement in contraceptive acceptance is especially heartening given the difficulties in commodities' supply historically experienced by the national family planning program and overall low national contraceptive prevalence. While the project team did not routinely collect data on the types of methods received by abortion clients, during the monitoring visits, we noted that a range of short-term methods was readily available in most facilities, including oral contraceptives, hormonal injectables and condoms. By the last visit in May 2009, longer-acting hormonal implants were beginning to be available in some locations. The choice of IUDs and sterilization remains low, although increased efforts in provider training and availability of long-term and permanent contraceptive methods are underway. Especially in health centers, providers often kept a supply of contraceptive methods in the same room or nearby area where abortion services were offered. The on-site provision of methods, versus referral of abortion clients elsewhere for contraceptive services, is well-documented as the most effective approach (Solo et al 1999). Continued emphasis by the TRHB to ensure the availability of counseling and short-, long-term and permanent methods for women receiving abortion-related services in hospitals and health centers is needed.

### *Study Limitations and Challenges*

Our study had several limitations. First, our assessment was organized around the implementation of an array of program interventions. The practicalities of schedules, budgets and training roll-out plans and other factors meant that our study design was not as ideal as we would have chosen. From both a logistic and measurement perspective, incorporating all 50 facilities into the study at the same time following clinical training and SAC orientation would have been preferable to minimize variations in the length of facilities' and providers' post-intervention participation. The high turn-over of providers especially at health centers was noted by our last monitoring visit, when many of the providers we interviewed had not participated in the original SAC orientations. It is a positive sign that facility performance at the endline remained high in spite of personnel changes.

We also did not have a comparison set of facilities that could have informed our evaluation of the effectiveness of the interventions. A pre-post comparison with a group of similar facilities with no special abortion training or SAC orientation and monitoring or even a different configuration of activities would have shed light on which intervention components were the most worthwhile in improving facility performance.

Logbook recording for obstetric complications was a challenge. While we reviewed the major types of non-abortion obstetrics complications during the SAC orientations, it was difficult to determine if these efforts had any impact since the obstetric logbooks did not change during the course of the study. As noted previously, a variety of logbooks for obstetric complications exist in facilities and this lack of standardization likely contributes to inaccuracies.

Our monitoring team noticed more complete use of the categories in the abortion logbook during the course of the study. However, in the final months of the project, the national MOH began testing a new abortion care logbook in several facilities that is part of a new health management information system (HMIS) for Ethiopia. Several key categories for SAC monitoring and analysis are absent in the new logbook, including postabortion contraceptive uptake,

and it also does not accurately represent all legal indications for abortion. During the course of the pilot project, some facilities had created their own column for recording postabortion contraception in the new logbook, but others had not and therefore, these counts were missing from those facilities. Also, a few facilities began to use both the “old” and “new” abortion log books, recording abortion cases in both books. It is difficult to assess the impact of these changes on our findings but we suspect that it is not major, given the debut of the new logbook in the latter months of the study and the very few number of facilities that totally discarded the previous, more comprehensive log book for abortion procedures.

Differences in the Gregorian calendar and the Ethiopian calendar required modifications of some of the data collection tools. We initially used the Gregorian calendar to set time periods on our data collection forms. However, facility logbooks record information according to the Ethiopian calendar, which differs in the start of the new year and length of months. Moreover, the Ethiopian calendar is roughly seven years behind the Gregorian. These differences created some confusion in the early monitoring efforts which we remedied with hand corrections on the tools. For the final six-month data collection period in all 50 facilities, the data collection tools were printed to reflect the Ethiopian calendar date and match the facilities’ reporting periods. We believe that this issue did not lead to any appreciable errors or differences in our counts.

### *Conclusions*

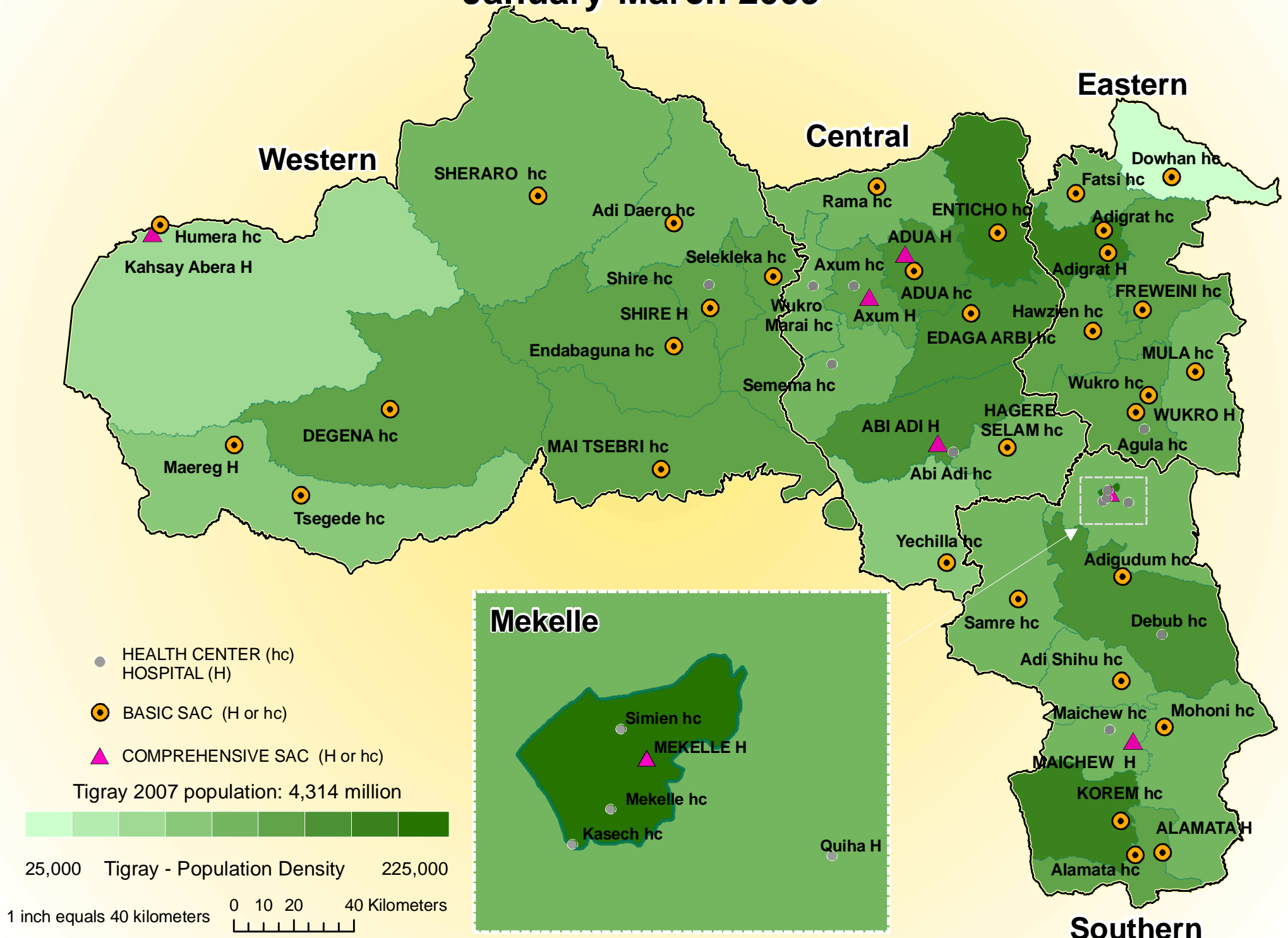
The SAC package allowed the facilities to use existing reporting systems to capture how well their facilities were performing over time. The relative simplicity of the SAC approach holds an advantage by allowing providers and facilities to focus on the minimum elements needed for adequate access to and quality of safe abortion care. As services mature, further performance assessment will be required, including review of maternal deaths and “near-misses,” routine observation of clinical practice, and obtaining women’s perspectives on service quality, pain management, privacy, and interactions with facility staff. If the new HMIS logbook is ultimately adopted in its current form, facilities and regional health bureaus and the national MOH will not be able to accurately calculate the complete set of SAC indicators, a loss of invaluable information for tracking performance.

Our findings captured largely positive trends in 50 public health facilities in a region in Ethiopia in the aftermath of abortion law liberalization and initial service delivery implementation. These results represent the first field application of the SAC approach that is especially informative in a fast-changing environment like Ethiopia’s. Health facilities in Tigray have made rapid improvements in their abortion services. In addition to sustaining these gains, challenges remain in the areas of second-trimester services, implementation of medical abortion as a safe and effective additional option, expansion of contraceptive choices, and informing women about their right to abortion and the availability of safe services. Continued focus on safe abortion care will lead to the achievement of recommended levels of availability, quality and use of life-saving care to reduce the unacceptably high and preventable abortion mortality in the region.

# Figure 1: Distribution of public sector health facilities in Tigray, Ethiopia January-March 2007



# Figure 2: Distribution of public sector health facilities in Tigray, Ethiopia January-March 2009



## References

- Berhan Y and Abdela A. 2004. Emergency obstetric performance with emphasis on operative delivery outcome: Does it reflect the quality of care? *Ethiopian Journal of Health Development* 18, 96-107.
- Central Statistical Agency [Ethiopia] and ORC Macro. 2006. *Ethiopia Demographic and Health Survey 2005*. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ORC Macro.
- Gebrehiwot Y and Liabsuetrakul T. 2008. Trends of abortion complications in a transition of abortion law revisions in Ethiopia. *Journal of Public Health* 31, 81-87.
- Healy J, Otsea K and Benson J. 2006. Counting abortion so that abortion counts: Indicators for monitoring the availability and use of abortion care services. *International Journal of Gynecology and Obstetrics* 95, 209-220.
- Otsea K. 2007. Workbook for monitoring safe abortion care provision. Chapel Hill, NC: Ipas.
- Otsea K and Tesfaye S. 2007. Monitoring safe abortion care service provision in Tigray, Ethiopia. Chapel Hill, NC: Ipas.
- Population Census Commission, Federal Democratic Republic of Ethiopia. 2008. Summary and statistical report of the 2007 population and housing census. Addis Ababa: United Nations Population Fund.
- Solo J, Billings DL, Aloo-Obunga C, Ominde A and Maukumi J. 1999. Creating linkages between incomplete abortion treatment and family planning services in Kenya. *Studies in Family Planning* 30, 17-27.
- World Health Organization, UNFPA, UNICEF and AMDD. 2009. Monitoring emergency obstetric care: a handbook. Available at: <http://www.unfpa.org/public/cache/offonce/publications/pid/3073>. Accessed August 11, 2009.
- UNICEF, WHO and UNFPA. 1997. Guidelines for monitoring the availability and use of obstetric services. New York: UNICEF.
- World Health Organization. 2003. Safe abortion: Technical and policy guidance for health systems. Geneva: World Health Organization.
- World Health Organization. 2007. Unsafe abortion, global and regional estimates of the incidence of unsafe abortion and associated mortality in 2003. Fifth edition. Geneva: WHO.