The Contribution of Non-Physicians In the Provision of Comprehensive Abortion Care: The Case of Tigray, Ethiopia

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Synopsis: This study demonstrates that non-physicians health care workers can safely provide comprehensive abortion services. These providers do not perform significantly worse than physicians.

Abstract

Objective: To examine whether non-physicians providers perform worse than doctors in the provision of abortion services, by assessing results from a pilot project in Tigray, Ethiopia designed to expand access to safe abortion services by training non-physician providers and introduce medication methods. **Methods:** We explore the types of procedures providers used, and the success of these treatments. We then use multivariable logistic regression to explore whether non-physician providers have significantly different probabilities of treatment success than doctors. **Results:** At all types of health facilities, pregnancy terminations were the most commonly needed procedure. In hospitals and health centers, where nurses are available, these providers were performing most services. All types of health providers relied primarily on medication abortion for safe terminations. In bivariate analyses and multivariable logistic regression controlling for a variety of confounders, provider type was not significantly associated with treatment outcomes among those receiving safe terminations. **Conclusions:** Non-physicians are as good as physicians in the provision of abortion-related services. The use of these groups of providers especially when medication methods are available is paramount in the expansion of access to abortion services.

Introduction

Access to safe abortion is a necessary step toward reducing maternal morbidity and mortality. In 2008, nearly half of the 43.8 estimated abortions that occurred globally were considered unsafe [1], and 98% of unsafe abortions took place in the developing world [2], in precisely the countries where existing health infrastructures are often unable to meet the needs of all women. Women who are young, poor, and living in rural areas are less likely to receive adequate abortion services, making them more likely to resort to unsafe practices [3, 4].

While the exact burden of unsafe abortion is nearly impossible to measure and thus unknown, it is widely understood that significant reductions in maternal mortality cannot be achieved while deaths associated with unsafe abortion remain so common [5]. Unsafe abortion is recognized as a major contributor to maternal mortality worldwide; it is estimated that 70,000 women die annually as a result of unsafe abortion [2]. Hospitalizations resulting from unsafe abortion are common worldwide [6], and hospital-based studies of morbidity associated with unsafe abortion indicate that the burden is high [7]. Poor women are more likely than non-poor women to experience complications following an unsafe abortion, and are less likely to receive medical treatment following an unsafe abortion if they need it [4].

Studies conducted in Uganda and Nigeria have found that the cost of unsafe abortion can be very high. Post-abortion care can include expensive treatments, medicines, sometimes prolonged hospital stays, and the out-of-pocket cost to an individual patient are typically much more than what poor women can afford [8, 9]. Although data on abortion-related costs are scarce, it has been estimated that the total cost of unsafe abortion to the developing world is likely around $500 million. Furthermore, the loss of productivity that

developing economies experience as a result of unsafe abortion-related morbidity and mortality may be as high as $400 million [10].

With the need for abortion services so great, especially in parts of the world where trained medical professionals and expensive equipment are unavailable, new and relatively easy technologies to provide safe abortion and post-abortion care, such as medication methods, are essential [4, 11-13]. Task shifting of abortion-related services offers a safe, effective, and scalable way of ensuring that more women have access to such services.

Medication abortion and manual vacuum aspiration (MVA) have the ability to safely and easily reduce abortion-related morbidity and mortality significantly, particularly when linked with task shifting to enable nurses and other mid-level providers to perform these services [12, 14-16]. Mid-level providers have safely performed abortion-related procedures in a number of contexts, and have also been a key asset in expanding knowledge of and access to information and services related to abortion [17-20]. When given the right training, mid-level providers have been able to provide medication abortion and MVA at similar levels of safety and efficacy as doctors, and patients typically report the same level of satisfaction [17, 18]. In many settings where doctors are scarce, mid-level providers have been performing abortions, prompting researchers and health professionals to call for better, more formalized training to allow such providers to more safely offer abortions [11, 21].

In 2005, the government of Ethiopia changed the provision of abortion services to women under a number of circumstances. According to the revised penal code, a woman's statement of rape, incest, or being underage is adequate to receive safe abortion services.

Since the decriminalization of the abortion law in 2005, progress has been made in Ethiopian health facilities improving the quality of safe abortion services offered; however,

significant challenges remain. In 2008, only 27% of all abortions were safely performed in health facilities, indicating that unsafe abortion remains common, and rural women are at increased risk for experiencing an unsafe abortion and subsequent complications [23]. The morbidity associated with unsafe abortion is also high in Ethiopia, with many poor and rural women unable to access appropriate post-abortion care [24]. However, recent efforts to improve access to abortion-related services have been promising. For example, a recent evaluation of a safe abortion care program in Ethiopia found that focusing attention on providing comprehensive post-abortion services to women, including family planning counseling, can greatly improve the quality of services [25].

We analyze data from the Comprehensive Abortion Care (CAC) Pilot Project in Tigray, Ethiopia, a project designed to safely and effectively expand access to abortion-related services at all levels of the health care system. The project was undertaken in three areas of the Tigray region. Figure 1 shows a map of the region and the areas in which the project took place. Personnel at all levels were trained in providing CAC services. This project expanded upon existing medical protocols for the provision of safe termination and treatment of incomplete abortion and involved the training of doctors, nurses, clinical officers, and health extension workers (HEWs). HEWs at health posts, who were previously not authorized to provide either of these services, were trained in provision of safe termination at up to 9 weeks' gestation and treatment of incomplete abortion at up to 12 weeks' gestation, both with misoprostol. They were also trained to make accurate referrals to higher-level health facilities for women who were greater than nine weeks' gestation and sought safe termination, had complications, or if misoprostol alone was insufficient for treatment of incomplete abortion. See Figure 2 for details of the services provided and referral linkages of this project. The

project was collaboration between the Tigray Health Bureau, the Bixby Center at the University of California, Berkeley and venture Strategies Innovations.

Materials and methods

All measures were collected prospectively from individual patient records kept by service providers at a patient's initial visit and any subsequent follow-up visits. These records were collected using a Service Delivery Form, a data collection tool designed specifically for this study. For the purposes of the present study, only women arriving for a safe termination or treatment of incomplete abortion are analyzed.

The success of a treatment was established at the follow up visit; if additional treatment was needed or the patient was referred elsewhere, she was considered to have had an unsuccessful outcome. Service Delivery Forms also recorded the level of health facility visited by the patient (hospital, health center, or health post), the type of health provider the patient saw, the treatment she sought, and the method used for her treatment. Additional covariates used in these analyses, such as women's age, obstetrical history, education level, and marital status, were also self-reported by patients, and these data were also extracted from patients' Service Delivery Forms. Service Delivery Forms also recorded whether women received family planning counseling and service provision, if desired, at their initial visit and at follow-up visits.

We first explore the baseline socio-demographic characteristics of women treated as part of this pilot project. We then examine which procedures were being performed most commonly at each type of health facility, which type of health provider was performing them, and which methods of treatment were most commonly used. For women who had follow-up

data available, we then explore how successfully each type of health provider performed safe terminations, and how effective each treatment method was.

Using multivariable logistic regression we explore whether, for women requesting pregnancy termination, the type of provider a woman received was associated with a successful outcome, controlling for facility type, gestational age, and other relevant socio-demographic characteristics that were considered confounding variables. Because HEWs were required to refer all patients with more than 9 weeks' gestational age, one set of analyses were restricted to patients who were treated at 9 weeks' gestational age or less. A separate analyses was conducted excluding HEWs to examine the association between mid-level and successful treatment at greater than 9 weeks' gestational age.

Informed consent was obtained from all women, and ethical approval was granted by the Committee for the Protection of Human Subjects at the University of California, Berkeley (CPHS #2009-2-13) and the Bureau of Health of the Government of the Regional State of Tigray.

Results

Table 1 describes the characteristics of women seeking abortion-related services in the relevant health facilities. A total of 4354 women were seen. Most of these women were seen at hospitals (64%) or health centers (34.8%). On average, the characteristics of women visiting hospitals and health centers are very similar, but women visiting health posts reported being older, having less schooling, and having more pregnancies, births, and abortions. The majority of women visiting health posts were married, in a union, or cohabiting (52.1%). While 52.1% of women seen at hospitals and 64.2% of women seen at health centers reported living less than 1 hour away from a health facility, only 21.9% of women seen at

health posts reported less than 1 hour of travel time. Across all types of facilities, most women reported that their current pregnancy was mistimed, meaning that the pregnancy happened sooner than desired.

After initial visit, only 2,313 women returned for a follow-up visit (53%); subsequent analyses addressing treatment method and success address only this group. As Table 1 shows, the women returning for a follow-up visit did not differ meaningfully from those who did not in terms of age, obstetrical history, marital status, education, distance to health facility, or desire for current pregnancy.

In Table 2 and all subsequent analyses, we have excluded the 67 women who were diagnosed with intrauterine fetal death; our analyses focus only on the women who received pregnancy termination or were treated for incomplete abortion. Table 2 summarizes the type of service performed at each level of health facility and the level of providers performing these procedures. At all levels of health facilities, pregnancy terminations were the most commonly needed service, accounting for 92% of all studied procedures in hospitals, 97.5% of procedures in health centers, and 89% of procedures in health posts. In hospitals and health centers, where nurses are available, these providers were performing the majority of services.

Table 3 describes the methods used by providers to offer pregnancy termination and treatment for incomplete abortion, addressing only the 2,313 women for whom follow-up data were available. All levels of health providers relied primarily on medication for pregnancy terminations, mostly mifepristone-misoprostol, with the exception of HEWs that were only allowed to use misoprostol. Table 3 also describes the success of each treatment method.

Overall, medication abortion was very effective for both pregnancy termination and treatment of incomplete abortion.

Table 4 summarizes the success of providers in performing pregnancy terminations and treatment of incomplete abortions. Among clients for whom follow-up data were available, 93% of safe terminations provided by doctors were successful, compared with 76.8% of terminations provided by clinical officers and 85% of terminations provided by nurses.

The results of multivariable logistic regressions are shown in Table 5. In both sets of analyses, the odds of having a successful pregnancy are not significantly lower for nurses or clinical officers than they are for doctors, when controlling for type of procedure, facility type, gestational age, and socio-demographic characteristics. The one exception seems to be clinical officers, who seem to have performed significantly worse than doctors (OR 0.17, 95% CI (0.043, 0.688)) in the analysis restricted to patients with gestational age of more than 9 weeks. It was not surprising that gestational age was also significantly associated with likelihood of successful termination. For each additional week of pregnancy the odds of success was reduced by 18% (OR 0.82 95% CI 0.718-0.935) in the group of terminations up to 9 weeks' gestation and by 11% (OR 0.897 95% CI 0.857-0.939) among those in the group of terminations with more than 9 weeks' gestation.

Discussion

Our findings demonstrate the need for comprehensive abortion services in this community, and the potential for expanding access to such services by training mid-level health providers to perform them. Women receiving care in health posts are, on average,

older, less educated, and have more pregnancies and births than women visiting health centers. In many rural areas, health posts provide the only health services available for many miles, and they often serve poorer rural communities. The fact that women from these communities are typically more disadvantaged and have more pregnancies than their urban counterparts points to the need for stronger services in rural areas.

The services provided through the CAC intervention were largely safe and effective. Overall, of women for whom follow-up data was available, 83% of women seeking terminations and 92% of those seeking treatment for incomplete abortion had a successful treatment. Nurses in CAC facilities provided most of these services, even in hospitals, where doctors were available. Furthermore, both safe terminations and treatment of incomplete abortions provided by non-physicians were successfully treated. This evidence supports the fact that CAC services were generally safe and effective overall, and that non-physicians could be relied upon to provide these services.

The relative shortage of doctors and the many demands on their time is a challenge in the region, and is the reason why policy makers and program planners decide for non-physicians to take on many of the doctors responsibilities [26]. For CAC services in particular, non-physicians contribution is a a safe and effective way to expand access to these services.

The use of medication abortion is also a crucial step in expanding access to abortion services. As this study demonstrates, misoprostol, either alone or in conjunction with mifepristone as necessary, can be administered safely and successfully by mid- and low-level providers. Prior to the initiation of the CAC intervention, MVA was the most common form of uterine evacuation in hospitals and the only method available in selected health centers

(those with clinical officers). The high numbers of safe terminations and incomplete abortion treatments performed using medication illustrates providers' ability and willingness to quickly adopt these new technologies and use them safely. It is especially important that HEWs, who had no prior training in the provision of abortion-related services, were also successfully trained to perform abortions using misoprostol for women who were less than 9 weeks pregnant, and to refer women to other health facilities after 9 weeks. The success of mid- and low-level providers in performing safe terminations and treating incomplete abortion using medication is an important step toward expanding access to such services.

Because the outcome of interest in multivariable analyses was initial treatment success, they do not account for the fact that initial treatment "failure" included cases where providers appropriately made referrals to higher-level facilities or to physicians. Only one patient in our study had a treatment that failed altogether; most received the appropriate referrals and services when necessary. Thus, in addition to being statistically non-significant, differences in treatment success across providers represent a small fraction of women overall, the majority of whom received the appropriate services following initial treatment. These findings point to the importance of the referral protocols put in place by this project and the need for successful task shifting to include appropriate protocols for ensuring that more complicated cases are seen by more skilled providers as necessary.

One of the limitations of this analysis is the fact that we do not have data on treatment success for about half of the women seem during the CAC implementation. Losses to follow-up can be high in such types of services, and loss is often only minimized with extensive efforts to locate women receiving services and to encourage them to return to the health clinic [27]. It is argued that when relieved of an affliction such as pregnancy termination,

many women decide not to return. Nonetheless, the fact that the women in our study who did not return for a follow-up visit look very similar to the women who did return is encouraging, and our result on the role of non-physicians in the provision of CAC services is still useful.

Task shifting of abortion-related services provides an opportunity to offer such services safely, cheaply, and broadly. When doctors are scarce and overworked, mid-level providers are increasingly performing duties for which they have not traditionally been trained. Training mid-level providers to perform abortion-related services allows health facilities to expand such services, thereby providing them to rural women for whom such services have traditionally been inaccessible. As this study demonstrates, it is possible to train such providers to safely and accurately assess gestational age, to perform safe terminations and treat incomplete abortions using medication, and to make the appropriate referrals to higher-level providers when necessary. Promoting task shifting of these services provides an important opportunity for health systems to offer abortion-related services to all women.

Table 1: Socio-demographic characteristics of women seeking abortion

	Hospital	Health Center	Health post	Total	Returned for Follow-up	Did not return for follow-up
N	2,765 (63.5%)	1,516 (34.8%)	73 (1.7%)	4,354	2364	1990
Mean Age (min, max)	22.9 (14, 48)	22.7 (12, 48)	27.3 (15, 42)	22.9 (12, 48)	22.9 (12,48)	23.0 (12,46)
Obstetrical history (mean)						
Gravida (min, max)	2.1 (0, 18)	2.1 (0, 13)	3.1 (0, 10)	2.1 (0, 18)	2.1 (0, 14)	2.2 (0,18)
Abortions (min, max)	0.14 (0, 8)	0.25 (0, 11)	0.39 (0, 4)	0.18 (0, 11)	1.0 (0,12)	1.1(0,11)
Parity (min, max)	1.0 (0, 11)	1.0 (0, 12)	2.7 (0, 9)	1.0 (0, 12)	0.2 (0,11)	0.2 (0,6)
Mean gestational age in weeks (min, max)	10.6 (3, 36)	7.3 (3, 22)	8.0 (3, 20)	9.4 (3, 36)	9.5 (3,35)	9.3(3,36)
Education level						
Illiterate	497 (18.2%)	268 (17.7%)	41 (56.2%)	806 (18.5%)	444 (18.8%)	362 (18.2%)
Primary	764 (28.0%)	463 (30.5%)	15 (20.5%)	1,242 (28.5%)	672 (28.4%)	569 (28.6%)
Secondary	1,090 (40.0%)	516 (34.0%)	9 (12.3%)	1,615 (37.1%)	885 (37.4%)	730 (36.7%)
Above secondary	377 (13.8%)	136 (8.97%)	6 (8.2%)	519 (11.9%)	238 (10.1%)	281 (14.1%)
No response	37 (1.3%)	133 (8.7%)	2 (2.7%)	172 (3.9%)	124 (5.3%)	48 (2.4%)
Marital status						
Single	1,639 (59.3%)	868 (57.3%)	16 (21.9%)	2,523 (58.0%)	1367 (57.8%)	1156 (58.1%)
Married/ in union/ cohabiting	755 (27.3%)	387 (25.5%)	38 (52.1%)	1,180 (27.1%)	587 (24.8%)	592 (29.7%)
Widowed/divorced	243 (8.8%)	87 (5.7%)	9 (12.3%)	339 (7.8%)	193 (8.2%)	146 (7.3%)
No response	128 (4.6%)	174 (11.5%)	10 (13.7%)	312 (7.2%0	216 (9.1%)	96 (4.8%)
Average distance to health facility in hours						
<1	1,440 (52.1%)	974 (64.2%)	16 (21.9%)	2,430 (55.8%)	1430 (60.5%)	999 (50.2%)
1 to 2	596 (21.6%)	174 (11.5%)	34 (46.6%)	804 (18.5%)	400 (16.9%)	404 (20.3%)
2 to 3	231 (8.3%)	96 (6.3%)	13 (17.8%)	340 (7.8%)	176 (7.5%)	164 (8.2%)
>3	429 (15.5%)	107 (7.1%)	8 (11.0%)	544 (12.5%)	253 (10.7%)	291 (14.6%)
No response	69 (2.5%)	165 (10.9%)	2 (2.7%)	236 (5.4%)	104 (4.4%)	132 (6.6%)
Desire for current pregnancy						
Unplanned, wanted to get pregnant later	1,812 (65.5%)	940 (62.0%)	41 (56.2%)	2,793 (64.1%)	1451 (61.4%)	1342 (67.4%)
Unplanned, did not want to get pregnant at all	557 (20.1%)	285 (18.8%)	18 (24.7%)	860 (17.8%)	500 (21.2%)	360 (18.1%)
Planned, but miscarriage	187 (6.8%)	56 (3.7%)	3 (4.1%)	246 (5.6%)	134 (5.7%)	111 (5.6%)
Planned, but now unwanted or health issue	42 (1.5%)	25 (1.6%)	4 (5.5%)	71 (1.6%)	46 (1.9%)	25 (1.3%)
No response	167 (6.0%)	210 (13.8%)	7 (9.6%)	384 (8.8%)	232(9.8%)	152 (7.6%)

Table 2: Abortion services performed by level of provider and health facility

Pregancy Termination

	Hospital *(N=2,474)*	Health Center *(N=1,478)*	Health Post *(N=65)*	Total *(N=4017)*
Doctor	2.6%	0.2%	0.0%	67
Clinical Officer	0.3%	24.2%	0.0%	365
Nurse	97.1%	75.3%	0.0%	3,510
HEW	N/A	N/A	100.0%	65
Missing	0.2%	0.3%	0.0%	10

Treatment of Incomplete Abortion

	Hospital *(N=224)*	Health Center *(N=38)*	Health Post *(N=8)*	Total *(N=270)*
Doctor	2.2%	2.6%	0.0%	6
Clinical Officer	0.0%	44.7%	0.0%	17
Nurse	97.8%	52.6%	0.0%	239
HEW	N/A	N/A	100.0%	8

Table 3: Treatment methods used by level of provider and their success

Pregnancy Termination ***(excluding those with missing information on type of provider (N=5))***

	Doctor *(N=57)*	Clinical Officer *(N=285)*	Nurse *(N=1,792)*	HEW *(N=50)*	Total *(N=2,184)*	Proportion Successful *(95% CI)*
Misoprostol	0.0%	20.7%	24.0%	56.0%	517 (23.7%)	77.6% (73.8, 81.1)
Mifepristone + Misoprostol	93.0%	61.1%	71.1%	0.0%	1508 (68.7%)	88.4% (86.7, 90.0)
MVA	7.0%	8.4%	3.6%	0.0%	94 (4.3%)	96.8% (91.0, 99.3)
Referred	0.0%	9.8%	1.2%	44.0%	72 (3.2%)	N/A
Other/Missing	0.0%	0.0%	0.1%	0.0%	1 (0.1%)	N/A

Treatment of Incomplete Abortion

	Doctor *(N=5)*	Clinical Officer *(N-8)*	Nurse *(N=105)*	HEW *(N=6)*	Total *(N=124)*	Proportion Successful *(95% CI)*
Misoprostol	60.0%	50.0%	54.3%	83.3%	69 (55.6%)	91.3% (82.0, 96.7)
MVA	40.0%	25.0%	39.0%	0.0%	45 (36.3%)	97.8% (88.2, 99.9)
E&C/D&C	0.0%	0.0%	6.7%	0.0%	7 (5.6%)	100%
Referred	0.0%	25.0%	0.0%	16.7%	3 (2.4%)	N/A

Table 4: Treatment success at follow-up visit by service provided and level of provider

Pregnancy Termination *(excluding those with missing information on type of provider (N=5))*

	Doctor ***(N=57)***	**Clinical Officer** ***(N=285)***	**Nurse** ***(N=1,792)***	**HEW** ***(N=50)***	**Total** ***(N=2184)***
Treatment Successful	93.0%	76.8%	85.0%	50.0%	1820 (83.3%)
Additional Treatment Required	5.3%	5.3%	11.5%	2.0%	226 (10.3%)
Referred	1.8%	17.9%	3.5%	40.0%	138 (6.4%)

Treatment of Incomplete Abortion

	Doctor ***(N=5)***	**Clinical Officer** ***(N=8)***	**Nurse** ***(N=105)***	**HEW** ***(N=6)***	**Total** ***(N=124)***
Treatment Successful	100.0%	75.0%	96.2%	33.3%	114 (91.9%)
Additional Treatment Required	0.0%	0.0%	1.9%	16.7%	3 (2.4%)
Referred	0.0%	25.0%	1.9%	50.0%	7 (5.7%)

Table 5: Adjusted Odds Ratios: Successful termination by provider type

	Model 1, restricted to <=9 weeks' gestation	**Model 2, restricted to >9 weeks' gestation**
Provider Type		
Doctor	*(reference)*	
HEW	0.155 (0.017, 1.442)	N/A
Nurse	0.528 (0.068, 4.082)	0.588 (0.165, 2.096)
Clinical Officer	0.369 (0.045, 3.030)	0.171 (0.043, 0.688)*
Gestational Age	0.820 (0.718, 0.935)*	0.897 (0.857, 0.939)**
Age	0.964 (0.912, 1.020)	0.990 (0.934, 1.045)
Education		
Illiterate	*(reference)*	
Primary	0.827 (0.439, 1.557)	1.160 (0.671, 2.005)
Secondary	1.036 (0.537, 1.996)	1.097 (0.648, 1.858)
Above Secondary	0.758 (0.352, 1.633)	0.479 (0.224, 1.023)
Marital Status		
Single	(reference)	
Married	0.683 (0.417, 1.120)	1.891 (1.049, 3.411)*
Widowed/Divorced	2.449 (0.843, 7.111)	1.885 (0.947, 3.749)
Gravidity	**0.827 (0.604, 1.134)**	**1.003 (0.788, 1.278)**
Parity	**1.420 (0.942, 2.488)**	**0.898 (0.654, 1.235)**

** $p<.05$; ** $p<.01$*

Figure 1: Sites of CAC project, Tigray region, Ethiopia

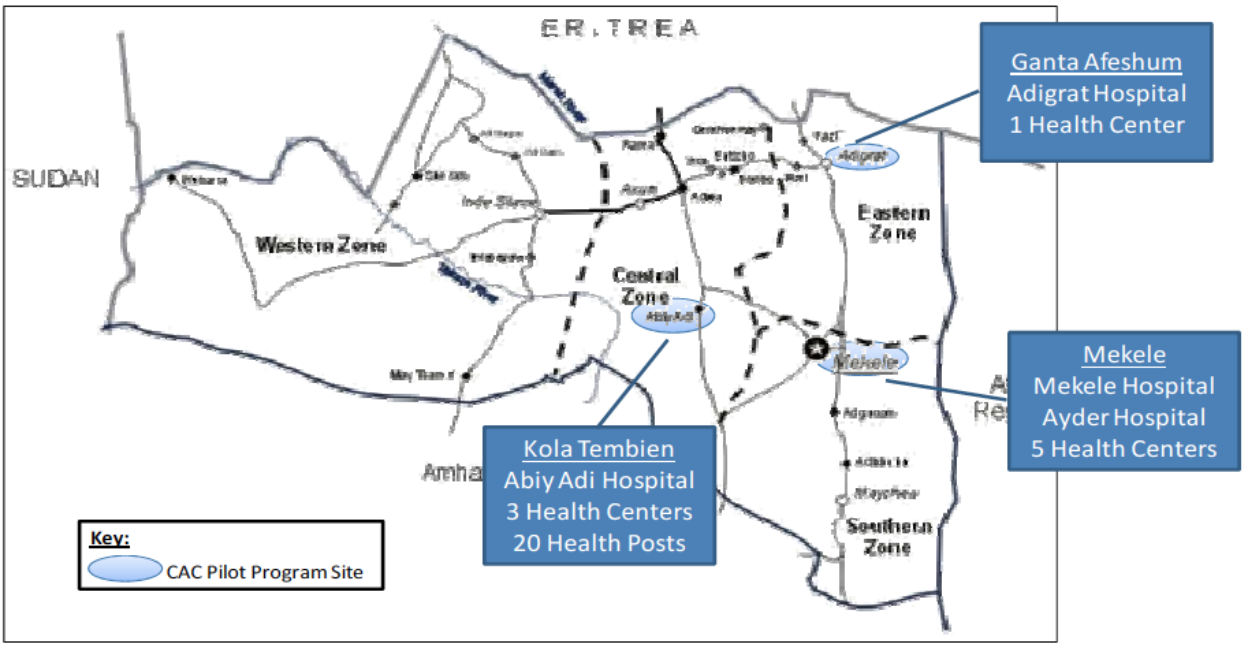
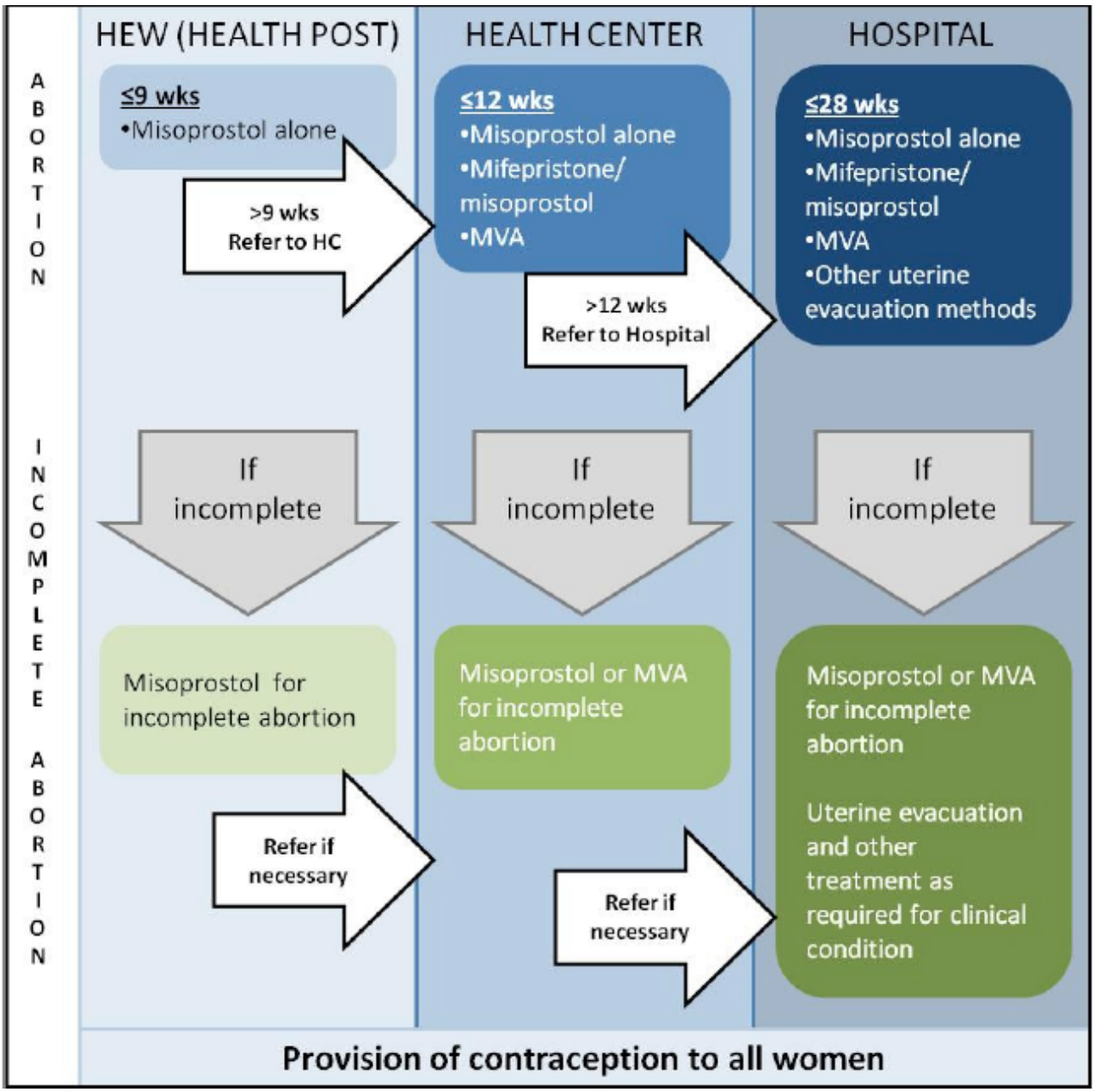


Figure 2: CAC pilot program services and referral linkages



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