

# The Estimated Incidence of Induced Abortion in Ethiopia, 2014: Changes in the Provision of Services Since 2008

**CONTEXT:** In 2005, Ethiopia's parliament amended the penal code to expand the circumstances in which abortion is legal. Although the country has expanded access to abortion and postabortion care, the last estimates of abortion incidence date from 2008.

**METHODS:** Data were collected in 2014 from a nationally representative sample of 822 facilities that provide abortion or postabortion care, and from 82 key informants knowledgeable about abortion services in Ethiopia. The Abortion Incidence Complications Methodology and the Prospective Morbidity Methodology were used to estimate the incidence of abortion in Ethiopia and assess trends since 2008.

**RESULTS:** An estimated 620,300 induced abortions were performed in Ethiopia in 2014. The annual abortion rate was 28 per 1,000 women aged 15–49, an increase from 22 per 1,000 in 2008, and was highest in urban regions (Addis Ababa, Dire Dawa and Harari). Between 2008 and 2014, the proportion of abortions occurring in facilities rose from 27% to 53%, and the number of such abortions increased substantially; nonetheless, an estimated 294,100 abortions occurred outside of health facilities in 2014. The number of women receiving treatment for complications from induced abortion nearly doubled between 2008 and 2014, from 52,600 to 103,600. Thirty-eight percent of pregnancies were unintended in 2014, a slight decline from 42% in 2008.

**CONCLUSIONS:** Although the increases in the number of women obtaining legal abortions and postabortion care are consistent with improvements in women's access to health care, a substantial number of abortions continue to occur outside of health facilities, a reality that must be addressed.

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Prior to the reform of the country's abortion law, abortion was allowed in Ethiopia only if two physicians, including at least one gynecologist, agreed that pregnancy termination would avert "grave or imminent danger" to the woman.<sup>1</sup> The revised law, enacted by Ethiopia's parliament in 2005, allows a woman to obtain a safe, legal abortion if she became pregnant through rape or incest, has physical or mental disabilities, would be putting her life or physical health at risk if she continues her pregnancy, or is younger than 18 and physically or mentally unprepared for childbirth.<sup>2</sup> The reform has resulted in an expansion of comprehensive abortion care and postabortion care\* services throughout the health care system. The reform also represents a step toward reducing maternal mortality, a public health issue requiring urgent attention in a country with a maternal mortality ratio of 353 maternal deaths per 100,000 live births.<sup>3</sup> Although the proportion of

these deaths that are due to unsafe abortion is unknown, a recent estimate based on data from the World Health Organization<sup>4</sup> suggests that 9% of maternal deaths in Sub-Saharan Africa are the result of complications from unsafe abortion.<sup>5</sup>

After the revision of the abortion law, the Ethiopian Ministry of Health developed and disseminated national guidelines for provision of legal and safe abortion care. These guidelines, which are based on World Health Organization standards, outline appropriate abortion methods at various stages of pregnancy. They also recommend training health care workers for their roles in service provision; equipping health care facilities to provide reliable, high-quality care, and ensuring that they have a sustainable supply of necessary equipment and medications; introducing and expanding the availability of medication abortion; enabling private-sector providers to expand services; and integrating abortion and postabortion contraceptive services with existing reproductive health services.<sup>6,7</sup> The guidelines were revised in 2014 to update the clinical regimens and gestational limits for medication abortion, expand the provision of second-trimester services and authorize integrated emergency surgical officers (a type of midlevel provider) to provide comprehensive abortion care.<sup>8</sup> Moreover, to

\*Postabortion care, in its most basic form, is treatment of incomplete abortion (source: World Health Organization, *Safe Abortion: Technical and Policy Guidance for Health Systems*, second ed., Geneva: WHO, 2012).

†The most recent DHS estimate of maternal mortality is 676 per 100,000 live births, which covers the period from 2004 to 2011 (source: Central Statistical Agency of Ethiopia and ICF International, *Ethiopia Demographic and Health Survey 2011*, Addis Ababa, Ethiopia: Central Statistical Agency; and Calverton, MD, USA: ICF International, 2012).

help women obtain services closer to home, the government has constructed new health centers, improved services at existing centers and expanded the scope of abortion care offered by midlevel providers (nurses, midwives, integrated emergency surgical officers and health officers).<sup>9</sup> Given these efforts, it is important to assess the extent to which women are utilizing the expanded services—in particular, to determine whether the proportion of abortions that are performed by trained providers in health facilities is increasing, and whether a substantial proportion of abortions continue to take place outside of health facilities, where the risk of complications is likely to be high.<sup>10</sup>

Abortion is largely a product of unintended pregnancy, which can be prevented through use of modern contraceptive methods. However, in 2011, the last year for which a full Demographic and Health Survey was conducted, only 19% of women aged 15–49 in Ethiopia were using a modern method. Although prevalence was higher among married women (27%) and sexually active unmarried women (52%),<sup>11</sup> a substantial proportion of these women had an unmet need for contraception (i.e., they were fecund and did not want a child within the next two years, but were not using a method). Notably, 25% of married women had an unmet need for family planning—16% had a need for spacing and 9% a need for limiting. While use of modern contraceptives has increased—40% of married women were using a modern method in 2014, according to that year's Mini DHS<sup>12</sup>—women with unmet need will still get pregnant, and some will choose to terminate their pregnancies.

As in many countries, official data regarding provision of abortion and postabortion care are incomplete in Ethiopia.<sup>13</sup> Abortion incidence and morbidity were most recently assessed in 2008,<sup>14,15</sup> when Ethiopian women had an estimated 382,000 abortions, 73% of which were obtained outside of health facilities.<sup>14</sup> Since then, access to facility-based abortion services has increased, as has the preference for small families.<sup>11,16</sup> We conducted a follow-up study to measure abortion service provision and the incidence of abortion and unintended pregnancy in Ethiopia in 2014. Comparing the new estimates of the incidence and rate of abortion with those for 2008 permits us to observe whether women's use of safe abortion services has increased in the wake of the amended law and expanded service implementation. Updated estimates of abortion incidence also allow us to monitor change in the incidence of unintended pregnancy.

## DATA AND METHODS

### Primary Data Sources

This study employed a variant of the approach used in the 2008 study, in which data were collected retrospectively and analyzed using the Abortion Incidence Complications Methodology (AICM)<sup>17</sup> and the Prospective Morbidity

Methodology.<sup>18,19</sup> Together, the methods generate estimates of abortion incidence for regions within Ethiopia and for the country as a whole.

The AICM comprises two surveys. The first, a Health Facilities Survey (HFS), obtains information from a nationally representative sample of health facilities about the number of women who receive abortion-related services (abortions and postabortion care) in those facilities. The second, a Health Professionals Survey (HPS), asks a sample of knowledgeable experts to estimate the proportion of women obtaining abortions who have complications that need treatment in a facility and the proportion of those with complications who obtain needed treatment; from these data, we can also estimate the proportion who do not have complications or require care.

The Prospective Morbidity Methodology uses information from one survey, a Prospective Data Survey (PDS), which gathers information on all women who receive either an abortion or postabortion care at a subset of facilities during a 30-day period.

Fieldwork for all three surveys took place between December 2013 and April 2014. The study protocol underwent ethical review by the Guttmacher Institute's institutional review board and by the Ethiopian Ministry of Science and Technology. Data collection was facilitated by letters of support from Ethiopia's regional health bureaus.

### Facility Survey Samples

In early 2013, we created a list of all health care facilities in Ethiopia that had the potential to provide abortion-related care. The Food, Medicine and Health Care Administration and Control Authority of Ethiopia provided the most complete list of facilities; this list was combined with lists from DKT International (an organization that distributes contraceptives worldwide and is the only distributor of abortion medication in Ethiopia), Marie Stopes International-Ethiopia and the Family Guidance Association of Ethiopia. After the deletion of duplicate entries, the combined list constituted the sampling frame for the HFS and PDS. The number of eligible health facilities had increased rapidly since the 2008 study, from 898 to 4,033; most of the growth was due to a quintupling of the number of public health centers and a large increase in the number of private clinics.

The HFS and PDS samples differed. The samples for both surveys included public hospitals, private and non-governmental organization (NGO) hospitals and clinics, public health centers and high-level private clinics, all of which are staffed by at least one general medical practitioner and at least one specialist.<sup>20</sup> However, only the HFS sample included medium-level private clinics, which are staffed by at least one health officer or general medical practitioner; although these clinics lack the capacity of the aforementioned facility types, they are capable of

providing abortion care.\* Since their contribution to abortion service provision was unknown, medium-level private clinics were not included in the PDS, which because of budget constraints focused on facilities with the largest abortion caseloads. Primary-level facilities do not provide abortion services and were not included in either survey.

We used a multistage sampling design to select among the 4,033 facilities that were potential providers of abortion services and hence eligible for one or both surveys (Table 1). In each of the country's 11 regions, we selected a proportion of each type of facility. We determined proportions according to the likelihood that each type of facility provided abortion-related services, and selected a large enough proportion and number of facilities to minimize the size of the sample weights and ensure adequate representation of variation within each region and facility type.† The HFS sample comprised 903 facilities, while the PDS sample consisted of 729. The response rate was 91% for the HFS and 82% for the PDS, yielding final samples of 822 and 594 facilities, respectively. All data were weighted for sampling and nonresponse.

#### Facility Data Collection

For the HFS, face-to-face interviews were conducted with one eligible staff member at each participating facility. The respondent was the person most knowledgeable about abortion care at the facility; in larger facilities, it was often an obstetrician/gynecologist or facility director; in small facilities, it was more commonly a midwife or nurse. The structured questionnaire included questions about the facility's infrastructure and equipment, and also asked respondents to estimate the number of patients who received an abortion or postabortion care in an average month and in the past month at that facility. Separate counts were obtained for the number of postabortion patients who received outpatient care and the number who received inpatient care.

Interviewers for the HFS were drawn primarily from regional health bureaus; in the three regions where the bureaus did not have appropriate staff to conduct the fieldwork, the study team recruited interviewers from other sources. All interviewers had a background in health service provision, and most had an MPH degree.

The HFS interviewers also supervised data collection for the PDS. The PDS questionnaire collected information on the demographic characteristics, reproductive history, clinical presentation and clinical management of each

\*Medium-level private clinics are classified into two categories: Blue Star clinics and other medium-level private clinics. Blue Star clinics are private primary care centers, franchised by Marie Stopes International–Ethiopia, whose staff have received additional training in sexual and reproductive health services, including abortion and contraceptive provision. These facilities are branded with the Blue Star logo in recognition of their expanded role in sexual and reproductive health care. Because of their greater likelihood of performing abortion, these clinics were sampled at a higher rate than were other private clinics.

†Not all regions had each type of facility.

**TABLE 1. Number of eligible facilities, percentage of facilities sampled, and number of participating facilities—all by facility type, Health Facilities Survey and Prospective Data Survey, Ethiopia, 2014**

Facility type	No. of eligible facilities	% sampled for HFS	% sampled for PDS	No. of participating facilities
Public hospitals	120	100	100	117
Private/NGO hospitals	64	100	100	61
Public health centers	2,596	13	13	368
High-level private clinics	282	24	24	73
Blue Star medium-level private clinics	297	18	0	54*
Other medium-level private clinics	596	12	0	75*
NGO clinics	78	100	100	74
Total	4,033	na	na	822

\*For HFS only. Notes: One military hospital was excluded because it did not provide treatment for abortion complications. HFS=Health Facilities Survey. PDS=Prospective Data Survey. NGO=Nongovernmental organization. na=not applicable.

woman who received an abortion or postabortion care during the 30-day study period. Each questionnaire was filled out by the woman's provider during the course of regular patient care.

To estimate caseloads at NGO facilities (those run by Marie Stopes International–Ethiopia or the Family Guidance Association of Ethiopia, the country's two largest NGO abortion providers), we used the facilities' own service provision statistics.

#### Health Professionals Survey

The AICM uses data on abortion complications to derive estimates of the number of women who obtain abortions outside of facilities. To estimate the likelihood that women who have an abortion experience complications and the likelihood that those who have complications obtain treatment, we interviewed 82 knowledgeable key informants using a structured questionnaire. The informants came from eight of the 11 regions and were selected from a list compiled by the study team in consultation with other knowledgeable stakeholders. About two-thirds of the informants were health care providers; the remainder—researchers, program managers, policymakers and health experts—were included to ensure that the estimates reflected a wide range of perspectives and experiences (e.g., community-based perspectives as well as experience in health facilities). The three interviewers for this component were obstetrician-gynecologists.

Respondents were asked to provide three types of estimates related to abortion and postabortion care: the percentage distribution of women who obtain abortions, according to the type of provider they use; the probability that women who obtain abortions experience complications that need treatment in a facility, again by type of abortion provider; and the likelihood that women who have such complications get care in a facility. For each of these dimensions, key informants were asked to make estimates for four subgroups of women: urban poor, urban nonpoor, rural poor and rural nonpoor.

### Other Data Sources

We drew on several other sources in our calculations. The 2011 Ethiopia Demographic and Health Survey (DHS) provided data, from a nationally representative sample of women aged 15–49, on sexual behavior, fertility, contraceptive use, the planning status of births and unmet need for contraception.<sup>2</sup> The 2014 Ethiopia Mini DHS provided information on regional total fertility rates and the proportion of women who deliver in health facilities.<sup>12</sup> We used the Ethiopian Central Statistical Agency's estimates of the number of women of reproductive age in Ethiopia and each of its regions.<sup>21</sup> Finally, we used data from the 2011 Household Consumption–Expenditure Survey regarding the distribution of the country's rural and urban populations by poverty level.<sup>22</sup>

### Estimating the Incidence of Induced Abortion

• *Number of induced abortions occurring at facilities.* To estimate the number of abortions occurring at each health facility, we first averaged three data points: estimates of the number of abortions performed in the past month and in an average month (from the HFS), and the number of women who had an abortion during the 30-day data collection period (from the PDS). For medium-level private clinics, which were not included in the PDS, the average of the two HFS data points was used. These results were adjusted to yield annual estimates per facility, weighted, and then summed to obtain the number of abortions by type of facility and at all facilities. We then added the number of abortions performed by clinics run by Marie Stopes International–Ethiopia and the Family Guidance Association of Ethiopia, obtained from 2014 service provision statistics. The resulting sum is the total number of abortions obtained in facilities in Ethiopia in 2014.

• *Number of abortions occurring outside of facilities.* Data from the HFS, PDS and HPS were used to estimate the number of abortions occurring outside of health facilities. The first two sources provided a count of women treated for abortion complications, and the third provided the data needed to calculate the multiplier, or factor, that is applied to the number of women treated for complications from out-of-facility abortions to obtain an estimate of the total number of women who obtain abortions outside of facilities.

As we did for abortions performed at facilities, we estimated the number of women who were treated for abortion complications at each facility by averaging three values: estimates from the HFS of the number of women treated in the average month and in the past month and the number treated during the 30-day PDS data collection period. Again, the calculation differed for medium-level private clinics, for which the estimate is the average of the two HFS data points. As before, estimates were adjusted, weighted and summed to yield annual estimates by facility type and region.

Because differentiating complications of induced abortion from those of miscarriage can be difficult in clinical practice, the HFS and PDS asked respondents for data

on all cases of postabortion care, regardless of the reason the pregnancy had ended. Moreover, the surveys did not differentiate between complications of induced abortions performed in facilities and those performed elsewhere. Thus, to estimate the number of women treated for complications from induced abortions occurring outside of facilities, we made two adjustments to the estimate of the number of women treated for complications.

First, to exclude women who had had miscarriages, we used an indirect estimation approach. We assumed that first-trimester miscarriages would not have been treated at health facilities, while later ones (13–21 completed weeks' gestation) likely would have resulted in complications requiring care in health facilities. Clinical studies have documented that the distribution of miscarriages by gestational age and the proportion of pregnancies ending in miscarriage are fairly constant across populations,<sup>23,24</sup> and that the proportion of pregnancies ending in late miscarriage is about 3.4% of the number of pregnancies ending in live births. By applying this proportion to the number of live births in Ethiopia in 2014 (3,521,000), we estimated that 120,100 women had a late miscarriage in that year.

Because of barriers to obtaining health care, some women with miscarriages may not obtain care in health facilities. We assume that the proportion obtaining care for late miscarriages is equal to the proportion of births that either occur in a health facility or do not occur in a facility because the woman considers it unnecessary. This proportion was calculated for each region using information obtained from the 2014 Mini DHS.<sup>12</sup> We subtracted the estimated number of miscarriages likely to have been treated in health facilities from the post-abortion caseload for each region, yielding the number of women treated in health facilities for complications of induced abortion. Nationally, of the 166,100 women treated for abortion complications, an estimated 38% (62,500) were treated for complications from miscarriage, and 62% (103,600) for induced abortion complications.

Next, we need to adjust for abortions that took place in facilities and resulted in complications treated at facilities. We used clinical data from other developing countries<sup>25</sup> and results from the 2014 Ethiopian HPS to estimate the likelihood that women would have complications from abortions done in facilities and the likelihood that they would obtain care for such complications. We applied these estimates to the total number of abortions occurring in facilities (326,200), yielding an estimate that 16,300 women were treated for complications from abortions carried out in facilities. By subtracting this number from the total number of women treated for complications of induced abortion, we obtained the number of women treated in facilities for complications from abortions performed outside of facilities (87,400).

These women, of course, were not the only women who had abortions outside of health facilities: Others

had an out-of-facility abortion but either did not have complications or did not obtain treatment for complications. To account for such women, we computed a multiplier or inflation factor based on HPS data, and applied it to the number of women receiving care in facilities for complications of abortions performed outside of facilities. From the HPS responses, we calculated a multiplier of 3.4, meaning that for each woman treated in a health facility for complications of an abortion performed outside of a facility, 2.4 other women either did not have complications that required care in a facility or did not obtain care for their complications. By applying this multiplier to the number of women in each region who were treated for complications from abortions performed outside of facilities, and then summing the results, we obtain an estimate of 294,100 women.

We then summed the number of abortions occurring in facilities and the number occurring outside of facilities for each region to obtain regional and national estimates. In addition, for each region and for the country as a whole, we calculated abortion rates (number of induced abortions per 1,000 women aged 15–49) and abortion ratios (number of abortions per 100 live births). To convey the inherent uncertainty in our estimates, we present a range of estimates; specifically, we calculated 95% confidence intervals around the mean number of abortions that occur in facilities and the mean number of women receiving postabortion care, allowing us to present low and high estimates along with our main (“medium”) estimates of the number of abortions and the abortion rate. Because the confidence intervals were based on HFS and PDS data, the multiplier (which was calculated using HPS data) was the same for all three estimates, but was applied to different estimates of the number of women treated for complications of abortions obtained outside of facilities.

### Estimating the Number of Pregnancies

To calculate the number of unintended pregnancies regionally and nationally, we summed the numbers of induced abortions, miscarriages of unintended pregnancies, and unplanned births. The last measure was derived using data from the 2011 DHS on the proportion of live births in the three years before the survey that were unplanned (mistimed or unwanted at the time of conception). To account for unintended pregnancies ending in miscarriage, we used a model-based approach derived from clinical studies of pregnancy loss by gestational age<sup>23,26</sup> and estimated the number of pregnancy losses to be 20% of the number of live births resulting from unintended pregnancies plus 10% of the number of induced abortions. The number of planned pregnancies was calculated by summing the numbers of planned births and miscarriages resulting from intended pregnancies. The sum of all live births, abortions and miscarriages (from intended and unintended pregnancies) yields the total number of pregnancies.

### Changes in Methodology

The 2008 and 2014 studies differed in a number of ways, which we summarize below. We do not believe that these methodological differences affect comparability.

- *Survey administration.* In 2008, the data for the PDS were collected for 28 days; in 2014, data were collected for 30 days. We accounted for this difference when creating annual estimates.

- *Sample universe.* Medium-level private clinics were included in the HFS sample in 2014, but not in 2008. We decided to begin including these clinics because of the rapid expansion of this sector; we do not think that omitting them in 2008 affected the incidence calculation, because such clinics accounted for a very small proportion of abortion provision at the time.

- *Estimates for NGOs.* In 2008, HFS and PDS data collected from NGO clinics were used to estimate caseloads at these clinics. In 2014, data provided by the NGOs were used.

- *Probability of seeking care.* In 2008, we assumed that the probability that women would seek care for a second-trimester miscarriage was the same as the probability that women had had their most recent delivery in a health facility; in 2014, we assumed that it was equal to the proportion of births that had taken place in a health facility or that had not occurred in a facility because the woman considered it unnecessary.

- *Data sources for abortions performed in facilities.* In 2008, only the PDS collected data on caseloads of women receiving abortions in facilities, while in 2014 both the PDS and the HFS collected such data.

- *Complication rates for abortions performed in facilities.* In 2008, calculation of the multiplier used the rate of complications from abortions performed by trained providers in facilities. Because experts in the field considered the rate an overestimate, the 2014 analysis also took into account findings from clinical studies in estimating this complication rate.

- *Age range.* The published estimates for 2008 were for women aged 15–44. For consistency with World Health Organization practices, the current analysis calculates estimates for women aged 15–49 for 2014 and adjusts the data presented for 2008 accordingly.

- *Range of estimates.* In 2008, we accounted for uncertainty in our estimates by presenting low and high estimates, which we calculated by subtracting or adding 1.0 to the multiplier. For 2014, we calculated 95% confidence intervals around the caseload estimates to generate the low and high estimates

## RESULTS

### Provision of Abortion Care by Facility Type

An estimated 4,033 facilities in Ethiopia were potential providers of abortion-related care in 2014 (Table 2). Of these facilities, 72% provided induced abortion, postabortion care or both. Nearly all public hospitals (98%) provided these services, as did the majority of public health centers (67%) and private or NGO facilities (80%). Most induced

**TABLE 2. Number and percentage of facilities providing legal abortion and postabortion care, by facility type**

Measure	All	Public hospitals	Public health centers	Private/ NGO facilities*
<b>Legal abortion/postabortion care</b>				
No. of facilities that potentially provide services	4,033	120	2,596	1,317
No. of facilities that provide services	2,904	118	1,738	1,048
% of facilities that provide services	72	98	67	80
<b>Legal abortion</b>				
No. of facilities that provide abortion	2,157	112	1,076	969
% of facilities that provide abortion	53	93	41	74
No. of women obtaining abortions	326,169	26,217	85,434	214,518
Mean no. of women per facility obtaining abortions†	151	235	79	221
<b>Postabortion care‡</b>				
No. of facilities that provide postabortion care	2,809	118	1,698	993
% of facilities that provide postabortion care	70	98	65	75
No. of women receiving postabortion care	166,133	34,823	84,291	47,019
Mean no. of women per facility receiving postabortion care	60	295	50	49

\*Includes hospitals and clinics. † Excludes facilities that reported no patients during the 30-day fieldwork period. ‡ Includes complications of both induced abortions and miscarriages. Notes: All data are weighted. Sum of types of facilities may not equal total because of rounding.

**TABLE 3. Selected measures of abortion and postabortion care, by year, with percentage change**

Measure	2008	2014	% change
No. of women receiving treatment for complications of induced abortion	52,607	103,648	+97
Treatment rate for abortion complications	3.0	4.7	+58
No. of legal abortions	102,818	326,169	+217
% of abortions performed in facilities	27	53	+97
Facility-based abortion rate	5.8	14.7	+153
Multiplier	na	3.4	na
No. of abortions performed outside of facilities	279,509	294,127	+5
% of abortions performed outside of facilities	73	47	-36
Out-of-facility abortion rate	15.8	13.3	-16

Notes: Rates are number of women with outcome per 1,000 women aged 15–49 in general population. Multiplier for 2008 is not reported because it is not comparable to that for 2014. na=not applicable.

abortions (66%) were provided by private or NGO facilities, while the majority of postabortion care (72%) was provided by public hospitals and health centers (calculations not shown).

Using weighted data from the HFS and PDS, we estimate that 326,200 women obtained induced abortions in health facilities (Table 2). On average, facilities that offered legal abortions performed 151 abortions in 2014; mean caseloads were 235 at hospitals and 221 at private and NGO facilities. (NGOs accounted for the vast majority of abortions in the latter group.)

As we noted earlier, approximately 166,100 women received care at facilities in 2014 for complications of abortion or miscarriage. The average number of women receiving postabortion care was 295 for public hospitals and approximately 50 in public health centers and in private and NGO facilities. About 103,600 of these cases were for complications of induced abortion, a

97% increase from the 52,600 cases in 2008 (Table 3). Part of the increase was due to population growth: The number of women of reproductive age rose by 25% during this time period (not shown). The rest of the increase in the number of women treated was attributable to an increase in the treatment rate, which rose by 58%, from 3.0 to 4.7 cases per 1,000 women of reproductive age (Table 3).

**Trends in Other Abortion Measures**

Between 2008 and 2014, the rate of facility-based abortions more than doubled in Ethiopia, rising from 5.8 to 14.7 per 1,000 women (Table 3). Moreover, the proportion of abortions that occurred in facilities increased from 27% to 53%. Despite these trends, potentially unsafe abortions remained a reality: An estimated 294,100 abortions occurred outside of health facilities in 2014. Although this estimate represents a 5% increase in the number of out-of-facility abortions since 2008, the rate of abortions taking place outside of facilities declined by 16%, from 15.8 to 13.3 per 1,000.

HPS data indicate that the most common providers of induced abortion were midlevel providers working in a facility; 43% of poor urban women, 28% of nonpoor urban women, 51% of poor rural women and 46% nonpoor rural women were likely to have had their abortion performed by such providers (not shown). Only a very small proportion (1–3%) of women in the four subgroups were thought to have induced their own abortion. From clinical data, we estimate that 3% of women whose abortion was performed by a midlevel provider in a health facility had complications; in contrast, 75% of self-induced abortions resulted in complications, HPS respondents estimated. This difference was likely due to service providers' general reliance on manual vacuum aspiration or medication (mifepristone and misoprostol) to terminate pregnancies, whereas women who self-induce typically ingest herbs and insert solid objects into their vagina.

Key informants' perceptions suggest that between 2008 and 2014, all but one socioeconomic and residential group made gains in access to facilities for abortion-related care. The exception was nonpoor urban residents, who were perceived in both surveys to have good access and utilization of care for abortion complications (not shown). Poor women in rural areas were believed to have made the greatest progress; in this group, the proportion of women needing postabortion care who received it was thought to have increased from less than half in 2008 to two-thirds in 2014. According to informants, the main reasons that women were not obtaining safe abortion services (not shown) were lack of knowledge of the law (76% of informants cited this reason), the perception that costs were high (66%), lack of knowledge of service availability (64%), fear of stigma (56%) and absence of accessible services (56%).

## Incidence of Induced Abortion

In 2014, the estimated number of induced abortions in Ethiopia was 620,300; the low and high estimates, representing the 95% confidence interval, were 520,700 and 731,200, respectively (Table 4). The medium estimate is 60% higher than the comparable estimate for 2008 (382,000), while the abortion rate rose from 22 per 1,000 women aged 15–49 (not shown) to 28 per 1,000 (Table 4), a 30% increase. The abortion ratio in 2014 was 17.6 abortions per 100 live births, indicating that there was approximately one abortion for every six pregnancies that ended in a live birth.

In both study years, abortion rates varied substantially among regions. The abortion rate continued to be lowest (6.7 per 1,000 women aged 15–49) in the least densely populated and most traditional rural regions (Afar, Benshangul-Gumuz, Gambela and Somali), presumably because of limited access to services, lower use of abortion services or both. The abortion rate remained highest (92 per 1,000) in Addis Ababa, where demand for fertility control is high. The densely populated urban regions of Dire Dawa and Harari also had a high abortion rate relative to other regions (78 per 1,000). It is likely abortion rates were higher than average in these three regions in part because women who reside elsewhere come to urban areas obtain abortion services.

## Incidence of Unintended Pregnancy

The pregnancy rate in 2014 was 222 pregnancies per 1,000 women aged 15–49, which is 8% lower than the rate of 242 per 1,000 in 2008 (Table 5; data for 2008 not shown). The estimated rate of unintended pregnancy, calculated by combining induced abortions, unplanned births and unintended pregnancies that ended in spontaneous abortion, was 85 per 1,000 women aged 15–49 in 2014, about 10% lower than the rate in 2008 (94 per 1,000). Thirty-eight percent of pregnancies were unintended in 2014, a slight decline from 2008 (42%). Thirteen percent of unintended pregnancies ended in induced abortion in 2014, an increase from 2008, when 10% ended in induced abortion (not shown).

The proportion of pregnancies that were unintended was much higher than the national average in the three urban regions—Addis Ababa, Dire Dawa and Harari (52–70%; Table 5). That proportion was similar to the national average in Amhara, Oromiya and the Southern Nations, Nationalities and Peoples region (37–43%), and below average in Tigray and the other rural regions (29% and 13%, respectively). The unintended pregnancy rate was much higher than the national average in the three urban regions (120–123 per 1,000 women aged 15–49). The rate was somewhat higher than the national average in Oromiya (97 per 1,000), close to average in Amhara and the Southern Nations, Nationalities and Peoples region (77 and 80 per 1,000, respectively), and below average in Tigray (60 per 1,000) and the four other rural regions (37 per 1,000).

## DISCUSSION

A decade after revising its abortion law, Ethiopia has achieved major progress in making safe abortion a reality for many women in the country. The proportion of abortions that occur outside of health facilities has declined dramatically, suggesting that women with unintended pregnancies now have greater access to safe abortions than they did in 2008. The number of women who obtain postabortion care has also increased, and the abortion rate rose from 22 per 1,000 women of reproductive age in 2008 to 28 per 1,000 in 2014. The increase in the abortion rate is partly attributable to declining fertility preferences,<sup>11,16</sup> but is likely also due to increased access to safe abortion services. Our estimate of the abortion rate, derived using the AICM and PDS, was nearly identical to that of a recent study that used Bayesian time series models to estimate the abortion rate among women aged 15–44 in Ethiopia.<sup>27</sup> The rate of 28 per 1,000 places Ethiopia on the lower end of the spectrum of Sub-Saharan African countries with known abortion rates; these rates, all estimated for 2012 or 2013, range from 17 per 1,000 in Senegal (the only country whose rate was lower than Ethiopia's) to 33 per 1,000 in Nigeria, 36 per 1,000 in Tanzania and 48 per 1,000 in Kenya.<sup>28–32</sup>

**TABLE 4. Number of abortions performed in and outside of facilities; and total number of abortions, abortion rate and abortion ratio—all according to region, 2014**

Region	No. of abortions performed in facilities	No. of abortions performed outside of facilities	No. of abortions			Abortion rate			Abortion ratio*
			Low	Medium	High	Low	Medium	High	
<b>All</b>	<b>326,169</b>	<b>294,127</b>	<b>520,684</b>	<b>620,296</b>	<b>731,167</b>	<b>23.5</b>	<b>28.0</b>	<b>33.0</b>	<b>17.6</b>
Tigray	22,282	17,397	20,621	39,679	58,738	14.6	28.2	41.7	19.7
Amhara	45,812	106,325	118,613	152,137	185,662	23.2	29.8	36.3	23.9
Oromiya	105,132	39,070	95,899	144,202	192,505	12.2	18.3	24.5	9.8
SNNP	76,764	75,891	88,822	152,655	216,488	19.9	34.2	48.4	23.2
Addis Ababa	63,532	39,910	70,885	103,442	135,999	63.2	92.3	121.3	141.4
Other rural region†	5,268	8,247	5,627	13,514	26,183	2.8	6.7	13.0	3.0
Dire Dawa/Harari	7,379	7,287	8,424	14,666	20,901	44.9	78.2	111.4	60.9

\*Calculated using the medium abortion estimate. †Afar, Benshangul-Gumuz, Gambela and Somali. Notes: All data are weighted. SNNP=Southern Nations, Nationalities and Peoples.

**TABLE 5. Selected measures of pregnancy and unintended pregnancy, by region, 2014**

Region	No. of pregnancies*	Pregnancy rate	% of pregnancies that were unintended	Unintended pregnancy rate
<b>All</b>	<b>4,927,554</b>	<b>222</b>	<b>38</b>	<b>85</b>
Tigray	286,135	203	29	60
Amhara	915,489	179	43	77
Oromiya	1,958,062	249	39	97
SNNP	969,914	217	37	80
Addis Ababa	198,381	177	70	123
Other rural regions†	555,917	276	13	37
Dire Dawa/Harari	43,656	233	52	120

\*Includes births, abortions and miscarriages. †Afar, Benshangul-Gumuz, Gambela and Somali. Notes: All rates are per 1,000 women aged 15–49. SNNP=Southern Nations, Nationalities and Peoples.

Between 2008 and 2014, the total fertility rate in Ethiopia decreased by 24%, from 5.4 to 4.1; although data on the wanted fertility rate\* are unavailable for 2014, between 2008 and 2011 the rate fell from 4.0 to 3.0.<sup>2</sup> As women's fertility preferences decline, demand for both family planning and abortion generally rise. The increase in contraceptive use in recent years suggests that the ability of Ethiopia's family planning services to reach women who want to space or limit births has improved, which in turn has likely contributed to the decrease in the total fertility rate. As contraceptive services continue to expand, women increasingly should be able to meet their fertility goals using family planning; this will not eliminate demand for abortion, but it may reduce it in the long run.

DHS data from 2011 showed that 16% of married women in Ethiopia had an unmet need for spacing and 9% had an unmet need for limiting.<sup>11</sup> Because women who want to end childbearing typically are more motivated to terminate unwanted pregnancies than are women who want to space their births, the demand for abortion likely is being driven to a greater extent by women who want to limit births than by those who want to space them. However, as access to abortion increases, women with mistimed pregnancies may be facing fewer barriers to abortion and thus becoming increasingly likely to terminate unplanned pregnancies. This trend may be of particular importance to women in urban areas, who tend to have greater educational and employment opportunities—as well as greater financial incentive to avoid births—than do rural women.

### Limitations

Our analysis has a number of limitations. The first is that the HFS data were based on provider estimates and may be inaccurate because of recall bias and memory distortion. For example, providers may be more likely to remember severe abortion complications than milder ones, and thus may underestimate the number of women receiving postabortion care at their facility by not including the

\*The wanted fertility rate is calculated in the same way as the total fertility rate, but excludes unwanted births from the numerator.

milder cases. Similarly, in providing estimates for the HPS, respondents must generalize across subgroups and integrate information, impressions and anecdotes obtained from a variety of sources (including the media, colleagues and personal observations). Because biases in this information weaken the precision of the multiplier, we gathered data from as many respondents as possible, to smooth out “noise” introduced from individual-level biases. Moreover, we presented low and high estimates to indicate that the actual number of induced abortions likely falls somewhere within the presented range.

A second limitation is that the accuracy of HFS data is highly dependent on the expertise of respondents at health facilities. If HFS interviewers did not select the individual most knowledgeable about abortion-related care at a health facility, the resulting data may not be accurate. Another limitation is that we indirectly estimated the proportion of women seeking care for complications of miscarriage. If our assumptions about the likelihood that women seek such care were inaccurate, our abortion estimates will be as well; the direction of the potential error, though, is unknown. Finally, the estimates of unintended pregnancy are based on models and on women's self-reports (in the DHS) of whether their recent pregnancies had been mistimed or unwanted. While there are weaknesses in this conceptualization of pregnancy intentions,<sup>33,34</sup> we are constrained by a lack of viable alternatives until the DHS devises a more robust measure.

### Conclusion

The increases in contraceptive use and abortion in Ethiopia reflect extensive efforts by the government, as well as by the private and NGO sectors, to increase access to health care—including sexual and reproductive health care—during the past decade.<sup>11,35</sup> Expanded efforts to create and improve infrastructure (particularly health centers), to increase the number of practicing midwives, to distribute and utilize medication abortion, and to increase the provision of abortion by midlevel providers and through community outreach have paid off in both reach and impact.<sup>36</sup> However, despite these improvements in women's access to health care, a substantial number of abortions continue to occur outside of health facilities under unsafe conditions—a situation that must be addressed.

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## RESUMEN

**Contexto:** En 2005, el parlamento de Etiopía enmendó el código penal para ampliar las circunstancias bajo las cuales el aborto es legal. Aunque el país ha expandido el acceso al aborto y a la atención postaborto, las últimas estimaciones de la incidencia del aborto datan de 2008.

**Métodos:** En 2014 se recolectaron datos de una muestra representativa a nivel nacional de 822 instituciones de salud que proveen servicios de aborto o atención postaborto, y de 82 informantes clave conocedores de estos servicios en Etiopía. Se usaron la Metodología de Estimación de Aborto por Complicaciones y la Metodología de Morbilidad Prospectiva para estimar la incidencia del aborto en Etiopía y evaluar tendencias desde 2008.

**Resultados:** Se estima que, en 2014, se realizaron 620,300 abortos inducidos en Etiopía. La tasa de aborto anual fue de 28 por 1,000 mujeres en edades de 15–49, lo que representa un aumento respecto de 22 por 1,000 en 2008; la tasa más alta se observó en las regiones urbanas (Addis Abeba, Dire Dawa y Harari). Entre 2008 y 2014, la proporción de abortos que ocurrieron en instituciones de salud aumentó del 27% al 53%, y el número de esos abortos aumentó sustancialmente; no obstante, se estima que en 2014 ocurrieron unos 294,100

abortos fuera de las instituciones de salud. El número de mujeres que recibieron tratamiento por complicaciones de abortos inducidos casi se duplicó entre 2008 y 2014, de 52,600 a 103,600. Treinta y ocho por ciento de los embarazos fueron no planeados en 2014, una ligera disminución respecto del 42% en 2008.

**Conclusiones:** Aunque los aumentos en el número de mujeres que obtienen abortos legales y atención postaborto son consistentes con las mejoras en el acceso de las mujeres a los servicios de salud, un importante número de abortos continúa ocurriendo fuera de las instituciones de salud, una realidad que debe ser abordada.

## RÉSUMÉ

**Contexte:** En 2005, par amendement du code pénal, le parlement éthiopien a élargi les circonstances d'avortement légalement admises. Bien que le pays ait amélioré les conditions d'accès à la procédure et aux soins après avortement, les dernières estimations de l'incidence de l'IVG remontent à 2008.

**Méthodes:** Les données ont été collectées en 2014 auprès d'un échantillon nationalement représentatif de 822 structures prestataires de l'avortement ou de soins après avortement, ainsi que de 82 informateurs clés au courant de la question des services d'avortement en Éthiopie. L'incidence de l'avortement en Éthiopie et les tendances depuis 2008 ont été estimées selon la méthode d'estimation indirecte AICM et l'approche prospective de morbidité.

**Résultats:** Le nombre d'IVG pratiqués en Éthiopie en 2014 est estimé à 620 300. Calculé à 28 pour 1 000 femmes âgées de 15 à 49 ans – en hausse par rapport à 22 pour 1 000 en

2008 –, le taux d'avortement annuel est le plus élevé dans les régions urbaines (Addis Abeba, Dire Dawa et Harari). Entre 2008 et 2014, la proportion d'avortements pratiqués dans les structures de santé est passée de 27% à 53%, avec un nombre de procédures en hausse nette. Quelque 294 100 IVG auraient cependant encore été pratiquées hors structure de santé en 2014. Le nombre de femmes recevant un traitement pour complications d'un avortement provoqué a presque doublé entre 2008 et 2014, passant de 52 600 à 103 600. Les grossesses non planifiées représentent 38% en 2014, en légère baisse par rapport à 42% en 2008.

**Conclusions:** Si la hausse du nombre de femmes obtenant un avortement légal ou des soins après avortement paraît conforme aux améliorations de leur accès aux soins de santé, un nombre considérable d'avortements intervient toujours en dehors des structures de santé. Il importe de faire face à cette réalité.

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