

Abortion Incidence in Rwanda

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Introduction

With only four years remaining to reach the Millennium development goals targets, in Rwanda as in most developing countries, the rate of decrease in maternal mortality is much lower than the rate needed to achieve the fifth Millennium Development Goal—a 75% reduction in the maternal mortality ratio between 2000 and 2015 (Horton 2011). To accelerate progress towards meeting these goals, developing countries need to address key causes of maternal morbidity and mortality, including unsafe abortion.

While the actual level of abortion-related mortality and morbidity in Rwanda is unknown, the World Health Organization (WHO) estimates that in Eastern Africa, unsafe abortion accounts for one in seven maternal deaths (WHO 2011). The only published research on this topic for Rwanda is a 2004 study of four health districts, which estimated that 50% of maternal mortality was due to abortion (spontaneous and induced) (Pearson and Shoo 2004). While this estimate is far too high as compared to the contribution of unsafe abortion to maternal mortality worldwide, it does establish that unsafe abortion is an important contributor to maternal mortality.

The law on abortion remains restrictive in Rwanda, with the procedure only permitted to save a woman's life or to protect her physical health. Moreover, a woman seeking a legal abortion has to go through a very demanding process of getting the consent of three doctors for the procedure, making

access to a legal abortion extremely difficult even when the abortion would be allowed under the law. A high penalty is proposed by the law for anyone who helps a woman to abort, many medical doctors do not even think about abortion even when it is medically indicated. As a consequence, many women turn to unsafe abortion to terminate unwanted pregnancies.

In 2007, Rwandan women had an average of 5.5 children, however, the average number of children they wanted was 3.7 (MOH, NISR, and ICF Macro 2009). Only 36% of married women were using a contraceptive method in 2007 (MOH, NISR, and ICF Macro 2009), and unmet need for family planning was very high exposing women to the risk of unintended pregnancy: 38% in 2005, the latest year for which these data are available (INSR and ORC Macro 2006). In addition, many young women become sexually active before marriage. The median age of first sex in Rwanda is 17 and 18 years old among women and men respectively with the median age of marriage as 20.6 (MOH, NISR, and ICF Macro 2009;TRAC 2010). A young unmarried women using contraceptives is perceived to be promiscuous. Given the strong sanctions against having a child while unmarried, any pregnancy which occurs during this time is likely to be unwanted. As many young men and women in urban areas delay marriage due to social economic factors or career and academic aspirations, this leads to increased risk of unintended pregnancy. A further factor that suggests that unintended pregnancy is high in Rwanda is the high level of unplanned childbearing: In 2007, according to women's reports, 40% of recent births were unplanned. Some proportion of women with unwanted pregnancies will seek abortion. Given the restrictive law and the strong stigma around abortion, women will often seek an abortion from untrained practitioners or under unhygienic conditions.

Seventeen years have passed since the 1994 Rwandan genocide which resulted in a devastating loss of health personnel and infrastructure. In that time, Rwanda has made impressive progress in gradually

rebuilding its health system and improving access to health services, including reproductive health services (Basinga 2009;Rusa et al. 2009). In 2001, the government initiated innovative reforms, including starting community-managed health organizations that pooled funds for health care, delivering health services through a decentralized structure to bring services closer to communities (Mahon 2007). Rwanda's current development plan and poverty reduction strategy for 2008–2012 places strong emphasis on reproductive health, including family planning (Government of Rwanda 2007).

Some of the benefits of these efforts are seen in large changes over a short period of time. Between 2005 to 2008, there was a three-fold increase in the percent of married women using modern contraceptive methods, from 9% to 27%; a 33% increase in the proportion of births attended by skilled personnel, from 39% to 52%; and a 35% decline in infant mortality, from 152 to 103 deaths per 1,000 live births (INSR and ORC Macro 2006;MOH, NISR, and ICF Macro 2009). Improvements in reproductive health care include better availability and quality of maternal health services and inclusion of postabortion care in the package of services offered. However, greater efforts are still needed to improve provision of postabortion care at all levels of health care provision (health centers, district hospitals and referral hospitals). For example, uterotonic drugs and antibiotics are included in the national essential drug list and indicated in the national service delivery guideline for the prevention and treatment of hemorrhage due to incomplete abortion, but misoprostol is still not available in most of Rwanda. In addition, most health facility staff still use manual curettage for treating postabortion patients; only a few specialized facilities perform dilatation and curettage (D&C), and very few use manual vacuum aspiration (MVA). These practices show that for the most part, postabortion care is not being offered using either the surgical or the medical abortion techniques recommended by WHO for uncomplicated postabortion cases (WHO 2003).

The present study provides the first national and regional estimates of the incidence of induced abortion and of the incidence of treatment for postabortion complications in health facilities in the private and public sector in Rwanda. National data exist (gathered through the Health Medical Information System (HMIS)) on the provision of PAC but the study offers comparative estimates by which to examine the completeness of the HMIS estimates. The data fill an evidence gap by providing the first available data on the private sector's provision of postabortion care.

Data on the overall incidence of induced abortion is a crucial indicator of women's and couples' difficulties in preventing unintended pregnancies, and of their need for better contraceptive services (Singh et al. 2010). Information on the magnitude of unsafe abortion and on its consequences for women's health can be used to help focus public attention on this issue and stimulate debate. In addition, such information can inform government action to improve policies and programs to improve access to and the quality of postabortion care services.

DATA AND METHODS

Data Sources

The primary data sources for the estimates of abortion incidence were the *Health Facilities Survey* and the *Health Professionals Survey*, primary data which we gathered that, together with other existing data sources, allow us to arrive at an estimate of abortion incidence. The study design and protocols were adapted from previous applications of this methodology known as the Abortion Incidence Complications Methodology (AICM) (Singh et al. 2011). In addition, we used data on fertility, contraceptive use, the proportion of women delivering at a health center, wantedness of births and unmet need for contraceptive services from national surveys: the 2000 Rwanda Demographic and Health Survey which gathered information from almost 10,500 women 15-49, 2005 Rwanda Demographic and Health Survey

which gathered information from over 11,000 women 15-49 and the 2007-2008 Rwanda Interim Demographic and Health Survey which interviewed over 7,000 women 15-49. We also drew on official national population projections and estimates, as well as the 2001 and the 2006 Enquête Intégrale sur les Conditions de Vie (EICV) (Household Living Standards Survey) (Ministry of Finance and Economic Planning 2002; National Institute of Statistics of Rwanda 2006; National Institute of Statistics of Rwanda 2009).

Health Facilities Survey (HFS). All health facilities (i.e., formal service delivery points managed by trained providers) which possibly provide postabortion care were included in the sample frame. Public, public/private (*Agree*ⁱ), as well as private health facilities were included. Types of health facilities included were referral hospitals, district hospitals, private polyclinics (where different types of specialists offer services), private health clinics (which offer general medicine or only one specialty), and public health centers. Health posts and dispensaries were excluded.

The list of all health facilities was compiled using data from the Ministry of Health and required merging data on private and public facilities. Some investigative work on the part of the in-country study team to complete the private facility list was required as it was not comprehensive. Our sample frame consisted of 468 health facilities of which 66% are governmental, 26% are *Agree*, and eight percent are private facilities. Less than one percent of facilities are referral hospitals, nine percent are district hospitals, less than one percent are polyclinics, nine percent are private health clinics, and 81% are public health centers.

We selected 100% of hospitals, polyclinics and private health clinics, and approximately 22% of public health centers. The proportion of public health centers that was selected varied by province depending

on the total number of facilities in each province (Table 1). We selected a higher proportion of health centers in Kigali (50%), and 19-22% in the other provinces (North, South, East, West). The total number of facilities selected was 168 and 99% responded.

At each selected facility, a senior staff member who was knowledgeable about the facility's provision of postabortion care was asked to respond to the survey. In hospitals, it was usually the chief of the Obstetrics and Gynecology department; in health clinics and health centers, it was typically the director of the facility. All potential respondents were read an informed consent form before survey administration began. No remuneration was offered to respondents. These informants were asked whether their facility provides treatment of abortion complications in an outpatient setting, an inpatient setting or both; and if treatment is provided, they were asked to estimate the number of postabortion patients (spontaneous and induced combinedⁱⁱ) treated in four groups: as outpatients or as inpatients, in the average month or in the past month. Specifying these two time frames increases the likelihood of accurate recall and of capturing variation from month to month. These two numbers are subsequently averaged and multiplied by 12 to produce an estimate for the calendar year.

Health Professionals Survey (HPS). This survey was fielded with individuals who are recognized to be highly knowledgeable about abortion provision and postabortion care in Rwanda. Selected respondents included general practitioners, obstetrician/gynecologists, nurses (A1 and A2)/midwives, other health professionals, social workers, a hairdresser, academics, government employees including parliamentarians, and individuals involved in bilateral as well as multilateral organizations, from both the public and the private sector. Factors considered in selecting respondents included their affiliation, expertise and experience, as well as their reputation among local stakeholders in the field of reproductive health for having extensive knowledge of and experience with postabortion care and

abortion provision. A purposive sample of 56 health professionals from throughout the country was selected and interviewed.

A particular effort was made for the HPS to have sufficient representation of respondents knowledgeable about the context of abortion in rural areas. Approximately 40% of the respondents had worked in rural areas six months or longer, and almost four in 10 worked primarily in rural areas. Respondents came from all five provinces: Kigali (n=23), South (n=14), West (n=8), East (n=7) and North (n=4). The respondents were asked about their perceptions of various aspects of induced abortion: where women obtain abortions, their probability of experiencing complications requiring medical care, and the probability that a woman requiring medical care would receive it.

Fieldwork was conducted May-August 2010. The HFS was carried out by a field team who were recruited from a pool of experienced data collectors who had previously worked for the National Institute of Statistics and graduated from either the medical school of the National University of Rwanda or from one of the nursing schools in Rwanda. The field team participated in a week long training held jointly by staff from the National University of Rwanda School of Public Health and the Guttmacher Institute. Part of the training included pre-testing the questionnaires in the field. The field team was organized into four teams of four: three interviewers (nursing or medical students) and one supervisor (a medical doctor, an experienced nurse or a district health supervisorⁱⁱⁱ). All the field teams started in Kigali to give the field supervisors an opportunity to closely monitor field protocols, performance and challenges. Once the HFS fieldwork had concluded in Kigali, the field teams covered the remaining provinces. The HPS was conducted by members of the study team.

Of the 168 facilities sampled, 166 (99%) participated in the survey (Table 1). Carrying authorization letters from the National Ethics Committee, the National Institute of Statistics, and the Ministry of Health was sufficient to have nearly universal collaboration of health providers in the field. The other factor which contributed to the high response rate was that the heads of facilities were contacted and informed about the visit ahead of time by either the investigators or the field supervisors.

The HFS data were weighted to project the results nationally, taking into account a facility's probability of selection into the sample, by province and facility type and the proportion responding. The weighting factor for a given facility type was the inverse of that subgroup's sampling ratio multiplied by the proportion of completed interviews among sampled facilities.

Estimating the Incidence of Induced Abortion

The total number of women having abortions in a year includes those who were treated for complications at health facilities, those who obtained care from sources other than health facilities (for example private doctors), those who received no care (including those who died before obtaining care) and those who had no complications. Following the same approach used in previous studies , we estimated the incidence of induced abortion first by estimating the annual number of women receiving treatment for induced abortion complications at health facilities, and then applying a multiplier that represents the proportion of women having an abortion who do not need treatment or do not obtain treatment at health facilities (Singh et al. 2011).

Using data from the HFS, we estimated that 25,728 Rwandan women are treated for complications of spontaneous or induced abortion in a year (Table 2). Because complications of induced and spontaneous abortion are often similar, and because legal restrictions on induced abortion may lead to misreporting

(by the woman and/or by the doctor), it is difficult to correctly categorize the cause of a pregnancy loss through direct questioning. We therefore rely on an indirect methodology to estimate the number treated for spontaneous abortion. Spontaneous abortions that are likely to require care at a health facility are those that occur in the second trimester: Spontaneous pregnancy loss of gestation 13-22 weeks is estimated to be 3.4% of live births, based on life tables from clinical studies of pregnancy loss (Bongaarts and Potter 1983; Harlap et al. 1980). Applying this percentage to the number of births occurring in each province and nationally, we obtain the number of such spontaneous abortion.^{iv} Nationally, there were 433,697 live births in 2009 in Rwanda and an estimated 14,789 late spontaneous abortions (Table 2). The estimated number of births in Rwanda in 2009 was calculated based on age-specific fertility rates from the 2007-2008 Interim DHS and estimates for 2009 of the number of women in each five-year age-group, nationally and for each of the five provinces.

A further adjustment is needed as only a certain proportion of women who need treatment for complications of a late spontaneous abortion or an induced abortion will have access to a health facility. We rely on the percent of women who delivered at a health facility as captured by the DHS as a proxy for the likelihood that a woman with complications from a spontaneous abortion would seek care. The proportion of women delivering at a health facility in 2009 was estimated for Rwanda and for each province by projecting forward the rate of increase between 2005 and 2007-2008, based on DHS surveys for those years, a 21% annual rate of change, and reaching an estimated 64% in 2009. Lacking comparable province-specific measures, the national rate of change was assumed to apply to all five provinces, projecting province-specific measures from the 2007-08 DHS to 2009. Applying these proportions, we estimate that in 2009, 9,431 women are treated at health facilities for complications of late spontaneous abortions, nationally. Subtracting this number from the total number of women

receiving postabortion care in 2009, we estimate that 16,297 women were treated for complications of induced abortion.

To obtain the total number of women having abortions, we estimated a factor or multiplier to capture the proportion of all women obtaining abortions who are not treated for complications at health facilities. Many women having abortions do not receive postabortion care: Some do not experience complications; others do not succeed in getting care at a health facility even though they have complications. The multiplier is calculated based on three questions asked in the HPS: The distribution of all women obtaining an abortion according to the type of provider they went to; the proportion who experience complications according to type of provider, and the proportion of women with complications who are estimated to obtain care from a health facility. Because conditions under which women obtain abortions likely vary greatly by socioeconomic status and place of residence, these questions were asked separately for the following four sub-groups of women: urban poor, urban nonpoor, rural poor and rural nonpoor. Based on the HPS, we calculated the percentage expected to be hospitalized for induced abortion complications among all women having abortions in each of these four subgroups. These percentages were weighted by the proportional size of the groups to arrive at a multiplier for the country as a whole. The lower the multiplier, the less safe the abortions are and/or the more access women have to medical care whereas the higher the multiplier, the more safe the abortions are and/or the less access women have to medical care. On the basis of these calculations, an estimated 28% of women undergoing an induced abortion likely receive treatment for complications. The national multiplier is the inverse of this proportion—3.60. That is, the estimated number of induced abortions in 2009 is 3.60 times the number of women treated for complications. Since conditions under which women obtain abortions and access to postabortion care likely vary by province, we calculated a separate multiplier for Kigali (4.87) and a single multiplier for the rest of the country (3.17) because the

HPS sample size was too small to permit calculating multipliers for each province; the multiplier for the rest of the country (3.17) is applied to all provinces other than Kigali. Given the use of indirect estimation methods, our estimate of abortion incidence is an approximation to the true incidence, and it is appropriate to present a range of estimates and to use the medium estimate as the recommended estimate. Low and high estimates were calculated by adding -1 and +1 to the multipliers.

Estimating Unintended Pregnancy

To calculate numbers and rates of unintended pregnancy, we first calculated the number of unplanned births by applying the proportion of births that are unplanned (mistimed or unwanted at the time of conception), from the 2007-8 DHS (the most recent national survey that provides this information), to the estimated total annual number of live births in 2009, nationally and for each province. Combining this number with the number of induced abortions and also including an estimate of the number of miscarriages that resulted from unintended pregnancies,^v yielded an estimate of the total number of unintended pregnancies occurring in Rwanda in 2009. We then calculated the rate of unintended pregnancies per 1,000 women of reproductive age and the proportion of all pregnancies that were unintended.

Measuring Contraceptive Use and Unmet Need

We obtained the proportion of women using modern, or effective, contraceptive methods from the 2005 and the 2007-8 DHS surveys. Effective methods are pills, injectables, male and female sterilization, IUDs, implants, condoms and spermicides. Using the 2005 DHS, we estimated unmet need for contraception among married women aged 15–49. Married women are classified as having an unmet need if they do not want a child in the next two years or they want no more children and are able to become pregnant, are married or are not using any method of contraception.

RESULTS

Provision of Postabortion Care

Of the 468 facilities in our sampling frame, 452 (97%) treat postabortion complications (Table 3).

Perhaps surprising to some, all *Agree* facilities reported providing PAC. Private facilities were the only type of facility where PAC was not universally provided: 64% of all private facilities (a hospital, polyclinics and clinics) reported providing PAC.

The average annual caseload of abortion patients (including spontaneous and induced) treated per facility that offers postabortion care (PAC) is 57. Public facilities see the largest number of patients. Referral hospitals, with the largest capacity of all types of facilities, treat an average of 484 postabortion patients per year; by comparison, district hospitals average 207 a year, and health centers have a much smaller caseload—31 patients per year. Although government facilities care for the majority of women treated for abortion complications (60%), *Agree* facilities treat 33% while private facilities treat 6% (not shown).

Abortion Morbidity

Almost 26,000 women received care for complications of spontaneous and induced abortions in Rwandan health facilities in 2009. We avoided duplication in counts of women treated in multiple facilities by asking about the number referred out, and deleting those cases from the overall count. Subtracting out the estimated number of women who were treated for complications resulting from late term spontaneous abortion, we estimate that 16,300 women were treated for complications resulting from induced abortion. Nationally, the rate of hospitalization for treatment of induced abortion complications was 7 per 1000 women of reproductive age. The rate was much higher than in Kigali (17

per 1,000 women), somewhat higher than average in the West province (9 per 1000 women) and below average in the North, South and East provinces (rates of 4 to 5 per 1,000). If all other factors remained the same, and if relatively few women had multiple unsafe abortions for which they required treatment of complications, the overall rate suggests that approximately 20% of women—about 1 in every 5—would require treatment for complications of an induced abortion over their reproductive lifetime.

According to the health professionals surveyed, the majority of abortions among relatively well-off women likely are performed by trained health professionals, such as doctors, medical health assistants, Nurses (A0-A2), and midwives. Access to trained health professionals is greater for poor women in urban areas given the availability of trained providers in urban areas as compared to poor women in rural areas (data not shown). However, complications may result from procedures carried out by trained providers who have little experience or who work in unhygienic settings. In addition, a substantial proportion of abortions in all sub-groups of women entail a high risk of complications because they are carried out by informal and untrained providers (traditional healers, lay practitioners, pharmacists or the women themselves). Physicians in Rwanda reportedly favor dilation and curettage as well as vaginal administration of misoprostol/mifepristone or some kind of hormonal induction (HPS data, not shown). Most informal providers in urban areas are thought to use vaginal herbs or drug overdoses, and many providers in rural areas, as well as women who induce their own abortions, are believed to use decoctions in water or alcohol and other oral methods of induction.

Abortion incidence

Applying the medium multiplier (3.60) to the estimated number of women receiving treatment for complications of induced abortion (16,300), we estimated that just under 59,000 induced abortions

occurred in Rwanda in 2009 (Table 4). The estimates using the various multipliers range from 42,000 to 75,000.

Nationally, the medium annual rate is estimated to be 24.4 induced abortions per 1,000 women aged 15-44 in 2009; the low and high estimates range from 17.6 to 31.2 per 1,000 women (Table 5). The abortion rate varied greatly across provinces: Kigali is estimated to have a very high rate (85 per 1000 women annually, medium estimate), followed by the West province (a medium rate of 29). By comparison, the abortion rate is much lower in the other three provinces, ranging from 13 to 15 per 1000 women.

There are several plausible factors that might contribute to Kigali actually having a higher than average abortion rate: Young women in Kigali are more likely to want to complete higher levels of education and to enter the labor force and to continue to work, increasing the likelihood that unintended pregnancies might jeopardize their life plans and goals. In addition, there is a greater probability of unintended pregnancy and abortion among young women in Kigali because of the larger gap between the median age at first intercourse and first marriage (a gap of 2.1 years) in this province: This gap is much smaller in other provinces – 0.8 of a year in South province and 0.5 year or less in the other three provinces (INSR and ORC Macro 2006). Based on the difference between the TFR and the wanted TFR, women in Kigali have as strong a preference to control family size and the timing and spacing of births as do women in other provinces, and, despite their higher than average levels of contraceptive use, they have a high level of unmet need (31%) (MOH, NISR, and ICF Macro 2009). These patterns are associated with having more unplanned pregnancies, which helps to explain their higher rates of terminating unwanted pregnancies. Kigali's higher multiplier also suggests that women in this province are more likely than

women in other provinces to obtain safe, but clandestine, abortions, possibly because they are able to afford safe services from trained professionals.

However, an important factor likely to be contributing to Kigali's extremely high estimated rate is women traveling from nearby areas in other provinces into Kigali for treatment of complications. In addition, given that almost all private clinics in Rwanda are located in Kigali, it is likely that women in other provinces travel to Kigali in order to obtain safe clandestine abortions from private clinics. Lacking data on place of residence for women who obtained postabortion care in facilities in Kigali, the indirect methodology counts all women who were treated for abortion complications in Kigali as residents of Kigali, spuriously inflating the numerator of the abortion rate for Kigali. These factors suggest that the results are to some extent overestimating the abortion rate for Kigali, and at the same time underestimating the rate for other provinces from which women leave to obtain postabortion care in Kigali.

At the national level, an estimated 14 abortions occurred per 100 live births in 2009 (Table 5, medium estimate). The abortion ratio was much higher in Kigali—59 abortions per every 100 live births, then in other provinces where this ratio ranged between 7 and 15. As in the case of the abortion rate, this measure would also be affected by women seeking care for postabortion complications in provinces other than the ones in which they are resident. As a result, the abortion ratio is likely overestimated for Kigali and underestimated for other provinces.

Abortion in the Context of Unintended Pregnancies

Combining our estimates of induced abortion for 2009 with an estimate of the number of unplanned births based on data from the DHS 2007/8, we estimated the total number of unintended pregnancies in

2009. The proportion of births that were unplanned during the 3-year period before the 2007/8 survey was applied to the total number of live births in 2009, assuming that this proportion changed little over this short period.

Overall, the results show that nationally, 113 unintended pregnancies occurred per 1,000 women in 2009, and 47% of all pregnancies were unintended (Table 7). As may be expected, given its high abortion rate, the province of Kigali has the highest unintended pregnancy rate (170 per 1,000) and the highest proportion of all pregnancies that were unintended (64%) among the five provinces. The unintended pregnancy rate is close to the national level in three provinces (North, East and West with unintended pregnancy rates ranging between 109 and 116, Table 7). The South region has a notably lower unintended pregnancy rate (93 per 1000 women).

Factors Underlying Unintended Pregnancy and Abortion

We examined differences among the five provinces in the use of any contraceptive method, in use of modern methods and in fertility preferences, to see if these differences were associated with differences in level of unintended pregnancy and abortion.

Nationally, the proportion of married women aged 15-44 who were currently using a modern contraceptive method remained at a very low level of 9% in 2000 and 2005 and then increased sharply to 27% in 2007/8 (INSR and ORC Macro 2006; MOH, NISR, and ICF Macro 2009; Office National de la Population (ONAPO) [Rwanda] et ORC Macro 2001). (The proportion using traditional methods increased from 4% in 2000 to 8% in 2005 to 10% in 2007/8.) The proportion using a modern method increased at a somewhat slower pace in Kigali than in other provinces - rising from 23% to 35%, compared to increases in other provinces from 8-10% to 23-33%.

In the DHS, the proportion of births that were reported to be unplanned (unwanted or mistimed) increased from 34% in 2000 to 39% in 2005 to 40% in 2007/8 (Table 6). The largest increase in the proportion of births that were unplanned between 2000 and 2005 was found in Kigali (15 percentage points), with large increases in Umutara and Kibungo as well (10 percentage points or more); Gisenyi had a decrease of 25 percentage points during the same time period. In 2007/8, unplanned births were highest in North Province followed by Kigali and East Province (47%, 44% and 43%, respectively).

Nationally, the gap between the number of children women want and the number they actually have, increased from 1.1 children in 2000 to 1.5 children in 2005 and increased further to 1.8 children in 2007/8, even as average family size fell from 6.1 to 5.5 (not shown). This gap increased in size in all provinces, in Kigali, as well as in other provinces. The proportion of women in union who had an unmet need for contraception in 2000 was 36% and in 2005 was 38% meaning that 36-38% of women did not want a child soon or wanted no more children, but were not using a contraceptive method. (It is not possible to calculate unmet need from the 2007/8 DHS as this survey did not obtain all the necessary information to calculate this measure.) The proportion with unmet need for contraceptive services was very high in all provinces, ranging between 31% in Kigali and 38-40% in the other four provinces. These high levels of unmet need for contraception and high levels of unplanned childbearing suggest that unplanned pregnancy is likely to be very high in all provinces, including Kigali.

The points made earlier about factors that underlie the very high abortion rate estimated for Kigali are relevant here. Even after allowing for some overestimation of the abortion rate in Kigali, and underestimation of the rate in nearby provinces, because of the likelihood that women come into Kigali to obtain both postabortion care and safe abortion services, it is likely that the abortion rate in Kigali is

higher than in other provinces. One important contributing factor that was identified is a higher level of risk for unintended pregnancy among young women in Kigali. However, more research is needed to better understand factors that contribute to abortion incidence and to better assess the extent to which the rate in Kigali may be overestimated.

Discussion

The rate of abortion found in Rwanda, 24.4 abortions per 1,000 women aged 15-44 annually, is a moderate rate as compared to the region of Eastern Africa which is estimated to be 39 abortions per 1,000 women aged 15-44 (Singh et al. 2009). There is no doubt that even at a rate of 24.4, unsafe abortion is causing harm to women and endangering their health and impacting them and their families negatively.

As abortion is illegal, Rwandan women may spend a lot of money (when they can afford it) to get abortion from a trained provider. Or if the woman cannot afford a safe abortion, she will risk her life by attempting to have an abortion under unsafe circumstances. In either situation, the woman may experience short-term or long terms consequences including hemorrhage, infection, and potentially, infertility.

Due to the public health insurance scheme, *Mutuelle*, women are likely to access health care at a public clinic for treatment of postabortion complications. This phenomenon increases the cost of care to the facilities as cases of postabortion care may require expensive treatment including surgical procedures, blood transfusions, and oxytocin as well as hospitalization. The provision of postabortion care by public facilities has a direct impact on the sustainability of the community-based insurance scheme.

Lower rates of PAC provision at private facilities may be due to several factors. One possible factor is that although the types of services private clinics are supposed to provide are clearly defined by the Ministry of Health, some private clinics may nevertheless not provide the services they are expected to provide to call themselves a clinic. Public facilities cannot shirk their health care provision facilities and so must provide the minimum package of service if they are health centers and a comprehensive package of service if they are district or referral hospitals, guaranteeing that they are able to manage postabortion care complications. Another possible reason that we found low rates of PAC provision at private facilities is that some of these facilities may have underreported the abortion-related services they provide because of their reluctance to be associated with abortion given that they may in fact be providing induced abortions.

Kigali's higher abortion rate as compared to the rest of the country deserves some further discussion. These data capture where the postabortion care (and abortions) occurs, not where the woman lives. As women are likely coming from surrounding areas to Kigali to access Kigali's superior medical services as evidenced by the fact that all of the referral hospitals are in Kigali which is where women with more complicated or severe abortion complications are supposed to get transferred, the higher rate in Kigali is likely to be partly an artifact of these patterns of health care seeking. Furthermore, the gap between sexual debut and marriage is greater in Kigali than in the rest of the country resulting in higher risks for unintended pregnancy among unmarried young women in Kigali. In Kigali, more young women than in rural areas delay marriage to advance their education, to pursue a career, or because of other social and economic factors: This increases their chances of being sexually active while unmarried, experiencing an unintended pregnancy and seeking an abortion. These factors argue that the abortion rate is in fact higher in Kigali than in other regions, even though the difference is likely not as large as these results suggest.

The methods being used to provide abortions, as perceived by the respondents to the health professionals' survey, are largely dilation and curettage among doctors, and decoctions in water or alcohol and drug overdoses as well as insertion of metal objects by other providers. There is very little use of manual vacuum aspiration, a low cost and less invasive procedure for of evacuating the contents of the uterus. The methods used by non-doctors, in particular, are extremely dangerous. The WHO has now included misoprostol in its list of recommended drugs to treat postabortion care, and there is need to increase awareness of this method among trained providers.

It is crucial to increase efforts to sensitize people about the importance of using effective family planning methods. There are many misconceptions about contraceptives including fear of sides effects, the belief that contraceptive methods leave women infertile, that the use of methods implies lack of commitment to marriage since in Rwandan culture, a women marries to have children. The high abortion rate is a clear indication of the fact that women are in need of modern contraceptive methods. The Ministry of Health should investigate carefully the barriers to contraceptive use in Rwanda and find appropriate arguments to address rumors and misconceptions about family planning. The government could counter misconceptions and provide accurate information about methods through radio broadcasts, interactive methods such as theatre, or communication messages during the monthly community service day. Furthermore, family planning should consistently be provided as an aspect of postabortion care provision. This could be mandated at the public facilities and strongly encouraged among the private facilities.

There is great need for programs to educate women and couples about the specifics of the abortion law, the criteria under which abortion is permitted and how to obtain a legal procedure, as most Rwandese

believe that abortion is illegal under all circumstances. Even though abortion can be legally accessed to save the life of the woman or to protect her physical health, the current legal guidelines determining how access can take place are so difficult, that it is likely that even when legally allowed, safe and legal abortion is beyond the reach of most women. This law was put in place in 1977 when Rwanda enacted a new penal code, and since then, Rwanda has not yet appeared ready to revisit that law. Even the tragic genocide that happened in 1994 did not result in a liberalization of the abortion law to allow abortion in case of rape, incest, or for economic and social reasons. Abortion remains very stigmatized in Rwanda and the parliament is not ready yet to change the law even through it recognizes the important place that abortion occupies in maternal mortality. In the light of these results it's important that parliamentarian and senators who represent the population discuss the possibility of relaxing the law on abortion by adapting to the situation on the ground. For example, parliament could take up the question of permitting one medical doctor to determine the need for an abortion rather than require three physicians to do so. Guidelines, the process for accessing abortion under the existing law, are also needed, e.g. which health professionals and facilities are expected to provide this service. While relatively small, such incremental changes can improve access to legal and safe abortion services.

These first-ever estimates of abortion incidence in Rwanda will hopefully be the basis for an open discussion of the impact of unsafe abortion on women's health, of the level of unintended pregnancy and means to prevent these undesirable outcomes.

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ⁱ *Agree* facilities are religious health care entities which obtain government support. Some of these facilities do not provide contraceptive services although that do not provide contraceptive services have arrangements with private institutions which provide family planning service (e.g. the Association Rwandaise de Bien Etre Familial (ARBFE)).

ⁱⁱ The reason we ask about both of these types of pregnancy losses is that in illegal settings, it is not feasible for respondents to estimate for these two groups separately.

ⁱⁱⁱ District health supervisor are responsible for visiting health centers in their district on a quarterly basis and providing a technical support by providing supervision.

^{iv} 3.4% of all live births is arrived at through the fact that 2.9% of all recognized pregnancies and 84.8% of all live births end in second trimester miscarriages. Although some women who miscarry at earlier gestations seek medical care, many likely are treated on an outpatient basis, and relatively few are hospitalized. Pregnancy losses at 23 or more weeks are not included because they are usually classified as fetal deaths rather than miscarriages.

^v The number of miscarriages is estimated using an accepted formula (10% of induced abortions +20% of live births). For unintended pregnancies, the number of births would be those that are mistimed or unwanted; and for intended pregnancies, the number of births would be those that are wanted at the time they occurred.

Table 1. Key measures of sample selection by strata, at the national level, Health Facilities Survey, Rwanda, 2009

Type of health facility	Total number of health facilities	Sampling fractions (%)	Number selected	Number Responded	Health Facility Survey: Participation rate (%)
Referral hospital	4	100	4	4	100
District hospital	41	100	41	41	100
Health center	385	19-50%	85	85	100
Private Hospital, polyclinic and clinics	38	100	38	36	95
Total	468	36	168	166	99

Source: Health Facility Survey

Table 2. Calculation of the number of women treated for induced abortion complications, nationally and by province, Rwanda 2009.

Province	Total number of women 15-44	Women treated for abortion complications ^a	Number of live births	Total number of miscarriages ^b	Women with miscarriages treated in Health facilities ^c	Women treated for induced abortion complications in health facilities ^d
Kigali city	237,172	5,096	34,102	1,163	952	4,144
North	415,208	3,386	72,276	2,465	1,558	1,829
South	639,025	5,173	112,076	3,822	2,224	2,949
East	550,359	4,550	108,593	3,703	2,314	2,236
West	565,889	7,522	106,650	3,637	2,382	5,140
Total	2,407,652	25,728	433,697	14,789	9,431	16,297

Note:

^a Includes both spontaneous and induced abortions

^b Miscarriages at 13-21 weeks' gestation, calculated as 3.41% of all live births

^c The proportion of women with miscarriages who obtain treatment is assumed to be equal to the proportion who deliver in facilities.

^d The total number treated for any abortion complication minus the number treated for care of miscarriages

Sources: Health Facility Survey, interim DHS survey 2007-2008, Census 2002, EICV2.

Table 3. Indicators of availability of postabortion services, provision of these services by type of facility, Rwanda, 2009

Indicators of service provision and utilization	Total	Public				Faith-based support/Public			Private
		Referral hospital	District hospital	Health center	Total	District hospital	Health center	Total	Private Hospital, polyclinic and clinics
Total Facilities	468	4	26	278	308	15	107	122	38
Post abortion services									
% of facilities that provide postabortion care	97	75	100	100	100	100	100	100	64
Number of facilities that provide postabortion care	452	3	26	278	307	15	107	122	23
Post abortion care: Annual caseload									
Average # of women treated per facility that offers PAC ^a	57	484	207	31	50	189	54	70	73
Total # of women treated for abortion complications	25,728	1,452	5,383	8,639	15,474	2,832	5,751	8,583	1,671

Notes:

^a Includes spontaneous and induced abortion complications.

Sources: Health Facilities Survey

Table 4. Number of women 15-44 treated in a health facility for complications of unsafe induced abortion; and estimated total number of induced abortions, by multiplier , according to province, Rwanda, 2009.

Province	No. of women treated for induced abortion complications	Estimated total number of induced abortions		
		3.6	3.6	4.6
Kigali city	4,144	16,049	20,193	24,336
North	1,829	3,968	5,796	7,625
South	2,949	6,399	9,348	12,297
East	2,236	4,852	7,088	9,324
West	5,140	11,153	16,293	21,433
Total	16,297	42,420	58,718	75,015

Sources: Authors' estimates based on Health Facility Survey

Table 5. Estimated abortion rate and abortion ratio by province and national, by multiplier, 2009 .

Province	Abortion Rate			Abortion Ratio		
	Multiplier			Multiplier		
	Low	Medium	High	Low	Medium	High
Kigali city	67.7	85.1	102.6	47.1	59.2	71.4
North	9.6	14.0	18.4	5.5	8.0	10.5
South	10.0	14.6	19.2	5.7	8.3	11.0
East	8.8	12.9	16.9	4.5	6.5	8.6
West	19.7	28.8	37.9	10.5	15.3	20.1
Total	17.6	24.4	31.2	9.8	13.5	17.3

Notes: The abortion rate is the number of induced abortions per 1,000 women ages 15-44 per year. The abortion ratio is the number of induced abortions per 100 live births.

Sources: Health Facility Survey, 2005 DHS, Population Estimates for 2009 (based on the 2002 Census).

Table 6. Percentage of births, by year and pregnancy intention status, according to region

Province	2007-2008		
	Unwanted	Mistimed	Total Unplanned
Kigali city	27	17	44
North	33	14	47
South	23	14	36
East	29	14	43
West	19	15	34
Total	25	15	40

Province	2000			2005		
	Unwanted	Mistimed	Total Unplanned	Unwanted	Mistimed	Total Unplanned
Kigali	14	24	38	31	22	53
Kigali Ngali	12	25	37	18	15	33
Gitarama	14	17	31	18	18	37
Butare	12	20	32	11	26	37
Gikongoro	11	25	36	11	25	36
Cyangugu	14	27	41	22	22	44
Kibuye	14	21	34	12	21	33
Gisenyi	25	37	62	13	23	37
Ruhengeri	10	18	28	13	23	37
Byumba	13	23	36	13	22	35
Umutara	9	19	28	24	14	38
Kibungo	14	25	39	12	39	50
Total	12	22	34	16	23	39

Definitions of the five major provinces changed between 2005 and 2007-8, making it not feasible to analyze trends between the most recent and the earlier two surveys at the level of major regions.

Source: Special tabulations of the DHS surveys for 2000 and 2005, Interim survey 2007-2008.

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Table 7. Number of pregnancies, unintended pregnancy rate, percentage of pregnancies that were unintended and estimated pregnancy rate, by region, 2009.

Province	No. of Pregnancies ^a	Unintended Pregnancy Rate ^b	% Pregnancies that are unintended	Pregnancy Rate ^c	No. of unplanned births
Kigali city	63,135	170	64	266	15,073
North	93,107	114	51	224	34,259
South	144,774	93	41	227	40,796
East	138,108	116	46	251	46,695
West	145,902	109	42	258	36,474
Total	585,026	113	47	243	173,045

Source Note: Population estimates for 2009 are estimated based on the 2002 census numbers for women ages 15-44 by 5-year age-groups, projected forward. Age specific fertility rates (ASFRs) obtained from the Interim DHS 2007-8 were applied to the population of women by 5-year age-groups in 2009, to estimate the number of births in 2009. The proportion of births that were unplanned (unwanted or mistimed, also from the 2007-8 Interim DHS) was applied to the total number of births (nationally and by region) to obtain the number of unplanned births in 2009. The number of abortions and miscarriages are estimates developed by the authors (see Methods section).

^a Pregnancies include: births, abortions and miscarriages.

^b Number of unintended pregnancies (unplanned births, abortions and miscarriages) per 1,000 women age 15-44 per year.

^c Number of pregnancies (live births, abortions and miscarriages) per 1,000 women 15-44 per year.