Abortion Incidence in Rwanda

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Abstract

Abortion is illegal in Rwanda except to save a woman's life or to protect her physical health. Nevertheless, many women obtain unsafe abortions, and some experience health complications. To estimate the incidence of induced abortion, we conducted a survey with a sample of health facilities that provide post abortion care as well as a purposive sample of knowledgeable health providers in Rwanda in 2009. The former provided an estimate of the number of cases being seen annually at health facilities for postabortion care; the latter provided a multiplier that captures the proportion of women having an abortion who do not obtain treatment at health facilities or who do not need treatment. Almost 16,300 women received care for complications of induced abortions in Rwanda in 2009. Nearly half of abortions in Rwanda lead to complications, and 1/5 of those who experienced a complication did not get treatment. Nationally, this translates to an annual rate of 24.4 induced abortions per 1,000 women aged 15-44 in 2009. Abortion rates were much higher in the capital (Kigali) than the rest of the country. There is an urgent need to strengthen family planning programs and postabortion care.

Introduction

With only four years remaining to reach the Millennium Development Goal (MDG) 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 morbidity and mortality 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 questionably high compared to the contribution of unsafe abortion to maternal mortality in the region, it does establish that unsafe abortion requires further attention in Rwanda.

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: 38% of married women were at risk of unintended pregnancy in 2005, the latest year for which these data are available (INSR and ORC Macro 2006). In addition, while many young women become sexually active before marriage, social sanctions often prevent them from using contraception, as unmarried women using contraception are perceived to be promiscuous. The median age of first sex in Rwanda is 17 years old among women and 18 among men, with the median age of marriage at 20.6

(MOH, NISR, and ICF Macro 2009;TRAC 2010). Given the strong sanctions against having a child while unmarried, any pregnancy that occurs during this time is likely to be unwanted. In light of these factors, it is not surprising that in 2007, according to women, 40% of recent births were unplanned. Some proportion of women with unwanted pregnancies will seek abortion.

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. This law was put in place in 1977 when Rwanda enacted a new penal code. A woman seeking a legal abortion has to go through a very demanding process to get the consent of two doctors for the procedure, making access to a legal abortion extremely difficult even when the abortion is allowed under the law. A high penalty is imposed by the law for anyone who helps a woman abort outside of these circumstances, therefore many medical doctors refuse to provide abortion even when it is medically indicated. Many women turn to illegal abortion to terminate unwanted pregnancies, some of which will be carried out by untrained practitioners or under unhygienic conditions.

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). 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 sectors in Rwanda. National data (gathered through the Health Medical Information System (HMIS)) exist on the provision of PAC, but this study offers comparative estimates by which to examine the completeness of the HMIS estimates. The data fill an additional evidence gap by providing the first available data on the private sector's provision of postabortion care. 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 government action.

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 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 from the 2000 and 2005 Rwanda Demographic and Health Survey, as well as the 2007-2008 Rwanda Interim Demographic and Health Survey. 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), a nationally applied poverty survey.

Health Facilities Survey (HFS). All health facilities (i.e., formal service delivery points managed by trained providers) that possibly provide postabortion care were included in the sample frame. Public, public/private (*Agree*[i]), and private health facilities were included. Types of health facilities included 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.

The list of health facilities was compiled using data from the Ministry of Health. Because the sample frame received from the Ministry of Health did not contain all private facilities, we worked with the president of the private health association to get a comprehensive list of private facilities potentially providing PAC services. Our sample frame consisted of 466 health facilities of which 64% are governmental, 29% 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, seven percent are private health clinics, and 83% 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 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 167 and 99% responded.

At each selected facility, a senior staff member knowledgeable about the facility's provision of postabortion care was asked to respond to the survey. In hospitals, the respondent 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. The informants were asked whether their facilities provide treatment of abortion complications in an outpatient setting, an inpatient setting or both; if a respondent indicated that the facility provides treatment, he or she was asked to estimate the numbers of postabortion patients (spontaneous and induced combined[ii]) treated as outpatients and as inpatients, as well as the numbers treated in an average month and in the past month. Specifying two time frames (average and past month) 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)[iii]/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 abortion provision and postabortion care. A purposive sample of 56 health professionals from throughout the country was selected and interviewed. The respondents were asked about their perceptions of various aspects of induced abortion: from whom women obtain abortions, their probability of experiencing complications requiring medical care, and the probability that a woman requiring medical care would receive it. A particular effort was made 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 for 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).

Health facility survey data collection: Fieldwork was conducted May-August 2010. The HFS was carried out by a field team recruited from a pool of experienced data collectors who had previously worked for the National Institute of Statistics or 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 groups of four, each including three interviewers (nurses or advanced medical students) and one supervisor (a medical doctor, an experienced nurse or a district health supervisor[iv]). All the field teams started in Kigali to give the in-country principal investigator (PI) an opportunity to closely monitor field protocols, interviewer performance and challenges. Once the HFS fieldwork had concluded in Kigali, the field teams covered the remaining provinces.

Of the 167 facilities sampled, 165 (99%) participated in the survey (Table 1). Authorization letters from the National Ethics Committee, the National Institute of Statistics, and the Ministry of Health were sufficient to enlist the nearly universal collaboration of health providers. Heads of facilities were contacted and informed about the visit ahead of time by the PI, co-investigators or the field supervisors, further contributing to the high response rate.

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 of facilities 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.

Health provider's survey field data collection: Because the HPS sample included high-level officers and conducting the interviews required greater skill and familiarity with the methodology, all HPS interviews were conducted by the PI, co-investigators and supervisors. Potential respondents were contacted in

advance and the interviewers made appointments for an appropriate time to conduct the interview. All interviewees gave their written consent to participating in the interview.

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 traditional providers), 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 obtain treatment at health facilities or do not need treatment (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 spontaneous and induced 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 at the facility level. 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, and 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 nationally and in each province, we obtain the number of spontaneous abortions.[v] 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. Nationally, there were 433,697 live births in 2009 in Rwanda and an estimated 14,789 late spontaneous abortions (Table 2).

Only a 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 will 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 was found. Therefore, the proportion of women delivering in hospitals is estimated to be 64% in 2009. Lacking comparable province-specific measures, the national rate of change was assumed to apply to all five provinces. Applying these proportions, we estimate that in 2009, 9,431 women were 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.

Many women having abortions do not receive postabortion care: Some do not experience complications, while others do not succeed in getting care at a health facility even though they have complications. To obtain the total number of women having abortions, we estimated a multiplier to capture the proportion of all women obtaining abortions who are not treated for complications at health facilities. 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. We then calculated the percent 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 abortion is and/or the more access women have to medical care whereas the higher the multiplier, the more safe abortion is 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 in Rwanda. 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 postabortion care likely vary by province, we calculated separate multipliers for Kigali (4.87) and the rest of the country (3.17). The HPS sample size was too small to permit calculating multipliers for each province. Given that our estimate of abortion incidence is an approximation of the true incidence, it is appropriate to present a range of estimates. Low and high estimates were calculated by adding -1 and +1 to the multipliers. We use the medium estimate as the recommended estimate.

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 number of live births in 2009, nationally and for each province. Combining this

number with the number of induced abortions and including an estimate of the number of miscarriages that resulted from unintended pregnancies[vi] 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 (the last year for which it is possible to derive this number), 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), are able to become pregnant, and are not using any effective method of contraception.

RESULTS

Provision of Postabortion Care

Of the 466 facilities in our sampling frame, 98% treat postabortion complications (Table 3). Perhaps surprisingly, all *Agree* facilities reported providing PAC. Public facilities cannot shirk their health care provision obligation and so must provide a comprehensive package of service if they are referral or district hospitals, and the minimum package of service if they are health centers, guaranteeing that they are able to manage postabortion care complications. 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. Lower rates of PAC provision at private facilities may be due to several factors. Firstly, although the types of services private clinics are supposed to provide are clearly defined by the

Ministry of Health, some private clinics nevertheless may not provide the services they are expected to provide to be considered a clinic. Another possible reason is that it may be expensive to invest in PAC provision equipment and other necessary commodities. Therefore, private clinics may find it more cost effective to refer the cases to public facilities.

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. Due to the public health insurance scheme, *Mutuelle,* women are likely to access health care at a public facility for treatment of postabortion complications. 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. While we acknowledge that not all women who are referred out will go to another facility for treatment, it was the most reliable means we had at our disposal to avoid double-counting cases. 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 in Kigali (17 per 1,000 women), somewhat higher 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 one in every five—will require treatment for complications of an induced abortion over their reproductive lifetimes.

According to the health professionals surveyed, the majority of abortions among relatively well-off women are likely 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 as compared to poor women in rural areas (data not shown), due to the availability of trained providers in urban areas. 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). 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 among 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). 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 low and the high 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). Only 10% of women 15-44 live in Kigali. 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 having a higher than average abortion rate: Young women in Kigali are more likely to complete higher levels of education and to enter the labor force, increasing the likelihood that an unintended pregnancy might jeopardize their life plans. In addition, there is a larger gap between the median age at first intercourse and first marriage (a gap of 2.1 years) in this province, compared to 0.8 of a year in South province and 0.5 of a year or less in the other three provinces (INSR and ORC Macro 2006). Despite the higher than average levels of contraceptive use in Kigali, 31% of married women there have an unmet need for family planning (MOH, NISR, and ICF Macro 2009). Each of the above factors contributes to the number of unplanned pregnancies in the province. Kigali's higher multiplier also suggests that women in this province are more likely than women in other provinces to obtain safer abortions, in part because they may be able to access services from trained professionals. As almost all private clinics in Rwanda are located in Kigali, women may be obtaining safe clandestine abortions from private clinics. Another important factor likely

to be contributing to Kigali's extremely high estimated rate is the number of women traveling from other provinces to Kigali for an abortion or for treatment of complications.

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—than 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 Kigali rather than the provinces in which they are resident. Consequently, 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%.

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 have a rate of 39 abortions per 1,000 women aged 15-44 (Singh et al. 2009). Uganda is estimated to have a rate of 54, Malawi is estimated to have a rate of 24, and Ethiopia is estimated to have a rate of 23 (Levandowski et al. 2011;Singh et al. 2005;Singh et al. 2010). Therefore, Rwanda's rate puts it on par with a number of countries in the region, and quite a bit below its neighbor, Uganda.

Even at a rate of 24.4, unsafe abortion is endangering women's health. Kigali's higher abortion rate as compared to the rest of the country deserves some further discussion. These data capture the province in which the postabortion care (and abortions) occurs, not where the woman lives. Women are likely coming to Kigali from surrounding areas to access Kigali's superior medical services, as evidenced by the

fact that all of the referral hospitals where women with more complicated or severe abortion complications are supposed to get transferred are in Kigali. The higher rate in Kigali is likely to be partly an artifact of these patterns of health care seeking. Additionally, the social factors described above including the gap between sexual debut and marriage and higher educational achievement in Kigali also contribute to the higher rate. While these factors suggest that the abortion rate is higher in Kigali than in other regions, the difference may not be as large as the results indicate.

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). Between 2005 and 2008, emergency contraception became legal and available, and 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 the inclusion of postabortion care in the package of services offered at public health facilities. 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. Rwanda's current development plan and poverty reduction strategy for 2008–2012 place strong emphasis on reproductive health, including family planning (Government of Rwanda 2007).

However, greater efforts are needed to improve the provision of postabortion care. While 85% of hospitals report having vacuum aspiration supplies and 97% report having a dilation and curettage

(D&C) kit, only 13% of health centers and seven percent of polyclinics have this equipment (National Institute of Statistics (NIS) [Rwanda], Ministry of Health (MOH) [Rwanda], and Macro International Inc. 2008). Despite the widespread availability of vacuum aspiration and D&C equipment at hospitals, most health facilities still use manual curettage for treating postabortion patients; very few use manual vacuum aspiration (MVA), and only a few specialized facilities perform D&C (HFS). Misoprostol is still unavailable in most of Rwanda. Therefore, most postabortion care does not employ the techniques recommended by WHO for uncomplicated postabortion cases (WHO 2003). Postabortion contraceptive service provision should be standardized to reduce women's risk for another unintended pregnancy.

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 are so difficult to fulfill that it is likely that even when legally allowed, safe and legal abortion is beyond the reach of most women. Even the tragic genocide that happened in 1994 did not result in a liberalization of the abortion law to allow abortion in cases of rape, incest, or for economic and social reasons. In light of these results, it is important that parliamentarians take up the question of increasing legal abortion access, by, for example, requiring only one medical doctor to determine the need for an abortion. Guidelines are also needed to clarify 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 provide the basis for an open discussion of the level of unintended pregnancy, the impact of unsafe abortion on women's health, and ways to prevent undesirable outcomes.

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[i] Agree health clinics are government-assisted clinics operated by religious groups or non-profit associations. Government-assisted clinics are registered and receive certain assistance from the government. Personnel in government-assisted clinics receive the same benefits as those in government facilities. These clinics agree to follow all standard guidelines and protocols of the Ministry of Health and are supervised by district hospitals. Some of these facilities with religious affiliations do not provide contraceptive services although they do have arrangements with private institutions to refer clients to facilities which provide family planning service (e.g. the Association Rwandaise de Bien Etre Familial (ARBEF)).

[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] In the Rwandan health system, healthcare providers are classified according to their level of training and experience. A2 nurses, who make up the majority of the health workforce, have completed secondary education in a nursing school. A1 nurses are more trained that A2 nurses, having completed high school and obtained three additional years of training in a nursing school.

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

[v] 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.

[vi] The number of miscarriages is estimated using an accepted formula (10% of induced abortions and 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	3	100	3	3	100
District hospital	41	100	41	41	100
Health center	385	19-50%	86	86	100
Private Hospital, polyclinic and clinics	37	100	37	35	95
Total	466	36	167	165	99

Source: Health Facility Survey, 2010

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, 2010; interim DHS survey 2007-2008; Rwanda population projection 2009

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

Indicators of service provision and utilization	National	Kigali	North	South	East	West
AVAILABILITY						
All facilities						
Total number of facilities	474	72	83	111	100	108
Number providing PAC	466	64	83	111	100	108
% providing PAC	98	89	100	100	100	100
ANNUAL AVERAGE ABORTION CASELOAD PER FACILITY						
All facilities that offer care	57	100	41	47	45	70
Type						
Referral hospital	363	264	0	660	0	0
District hospital	200	441	90	176	197	199
Health center	37	36	37	28	31	55
Private facilities	46	51	0	0	0	2
Ownership						
Public	52	129	47	44	38	55
Agrée	65	41	25	52	85	91
Private	45	49	0	0	0	2
Rate of complications treated per 1,000 women 15-44						
All abortions	10.7	21.5	8.2	8.1	8.3	13.3
Induced abortions	6.8	17.5	4.4	4.6	4.1	9.1

Source: Health Facility Survey, 2010

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		
		2.6	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, 2010; EICV2 Preliminary Report 2006

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, 2010; 2005 DHS; Rwanda population projection 2009

Table 6. 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 2008 are estimated based on the 2007 census numbers for women ages 15-44 by 5-year age-groups, projected forward one year. Age specific fertility rates (ASFRs) obtained from the DHS 2005 were applied to the population of women by 5-year age-groups in 2008, to estimate the number of births in 2008. The proportion of births that were unplanned (unwanted or mistimed, also from the 2005 DHS) was applied to the total number of births (nationally and by region) to obtain the number of unplanned births in 2008. The number of abortions and miscarriages are estimates developed by the authors (see Methods section).

Source: 2005 DHS; Rwanda population projection 2009

[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.

Table 7. 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

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

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