CHAPTER 6

The Abortion Incidence Complications Method: A Quantitative Technique

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Abortion is one of the outcomes of reproductive behavior that remains difficult to measure in most countries. Several methodologies using direct and indirect approaches have been developed to contribute to an accurate measurement of the level of abortion. The Abortion Incidence Complications Method (AICM) is an indirect approach that builds on the number of women treated in medical facilities for abortion complications to eventually arrive at the total number of abortions.

The goal of the AICM is to produce estimates of the incidence of abortion in settings where the procedure is highly restricted or where abortion may be permitted under broad criteria but its practice is still unsafe for many reasons (e.g., safe medical services are inadequate, unaffordable or inaccessible). The method provides estimates of the following three indicators:

a) the number of induced abortions occurring each year (incidence);

b) the abortion rate (the number of abortions per 1,000 women); and

c) the abortion ratio (the number of abortions per 100 live births).

The method can generate the above three indicators for major geographic regions and, depending on what data are collected and their quality, for smaller administrative units such as states, departments or provinces. Estimates of the number of induced abortions from this methodology can be combined with data on the number of births that are unplanned and estimates of the number of unplanned pregnancies ending as miscarriages to develop estimates of the numbers and rates of unintended pregnancies.

In addition, the AICM yields a national estimate of the number and rate of women receiving treatment in a hospital or health facility annually as a result of induced abortion complications. Although it is difficult to obtain, the facility-based treatment rate is a useful measure of the health consequences of unsafe abortion and of abortion's contribution to maternal morbidity. This indicator, which measures the safety level of abortion provision, can be compared across countries. Moreover, information on abortion morbidity is essential for estimating the costs of treating abortion complications to the health system.

This chapter provides an assessment of our experience in implementing the AICM over the past two decades in diverse settings. Each of the studies that have applied the method has addressed, for the specific case country, issues of data quality and reliability; made comparisons to other available studies or related information; and assessed consistency with external data to the extent possible. In general, the estimates of abortion incidence from the method have been found to be plausible at the global, regional, and individual country levels and across time. In the few cases where other methodologies have been used in the same country, results from the AICM compare well with the estimates from those methodologies.

Background

Measurement of the incidence of induced abortion is essential to inform reproductive policies and programs that focus on preventing unintended pregnancy, the root cause of induced—and often unsafe—abortion. A first step toward preventing both unintended pregnancies and the unsafe abortions they lead to is demonstrating their incidence.

However, in countries where abortion is highly legally restricted, and even in some countries where it is legal and accessible, documenting incidence is extremely difficult to do (Rossier 2003). One of the most important constraints to measuring the incidence of induced abortion is the stigma surrounding it, which translates into women's unwillingness to report having had one, particularly in face-to-face interviews. In addition, in settings where abortion is highly legally restricted, identifying and interviewing a representative sample of abortion providers is very difficult.

Because of the difficulties of measuring abortion incidence using direct approaches, some researchers have focused on improving these approaches or have developed indirect estimation methodologies. Over the past few decades, a number of indirect methodologies have

been developed to estimate abortion incidence in settings where it is legally restricted. This chapter focuses on one of these approaches, the AICM.

The basic methodology has been adapted to address variable data constraints and has evolved to take into account differences in abortion service provision, both across countries and over time. The method was proposed and developed in the early 1990s by the Guttmacher Institute and was first applied in six countries in Latin America—Brazil, Chile, Colombia, the Dominican Republic, Mexico and Peru (Singh and Wulf 1994). In the mid-1990s, it was implemented in two Asian countries, Bangladesh and the Philippines (Singh et al. 1997) and one Sub-Saharan African country, Nigeria (Henshaw et al.1998). In the past five years, the method has been implemented in Guatemala (Singh et al. 2006), Mexico (Juarez et al. 2008), Pakistan (Sathar et al.2007), the Philippines (Juarez et al. 2005) and Uganda (Singh et al. 2005). Currently, the approach is being used in Burkina Faso, Colombia, Ethiopia and Malawi. The methodology has also been applied by non-Guttmacher affiliated researchers in three Latin American countries—Argentina (Mario and Pantelides 2009), Costa Rica (Gómez-Ramírez 2008) and Peru (Ferrando 2002).

Overview of Data Used in the AICM

Two types of data are needed to implement the method.

- *The number of women who receive facility-based treatment for induced abortion complications.* These data are obtained in different ways, depending on the country. The two most common sources are official health statistics (where these are known to be of high quality) and nationally representative sample surveys of health facilities (Health Facilities Surveys, or HFS) that provide postabortion care.
- *The proportion of all women having abortions who receive facility-based treatment for complications.* This proportion is obtained through a Health Professionals Survey (HPS), which is conducted with experts who are knowledgeable about abortion provision in the study country and can estimate the proportion of women who develop complications and receive treatment for them. This information is the basis for calculating the multiplier or inflation factor needed to yield the overall total.

Both the HPS and the process of collecting data on the number of women who receive facility-based treatment for abortion complications are described in detail in this chapter.

Overview of Calculations Needed for the Method

Calculating Miscarriages to Remove Them from Total

Women who receive treatment in facilities for abortion complications usually include those who are treated for complications resulting from both induced and spontaneous abortions. However, national health statistics, reports from specific health facilities and HFS results typically do not distinguish between induced and spontaneous abortions because symptoms are often similar. Moreover, even when evidence points overwhelmingly toward an induced abortion, health personnel may be reluctant to classify women as induced abortion patients because doing so often requires completing additional forms and it may expose patients (and medical personnel themselves if they fail to report women to authorities) to possible legal or moral sanction.

Thus, to exclude women who have had a miscarriage rather than an induced abortion, we need to estimate the number of women whose complications stem from spontaneous abortions. For this we use data on the biological patterns of spontaneous abortion, which have been established by clinical studies (Harlap et al. 1980; Bongaarts and Potter 1983). Based on input from medical professionals dating from the method's first application, we assume that only women who suffer late miscarriages (i.e., those at 13–22 weeks) are likely to require care at a health facility.* Miscarriages at 13–22 weeks account for about 2.9% of all recognized pregnancies and are equal to 3.41% of all live births.

A further data adjustment is needed, however, because only a certain proportion of all women who need facility-based treatment for complications from a late spontaneous abortion will have access to a facility that provides postabortion care (or use such facilities for this indication). We assume this proportion to be the same as the proportion of women giving birth who deliver in a facility. This proportion, at both national and regional levels, is available from a Demographic and Health Survey (DHS) or similar survey. Thus, the number of women admitted to a hospital/health facility for complications from late spontaneous miscarriages is the product of those expected to experience a late spontaneous miscarriage and the proportion expected to receive care in a hospital or health facility. The total number of women treated in hospitals or health facilities for complications from *induced* abortions

*Although some women who miscarry at earlier gestations seek medical care, they are likely treated by primary-level facilities or by doctors in their private practice and relatively few are treated in facilities that provide postabortion care. Pregnancy losses at 23 weeks or later are not included because they are usually classified as fetal deaths rather than miscarriages.

is obtained by subtracting those treated for complications from miscarriages from the total treated for all abortion complications.

Calculating the Multiplier

However, not all women who have an induced abortion experience health complications; further, for many reasons, not all of these women seek care for their complications. Therefore, women who are treated represent a fraction of all women with induced abortion complications. We need to calculate an inflation factor (multiplier) to apply to the hospitalized numbers to account for the proportion of women having an abortion who do not need treatment or do not seek/obtain it at a health facility.

The inflation factor or multiplier is derived from information from the HPS. Data from three main questions provide the basis for this factor: the percentage distribution of all women who obtain an induced abortion according to type of abortion provider; the proportion likely to experience complications requiring medical care according to provider type; and the probability that women with complications will receive medical care at a hospital/health facility. Because women's area of residence and economic level affect their access to (and attitudes toward) abortion providers, this information is obtained for four key subgroups of women—poor urban, nonpoor urban, poor rural and nonpoor rural.

Among all women having an induced abortion, the multiplier estimates how many are *not* treated in a facility for every woman who is. The multiplier takes into account two factors: safety of the procedure and accessibility to medical care. In general, the safer the abortion, the higher the multiplier; that is, for every woman receiving treatment, a higher number will have had an abortion that does not result in complications requiring medical care. Conversely, the less safe abortion services are, the lower the multiplier; that is, the total has to be multiplied by a lower number because the number of women developing serious complications more closely approximates all women who have an induced abortion. Furthermore, where facilities are easily accessible, the proportion of women with complications who receive treatment will be relatively high. In contrast, in areas with limited access, such as poor, underserved areas, the proportion receiving treatment will be relatively low, and some women with serious complications may not get the treatment they need.

To obtain the multiplier, the following calculations are needed:

- For each population subgroup, the proportion of women who obtain an abortion from each provider type is multiplied by that provider's expected complication rate. The results are summed across all provider types to obtain the proportion of all women obtaining an abortion (in each population subgroup) who will likely develop complications that require treatment.
- The next step is to multiply the total proportion estimated to develop complications by the proportion likely to obtain care for them in a health facility (for each population subgroup). This produces the proportion of all women having an induced abortion who will receive treatment, for each population subgroup.
- Next, we weight the proportions to reflect the size of the four population subgroups within a given country. Data on the distribution of women of reproductive age according to the combined poverty and area-of-residence measure (so they sum 100%) are generally obtained from individual countries' DHS surveys: The distribution of women according to the four categories is based on an actual measure of place of residence and a proxy measure of relative poverty. In almost all countries studied so far, educational attainment has been the proxy measure for poverty: Women with a relatively low level of education are considered poor and those with a moderate-to-high level are considered nonpoor. The specific definitions of "low," "moderate" and "high" are decided by the study investigators in each country. Although an actual measure of poverty—the wealth index—is now available for DHS surveys, it has not yet been used for the AICM because it does not differentiate relative poverty within urban and rural areas: Because urban residents are relatively much better off than rural residents, almost all urban residents fall into the highest two quintiles of this index. Individual countries' national surveys that yield poverty information should be assessed to see if they provide better measures of relative poverty within areas of residence than the DHS wealth index does.
- The proportions hospitalized for treatment of abortion complications in each population subgroup are then multiplied by the proportion that the subgroup represents. The sum of the products of the pairs of values for the four subgroups is the weighted, national proportion of all women having induced abortions who are likely to have received facility-based treatment for complications.
- The multiplier is the inverse of this weighted national proportion. For example, if 23% of all women having an induced abortion are estimated to receive treatment in a hospital or health facility for complications, the multiplier is 4.3 (100/23).

Applying the Multiplier to Calculate Rates and Ratios

The total number of induced abortions in a country is estimated by multiplying the number of women admitted for the treatment of complications by the multiplier. The abortion rate (number of abortions per 1,000 women of reproductive age) is derived from the estimated total number of induced abortions and the total population of women aged 15–44 or 15–49, depending on the individual study. For these population data, presented in five-year age-groups, we rely on the country's most recent census or UN population projections. The data are interpolated to match the years for which data are obtained on the number of women who received postabortion care.

The abortion ratio is derived by dividing the estimated total number of induced abortions by the total number of live births. We estimate live births by multiplying age-specific fertility rates (from a DHS survey or some other reliable source) by the corresponding population of women of reproductive age. The abortion ratio is the number of induced abortions per 100 live births.

Strategies to Collect Data on Admissions from Complications

The sources of data to estimate the numbers of women admitted for treatment of abortion complications will vary, depending on the extent to which a given country's health statistics are reliable, complete and up to date. Below we describe three examples of the variability in countries' data quality and completeness that influenced the data collection approach used when applying the method.

Countries with High-Quality Hospital Discharge Data

The six Latin American countries where the methodology was first applied in the early 1990s fall into this category (Singh and Wulf 1994). To apply the method, available official statistics are assessed for the completeness of coverage and quality of the data. Key informants involved in management of health data systems (or other relevant sources) must be interviewed to ascertain the quality of official statistics, and the extent to which any problems are occurring. For example, where coverage is incomplete or omits information from certain geographic areas or types of facilities (as was the case with Peru), the number of treated abortion cases must be adjusted to reflect the proportion likely to have been missed. Further, some sectors may not be part of the official statistics reporting system—typically the private sector or specialized sectors such as the social security system—but available information on the caseloads of the excluded sectors can be used to estimate the number of women treated at the national level. In the first six-country application of the methodology, the degree of underreporting of postabortion hospitalizations varied, from essentially no underreporting in Chile to a level of 33% in the Dominican Republic,* as estimated by officials who were familiar with the data.

Hospitalization data also need to be assessed for incorrect diagnosis coding—i.e., cases that were incorrectly coded need to be removed or added in, depending on the specific error and how the data were recorded. For example, multiyear data for four of the six countries were available for the specific diagnosis codes 630–639† of WHO's International Classification of Diseases, Ninth Revision (ICD-9), which allowed for internal consistency checks; these checks, input from key informants and results from other in-depth studies provided the basis for some small adjustments (Singh and Wulf 1994).

For example, individual diagnosis-code data in some of the six countries allowed us to estimate the proportion of all patients who were coded 630–633 (miscarriages and obstetric pathologies) to separate out these inappropriately included cases in countries where all cases are lumped into a single grouping of 630–639. The quality of the data was further assessed using information provided by a study carried out by the Federación Latinoamericana de Sociedades de Gineco-Obstetricia (FLASOG) in four Latin American countries (Pardo and Uriza 1991). The FLASOG study compared data from individual hospital patients with official data and found that some women were incorrectly diagnosed with "threatened abortion" (ICD-9 code 640) instead of codes 634–639. This finding enabled us to adjust for cases that were miscoded as "threatened abortion."‡

Another important requirement when using official statistics is to assess the completeness of the total number of women admitted with abortion-related complications. This requires information on the structure of the health system—i.e., the main types of care provided (tertiary,

*For the Dominican Republic, a count of procedures was available from hospital logbooks only, and the data collection system suffered from other weaknesses, which resulted in a large proportion of cases being missed.

†The code values refer to the following: 630—molar pregnancy or hydatidiform mole; 631—other abnormal product of conception; 632—missed abortion, early fetal death (at 22 or fewer weeks of gestation) with retention of the fetus or retained products of conception, not following either a spontaneous or an induced abortion; 633—ectopic pregnancy, including tubal pregnancy; 634—spontaneous abortion; 635—legally induced abortion; 636—illegally induced abortion; 637—unspecified abortion; 638—failed attempted abortion; and 639—complications following abortions and ectopic or molar pregnancy.

‡The prevalence of this type of miscoding averaged 5.5% in the four FLASOG study countries. To account for the miscoded cases within code 640, we considered that the number of patients diagnosed with codes 634–639 represented 94.5% of the true number of hospitalized abortion cases. Thus, after subtracting cases miscoded as 630–633, the remaining numbers were inflated by dividing by 0.945.

secondary and primary) and the ownership category of facilities (public/government, private, nongovernmental organization [NGO]).* We also need to know whether each type or category of facility treats postabortion patients, whether official statistics capture care provided at all relevant categories of facilities and the level of completeness of these data (and if incomplete, which categories are omitted). If any categories of facilities that provide postabortion care are completely missing, the proportion these omitted categories would likely treat needs to be estimated, if possible; if not, the incidence of postabortion treatment and, consequently, of induced abortion, will be underestimated, and must be understood to miss those treated in the omitted categories of facilities. Similar adjustments are needed to correct for underreporting in included categories.

The completeness with which hospitals and health facilities actually submit their records to a central system also needs to be assessed. Even where such reporting is required, not all hospitals/facilities comply because of delays or irregularities in the submission process or simply because of incomplete and poor quality records. Interviews with key informants (typically individuals in charge of collecting discharge data) are needed to provide a basis for estimating any corrections that may be needed to adjust for omitted or incomplete discharge data; the researcher applying the AICM also needs to seek out any available information or special studies related to the issue of discharge data quality and completeness.

In addition, the quality of reporting systems may deteriorate over time for various reasons, which can affect the ability to accurately assess trends. For example, when health care provision is decentralized as of a certain date, local control of budgets increases, which reduces the incentive for local administrative offices to provide statistics to a centralized office, so fewer cases are likely reported to a central agency from that point forward. Changes in the way health care is delivered can also affect trends in data quality. For example, an application of the method currently underway in Colombia revealed serious problems of incompleteness that did not exist with data from the late 1980s through the mid-1990s. This deterioration in data quality appears to be an unforeseen consequence of health care reform in the country in 1993, which decentralized health care and recordkeeping. At the same time, the 10th version of the International Classification of Diseases, an entirely new coding system, replaced the 9th version, which likely increased the difficulty of accurately classifying patients, and affected the comparability of reporting.

*Although there are some basic structural similarities, categories of health facilities vary greatly across countries. Countries will generally have some facilities in each ownership category that offer each of the three main types of care—tertiary, secondary and primary. However, each ownership category may have subcategories, which vary across countries. For example, in Mexico, there are several subcategories within the public sector. In some countries the structure reflects administrative or geographic subdivisions; for example, in the Philippines, hospitals are categorized administratively (general, regional, provincial, municipal, district, community, medicare, specialized and military), in addition to specific levels of care (tertiary, secondary and primary).

Countries with Incomplete National Discharge Data: The Example of the Philippines

In the Philippines, where the AICM has been applied twice (Singh et al. 1997; Juarez et al. 2005), all hospitals are required to complete and submit annual reports to their regional Department of Health office; the reports include the number of patients treated for the top 10 causes of hospitalization. However, since the forms are not compiled, processed or tabulated and not all hospitals regularly submit them, we had to compile all available hospital reports, starting with those that were available from the central Department of Health office in Manila. To produce a more complete list of private and public hospitals, each regional Department of Health was visited to obtain reports for the missing hospitals.

The total number of hospitals/facilities identified in the Philippines increased from 1,863 in 1994 to 2,039 in 2000. In 2000, 81% of facilities (representing 89% of beds) had usable reporting forms. A regression approach was developed to estimate the number of women treated in the remaining 19% of facilities. In the two studies of abortion incidence, two further adjustments were made to the official data: 1) if discharge data were available for more than one year, the data were averaged over a three-year period, centered on the year for which abortion incidence was being estimated (1994 and 2000, respectively); and 2) if the form reported only part of a year, the number of patients was adjusted to create an annual estimate proportional to the number of months reported in the form.

Countries Where a Nationally Representative HFS Is Needed

Where usable official hospital discharge data are missing outright, a nationally representative HFS needs to be fielded to estimate the number of postabortion complication cases treated in hospitals. Countries where this approach has been used include Bangladesh, Guatemala, Nigeria, Pakistan and Uganda; at the time of this writing, the approach is currently being implemented in Burkina Faso, Colombia, Ethiopia and Malawi. In all but one of these countries, a nationally representative sample of facilities that likely treat postabortion complications was surveyed; the exception was Guatemala, where *all* such facilities were surveyed because the total number in the country is relatively small.

Sampling considerations for an HFS

To conduct the survey, the universe of health facilities that treat postabortion patients in a country needs to be defined. The first step is obtaining details on the structure of the health care system (i.e., the types and categories of the relevant facilities). Then, a listing of all facilities is required to draw a nationally representative sample that can be weighted to produce national estimates. This list must include information on each facility—name, location (exact address) and any characteristic that will be used for stratifying the sample (e.g., type of ownership, type of facility and major geographic area or region, depending on the country).

In some countries, the survey may need to cover both patients treated for complications of unsafe abortion and patients who are actually receiving safe abortions in these facilities. This would apply in countries where the abortion law has recently been liberalized and the provision of safe abortion is being phased in (e.g., Ethiopia and Colombia) or where safe abortion is widely and openly practiced—and providers are willing to report them—despite its being highly legally restricted (e.g., Nigeria).

Once all relevant facilities have been listed, a stratified sample design is generally used. Strata typically include major region, ownership or sector (public, private and NGO) and type of facility (hospitals and health centers, each of which may also be divided into more detailed categories, depending on the country). The size of the facility (measured by number of beds) may also be used for stratification. In most countries, 100% of the largest facilities (typically tertiary hospitals) are sampled because such facilities receive the highest proportion of the total number of postabortion cases. The exact proportion of other categories to be sampled is informed by their size and importance in postabortion care provision in a given country.

In practice, sampling fractions have typically varied from about 10% of facilities (for categories that include hundreds of facilities that treat relatively few women) to 40% or more of facilities (for categories that include relatively few facilities and/or that have large postabortion care caseloads). Facilities to be sampled are selected after systematically ordering the universe within sample strata and choosing a random start number. To some extent, the size of the sample will also depend on the resources available and the total number of facilities in each category and in the country as a whole. (As mentioned earlier, for Guatemala, all facilities that provide postabortion care were included in the sample because the entire country had a total of only 183.)

Results of an HFS

The HFS provides an estimate of the annual number of women treated for abortion complications at the national and regional levels. A key informant, or senior staff member, at each sampled facility is asked a series of questions, including whether treatment of abortion complications (from either spontaneous or induced abortions) is provided on an outpatient or inpatient basis, or both. The specific key informant will depend on the degree of specialization of the health unit. For example, in larger tertiary facilities, such as hospitals, the informant is likely to be the chief of the Obstetrics and Gynecology department (usually an OB/GYN). In smaller facilities, such as health centers or clinics, the informant is likely to be director of the facility, or a nurse, midwife or other health worker in charge who can provide information about abortion complications treated at the health facility.

In some cases, issues with the definition of "hospitalization" may arise and must be dealt with. For example in Guatemala, both inpatients and outpatients are considered to be hospitalized, so length of stay was used to define the two groups (i.e., inpatients were defined as patients staying 24 or more hours at the facility, and outpatients were those who stayed fewer than 24 hours).

For inpatients and outpatients, key informants are asked to provide the numbers treated for abortion complications at the facility in the average month and in the past month. These two numbers are averaged and multiplied by 12 to produce an estimate for the calendar year. The sample estimates are weighted up (weights take into account both the proportion of facilities that are sampled and nonresponding facilities) to produce national estimates of the total number of women treated for all types of abortion complications (i.e., those from both spontaneous and induced abortions).

Specifying the two reference periods increases the likelihood of accurate recall and of capturing variation from month to month. Doing so helps respondents who may have difficulty recalling or estimating the number of women treated in their facility for postabortion complications. Results from the HFS surveys have shown a systematic pattern at the national level of slightly higher numbers being reported for an average month than for the past month. We continue to recommend that the average of these two measures be used as the best estimate of the number of women treated in each facility. This approach accounts for the possibility of measurement error from unusual fluctuations in the past month and for the potential for bias in individuals' perceptions of a typical month.

That the typical-month and last-month estimates can differ, and that those differences can go in opposite directions for some categories (see Table 1; all tables at end of chapter), supports our recommendation. However, it is important to note that respondents in some countries have had difficulty with the meaning of a "typical" month, so training of interviewers must be careful to clarify what is meant, using alternatives to describe an "average"

month—e.g., a typical, regular or normal month.

Another important issue that must be considered when fielding an HFS is adapting the survey instrument to local conditions of abortion provision in the country. For example, the instrument must consider whether safe abortion services are also being provided in the facilities surveyed about treatment of postabortion complications. This adaptation was needed in surveys already done in Nigeria and Bangladesh and in ones that are currently underway in Colombia and Ethiopia. For example, in Nigeria, although abortion is highly restricted by law, procedures are commonly provided in private hospitals and clinics. In Bangladesh, menstrual regulations using vacuum aspiration are legally permitted and are offered in the same facilities that provide postabortion care. In these two countries, the questionnaire asked for data on the number of women obtaining safe procedures and the usual set of questions asked for the number of women treated for postabortion complications.

An alternative is to collect data prospectively in each sampled facility for all abortion complication patients treated during a given number of weeks (for example, two to four weeks). These data may be obtained from providers, from facility records, from interviewing patients, or from any combination of the three; in all cases, however, the data are for individual women. Prospective data have some important advantages over retrospective data: For example, data that are collected when care is being delivered usually provide a more accurate count of postabortion patients. In addition, a prospective design allows individual-level information (for example, women's demographic and socioeconomic characteristics) to be obtained for each patient, which permits more in-depth analysis than is possible with aggregate data obtained in the usual HFS.

But a prospective approach also has some important limitations, including high cost, logistical complexity of fieldwork, difficulty ensuring the quality of the data collected and potential for undercounting of patients (e.g., the data collection period may be unusual and not average; some patients may not be recognized as postabortion patients; 24-hour coverage of the flow of patients may be difficult to achieve; and some women may refuse to be interviewed and others may be discharged before being interviewed). Prospective surveys that have collected data on individual postabortion patients have been conducted in Egypt (Dale et al. 1998), South Africa (Jewkes et al. 2005), Kenya (Gebreselassie et al. 2004) and Cambodia (Fetters et al. 2008). In most cases, the primary goal of these surveys was to document morbidity from abortion (see Chapter 10); however, in Kenya, rough estimates of abortion incidence were calculated from the data using a hypothetical multiplier selected from the existing literature (Ipas 2004). For the first time, the AICM is being implemented—in Ethiopia—using both the prospective approach (obtaining patient-specific data) and the retrospective approach (obtaining aggregate information through an HFS) to compare these two data collection approaches for estimating the number of postabortion patients.

Strategies to Estimate the Proportion that Admitted Cases Represent

Overview of the HPS

Among all women who have an induced abortion, the proportion who will likely be admitted for treatment from complications is derived from data obtained through the HPS, a purposive sample of health professionals. These medical and nonmedical professionals are selected on the basis of their extensive knowledge of and experience with conditions of abortion service provision and postabortion care.

Three key questions are asked that yield the basis for estimating this proportion: the percentage distribution of all women who obtain induced abortions according to type of abortion provider;* the proportion of women likely to experience complications requiring medical care with each type of provider; and the probability that women who have such complications will receive care from a health facility. (The HPS also asks respondents for their opinions on family planning counseling and services in their country and on possible abortion law reform, as well as for suggestions for improving postabortion care.) Because the safety of women's abortions can vary by women's ability to pay and their access to providers, the information is obtained for each of the four subgroups of women mentioned earlier (poor urban, nonpoor urban, poor rural and nonpoor rural).

The number of provider types has increased from three in studies carried out in the early 1990s to 5–6 in those conducted more recently (see Table 2). Local partners determine how to meaningfully categorize providers based on whether each type accounts for a sufficient proportion of abortions and is sufficiently differentiated in terms of safety and access. Six provider types is probably the maximum that is acceptable, given the increased time burden required for responses on a large number of provider types and the likelihood that data quality would suffer as a result.

Further, the widespread use of misoprostol in many areas has spurred the need to incorporate questions into the HPS to measure its use. For example, the HPS questionnaire was modified to include use of misoprostol

*The categories of providers vary across countries and typically include at least the following major groups: doctors, trained nurses or midwives, untrained practitioners, pharmacies and the woman herself.

in the recent application of the AICM in Mexico (Juarez et al. 2008) and to the one currently underway in Colombia. More generally, application of the AICM must take into account changes over time in the methods of abortion in a given country to assure that the survey instrument being used accurately reflects current practice.

Sampling considerations for the HPS

The initial list of health professionals—medical and nonmedical—is prepared with input from project partners based on their contacts with stakeholders and program planners and on the content of interviews with NGOs. It is important to include some professionals from all sectors that are relevant to the issue of abortion in the country—for example, government departments, service provision, NGOs (for example, women's organizations and professional associations) and research institutions. Thus, to maximize representativeness, some professionals are chosen because they have experience treating abortion complications whereas others are included because they are researchers, women's health activists, policymakers, family planning program planners and administrators, etc.

Further, to the extent possible, professionals who have knowledge/experience of abortion practice in rural areas and a variety of regions across the country should be included in the survey. This is important because most of the professionals surveyed likely work and live in urban areas, but conditions of abortion provision may be very different in rural and provincial parts of the country.

The sample size for the HPS has varied across the countries where the AICM has been applied. In the first Latin American studies, the numbers of professionals interviewed for the HPS ranged from 21 in the Dominican Republic to 46 in Brazil (Table 2). Deciding on the number of respondents to be interviewed depends on the size of the group of individuals with extensive knowledge of abortion service provision in a given country and their willingness to be interviewed. The size of the country itself is an important factor, as smaller countries generally have fewer knowledgeable health professionals.

In addition, the desired representativeness of the incidence data influences the size of the HPS sample: In the early 1990s applications of the AICM in the six Latin American countries and in 1996 in Nigeria, the method aimed to produce national estimates only, so relatively small samples of professionals were needed (21 to 67). More recent studies, however, have aimed to estimate the multiplier and resulting incidence at both the national and regional levels, so correspondingly larger samples were used (approximately 100 in Mexico, 154 in Pakistan and 102 in Colombia). In most applications of the methodology, about two thirds of HPS respondents have had a medical background and about one third, a nonmedical background.

Application of the AICM: the Example of Uganda

The AICM was recently applied in Uganda (Singh et al. 2005). Abortion rates and ratios, along with unintended pregnancy rates, were calculated for the nation and its four major regions. Because there were no official statistics on hospitalized women for treatment of abortion complications, an HFS was conducted along with the HPS.

Sample Selection and Questionnaires

For the HFS, a stratified multistage sample design was used. The master list of all health facilities considered likely to provide medical care to women with abortion complications was categorized by type of facility within each major region of the country. Within each stratum, facilities were ordered according to ownership (public, private or NGO). We chose different sample fractions according to each type of facility's importance in the provision of postabortion care. Facility types that were recognized as more likely to treat large numbers of postabortion patients were assigned a higher selection probability. For example, 100% of hospitals in the country were sampled (see Table 1 in Singh et al. 2005). Overall, a nationally representative sample of 359 health facilities was selected from the list of all facilities likely to provide postabortion care. Of these, 313 facilities participated in the HFS. The survey data were weighted to project the results nationally, taking into account the probability of selection and the nonresponse rate of facilities by type and ownership (see Table 1 in Singh et al. 2005) and region.

For the HPS, the research team prepared a list of health professionals who were familiar with the conditions of abortion provision and postabortion care. We considered the following factors in selecting respondents: their affiliation; expertise and experience; and reputation for having extensive knowledge of and experience with postabortion care among local stakeholders in the field of reproductive health. A purposive sample of 54 health professionals was selected and 53 were interviewed (Prada et al. 2005).

The original HFS and HPS instruments were adjusted to reflect the Ugandan context.* The questionnaire for the HFS included a series of questions about whether the facility provided treatment of abortion complications in an outpatient or inpatient service, or both. If treatment was provided, the survey asked for the number of women

*For examples of HFS and HPS survey questionnaires and how they were adapted for the application of the AICM in Ethiopia in 2008, see http://www.abortionresearchconsortium.org/studyinstruments.html.

treated as inpatients and outpatients for complications of abortion (spontaneous and induced combined) in the typical month and in the past month. These two numbers were averaged and multiplied by 12 to produce an estimate for the calendar year. Data were collected from May through September 2003 by staff affiliated with the project partner, Department of Obstetrics and Gynecology, Faculty of Medicine, Makerere University (see Prada et al. 2005 for details on the fieldwork).

Estimating the Numbers Treated for Complications (Spontaneous and Induced)

Using data from the HFS, we estimated that 109,926 Ugandan women were treated in 2003 for complications from spontaneous and induced abortions (Table 3). Next, we estimated the number of women treated for complications from spontaneous abortions only to subtract them from the total. We used available data on the biological pattern of spontaneous abortion to assume that women having miscarriages at 13–22 weeks' gestation likely require care at a health facility, and that these miscarriages are equal to 3.4% of all live births. We estimated the number of births using age-specific fertility rates from the 2000–2001 Uganda DHS (UDHS) and the number of women in each five-year age-group using 2002 census data. These estimates were calculated nationally and for the four major regions; thus, an estimated 1,254,812 live births and 42,789 late spontaneous abortions occurred in Uganda in 2003.

Further adjustment is needed because only a certain proportion of women who need treatment for complications from late spontaneous abortions will have access to a health facility. According to the 2000–2001 UDHS, 39.2% of Ugandan women deliver at a health facility. This proportion varied from 58.8% in the Central region to 23.1% in the Western region. However, because project partners indicated that Ugandan women were more likely to seek care for an illness (i.e., abortion complications) than for a "healthy" event (delivery), we inflated these proportions by 50%. Thus, a total of 25,168 Ugandan women were likely treated in health facilities for complications of spontaneous abortion in 2003. Subtracting this number from the total yields an estimated 84,758 women who were treated for complications of induced abortion only (109,926 – 25,168 = 84,758, Table 3).

Estimating the Multiplier and the Total Number of Induced Abortions

Using information provided by the HPS, we estimated that 28% of Ugandan women who have an induced abortion likely receive treatment for complications (Prada et al. 2005). The national multiplier is the inverse of this proportion—3.5. This means that for every woman who is hospitalized with abortion complications, 3.5 have abortion complications but do not obtain medical care in a health facility.

Given the multiple assumptions underlying our estimates of the total number of abortions in Uganda and the likelihood that the multiplier varies by region, area of residence and poverty status, it is appropriate to present a range of estimates and recommend use of the midrange one. Thus, we calculated estimates for multipliers one unit above and below the midrange (2.5 and 4.5, respectively). These multipliers were then applied to the total number of women treated in health facilities for complications from induced abortion.

Applying the medium multiplier (3.5) to the number of hospitalized postabortion cases (84,758) yields a total estimate of 296,653 induced abortions in Uganda in 2003 (84,758 x 3.5 = 296,653). Depending on the multiplier used, the estimated abortion rate ranges from 39 abortions per 1,000 women aged 15–49 (with the multiplier of 2.5) to 69 per 1,000 (with the multiplier of 4.5). Similarly, the estimated abortion ratios for 2003 ranges from 17 abortions per 100 live births to 30 per 100 (Table 4). The midrange estimated rate of 54 abortions per 1,000 women aged 15–49 means that about five of every 100 women have an induced abortion each year; the midrange ratio of 24 abortions per 100 live births means that one abortion occurred for every four live births.

Data on the root cause of induced abortion—unintended pregnancy—can also be generated by the AICM. To calculate the unintended pregnancy rate in 2003, we combined our estimates of induced abortions with the numbers of unplanned births; the latter were obtained by applying the proportions of births that were unplanned (mistimed + unwanted) during the five-year period before the 2000–2001 UDHS to the total number of live births in 2003 (assuming little change over this short period). Nationally, an estimated 141 unintended pregnancies occurred per 1,000 women in 2003 and half of all pregnancies were unintended (Table 5).

Assessment of the AICM

Scope of the Method's Application

Since the early 1990s, when the methodology was first applied in six Latin American countries, up to the time of this writing (2009), the AICM has now been (or is in the process of being) applied at least once in 17 countries. These diverse countries span the globe and are located in the major regions of Asia (Bangladesh, Pakistan and Philippines); Africa (Burkina Faso, Ethiopia, Malawi, Nigeria and Uganda); and Latin America and the Caribbean (Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Guatemala, Mexico and Peru. The methodology had

to be modified somewhat in some studies due to existing data limitations and unique conditions of abortion provision in individual countries.

Verifying Completeness of Official Statistics and HFS/HPS Data

The method includes steps to assess the completeness of coverage and accuracy of the numbers of women treated for postabortion complications. In countries where official health statistics are available, the steps include verifying the accuracy of the diagnosis codes, conducting interviews with health officials and performing internal consistency checks on the data. In countries where an HFS had to be implemented, the quality assessment and internal validity steps include using the two reference-period questions for the number of complications treated (the past month and an average month) and collecting numbers of inpatients and outpatients separately (to ensure that both groups are included and that the total count of abortion-related cases is as complete as possible).

Wherever possible, external data can provide useful checks to estimates of the multiplier. For example, data derived from population-based surveys can be invaluable in cross-checking estimates based on health professionals' perceptions of the conditions under which abortion is provided. Data from community surveys are another valuable source for estimating the percentage of all women who obtain abortions and are treated in hospitals for complications. However, any interpretation of such survey results must take into account the high probability that women will underreport their abortion experience and the high likelihood that levels of underreporting may vary significantly by subgroup. (In addition, large-scale, nationally representative, population-based surveys are usually very expensive.).

Results from a community survey can provide a means of checking and validating HPS results if such a survey is implemented at the same time as an AICM study. In fact, only a few independent community surveys are available that provide an estimate of a multiplier, and they do not provide directly comparable data for the same time period or area covered by an HPS. However, because some critics may question using a semi-qualitative approach—the HPS, an opinion-based survey of key informants—to obtain a quantitative parameter (the multiplier), it is valuable to look at results from existing community surveys to make approximate comparisons with the range of multipliers obtained by HPS surveys.

The earliest data from such surveys on the proportion of women who had had an abortion and obtained hospital/facility care date from the 1960s in Chile (Armijo and Monreal 1965; Monreal 1976); they estimated a multiplier of 3, indicating that one in every three women undergoing an induced abortion was hospitalized. There are only a few subsequent studies of this type, and three were conducted in a single country, the Philippines. A study in a rural district in the Philippines in the mid-1980s estimated that about one in 11 women having abortions was treated in hospital, a multiplier of 11 (Gallen 1982). In the 1993 Philippines Safe Motherhood Survey, 29% of women who reported an early pregnancy loss in the three years before interview said they were hospitalized (a multiplier of 3.4), but this study suffers from a very high level of underreporting of induced abortion (National Statistics Office and Macro International 1994). Finally, a 1994, Metro Manila community survey that focused on abortion found that 36% of women who had had an abortion had been hospitalized (a multiplier of 2.8, Cabigon 1996). In Nigeria, a 2002 large-scale (but not national) study yielded an estimated multiplier of 10 (Bankole et al. 2006; Bankole et al. 2008).

In sum, these community-based surveys yield national multipliers ranging from 2.8 to 11. Although these findings are not meant to validate the results of any particular application of the AICM, they define a range for the multiplier between a minimum of 3 and a maximum of 11, reflecting a wide range of contexts with different levels of abortion safety and access to postabortion care. The finding that the group of existing community-based surveys produced a range of multipliers that span results from HPS surveys provides broad support for the use of the HPS to obtain the multiplier.

Cross-checking HPS data

In addition, checks on the consistency of HPS data can also be carried out. Tables 6, 7 and 8 present comparable data on HPS results from several countries. Table 6 shows a common pattern of nonpoor urban women obtaining the "safest" abortions—that is, a much higher proportion of these women than women in any of the other three subgroups receive abortions from trained health professionals (the first two categories combined, physicians and nurse-midwives). Nonpoor rural women generally have a somewhat similar profile to nonpoor urban women, but are more likely to resort to unsafe providers. The situation of poor urban women varies across countries—for example, poor urban women are similar to nonpoor rural women in Uganda, but they are substantially worse off, at least in terms of far lower proportions using physicians, in Guatemala and Pakistan. Poor rural women are the worst off subgroup of all four in all countries.

Table 7 shows another key measure that can be compared across groups to check expected relationships—the probability of experiencing a complication with each type of provider. As expected, the strong relationship between

provider type and likelihood of complications is mostly consistent across countries, with one important exception: Among all subgroups of women, the probability of complications with pharmacist-provided abortions and self-induced abortions is much lower in Pakistan than in all other countries.

In general, the probability of experiencing a complication with each provider type is quite similar across the four subgroups of women. Any differences that emerge are relatively small and fit the expected pattern: Nonpoor urban women have the lowest likelihood of experiencing a complication with each type of provider and this probability rises across the poverty/residence spectrum (i.e., from nonpoor rural women to poor urban women to poor rural women).

Table 8 shows the third key measure for estimating the multiplier—the proportion of women suffering an abortion complication who are expected to be treated in a health facility. The results show a plausible pattern in most countries of nonpoor urban women having the greatest likelihood of obtaining care, followed by nonpoor rural women, poor urban women and poor rural women. The exceptions are the six Latin American countries where poor urban women have the highest likelihood of being treated in health facilities, probably because nonpoor urban and rural women are expected to obtain care from private physicians in their office practice and not from hospitals.* It is notable that the expected use of care varies little by subgroup in Bangladesh and the Philippines, suggesting that access is relatively uniform across urban and rural areas. However, as with the six Latin American countries, it is also possible that nonpoor women in both urban and rural areas in these two countries obtain care from physicians in the private sector.

Evaluating estimates of miscarriages

The AICM has been modified to take into account variations across countries in women's likelihood of seeking care for late miscarriages. As explained earlier, this likelihood is estimated on the basis of clinical information on the distribution of spontaneous pregnancy losses by gestation and the assumption that women will likely seek treatment for a second-trimester miscarriage. In addition, we assume that the proportion of women suffering a late miscarriage who obtain medical care is equivalent to the proportion who deliver in a health facility. (The latter assumption was modified in Uganda and Pakistan where the proportion was inflated by a factor of 1.5, at the recommendation of local investigators who noted that women are more likely to seek care for an "illness" such as a complicated miscarriage than for a normal healthy delivery.)

However, verifying the hospitalization rate for late miscarriages presents a problem because external data are unavailable, even in countries that maintain hospital discharge statistics. For example, analysis of these data for the five of the six Latin American countries with detailed diagnosis data showed that the proportion of all hospitalized cases that were classified as miscarriages varied widely. In four of these five countries—Chile, Colombia, Mexico and Peru—that proportion ranged from less than 1% in Peru to 9% in Chile; however, 80–99% of hospitalized cases in these four countries were diagnosed with code 637–unspecified abortion, which may be spontaneous or induced. On the other hand, in the fifth country, Brazil, almost two thirds of all abortion complications were coded as spontaneous abortions.

Key informants indicated that official hospital discharge data would not provide accurate breakdowns of cases by type of abortion because the symptoms of an incomplete induced abortion can be indistinguishable from those of a miscarriage. In addition, medical personnel may be reluctant to expose themselves and their patients to the risk of prosecution by diagnosing complications from an induced abortion. Similar reasons explain the poor quality of estimates obtained by direct questioning of HFS respondents, which we tried in studies done in the early to mid-1990s.

Clearly, there is a great need for more studies measuring spontaneous pregnancy loss in developing countries. Most of the limited and now dated work in this area has been carried out in the developed world. New clinical studies in both developed and developing countries would provide a better basis for the assumptions used in our methodology.

The Importance of Generating a Range of Multipliers

In recognition of the inevitable lack of precision given the large number of assumptions that underlie the methodology, we deliberately generate a range of estimates—an upper and lower bound, and a medium "best estimate" of abortion incidence. The value of the medium multiplier, obtained through the HPS, is increased and decreased by

*The HPS question that asks about the proportion of women experiencing complications who are likely to obtain care at a facility must be worded to match the coverage of data on the number of postabortion patients. For the most recent example of the method's application in Mexico (Juarez et al. 2008), where official statistics on postabortion complications cover the public sector only, this question asked for the proportion who are expected to receive care in each sector, public and private, and the proportion who would likely not seek care at all. However, in the Latin American study conducted in the early 1990s, the question did not specify type of sector, and the official statistics (which are for the public sector) were adjusted to account for the proportion of cases that are treated in private-sector facilities.

one unit to yield the low and high estimates; we expect the actual incidence of abortion to fall within this range. It may be useful to explore other ways of calculating a range around the multiplier.

For several countries, we had to use the same estimates for major regions as for the country as a whole because the HPS sample size was too small and concentrated in major urban centers to provide a basis for calculating multipliers for each major region. One exception was Pakistan, which had a sufficiently large and representative sample to permit calculation of multipliers for each of four major regions. The results showed moderate differences across regions, with the Northwest Frontier Province having the least safe abortion conditions (a multiplier of 3.9) and Punjab and Sindh provinces having the safest conditions (multipliers of 4.7 and 4.8, respectively).

Variability in Input Data for the Multiplier

The applications of the method in Latin America in the early 1990s and in Guatemala in 2003 identified consistent differences between HPS respondents by their work background: Respondents whose main experience was in medical care estimated, on average, less safe conditions of abortion provision and less access to postabortion care than respondents whose experience was in other fields. The breakdown by respondents' health sector (public vs. private) showed a similar pattern. Indeed, compared with Latin American professionals from nonmedical backgrounds, those from medical backgrounds generally estimated higher proportions of women experiencing complications, no matter the abortion provider (Table 9). Similarly, public-sector respondents generally perceived abortions to be less safe than private-sector respondents. We attribute these differences to medical and public-sector personnel's relatively greater exposure to and closer contact with the actual consequences of unsafe abortion; interestingly, we did not find the same pattern in African countries, such as Uganda, where both medical and nonmedical professionals had uniform perceptions on safety.

Moreover, variability by medical background and sector in the expectation that postabortion complications will be treated in medical facilities in the more developed region of Latin America may stem from medical, public-sector respondents' belief that the health system is performing better than it actually is. Results from recent studies in Colombia and Mexico confirm this pattern found in the first Latin American studies. More studies are needed to confirm whether there is a consistent pattern by respondents' background and work sector in Sub-Saharan Africa. While the variability in HPS responses is likely not a major issue affecting all countries, it should be kept in mind during future work, at least in Latin America. The range of opinions about the safety of abortion and the proportions receiving care support the current approach of requiring that both medical and nonmedical respondents be included in the HPS sample to compare data and adjust the multiplier, if necessary.

Table 10 presents these countries' variable multipliers according to the respondents' professional background and health sector. The largest differences by professional background are in Colombia and the largest by health sector are in Brazil. As mentioned earlier, the Ugandan data show the opposite pattern, with medical professionals and public-sector employees predicting safer abortions than nonmedical and private-sector employees.

The increasing use of misoprostol in countries that highly restrict abortion has likely changed the types of abortion complications that result and the number of women seeking care for them. These changes have a potential impact on our estimate of the multiplier, which will likely undergo further change as reliance on misoprostol increases further. Starting with the 2007–2008 study in Mexico, the HPS questionnaire was modified to obtain information on the use of misoprostol, which is now included in the calculation of the multiplier. This was also done with the study currently underway in Colombia. In countries where misoprostol is easily accessible and widely used, its measurement should be incorporated into the methodology.

Factors Determining the Feasibility of the AICM

Time Frame for Applying the Method

The duration of data collection varies depending on whether the researcher uses official statistics or carries out an HFS and on the desired sample size of the HPS. The length of the data collection phase also depends on factors such as the country's size, the country's transportation infrastructure, the distance between sampled facilities and the availability of skilled field staff.

Based on the studies completed so far, the minimum time needed to field an HFS was 1.5 months (Guatemala, Oct.–Nov. 2003; Singh et al. 2006) and the maximum, 17 months (Nigeria, May 1996–Oct. 1997; Henshaw et al. 1998). Data collection using official records may take less time, but depends on obtaining permission to access official data and their degree of completeness. For example, in the study conducted in the Philippines, it took 10 months to examine hospital records (May 2003–Feb. 2004; Juarez et al. 2005) because not all records were available at the central office and the research team needed to obtain reports from each of the 16 regional health offices. In the six Latin American countries in the early 1990s, official data collection took between about two and six months.

The time needed to collect data for the HPS varied between 1.5 months in Guatemala (Singh et al. 2006) and nine months in Mexico (Juarez et al. 2008). Guatemala is a small country compared with the others where the methodology has been applied; although the HPS sample size in Guatemala was also smaller (74) compared with those in Mexico (132) and Pakistan (154), it was larger than that of Uganda (53), where fieldwork took 2.25 months.

Of course, the variability in time frames for the respective surveys make the overall time needed for both paramount. For example, fielding both the HFS and the HPS in Colombia took two months (Mar.–Apr. 2009; forthcoming), while fielding the two surveys in Uganda took a total of about six months (Mar.–Aug. 2003; Prada et al. 2005). Although the HFS sample sizes were similar in both countries (313 in Uganda and 300 in Colombia, respectively), Colombia had nearly double the number of HPS respondents than Uganda (102 vs. 53). However, country conditions were such that data collection still took longer in Uganda than in Colombia. These examples show that the large variability in fieldwork duration was not directly related to the methodology per se but to other factors specific to the country.

Specific Challenges in Fielding the HFS

If the lack of official statistics on postabortion complications results in a decision to carry out an HFS, a complete list of hospitals/facilities that treat abortion complications is essential. However, a master list is not always available or easily accessible, and it is sometimes incomplete or out of date. For example, if the list is more than 2–3 years old, problems could arise once the sample is drawn (i.e., listed facilities might have closed, others not listed might have opened, the classification of a facility might have changed, etc.); this situation occurred in Uganda and Guatemala, and the list needed to be updated, which proved very costly and time-consuming.

Further, in Pakistan, the list included only public or government-owned facilities; as a result, the complete lack of private-sector facilities led to an underestimate of the number of women treated for postabortion complications and of overall abortion incidence (Sathar et al. 2007). Moreover, Bangladesh's list included only facilities that provide inpatient care (i.e., facilities with at least one bed), so the HFS results also likely underestimated incidence to the extent that abortion complications are treated on an outpatient basis (Singh et al. 1997). Thus, some applications of the methodology have been unable to meet the standard criteria, which call for inclusion of all facilities that provide postabortion care in the universe from which the HFS sample is drawn (including facilities that provide either or both inpatient and outpatient care). Thus, the conditions that vary across individual countries need to be carefully assessed for each study.

The HFS sample design permits results to be weighted up to produce a national estimate of the number of all women treated for postabortion complications. With the data available to date, this weighting assumes that selected facilities are representative of other facilities in their sample design cell (e.g., government clinics in a given region, where the sample is stratified by ownership, type of facility and region). However, while HFS surveys must assume that the number of cases treated is the same within each category of facilities sampled, because data on number of beds for every facility in the universe are generally lacking, that number and the number of cases treated within each sample category can vary substantially, even in countries where facilities of a particular type are mandated to have a certain number of beds.

For example, although Uganda Level III public health centers averaged 13 beds, these facilities ranged from two to 40 beds; similarly, their monthly postabortion caseload averaged five patients, but ranged from none to 18 patients per month. It is important to note, however, that there are generally large differences between the main sample categories in facility size, so the assumption underlying sample weights remains reasonable. Other ways of weighting may prove more accurate—for example, better data on bed capacity for the entire universe of facilities or some measure of size or capacity other than the number of beds—but such data are not usually available for all facilities in a country. On the other hand, too many other nonfacility factors influence the number of postabortion admissions, not the least of which is the extent to which abortion is unsafe in a given country, the accessibility of health facilities and women's preference for nonmedical sources of care. As a result, the current approach of using the average caseload for each sample category may be the best way of proceeding. It is important to emphasize, however, that this basis for weighting makes random choice within sample strata extremely important to provide a basis for generalizing from sampled facilities to all facilities in each category.

Specific Challenges in Fielding the HPS

The successful implementation of an HPS depends on finding health professionals who are very knowledgeable about the conditions under which abortions are obtained and postabortion care is provided in their country, and about the factors that influence access to these services. Of course, the researchers tasked with identifying these individuals have to be very involved with the issue of abortion. In some cases, researchers may depend on abortion provider "friends" who can open doors to other providers

or professionals to establish a chain of potential respondents willing to be interviewed. In general, few professionals are knowledgeable about abortion provision, especially outside a country's main cities, which is an important constraint on sample size. In earlier applications of the method, most HPS respondents lived in the capital city or in one or two other major urban areas. However, more recent surveys—such as those conducted in Colombia, Ethiopia, Guatemala, Mexico, Pakistan and Uganda—have succeeded in obtaining samples of professionals who are more widely distributed throughout the country.

Severe legal restrictions on abortion pose a special challenge to fielding an HPS. Some health professionals who are known to be highly knowledgeable about abortion provision and postabortion care may be reluctant to be interviewed. This recently happened with the HPS fielded in 2007 in Mexico where one state had to be dropped from the survey because all its respondents refused to be interviewed, even though they had initially agreed to participate in the survey. Apparently, liberalization of the abortion law in Mexico City had the unexpected consequence of causing great concern among professionals in other states who feared they would somehow be associated with a similar reform movement through their participation in the study.

Certainly, selecting the most appropriate individuals to conduct the interviews is a very important aspect of implementing the survey. Interviewers should have research experience in the reproductive health field and be skilled at conducting interviews on the sensitive topic of abortion, which includes guaranteeing confidentiality to persuade professionals to participate and obtain their trust. Local partners in Guatemala and Nigeria recommended that medical doctors be interviewers because HPS respondents are often doctors themselves, who are usually more willing to talk about abortion with their peers than with persons outside the profession. In the Latin American studies carried out in the early 1990s, interviewers were social science researchers who had extensive experience in reproductive health; in recent work in Uganda, the interviewer was a mid-level social science researcher.

Another important step is training interviewer(s) who must be able to explain questions that seek to elicit respondents' perceptions about conditions of abortion provision and the likelihood that women will experience complications and obtain medical care in a facility. They must also be trained to persuade respondents to use their experience to provide their best estimate. Because this information is asked for the four subgroups of women, the concepts of "poor" and "nonpoor" must be clearly defined, particularly in countries where poverty is widespread, such as in Uganda and Guatemala.

Need for IRB Approval and Ethical Considerations

The two potential groups who participate as subjects in the method—health professionals for the HPS and key informants for the HFS—do so as part of their professional responsibilities and not as individuals. In studies carried out from the early 1990s through the early 2000s, investigators and their institutions did not consider that IRB review was needed for the HFS and HPS surveys because respondents were not providing personal information. In recent years, however, the Guttmacher Institute has required an expedited IRB review—when only the Chair of the board reviews the study, rather than the whole board.

Each country has had its own approval purpose and determining what this is, and the time required for obtaining approval or IRB review, is an important early step of implementing an AICM study. All necessary government approvals and permissions must be obtained before the study is conducted. For example, in Uganda, permission of the National Council of Science and Technology was sought and obtained after submitting a detailed description of the project, including all data collection instruments and protocols.

Analysis of the HFS and HPS data does not reveal characteristics of respondents or health facilities, and only aggregated data are used and published. Names of the interviewed health professionals are known only by the principal investigator and research team, and are kept in a secure place.

For prospective data collection, actual women with abortion complications can be interviewed or information can be extracted from medical records. In the first situation, and preferably in the second as well, full IRB approval is needed and usual protocols and procedures must be followed for informing subjects about the purpose of the study and obtaining their consent prior to participation.

In addition, the study country's government and other major stakeholders must be informed about the research effort to ensure that it benefits from input and advice early in the process and that potential users of the resulting estimates are adequately prepared for them. A project advisory panel is recommended as an efficient approach for incorporating input from key stakeholders throughout the project.

Limitations of the AICM

Like all other techniques of estimating highly stigmatized—and deliberately hidden—behaviors, the AICM is subject to the usual issues of imprecision and the inability to independently verify resulting data. Although we have tried to adjust for the expected difficulties and data problems, the method still has the following limitations that should be borne in mind:

- The method does not provide data on the characteristics of women who obtain abortions or who experience complications. Instead, it provides only aggregate counts.
- The method does not provide information on the specific abortion complications suffered (i.e., type or severity of symptoms) and their treatment. Instead, it gives only the total count of women admitted to hospitals or other medical facilities.
- Given the number of assumptions that underlie the method, the resulting estimate of incidence should be viewed as an approximate indication, rather than as an exact measure.
- Estimates of the late miscarriage rate (one of the key assumptions in calculating the multiplier) are based on clinical studies conducted about three decades ago (i.e., in the 1980s). The relatively stable biological patterns from that time may have changed in response to changes in lifestyle, diet and environmental conditions, but generalizable data on these factors are still unavailable, since more recent broad-based clinical studies have yet to be conducted.
- To calculate the multipliers, we rely on a sample of health professionals that provide their best estimates based on their perceptions of the type of abortion providers women use, the probability of complications with each, and how likely women are to seek needed care, in both rural and urban settings.
- Estimates of the number of women treated at sampled facilities for postabortion complications are based on senior staff members' perceptions of the number of women treated at their facilities in the past month and in an average month. Therefore, their estimates are likely to be approximate, but are unlikely to be biased in a particular direction.
- When there is a need to collect original data on abortion complications treated in hospitals, these efforts can involve substantial fieldwork and be quite costly.

Strengths of the AICM

The method has many advantages over other techniques of estimating induced abortion in settings where the procedure is highly legally restricted. Below we present nine of the method's particular strengths.

- The method includes a number of steps to assess completeness of coverage and accuracy of the count of women treated for abortion complications in health facilities. It also recommends that any available relevant data be used to assess the quality and completeness of the study results.
- Unlike other morbidity-based methods, the AICM follows a series of steps to estimate and then remove the proportion of postabortion morbidity that is attributable to miscarriages rather than to induced abortion. Thus, the complications data cleanly reflect induced abortions only.
- Internal checks on the consistency of patterns in HPS data can be carried out, both within the country and across countries.
- The method is flexible in allowing researchers to modify it when needed to take into account country-specific differences that may affect the assumptions.
- The method requires a range of estimates to highlight the imprecision of the central or medium estimate, given the large number of assumptions that underlie the methodology.
- The HPS provides a picture of abortion service provision in the country, including estimates of safety for four population subgroups (as measured by the proportions in each subgroup who see each type of provider and who develop complications with each type of provider).
- The method provides a reliable estimate of the numbers and rates of women who obtain treatment for complications of unsafe abortion in health facilities or hospitals. Given the general lack of such data, this is valuable, needed information, even though it is a partial measure of morbidity from unsafe abortion, since it omits women who have complications but who do not obtain care in facilities.
- The method generates a range of estimates of abortion incidence for a study country as a whole as well as for its major regions.
- The methodology can be modified to take into account changing conditions of abortion provision in terms of specific methods used (such as increasing reliance on misoprostol). It can also measure legal and/or safe abortion procedures that are performed in facilities.

REFERENCES

Armijo R and Monreal T, The problem of induced abortion in Chile, *Milbank Memorial Fund Quarterly,* 1965, 43:263–280.

Bankole A et al., *Unwanted Pregnancy and Induced Abortion in Nigeria: Causes and Consequences,* New York: Guttmacher Institute, 2006.

Bankole A et al., Abortion-seeking behaviour among Nigerian women, *Journal of Biosocial Science*, 2008, 40(2):247–268.

Bongaarts J and Potter RG, *Fertility, Biology and Behavior: An Analysis of the Proximate Determinants*, New York: Academic Press, 1983.

Cabigon J, Special tabulations of 1994 Community Survey of Women in Metro Manila, Quezon City, Philippines: Population Institute, University of the Philippines, 1996.

Dale H et al., The postabortion caseload in Egyptian hospitals: a descriptive study, *International Family Planning Perspectives*, 1998, 24(1):25–31.

Ferrando D, *El Aborto Inducido en el Perú: Hechos y Cifras*, Lima, Peru: Flora Tristan and Pathfinder International, 2002.

Fetters T et al., Abortion-related complications in Cambodia, *BJOG,* 2008, 115(8):957–968.

Gallen M, Abortion in the Philippines: a study of clients and practitioners, *Studies in Family Planning*, 1982, 13(2):35–44.

Gebreselassie H et al., The magnitude of abortion complications in Kenya, *BJOG,* 2004, 111(1):1–7.

Gómez-Ramírez C, *Estimación del aborto inducido en Costa Rica, 2007, Informe de Resultados,* San José, Costa Rica: Asociación Demográfica Costarricense, 2008.

Harlap S et al., A life table of spontaneous abortions and the effects of age, parity and other variables, in: Hook EB and Porter I, eds., *Human Embryonic and Fetal Death*, New York: Academic Press, 1980.

Henshaw SK et al., The incidence of induced abortion in Nigeria, *International Family Planning Perspectives,* 1998, 24(4):156–164.

Ipas, *A National Assessment of the Magnitude and Complications of Unsafe Abortion in Kenya,* Chapel Hill, NC: Ipas, 2004.

Jewkes R et al., The impact of age on the epidemiology of incomplete abortions in South Africa after legislative change, *BJOG,* 2005, 112(3):355–359.

Juarez F et al., The incidence of induced abortion in the Philippines: current level and recent trends, *International Family Planning Perspectives,* 2005, 31(3):140–149.

Juarez F et al., Estimates of induced abortion in Mexico: what's changed between 1990 and 2006? *International Family Planning Perspectives*, 2008, 34(4):2–12.

Mario S and Pantelides EA, Estimación de la magnitud del aborto inducido en la Argentina, 2005, *Notas de Población,* No. 87, 2009.

Monreal T, Determinant factors affecting illegal abortion trends in Chile, in: Holtrop HR et al., eds., *New Developments in Fertility Regulation*, Chestnut Hill, MA, USA: Pathfinder Fund, 1976, pp. 123–132.

National Statistics Office (NSO) and Macro International, *National Safe Motherhood Survey 1993,* Manila, Philippines: NSO; and Calverton, MD, USA: Macro International, 1994, pp. 88–90.

Pardo F and Uriza G, Estudio de morbilidad y mortalidad por aborto en 36 instituciones de Bolivia, Colombia, Perú y Venezuela, *Revista Colombiana de Obstetricia y Ginecología,* 1991, 42:287–297.

Prada E et al., Abortion and postabortion care in Uganda: a report from health care professionals and health facilities, *Occasional Report*, New York: The Alan Guttmacher Institute, 2005, No. 17.

Rossier C, Estimating induced abortion rates: a review, *Studies in Family Planning,* 2003, 34(2):87–102.

Sathar ZA et al., Estimating the incidence of abortion in Pakistan, *Studies in Family Planning*, 2007, 38(1):11–22.

Singh S and Wulf D, Estimating abortion levels in Brazil, Colombia and Peru, using hospitals admissions and fertility survey data, *International Family Planning Perspectives,* 1991, 17(1):8–13.

Singh S and Wulf D, Estimated levels of induced abortion in six Latin American countries, *International Family Planning Perspectives,* 1994, 20(1):4–13.

Singh S et al., Estimating the level of abortion in the Philippines and Bangladesh, *International Family Planning Perspectives,* 1997, 23(3):100–107.

Singh S et al., The incidence of induced abortion in Uganda, *International Family Planning Perspectives,* 2005, 31(4):183–191.

Singh S et al., Induced abortion and unintended pregnancy in Guatemala, *International Family Planning Perspectives,* 2006, 32(3):136–145.

TABLE 1. Comparison of results from items asking for mean number of postabortion cases in past month and in an average month, by type of facility and ownership, Bangladesh, Guatemala, Nigeria, Pakistan and Uganda

Country (and year of data collection)	Type of facility	Category of facilities by type or ownership	Mean no. of postabortion cases treated		No. of facilities
			Past month	Average month	
Bangladesh (1995)		**All**	**15**	**18**	**108**
	Type of facility	Teaching hospital	71	90	13
		District hospital	17	20	16
		Thana headquater hospital	5	6	54
		Voluntary/NGO facility	7	7	25
	Ownership	Public-sector	18	22	82
		Private-sector	7	8	26
Nigeria (1996)		**All**	**8**	**9**	**402**
	Type of facility	Hospital	9	11	254
		Clinic	6	8	89
		Maternity/nursing home	3	4	25
		Other	6	8	33
	Ownership	Public-sector	11	14	89
		Private-sector	6	7	290
		Mission/other	17	15	23
	Type of facility and ownership	Public hospital	12	14	109
		Public clinic	11	11	24
		Public other	9	9	14
		Private hospital	6	8	145
		Private clinic	4	7	65
		Private other	4	5	44
Pakistan (2002)		**All**	**23**	**30**	**146**
	Type of facility	Teaching hospital	93	117	52
		District headquarter hospital	59	75	42
		Thana headquarter hospital	32	34	31
		Rural health center	6	9	21
Guatemala (2003)		**All**	**12**	**13**	**177**
	Type of facility	Hospital	13	14	163
		Sanatorio (private clinic)	4	5	11
		Other (health center type A)	6	5	3
	Ownership	Government	31	35	41
		IGSS (Social Security)	25	21	15
		Private	4	5	121
	Type of facility and ownership	Public hospital	31	36	40
		IGSS hospital	27	23	14
		Private hospital	4	5	109
		Other	4	5	14
Uganda (2003)		**All**	**12**	**14**	**286**
	Type of facility	Hospital	29	31	92
		Level IV health center	7	9	55
		Level III health center	3	5	108
		Private midwife	3	5	31
	Ownership	Public	13	15	187
		NGO	15	18	58
		Private	4	5	41
	Type of facility and ownership	Public hospital	37	39	51
		Level IV public health center	6	7	51
		Level III public health center	3	5	85
		NGO hospital	20	23	36
		NGO health centers (levels III and IV)	7	10	22
		Private other	7	6	9
		Private midwife	3	5	32

Sources: **Bangladesh**—Singh et al. 1997; **Nigeria**—Henshaw et al. 1998; **Pakistan**—Sathar 2007; **Guatemala**—Singh et al. 2006; and **Uganda**—Singh et al. 2005.

TABLE 2. Data and sources used in Guttmacher applications of the Abortion Incidence Complications Method (AICM), various countries and years

Region and country	Data year	Year of publication	Data on the no. of women treated for abortion complications				Data from HPS			
			Source	No. of health facility types	Ownership/sector	Sample size (no. of facilities)	Total sample size (no. of professionals)	By background		Multiplier used to calculate incidence (usually midpoint of range of three estimates)
								Medical	Nonmedical	
AFRICA										
Ethiopia	2007	2010	HFS	5	Public, private	337	79	51	28	7.3
Nigeria	1996	1998	HFS	3 [1]	Public, private, NGO [2]	672	67	34	33	3.34 [3]
Uganda	2003	2005	HFS	4 [4]	Public, private, NGO	313	53	44	9	3.5
ASIA										
Bangladesh	1995	1997	HFS	4 [5]	Public, private, NGO	110	26	19	7	5
Philippines	1994	1997	National hosp. statistics	8 [6]	Public, private	na	49	42	7	5 [7]
Philippines	2000	2005	National hosp. statistics	8 [6]	Public, private	na	na	na	na	6
Pakistan	2002	2007	HFS	4 [8]	Public=Nat'l; Private = exploratory only	Public=146; Exploratory: Private=72; Health posts=15	154	141	13	4.5 [9]
LATIN AMERICA										
Brazil	1991	1994	National hosp. statistics	7 [10]	Public, private	na	46	36	10	3.5 [11]
Colombia	1989	1994	National hosp. statistics	4 [12]	Public, private	na	30	22	8	5.5 [11]
Colombia	2008	2010	HFS	9 [13]	Public, private	289	102	47	55	4.12
Chile	1990	1994	National hosp. statistics	4 [14]	Public, private	na	41	14	27	4.2 [11]
Dominican Republic	1992	1994	National hosp. statistics	3 [15]	Public, private	na	21	16	5	3.8 [11]
Guatemala	2003	2006	HFS	3 [16]	Public, Social Security, private	183	74	63	11	3
Mexico	1990	1994	National hosp. statistics	8 [17]	All categories of public facilities	na	25	9	16	3.8 [11]
Mexico	2006		National hosp. statistics	6 [18]	All categories of public facilities	na	132	82	50	5.8
Peru	1989	1994	Partial hosp. statistics	4 [19]	Public, private	na	34	8	26	4.9 [11]

[1]Hospitals, clinics and maternity/nursing homes. [2]Public facilities (all levels of government ownership—federal, state or local); NGO facilities (mission or religious hospitals); and private facilities. [3]Multiplier of 3.34 (deduced from the total estimated number of abortions and number hospitalized) is adjusted to reflect both physician- and nonphysician-performed abortions. The study team rejected the HPS multiplier of 5.4 as too high, after careful consideration of the conditions of abortion provision at that time. (See: Makinwa-Adebusoye P, Singh S and Audam S, Nigerian health professionals' perceptions about abortion practice, *International Family Planning Perspectives,* 1997, 24(4):155–161.) [4]Hospitals, level IV health centers, level III health centers and private midwife/maternity homes. [5]Teaching hospitals, district hospitals, thana (administrative unit below district) hospitals and NGO facilities. [6]Seven types of facilities/hospitals (general, regional, provincial, municipal, specialized, Medicare and city) and medical centers. [7]The HPS value of 3.7 was deemed too low by the study team. [8]Teaching, district, subdistrict and rural health centers. [9]The HPS was large enough to estimate a multiplier for each of the four major regions; these ranged from 3.9 in the Northwest Frontier Province to 4.8 in Sindh. The initial three estimates of 4.0, 4.5 and 5.0 were not made using the usual approach, but were based on a range of assumptions of the proportion of late spontaneous abortions being treated in hospitals (50%, 35% and 23%). [10]Contracted (private hospitals that contract with the National Health System), university, nonprofit, Instituto Nacional da Assistência Médica e da Previdencia Social (InaMPS), federal, state and municipal. [11]In addition to the country-specific HPS multiplier together with the biological assumption of late miscarriages that will need hospitalization, the six early applications of the method in Latin America also used three hypothetical multipliers: 1) a multiplier of 3 and the assumption that 25% of postabortion hospitalizations are for complications of miscarriages; 2) a multiplier of 5 and the 25% assumption for miscarrieages; and 3) a multiplier of 7 and the 25% assumption outlined above. [12]Primary, secondary and tertiary hospitals and private clinics. [13]Nine categories of facilities based on level of complexity of care (primary, secondary and tertiary) and inpatient/outpatient admissions, along with likelihood of provision of postabortion care and of emergency care. [14]Hospitals (public), private facilities, university clinics and hospitals, and public hospitals outside the Ministry of Health system. [15]Hospitals, sub-centers and clinics with Secretaría de Estado de Salud Pública y Asistencia Social SESPAS), and Armed Forces and Social Security hospitals. [16]Hospitals, sanatorios (clinics) and type A health centers. [17]Instituto Mexicano del Seguro Social (IMSS), Social (IMSS), urban IMSS, rural Secretaría de Salubridad y Asistencia (SSA), Departamento del Distrito Federal (DDF), Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE), Petróleos Mexicanos (PEMEX), Secretaria de la Defensa Nacional (SEDENA) and Secretaria de la Marina (SEMAR). [18]National Institutes of Health, health centers with inpatient beds, comprehensive hospitals, general hospitals, specialty hospitals and specialty health centers. [19]Public hospitals, private hospitals, Social Security hospitals and Armed Forces hospitals. *Note:* na = not applicable. *Sources:* Special tabulations by authors of data files or extraction of measures from each country's published findings.

TABLE 3. Data used to calculate the number of women hospitalized for induced abortion complications, Uganda, 2003

Region	Hospitalizations for complications of spontaneous and induced abortions	Estimated total number of live births	Estimated number of late miscarriages[1]	Estimated number of late miscarriages treated in health facilities[2]	No. of women hospitalized for complications of induced abortions only[3]
Total	**109,926**	**1,254,812**	**42,789**	**25,168**	**84,758**
Central	42,929	370,851	12,646	11,154	31,775
Eastern	25,544	361,799	12,337	7,439	18,104
Northern	20,512	213,998	7,297	2,934	17,579
Western	20,941	308,164	10,508	3,641	17,300

[1]Late spontaneous abortions = 3.41% of all live births (see text for explanation). [2]The proportion of late miscarriages that are treated in a health facility is 1.5 times that of births delivered in a health facility, assuming that women are more likely to seek care for a health problem than for normal delivery. [3]The total hospitalized for any type of abortion complication minus miscarriages. *Source:* Singh et al. 2005, Table 2.

TABLE 4. Estimated total number of induced abortions, abortion rates and ratios for a range of multipliers, Uganda 2003

Region	No. of women 15–49	No. of women hospitalized for complications of induced abortion	Multiplier and resulting no.of induced abortions			Muliplier and resulting rate (no. of abortions per 1,000 women 15–49)			Multiplier and resulting ratio (abortions per 100 live births)		
			2.5	3.5	4.5	2.5	3.5	4.5	2.5	3.5	4.5
Total	**5,497,200**	**84,758**	**211,895**	**296,653**	**381,410**	**39**	**54**	**69**	**17**	**24**	**30**
Central	1,788,372	31,775	79,438	111,213	142,988	44	62	80	21	30	39
Eastern	1,474,411	18,104	45,261	63,365	81,469	31	43	55	13	18	23
Northern	877,031	17,579	43,947	61,526	79,105	50	70	90	21	29	37
Western	1,357,386	17,300	43,249	60,549	77,848	32	45	57	14	20	25

Sources: **Total number of women aged 15–49**—United Nations (UN) Population Division, *World Population, Prospects: The 2002 Revision,* Vol. II, New York: UN, 2003. **Proportions of women living in each region**—Uganda Bureau of Statistics (UBOS) and ORC Macro, *Uganda Demographic and Health Survey* (UDHS), 2000–2001, Kampala, Uganda: UBOS; and Calverton, MD, USA: ORC Macro, 2001. **Live births**—calculated by the authors by applying age-specific fertility rates from the UDHS to the number of women in each age-group and region (generated from applying the DHS proportions to the UN population data).

TABLE 5. Estimated numbers of pregnancies, unintended pregnancy rate, percentage of pregnancies that are unintended and overall pregnancy rate, Uganda, 2003

Region	Number of pregnancies	Rate of unintended pregnancy[1] (per 1,000 women 15–49)	% of pregnancies that are unintended[2]	Pregnancy rate (per 1,000 women 15–49)[3]
Total	**1,551,465**	**141**	**50**	**282**
Central	482,064	144	53	269
Eastern	425,164	159	55	288
Northern	275,524	151	48	314
Western	368,713	110	41	272

[1]Number of unintended pregnancies (unplanned births + abortions) per 1,000 women aged 15–49 per year. [2]Number of unintended (unwanted + mistimed) / total number of pregnancies x 100. [3]Number of pregnancies (live births + induced abortions) per 1,000 women aged 15–49 per year. *Note:* We assume that 2000–2001 UDHS data on age-specific fertility rates and the wantedness status of births apply to 2003. *Source:* Table 7 in Singh S et al. 2005.

TABLE 6. For four subgroups of women by residence and poverty status, percentage distribution of their abortions according to provider type as estimated by HPS respondents, various countries

Country and provider type	Nonpoor		Poor	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)
BANGLADESH (1995)				
Doctor	8	12	7	10
Nurse/Midwife	25	25	27	27
Pharmacist	35	33	40	34
Traditional Birth Attendant/Lay Practitioner	48	54	55	54
Woman herself	43	45	51	55
NIGERIA (1996)				
Doctor	13	20	15	20
Nurse/Midwife	30	35	39	42
Traditional Birth Attendant/Lay Practitioner	46	50	56	55
Chemist	50	52	59	60
Woman herself	49	52	64	60
PAKISTAN (2002)				
Doctor	13	15	16	17
Nurse, Midwife, Lady Health Visitor	40	45	48	50
Traditional Birth Attendant	40	42	50	49
Pharmacist	14	14	16	17
Woman herself	33	35	43	43
GUATEMALA (2003)				
Doctor	13	15	18	21
Nurse/Midwife - Trained	47	51	58	61
Traditional Birth Attendant	60	64	69	72
Pharmacist	51	51	61	61
Woman herself	68	69	76	75
UGANDA (2003)				
Doctor	17	25	23	32
Clinical Officer	33	41	41	48
Nurse/Midwife	35	38	41	43
Traditional Healer/Lay Practitioner	60	59	68	68
Pharmacist/Dispenser/Drug Store	45	48	51	52
Woman herself	66	65	75	75
PHILIPPINES (1996)				
Doctor	13	16	17	17
Nurse/Midwife	31	34	35	34
Chemist	25	25	27	25
Traditional Birth Attendant/Lay Practitioner	52	52	59	62
Woman herself	42	43	48	44
LATIN AMERICA (1992) - SIX COUNTRIES[1]				
Doctor	7	10	13	14
Nurse/Midwife	19	19	29	32
Untrained Practitioner (includes woman herself)	48	49	58	61

[1]Brazil, Colombia, Chile, Dominican Republic, Mexico and Peru. *Note:* Percentages are the average of all responses given by respondents. Excludes "don't know" answers. *Source:* Special tabulations of HPS data files.

TABLE 7. For four subgroups of women having abortions, percentage estimated by HPS respondents who will experience complications, by type of provider, various countries

Country and provider type	Nonpoor		Poor	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)
BANGLADESH (1995)				
Doctor	8	12	7	10
Nurse/Midwife	25	25	27	27
Pharmacist	35	33	40	34
Traditional Birth Attendant/Lay Practitioner	48	54	55	54
Woman herself	43	45	51	55
NIGERIA (1996)				
Doctor	13	20	15	20
Nurse/Midwife	30	35	39	42
Traditional Birth Attendant/Lay Practitioner	46	50	56	55
Chemist	50	52	59	60
Woman herself	49	52	64	60
PAKISTAN (2002)				
Doctor	13	15	16	17
Nurse, Midwife, Lady Health Visitor	40	45	48	50
Traditional Birth Attendant	40	42	50	49
Pharmacist	14	14	16	17
Woman herself	33	35	43	43
GUATEMALA (2003)				
Doctor	13	15	18	21
Nurse/Midwife - Trained	47	51	58	61
Traditional Birth Attendant	60	64	69	72
Pharmacist	51	51	61	61
Woman herself	68	69	76	75
UGANDA (2003)				
Doctor	17	25	23	32
Clinical Officer	33	41	41	48
Nurse/Midwife	35	38	41	43
Traditional Healer/Lay Practitioner	60	59	68	68
Pharmacist/Dispenser/Drug Store	45	48	51	52
Woman herself	66	65	75	75
PHILIPPINES (1996)				
Doctor	13	16	17	17
Nurse/Midwife	31	34	35	34
Chemist	25	25	27	25
Traditional Birth Attendant/Lay Practitioner	52	52	59	62
Woman herself	42	43	48	44
LATIN AMERICA (1992) - SIX COUNTRIES[1]				
Doctor	7	10	13	14
Nurse/Midwife	19	19	29	32
Untrained Practitioner (includes woman herself)	48	49	58	61

[1]Brazil, Colombia, Chile, Dominican Republic, Mexico and Peru. *Note:* Percentages are the average of all responses given by repondents. Excludes "don't know" answers. *Source:* Special tabulations of HPS data files.

TABLE 8. Among subgroups of women experiencing postabortion complications, percentage likely to be treated in a health facility as estimated by HPS respondents, various countries

Country	Nonpoor		Poor	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)
Bangladesh (1995)	63	58	52	53
Guatemala (2003)	88	79	72	61
Nigeria (1996)	67	65	48	35
Pakistan (2002)	86	71	60	41
Philippines (1996)	69	69	63	59
Uganda (2003)	83	70	62	51
Latin America (1992) - six countries[1]	59	57	70	59

[1] Brazil, Colombia, Chile, Dominican Republic, Mexico and Peru. *Source:* Special tabulations of HPS data files.

TABLE 9. Variation by HPS respondents' characteristics in their estimates of the likelihood of complications with each provider type, for four subgroups of women, various countries and years

Country and respondent characteristic (and provider type)	Nonpoor		Poor	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)
GUATEMALA, 2003				
Medical background				
Doctor				
Nurse/Midwife - Trained	13	14	18	20
Traditional Birth Attendant	49	53	60	62
Pharmacist	62	65	70	72
Woman herself	52	52	61	62
	70	69	77	76
Nonmedical background				
Doctor				
Nurse/Midwife - Trained	13	14	21	24
Traditional Birth Attendant	38	43	47	56
Pharmacist	51	60	64	69
Woman herself	46	48	56	60
	61	66	75	75
Public-sector				
Doctor				
Nurse/Midwife - Trained	12	13	17	20
Traditional Birth Attendant	51	60	61	67
Pharmacist	64	68	73	76
Woman herself	60	60	70	72
	77	78	85	84
Private-sector				
Doctor				
Nurse/Midwife - Trained	13	15	19	22
Traditional Birth Attendant	40	40	53	53
Pharmacist	54	57	62	65
Woman herself	40	42	50	49
	58	58	67	65

TABLE 9. (continued) Variation by HPS respondents' characteristics in their estimates of the likelihood of complications with each provider type, for four subgroups of women, various countries and years

Country and respondent characteristic (and provider type)	Nonpoor		Poor	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)
UGANDA, 2003				
Medical background				
Doctor	17	24	21	31
Clinical Officer	32	39	40	47
Nurse/Midwife	34	37	40	42
Traditional Healer/Lay Practitioner	43	45	47	49
Pharmacist/Dispenser/Drug Store	58	58	68	68
Woman herself	66	65	75	75
Nonmedical background				
Doctor	21	33	32	40
Clinical Officer	36	48	44	54
Nurse/Midwife	41	46	49	49
Traditional Healer/Lay Practitioner	56	63	66	67
Pharmacist/Dispenser/Drug Store	67	69	71	70
Woman herself	67	66	74	71
Public-sector				
Doctor	16	22	21	29
Clinical Officer	34	40	42	48
Nurse/Midwife	32	36	39	40
Traditional Healer/Lay Practitioner	37	42	46	48
Pharmacist/Dispenser/Drug Store	53	58	64	65
Woman herself	59	63	70	71
Private-sector				
Doctor	20	30	26	38
Clinical Officer	31	41	40	49
Nurse/Midwife	39	43	45	49
Traditional Healer/Lay Practitioner	59	58	59	58
Pharmacist/Dispenser/Drug Store	69	63	75	73
Woman herself	77	69	81	80

TABLE 9. (continued) Variation by HPS respondents' characteristics in their estimates of the likelihood of complications with each provider type, for four subgroups of women, various countries and years

Country and respondent characteristic (and provider type)	Nonpoor		Poor	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)
LATIN AMERICA, 1992 - SIX COUNTRIES[1]				
Medical background				
Doctor	8	10	14	12
Nurse/Midwife	26	18	34	32
Untrained Practitioner (includes woman herself)	54	47	58	60
Nonmedical background				
Doctor	7	11	14	17
Nurse/Midwife	13	19	24	32
Untrained Practitioner (includes woman herself)	44	51	58	62
Public-sector				
Doctor	9	10	14	15
Nurse/Midwife	24	18	33	33
Untrained Practitioner (includes woman herself)	58	48	62	62
Private-sector				
Doctor	6	10	12	13
Nurse/Midwife	15	19	26	32
Untrained Practitioner (includes woman herself)	40	51	53	60

[1]Brazil, Colombia, Chile, Dominican Republic, Mexico and Peru. *Source:* Special tabulations of HPS data files.

TABLE 10. For countries with available data, variation by HPS respondents' characteristics in multipliers for calculating incidence of induced abortion

Year and country	Professional background		Health sector	
	Medical	Nonmedical	Public	Private
1992				
BRAZIL	3.61	3.77	2.51	6.80
CHILE	5.28	3.97	3.78	6.26
COLOMBIA	5.28	10.41	4.70	7.12
DOMINICAN REPUBLIC	1.17	3.48	2.87	3.15
MEXICO	3.73	4.15	3.42	4.87
PERU	4.06	4.97	4.57	5.12
2003				
GUATEMALA	2.47	3.00	2.26	3.13
UGANDA	4.03	2.73	3.84	3.48

Source: Special tabulations of HPS data files.