

# Global consequences of unsafe abortion

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Unsafe abortion is a significant cause of death and ill health in women in the developing world. A substantial body of research on these consequences exists, although studies are of variable quality. However, unsafe abortion has a number of other significant consequences that are much less widely recognized. These include the economic consequences, the immediate costs of providing medical care for abortion-related complications, the costs of medical care for longer-term health consequences, lost productivity to the country, the impact on families and the community, and the social consequences that affect women and families. This article will review the scientific evidence on the consequences of unsafe abortion, highlight gaps in the evidence base, suggest areas where future research efforts are needed, and speculate on the future situation regarding consequences and evidence over the next 5–10 years. The information provided is useful and timely given the current heightened interest in the issue of unsafe abortion, growing from the recent focus of national and international agencies on reducing maternal mortality by 75% by 2015 (as one of the Millennium Development Goals established in 2000).

The WHO defines unsafe abortion as a procedure for terminating an unintended pregnancy carried out either by persons lacking the necessary skills or in an environment that does not conform to minimal medical standards, or both [1]. An estimated 21 million unsafe abortions occur each year, an annual rate of 16 for every 1000 women in the developing world, where the vast majority of unsafe abortions take place [WHO, 2010, SUBMITTED] [2]. Recent work indicates that there has been little decline in this rate between 1995 and 2003, the most recent year for which there are published estimates of the number of unsafe abortions worldwide [3]. Unsafe abortion has gained more attention recently as an important and preventable cause of maternal mortality and morbidity. In light of the worldwide focus on attaining the Millennium Development Goals (MDGs), a broad agenda, agreed by world leaders in 2000, aims to reduce poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women, and more specifically MDG 5, which aims to reduce maternal mortality by 75% by 2015.

Two fundamental factors that underlie unsafe abortion are poor access to safe and legal abortion services, and unintended pregnancy. A third of the 1.3 billion women (who are 15–44 years of age) in the developing world live in countries where abortion is not permitted for any reason at all or permitted only to save the woman's life, and another 15% are in countries where abortion is permitted only to protect physical or mental health, but where access even under these restrictive criteria is very limited [4]. In addition, 22% of women from developing countries live in India, where despite a

liberal law, permitting abortion on socioeconomic grounds, access to safe abortion services is poor, and approximately 60% of abortions in India are considered to be unsafe [3]. Estimates of the level of unintended pregnancy in the developing world are available for 2008. The annual rate of unintended pregnancies was 57 per 1000 women, and 40% of all pregnancies were unintended (~half of these ended as induced abortions) [4].

Although unsafe abortion is recognized as a significant contributor to mortality and morbidity among women of reproductive age, research on this topic is relatively scarce and the evidence base on the consequences of unsafe abortion is limited [5]. One key constraint concerning research on the consequences of unsafe abortion (and on other aspects as well), is the difficulty of obtaining information that is representative of all women having an abortion, because of the very high level of underreporting of abortion experience in population-based studies that directly interview women [6]. Moreover, the measurement of consequences, other than those that are immediate or very short term, presents the additional difficulty of achieving adequate follow-up on respondents on an especially sensitive topic, compounding the usual demands of achieving a high response rate in longitudinal studies. As a result, much of the available evidence is cross-sectional and facility based, conducted in hospitals or other types of facilities, designs that have the advantage that women who have experienced an unsafe abortion are more easily identified for inclusion in a study, but that have the disadvantage of not representing all women having unsafe abortions, since they exclude women who may need but do not obtain care at such facilities.

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The consequences of unsafe abortion vary depending on the context and the environment, reflecting existing conditions of abortion provision, safety and legality. In countries where abortion is highly legally restricted, or where access to safe services is poor even though the law permits abortion under broad criteria, it is common to find that women who are financially better-off are able to obtain safe, clandestine abortion procedures because they can afford the services of a trained provider, while poorer women and other disadvantaged groups (such as adolescents and women in rural areas) will often go to providers who lack formal training, or attempt to induce the abortion themselves, resulting in health complications [4].

This article provides an overview of what is known about the consequences of unsafe abortion, at the global level. It also highlights the gaps within the current evidence and describes ongoing research efforts to fill these gaps. It comments on trends in abortion service provision and legal status of abortion in terms of their potential effect on the consequences of unsafe abortion.

### **Health consequences**

The direct and immediate health consequences of unsafe abortion are better documented than other consequences. Health consequences of abortion have been the topic of research for the past several decades, motivated by the need to ensure that these were recognized and addressed by governments, medical professionals and the public.

### **Incidence of mortality**

An estimated 70,000 women died as a result of unsafe abortions in 2005, worldwide, according to the most recent published estimate [4]. More than half of deaths resulting from unsafe abortions occur in Sub-Saharan Africa (~38,000) and approximately a third in South Central Asia (~24,000). The number of abortion-related deaths is negligible in the developed world and China, areas where abortion is legal under broad criteria and safe abortion services are accessible and are provided by skilled health professionals using effective methods in hygienic conditions. Despite large differences in maternal mortality levels across the three major developing regions (Asia, sub-Saharan Africa and Latin America and the Caribbean), the proportion of maternal deaths due to unsafe abortions is remarkably similar (11–14%) [2].

New estimates of maternal mortality for 2008, based on a joint effort by international agencies led by WHO were recently published [7]. The

midpoint estimate of the total number of maternal deaths in 2008 ranges is 358,000 [7]. The new estimate reflects a sharper downward trend in maternal mortality since 1990 than previous estimates have done. However, these new estimates do not provide a distribution according to cause of death, and therefore do not provide information on abortion-related deaths. Work on new estimates of the cause of maternal deaths is ongoing. In the meantime, an approximate estimate of the number of maternal deaths due to abortion in 2008 can be calculated by applying the 2005 proportion of all maternal deaths due to abortion, 13% [2], to the total number of maternal deaths estimated for 2008 [7]: an estimated 46,000 maternal deaths occurred in 2008, due to unsafe abortion

Measures of maternal deaths must be viewed as approximate values because the empirical information on which they are based has many limitations. Maternal deaths may not be accurately classified as due to maternal-related causes because of a number of factors, such as inadequate information on which to base cause of death, the lack of medical certification of cause of death in many countries and the woman's pregnancy status at the time of death may be unknown. Underreporting of the number of maternal deaths due to unsafe abortion faces the above barriers, as well as the additional constraint of an unwillingness to report abortion as the cause of death, especially where the law is highly restrictive and abortions are obtained clandestinely and are very stigmatized. Estimates for 2005 show wide variation across regions in abortion-related mortality.

### **Incidence of morbidity**

Information on morbidity due to unsafe abortion is scarce and estimates are less comprehensive, compared with estimates of abortion-related mortality. Nationally representative studies have collected data for 16 countries on one key indicator of abortion-related morbidity: the number of women hospitalized for induced abortion complications, from 1990 to 2008. Although an additional number of countries have official statistics on the number of women treated for postabortion complications, the completeness and quality of these data has not been assessed. Generalizing from these country-specific studies, available as of 2005, it was estimated that approximately 5 million women were hospitalized for the treatment of unsafe abortions in the developing world in 2005, an annual rate of seven per 1000 women of childbearing age [8]. An estimated 2.3 million

women were treated for abortion complications in Asia, 1.7 million in Africa and 1.0 million in Latin America and the Caribbean.

Separately, based on aggregated findings from recent surveys of key informants who are highly knowledgeable about abortion service provision in six countries (surveys conducted between 2002 and 2008), it was estimated that approximately 40% of the nearly 20 million women who have clandestine abortions experience complications and require medical care in a hospital or other medical facility, accounting for approximately 8 million women [4]. Of this 40%, an estimated 25% receive treatment in a facility (~5 million women), while the rest, an estimated 15% or ~3 million women), have complications but do not obtain the care they need.

The limited information available on trends in abortion-related morbidity suggests that the number of women treated for postabortion complications in facilities has not declined. Trend data are available for Mexico [9] and Peru [10] in Latin America and the Philippines [11]. There are two national studies that are several years apart, in each of these countries during the period 1990–2006, these studies show no decline in the rate of hospitalization for abortion-related care per 1000 women. However, it is hypothesized that the severity of the abortion-related complications has declined over the past 2 decades, based on observations by obstetricians and gynecologists who provide this care [5]. Unfortunately, evidence on the severity of complications is extremely limited. Accurate and detailed data on types of symptoms and diagnoses would be one type of evidence to assess such a trend; however, this information is not available for the earlier studies, nor for recent years, for the most part. In the case of Mexico, information on the length of hospital stay of postabortion patients in the early 1990s was compared with the length of stay in 2006, and a decline of approximately a-third of a day was found [9]. This is indicative of a decline in severity, but this measure does not adequately capture the severity of morbidity, and the quality of the data on length of stay may not be accurate.

### **Severity of morbidity**

Information on the nature of health consequences related to unsafe abortion has been the subject of a number of studies over the past several decades, many based on one or a few hospitals. These studies provide descriptive documentation of the symptoms and treatment of abortion-related health complications, as well as

other information, including the abortion methods that women use, their demographic and social characteristics, and a few studies estimate the cost of providing medical care.

Some progress has been made in addressing the challenge of developing a standardized measure of the severity of abortion-related complications, based on nationally representative information. A seminal study in 1986 by a task force of the WHO developed a quantitative study design, providing the starting point for work on measuring severity of postabortion complications. This study tested the approach by conducting surveys in four countries on large samples of postabortion patients in facilities. The focus of the WHO study was dual – to measure severity by collecting data on symptoms and diagnoses, and to classify women according to whether they certainly, probably or possibly had an induced abortion, or whether they probably had a spontaneous pregnancy loss [12]. The data from these surveys provided new information on the proportion of postabortion care for patients who had experienced severe symptoms such as evidence of genital trauma or a foreign body in the uterus, vagina or cervix, and the presence of sepsis or peritonitis.

Researchers have since built on the WHO design and improved the measurement of morbidity, developing a more standardized questionnaire that permits classification according to severity of the complication, using three categories: severe, moderate and mild (but requiring treatment in a facility), based on information obtained from women and medical providers. The severity of complications was classified as low if the woman had a temperature of 37.2°C or less, no clinical signs of infection, no system or organ failure and no suspicious findings on evacuation; moderate if she had a temperature of 37.3–37.9°C, localized peritonitis or offensive discharge; and high if she had a temperature of at least 38°C, a high pulse rate, system or organ failure, generalized peritonitis, shock, or a foreign body or mechanical injury on evacuation, or if she eventually died [13].

This approach was first applied in South Africa [14] and subsequently in Kenya [15], Cambodia [16] and Ethiopia [17]. These studies have used a prospective design, typically collecting data on all postabortion patients treated during a 2–4 week period. This recent group of studies made an important modification to the WHO design: they do not attempt to classify patients according to whether they may have had an induced or spontaneous abortion, and the results are for pregnancy loss in all patients.

The methodology was first applied in South Africa in 1994, and this study was replicated in 2000, to assess the impact of abortion law change in 1996. The results from South Africa show that providing legal abortion services did have an impact on abortion-related morbidity and deaths. The proportion of complications classified as low severity rose from 66 to 72%, the proportion of high severity fell from 17 to 10%, and the number of deaths fell by at least 50% [18,19].

A recent review of quantitative methods for measuring the severity of morbidity reports that the prospective methodology ‘has evolved from the mid-1980s when it was used to distinguish between miscarriages and induced abortions to focus instead on the clinical symptoms of morbidity severity from all pregnancy losses’ [20]. To date, studies have found a range in the proportion of postabortion patients who experienced severe symptoms, from 10% in South Africa (in 2000), to 27% in Ethiopia (in 2008), 28% in Kenya (in 2002) and 40% in Cambodia (in 2005, where it is believed to be an overstatement, owing to poor data on patient’s temperatures). While there is still room for improvement in the measurement of the severity of morbidity, these studies support the conclusion that a substantial proportion of postabortion patients experienced severe symptoms. Another indicator of the severity of symptoms is the proportion at gestation above 13 weeks: this proportion was at least a third or higher in Kenya and Ethiopia and approximately a fifth in Cambodia [15,21].

### **Long-term health consequences**

Limited empirical research has been performed on the long-term health consequences resulting from unsafe abortions. Some severe cases of abortion complications (perforations and other physical trauma and septic shock) require surgery to remove the uterus. Anemia and prolonged weakness are conditions that may persist long after an abortion takes place [22–24]. Some chronic conditions that result from unsafe abortion (e.g., pain, inflammation of the reproductive tract and pelvic inflammatory disease) may continue indefinitely, severely compromising women’s health [2]. These conditions, as well as other postabortion complications, may also result in secondary infertility. The WHO estimates that approximately 1.7 million women develop secondary infertility owing to unsafe abortions and an estimated 3 million women suffer from the effects of reproductive tract infections [2]. A study in Nigeria, conducted between 1996

and 1999, found that half of women treated for induced abortions will have fertility problems and 37% of infertility problems reported by a community-based sample of women, were most likely the result of induced abortion [25].

### **Disability-adjusted life years**

The disability-adjusted life years (DALYs) is a single measure that summarizes the impact of both mortality and morbidity resulting from each disease or medical condition in terms of the number of years of healthy life lost due to the disease or condition. One lost DALY can be thought of as one lost year of ‘healthy’ life, and the burden of disease as a measurement of the gap between the current health of a population and an ideal situation where everyone in the population lives into old age in full health. Each year, an estimated 8.3 million DALYs are lost owing to the impact of unsafe abortion on women’s mortality and ill health: this is a fifth of all DALYs lost due to all pregnancy-related death or illness [26]. As in the case of unsafe abortion practice itself, almost all of this impact is felt in the developing world.

### **Economic consequences**

The economic impact of unsafe abortion falls into two components – the direct costs of providing medical care for women who are hospitalized as a result of complications of unsafe abortion, and indirect costs to women, households, the community and society. Direct costs are generally highly subsidized by the public sector, although women and their families bear a proportion of these costs, and in some countries this can be a very large proportion. The indirect costs include: the loss of productivity from abortion-related morbidity and mortality among women and other household members; the negative impact on children’s health, education and well-being due to the ill health or death of their mother; and the loss of alternative health services caused by the use of scarce medical resources for the treatment of abortion complications. These consequences have an impact not only on health systems and the public sector, but also affect the economic status of households and families, since a sudden expenditure can push a household into poverty.

Very little work has been done in quantifying the indirect cost of abortion-related morbidity and mortality on women and households, or on the long-term (direct or indirect) costs to the public sector and health systems. Most of the research performed on the cost of postabortion care has focused on measuring the direct

short-term cost of treatment of the health consequences of unsafe abortion. Moreover, up until a few years ago, most studies on this topic were small-scale (covering one or a few facilities) and did not provide national estimates. Since 2005, a few research groups have focused on developing methodologies that would provide national and regional estimates of the direct costs of providing postabortion care. Most of these studies have focused on the short-term costs, which is understandable, given the difficulty of measuring the long-term health consequences of unsafe abortion, and of estimating the costs of treating these conditions, in countries where such treatments are often not available. Below we summarize research into the economic cost of unsafe abortion, discussing research done before 2005 and from 2005 onwards, since this year marks a significant change in the content of research on this topic.

#### ***Studies of the cost of postabortion care prior to 2005***

The cost of providing postabortion treatment in facilities includes supplies, drugs and labor, and overhead or health systems costs. Studies vary in the cost components that they include, with most not including overhead costs. In addition, the type of facility, tertiary only, lower-level facilities only or a mix of facilities, has a strong influence on the types of postabortion complications that are treated, and therefore on the average cost per patient. Tertiary hospitals typically receive patients with the most severe complications, because lower-level facilities are unable to treat them and therefore refer such patients.

A review on this topic in sub-Saharan Africa found 28 relevant studies (published over the period 1990–2005), of which 10 provided estimates of post abortion care (PAC) costs (one was national level), eight were literature reviews, two were methodological studies, and a special subset of eight focused on a particular issue, comparing the cost of the manual vacuum aspiration (MVA) procedure to the cost of the dilation and curettage (D&C) procedure for the treatment of abortion complications [27]. For the studies on the cost of PAC, general conclusions were constrained, since most of these studies did not differentiate cost by the type of complication and did not specify which cost components were included. In addition, these studies were, for the most part, implemented in tertiary hospitals in urban areas, and results are therefore likely to represent patients with more severe complications, rather than the average for all postabortion

patients. Nevertheless, as a group, these studies demonstrate that ‘providing PAC is a costly undertaking for the patient, for the hospital and for the health system as a whole.’ Another clear conclusion from the group of eight studies that compared the cost of MVA to the cost of D&C is that MVA is a more cost effective and safer treatment than D&C.

This review identified two tools that provide frameworks that form the basis for future work on this issue. The first is the WHO’s Mother–Baby Package Costing Spreadsheet, a tool that is designed to measure all components of maternal and child health and both current costs, as well as the cost of interventions to achieve WHO-recommended standards. The second is a software package ‘Savings’ developed by Ipas (North Carolina, USA) specifically to estimate the costs of abortion and postabortion care under different health service delivery systems and policy frameworks [28].

#### ***Research on the cost of postabortion care from 2005 onwards***

Spurred on by the increased attention to achieve the MDG goals, particularly the reduction of maternal mortality and an improvement in maternal health, new work to improve the estimation of the cost of unsafe abortion began in 2005. One area in which advances have been made is the development of more standardized study designs and measurement tools for estimating these costs. There are now a few published studies from these efforts that provide methodological guidance to researchers, as well as new substantive information.

A recent systematic review identified 21 studies worldwide that had estimated the cost of postabortion care per patient in low-and middle-income developing countries (including only those that had adequate specification of data collection and analysis methods) [29]. Approximately 60% of these studies were from Latin America and the remainder were from Africa, with no data of this type identified for Asia, the Middle East or Eastern Europe, regions where unsafe abortion occurs. The lack of empirical data for Asia is especially notable, given that approximately half of all unsafe abortions occur in this region [3].

Drawing on these reviews, a 2009 study estimated the cost of providing postabortion care in Latin America and Africa, using two different approaches [30]. Generalizing from available empirical data on the overall cost per patient (a ‘top-down’ approach), this study estimated that

the average cost per patient was US\$83 in Latin America and \$94 in Africa (in 2006). In addition, using the WHO's Mother–Baby Package model, which builds from the cost of each specific input (itemized supplies, labor and drugs) to aggregate to the average cost per patient (a 'bottom-up' approach), this study estimated that the average cost per patient was \$130 in Latin America and \$114 in Africa (averages that include capital and overhead costs, but that assumed all postabortion cases are low severity; building in severity would increase these costs by a factor of at least 50%). The total annual cost of providing postabortion care including overhead and capital costs in these two developing regions was estimated to range between \$227 and \$320 million in 2006 (and the average cost was \$274 million). Rough estimates were made for Asia assuming that the average cost was similar to that in sub-Saharan Africa and Latin America, resulting in an estimated total annual cost of postabortion care in the developing world of just over \$500 million [31].

Another policy-relevant direction of work in this area has been to measure the cost of providing safe abortion services, under laws that are liberal, in order to contrast these costs with that of providing postabortion care, and to show how different service provision models can vary markedly in cost, using the Savings model that was mentioned earlier. Models costing the use of mainly D&C procedures or mainly MVA procedures, under different legal environments were examined, as well as the most cost-effective model – that is provision in a legal environment, by mid-level providers in primary care settings. This model was tested using data from Uganda from the mid-1990s and results show that the highest cost of abortion care was where the legal context was highly restricted and service delivery was highly centralized and mainly used D&C procedures (\$45 per patient); by contrast, the lowest cost was estimated for settings where the law was liberal and most care was provided by mid-level staff in primary care settings, using the MVA procedure (\$6).

Another policy-relevant analysis approach is to estimate the cost of providing the necessary contraceptive services and supplies to prevent the unintended pregnancies that resulted in unsafe abortions, and to compare this with the cost of providing postabortion care. A recent study in Nigeria addressed this question and found that the cost:benefit ratio is \$4:\$1 [32]. The application in Nigeria demonstrated how important it is to obtain current cost data for the setting in

which a study is being conducted, as opposed to relying on global average costs that by definition cannot reflect the situation in a specific country, and that also tend to be based on data that are some years old, rather than being current.

These studies have, for the most part, focused on the short-term economic consequences of unsafe abortion, and mostly deal with the cost of medical care for complications. There are other types of economic costs that have not been studied because of the difficulty in collecting data to document these costs. For example, the cost of medical care for longer-term consequences of unsafe abortion, which include chronic reproductive tract infections and infertility, has not been rigorously studied so far. In part, this is because estimates of the numbers of women who will experience these consequences are themselves difficult to make; an additional factor is the difficulty of estimating the medical costs needed to treat these serious long-term health consequences because the use of the necessary medical technology has been so infrequent. However it is important for researchers to continue to work on developing estimates of these needs, because the situation of access to medical technology is evolving, and also because this type of care is extremely expensive, counterbalancing the relatively low frequency with which it is likely to be needed.

Another aspect of the economic cost of unsafe abortion for which documentation is relatively weak is the impact on women, families and households. The steps that women take to obtain an unsafe abortion, to seek medical care for complications (including intermediate care before reaching the hospital, transportation and out-of-pocket expenses while in a facility), and costs after obtaining postabortion treatment (for example for drugs or supplies) are themselves costly, and these are out of pocket expenses that the household incurs. Loss of productive time because of the health complications can also be an important consequence for the household. Again, this is difficult to quantify given the disagreement on approximating the monetary value of women's labor and time, particularly for women who are not earning an income.

Growing from increased awareness of the important evidence gap on the cost of unsafe abortion, an initiative to develop a more standardized approach for research to estimate the cost of postabortion care began approximately 3 years ago. The first step, undertaken in 2007 was a pilot study to develop a study design, questionnaires and other necessary protocols,

building on existing approaches and adapting them to this specific type of service. This effort included a workshop of country and international experts to review draft protocols and a proposed design, leading to pilot testing in three countries (Ethiopia, Mexico and Pakistan), and then further revisions based on these experiences. One of the lessons learned from the pilot study is the need for more attention to be directed to finding ways, specific to each country context, for following up postabortion patients. Such efforts are important given that out-of-pocket expenses and lost productivity do not end with the patient's discharge from a hospital or health facility, and a follow-up interview is essential for measuring these aspects of the economic impact of the unsafe abortion. Even though follow-up interviews were conducted approximately 2 months after the initial facility-based interview, pilot studies encountered significant problems when locating the respondent and in their willingness to be interviewed, because of the stigma associated with having had an unsafe abortion. This pilot project produced model questionnaires and a study design that are available for adaptation and use by others [101]. The next step is to apply these at the national level – and one such study is now underway, in Uganda. This study will measure the cost of providing postabortion treatment at the national level, as well as the impact on the economic status of households.

### Social consequences

Awareness that unsafe abortion has social consequences is not new. In fact, abortion is stigmatized and may have social consequences in many countries where it is legal, accessible and safely provided, and, as discussed later, some of the recent research on this topic has been carried out in the USA. While it is likely that the social consequences will be more severe where abortion is highly restricted by law and is unsafe compared with where it is legal and safe, studies are needed to make such comparisons and assess differences across contexts. However, the development of research in this area is more recent than that on the economic costs of unsafe abortion, and the body of evidence is even more limited [33]. Research studies are needed to examine the possible social consequences such as the effect on the stability of marriages and quality of relationships including intimate partner violence (e.g., a relationship or marriage may break-up if a woman becomes infertile as a result of an unsafe abortion; or if she is suspected of having the abortion because she became pregnant by

another man); the impact of a mother's ill health and/or death (due to unsafe abortion) on the well-being of her children and family; and the impact of stigma. Stigma is manifested in many different ways, including how women who have had an abortion are treated by their family, community and healthcare providers. Stigma can be very consequential for unmarried and young women because of the strong social sanctions against sexual activity among these groups, as well as their lack of resources and inexperience in seeking healthcare. Potential consequences for unmarried young women suspected of having had an abortion include difficulty finding a partner to marry. Married women may also experience stigma because their husband and others may suspect them of infidelity; socio-psychological consequences can also be important, and may result from the attitudes of others, as well as from individuals' own feelings of guilt and shame.

Recent studies in Guatemala and Uganda have shown how strong social sanctions are against women who have unsafe abortions, whether from the community at large or from their husbands or other family members [34,35]. The negative attitudes that healthcare providers have in regard to women also emerge as quite strong in these studies as well as in other studies; an important consequence is that fear of mistreatment by health providers may delay and even deter women from seeking care when they have abortion complications. Studies in Uganda [36] and Zimbabwe [37] show similar findings regarding the attitudes of men towards women who have abortions: most men perceive that women who have had or are having abortions are doing so because they are pregnant by a man other than their husband, and state that they would not provide support (financial or otherwise) to a woman in such a situation to help her obtain the abortion or postabortion care.

Very little work has investigated the impact of unsafe abortion on family well-being, and specifically on the well-being of children. However, a high proportion of women undergoing unsafe abortions are already mothers – the large majority in Asia and Latin America [38], and in some African countries (92% of postabortion care patients in a national 2008 study of Ethiopia) [31], with large minorities in other African countries (38% in a large-scale 2002 study in Nigeria) [35]. Empirical research is needed to examine the prevalence and impact of a range of possible consequences of unsafe abortion on infants and children. The ongoing study in Uganda that

was discussed previously, addresses this type of consequence in a limited way, by including questions on whether children were not able to attend school, and if so for how many days. Other consequences for children, if their mother is very ill or dies, include the increased likelihood that the children will be undernourished and more likely to suffer from accidents or illnesses because they are less well taken care of; this is especially true in infants and young children. In addition, the death of a mother may result in her children suffering from abandonment, poverty, family disruption (children are ‘distributed’ among relatives), school abandonment (particularly true for girls who replace their mother in taking care of the household), and even death of the child. The rate of orphanhood has been measured when the mother has died as a result of AIDS; however, there are very few studies of the impact of abortion-related maternal deaths on infant and child survival. One study carried out in Bangladesh in the early 1990’s found that maternal death (in general, not abortion related) resulted in a much higher probability of death among children, especially girls, in the 2 years after their mother died [39]. A recent large-scale study in Bangladesh addressed the question of the impact of the death of a mother on the survival of her children, and found an extremely strong impact: children whose mothers died have a cumulative probability of survival to age 10 years of only 24%, compared with 89% for those whose mothers remained alive [40].

Research on stigma related to abortion has progressed in the recent years. An in-depth examination of the concept concludes that abortion stigma is ‘potentially multifaceted, multidirectional and its meaning and expression are likely to be context specific’ [41]. It further concludes that there is an urgent need for research on the impact of abortion stigma in a variety of specific contexts, and that the emphasis should be not on the individual level, but that the community should be the central focus of the research. Clearly, measurement and research approaches will need to be adapted and newly developed to study this issue. Researchers are adapting existing scales for measuring stigma from other areas (e.g., regarding HIV) to abortion stigma [42,102] and other techniques such as focus group guides specifically addressing the measurement of abortion stigma [103]. Demonstrating how generalized abortion stigma is, cutting across countries where abortion is legal under broad criteria, and where it is highly legally restricted, preliminary findings from an ongoing study in

the USA found that approximately two thirds of a national sample of over 9,000 abortion patients reported in a 2008 survey that they perceived stigma (agreeing with statements such as ‘I would be looked down upon by some people if they knew [that] I had this abortion’) and a similar proportion that they had internalized stigma (agreeing with statements such as ‘I need to keep this abortion a secret from my close friends and family’) [42].

Social stigma was one theme addressed by a 2006 pilot study undertaken in four developing countries where abortion is highly legally restricted (Mexico, Nigeria, Pakistan and Peru) and one where abortion is available under broad criteria (the USA). The study found that both men and women strongly associated abortion with social consequences such as rejection or harassment, and many women reported feelings of shame and guilt about abortion, confirming the prevalence of internalized stigma among the participants [TSUIA ET AL., SUBMITTED]. A broader set of consequences are being studied in a prospective, longitudinal study, which is ongoing in the USA (with plans to expand to other countries): This study is investigating the consequences of being denied an abortion on a woman’s mental and physical health and her socioeconomic situation, by comparing women who are denied an abortion with women who are able to obtain their desired abortions, and who are just within the clinics’ gestational limit [104].

### Future perspective

It is useful to consider how the field may change over the next 5–10 years in regard to the consequences of unsafe abortion. It is also important to identify key gaps in research and knowledge about the consequences of unsafe abortion.

### Possible trends in consequences of unsafe abortion

Some positive trends have been documented over the past decade and are expected to reduce the health consequences of unsafe abortion [4]. More countries have moved to liberalize their laws on abortion than have moved to restrict them over the past decade. However, new laws and policies must be implemented if they are to result in improved access to safe and legal abortion services, and countries differ greatly in the extent and speed of implementing new laws, policies or guidelines. The emergence of medication abortion (misoprostol alone or combination of misoprostol and mifepristone), provides another means for improving access to safe



abortion services in legal settings, in addition to existing recommended procedures for surgical abortion. Increased access to medication abortion promises to increase safety in the next 5–10 years because this method can be provided in low resource settings by mid-level professionals and paramedical staff. This opens up the possibility of improved access to safe and legal abortion services for poor women in rural areas, and in groups that continue to resort to unsafe abortion in many countries where the procedure is legal because of lack of access to legal and safe services. Some clinical studies have examined safety and efficacy in low resource settings, and report positive findings [43]. In addition, operational research studies are being carried out to test the feasibility of different service provision approaches [44]. Other efforts under way that contribute towards improving access to medication abortion include advocacy to get the drug on the official list, efforts to ensure adequate and affordable supplies and to provide information to providers and women on the correct use of the method.

Community-based off-label use of misoprostol also appears to be increasing in countries where abortion is highly legally restricted (and also in countries where the procedure is legally permitted under broad indications but access to safe abortion services is inadequate). However, documentation of this trend is poor. Studies from a number of Latin American countries and a few Asian countries provide empirical evidence of increases in the use of this method starting in the 1990s [3]. This trend has the potential to decrease the severity of complications from unsafe abortion [45], and to decrease the number of such complications in the long term, in both legal and illegal settings.

Finally, in the developing world, contraceptive use is continuing to increase, a steady, although relatively slow, long-term trend, and, as a result, unintended pregnancy is declining overall [4]. However, it is important to note that sub-Saharan Africa is an exception (and there are a few countries in other regions that are exceptions to this generalization as well). Although contraceptive use is increasing in sub-Saharan Africa as it is in other regions, contraceptive prevalence is much lower than in Latin America and Asia and the unmet need for contraception is much higher. In Latin America and Asia, these trends are expected to contribute to a reduction in abortion overall and in unsafe abortion, and therefore in its consequences; however, in sub-Saharan Africa, there is much

less certainty about future trends, and these will depend on the pace of increase in contraceptive use in the coming years. It is also important to note that in all countries, the unmet need for contraception is a moving target and in many settings, the rise in contraceptive use is not rapid enough to keep up with the increased preference of women and couples to have smaller families and to more closely control the timing of their births. Research on the relationship between being HIV-positive and fertility preferences is beginning to develop, and most studies are finding that being HIV-positive is associated with not wanting to have a child soon and not wanting to have more children [46]. As a result, HIV-infected women may resort to abortion and in contexts where abortion is highly restricted, may experience a higher level of health and other consequences than other women. These are questions that need to be examined.

#### **Key research gaps**

This review of the evidence shows that there are large research gaps. However, it also highlights the fact that new initiatives and new methodologies are being pursued, and progress is being made in existing methodologies. Clearly there is still a great need for the further research designs and for a range of approaches to measure these outcomes, at the individual and community levels in a number of different societal contexts, and eventually comparative studies on these issues.

There are important gaps in research related to the consequences of unsafe abortion in the following areas:

- Documentation of the incidence and severity of health consequences from unsafe abortion in regard to mortality and morbidity; continued work to improve quality of data and techniques for measuring severity of consequences;
- Continued development of methodologies for measuring the economic consequences of unsafe abortion for health systems and households and implementation of studies on these issues;
- Exploratory and methodological research on the social consequences of unsafe abortion, leading to development of representative studies on these consequences;
- Studies on the safety, efficacy and feasibility of medication abortion in low resource settings (needed to convince authorities in countries to make the method available for indications that are legally permitted);

- Studies on the knowledge, attitudes and practice of providers regarding provision of abortion services under indications that are permitted by law related to increasing the provision of safe, legal services; and on the provision of adequate and comprehensive postabortion care where unsafe abortion is occurring (related to reducing the delay in women accessing care, and therefore reducing severity of complications) and for the provision of contraceptive services (reducing unintended pregnancy and unsafe abortion);
- Measurement of the degree and extent of the impact of law changes on the health consequences of unsafe abortion; well-timed studies (before and after law change and to the extent possible before and after the introduction of medication abortion is available, and after its use becomes widespread). The gains in South Africa from liberalization of the abortion law (previously mentioned) are indicative of what is possible in terms of large reductions in abortion-related morbidity and mortality, with improved access to safe and legal abortion services;
- Use of misoprostol in contexts where abortion is highly restricted by law – to document use of the method (i.e., extent, correct use, quality of the drug and other relevant aspects) and relationship to decreased severity of complications;
- Studies on unintended pregnancy, preferences of women and couples to have small families and timed births, contraceptive use and unmet need for contraception are needed to place unsafe abortion in the broader context within which it is occurring;
- Studies on the relationship between HIV/AIDS and unsafe induced abortion are needed, particularly in groups and countries

## Executive summary

### Background

- Unsafe abortion continues to play a substantial role in maternal mortality in the developing world, accounting for approximately 13% of maternal deaths.
- An estimated 5 million women are treated in medical facilities for postabortion complications annually in the developing world.
- Approximately three in 10 women who are treated for postabortion complications are considered to have severe symptoms, based on a few country-specific studies.
- The WHO estimates that approximately 1.7 million women have become infertile as a result of unsafe abortions, and an estimated 3 million women suffer from reproductive tract infections.
- Researchers are developing many new designs and approaches to improve and standardize measurement of the severity of complications resulting from unsafe abortion.

### Economic consequences

- The annual cost to health systems of providing postabortion care in sub-Saharan Africa and Latin America was estimated to be US\$274 million in 2006.
- Including Asia (where the evidence base is much weaker), the annual cost of postabortion care in the developing world as a whole is an estimated US\$500 million in 2006.
- Researchers are improving approaches to provide a more standardized measurement of the economic cost of unsafe abortion to health systems and the economic impact of unsafe abortion on households, including indirect costs such as lost productivity and incurring debts to pay the out-of-pocket costs.

### Social consequences

- This is the least developed area in terms of available research evidence. However, research on abortion stigma is attracting recent attention.
- Progress is being made in the development of quantitative measurement tools (e.g., abortion stigma scales) and qualitative approaches as well, to measure the social costs of unsafe abortion.

### Future perspective & research gaps

- Some positive trends have been documented over the past decade and are expected to reduce the health and economic consequences of unsafe abortion, including the increased use of contraception, more widespread use of safer methods of abortion even in countries where abortion is highly restricted, and broadening of the indications on which abortion is permitted in some countries.
- There are large evidence gaps in this area. In all aspects of consequences of unsafe abortion, the evidence base is inadequate, even for health consequences, on which more research has been done, compared with the economic and social consequences. There is great need for more research on monitoring changes in consequences as abortion provision changes, assessing the impact of law change on the prevalence and consequences of unsafe abortion, and examining the differential impact of unsafe abortion on HIV-positive women.
- Moreover, ongoing changes in factors that influence the level of unsafe abortion and its consequences make it even more important to continue to improve methodologies and measurement techniques and to conduct new research on the consequences of unsafe abortion.

where HIV prevalence is high and access to safe and legal abortion services is limited (such as in many countries of sub-Saharan Africa).

Assuming that the current level of research activity and innovation continues and that the level of donor support for such research continues, it may be expected that substantial gains will be achieved in the coming 5 years, increasing the evidence base and strengthening methodologies for this research. While there is substantial support for research on unsafe abortion and its consequences, motivated by agencies' commitment to global goals of improving women's health and survival, funding streams will need to be sustained to ensure that research on this issue carries forward. The research goals for the next 5–10 years are to achieve more comprehensive and better documentation of the health, economic and social consequences of unsafe

abortion, while continuing to improve methodologies. Given the time and cost of studies on unsafe abortion, an equally important parallel goal for this field is to synthesize findings from available studies, in order to identify generalizable relationships and trends that apply to other countries, and then communicate these findings to policy makers and providers at national, regional and global levels.

#### Financial & competing interests disclosure

*The author has no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.*

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