

Sexual and Reproductive Health 4



Unsafe abortion: the preventable pandemic

David A Grimes, Janie Benson, Susheela Singh, Mariana Romero, Bela Ganatra, Friday E Okonofua, Iqbal H Shah

Ending the silent pandemic of unsafe abortion is an urgent public-health and human-rights imperative. As with other more visible global-health issues, this scourge threatens women throughout the developing world. Every year, about 19–20 million abortions are done by individuals without the requisite skills, or in environments below minimum medical standards, or both. Nearly all unsafe abortions (97%) are in developing countries. An estimated 68 000 women die as a result, and millions more have complications, many permanent. Important causes of death include haemorrhage, infection, and poisoning. Legalisation of abortion on request is a necessary but insufficient step toward improving women's health; in some countries, such as India, where abortion has been legal for decades, access to competent care remains restricted because of other barriers. Access to safe abortion improves women's health, and vice versa, as documented in Romania during the regime of President Nicolae Ceausescu. The availability of modern contraception can reduce but never eliminate the need for abortion. Direct costs of treating abortion complications burden impoverished health care systems, and indirect costs also drain struggling economies. The development of manual vacuum aspiration to empty the uterus, and the use of misoprostol, an oxytocic agent, have improved the care of women. Access to safe, legal abortion is a fundamental right of women, irrespective of where they live. The underlying causes of morbidity and mortality from unsafe abortion today are not blood loss and infection but, rather, apathy and disdain toward women.

Introduction

Unsafe abortion is a persistent, preventable pandemic. WHO defines unsafe abortion as a procedure for terminating an unintended pregnancy either by individuals without the necessary skills or in an environment that does not conform to minimum medical standards, or both.¹ Unsafe abortion mainly endangers women in developing countries where abortion is highly restricted by law and countries where, although legally permitted, safe abortion is not easily accessible. In these settings, women faced with an unintended pregnancy often self-induce abortions or obtain clandestine abortions from medical practitioners,² paramedical workers, or traditional healers.³ By contrast, legal abortion in industrialised nations has emerged as one of the safest procedures in contemporary medical practice, with minimum morbidity and a negligible risk of death.⁴ As with AIDS, the disparity between the health of women in developed and developing countries is stark. Unsafe abortion remains one of the most neglected sexual and reproductive health problems in the world today. This article will describe the scope of the problem of unsafe abortion, estimate its mortality and morbidity, document the relation between laws and women's health, estimate costs, and describe prevention strategies. The key messages are presented in panel 1.

Worldwide burden

Worldwide estimates for 1995 indicated that about 26 million legal and 20 million illegal abortions took place every year.⁵ Almost all unsafe abortions (97%) are in developing countries, and over half (55%) are in Asia (mostly in south-central Asia; table).⁶ Reliable data for the prevalence of unsafe abortion are generally scarce,

Published Online
November 1, 2006
DOI:10.1016/S0140-6736(06)69481-6

This is the fourth in a [Series](#) of six articles about sexual and reproductive health

Department of Obstetrics and Gynecology, University of North Carolina School of Medicine, Chapel Hill, NC 27599-7570, USA (Prof D Grimes MD); Ipas, Chapel Hill, NC, USA (J Benson DrPH); The Guttmacher Institute, New York, NY, USA (S Singh PhD); CONICET/Centro de Estudios de Estado y Sociedad, Buenos Aires, Argentina (M Romero MD); Ipas, Pune, India (B Ganatra MD); College of Medical Sciences, University of Benin and International Federation of Obstetricians and Gynaecologists, Benin City, Nigeria (Prof F Okonofua MD); World Health Organization, Geneva, Switzerland (I Shah PhD)

Correspondence to:
Dr David Grimes
dagrimes@mindspring.com

Panel 1: Key messages

- 1 An estimated 19–20 million unsafe abortions take place every year, 97% of these are in developing countries.
- 2 Despite its frequency, unsafe abortion remains one of the most neglected global public health challenges.
- 3 An estimated 68 000 women die every year from unsafe abortion, and millions more are injured, many permanently.
- 4 Leading causes of death are haemorrhage, infection, and poisoning from substances used to induce abortion.
- 5 Access to modern contraception can reduce but never eliminate the need for abortion.
- 6 Legalisation of abortion is a necessary but insufficient step toward eliminating unsafe abortion.
- 7 When abortion is made legal, safe, and easily accessible, women's health rapidly improves. By contrast, women's health deteriorates when access to safe abortion is made more difficult or illegal.
- 8 Legal abortion in developed countries is one of the safest procedures in contemporary practice, with case-fatality rates less than one death per 100 000 procedures.
- 9 Manual vacuum aspiration (a handheld syringe as a suction source) and medical methods of inducing abortion have reduced complications.
- 10 Treating complications of unsafe abortion overwhelms impoverished health-care services and diverts limited resources from other critical health-care programmes.
- 11 The underlying causes of this global pandemic are apathy and disdain for women; they suffer and die because they are not valued.

	Number of unsafe abortions (thousands)	Unsafe abortions per 100 livebirths	Unsafe abortions per 1000 women aged 15–44 years
World	19 000	14	14
Developed countries*	500	4	2
Developing countries	18 400	15	16
Africa	4200	14	24
Asia*	10 500	14	13
Europe	500	7	3
Latin America and the Caribbean	3700	32	29
Northern America	N/A	N/A	N/A
Oceania*	30	12	17

Source: WHO.⁵ *Japan, Australia, and New Zealand have been excluded from the regional estimates, but are included in the total for developed countries. N/A=none or negligible incidence.

Table: Global and regional estimates of annual incidence of unsafe abortion, 2000

especially in countries where access to abortion is legally restricted. Whether legal or illegal, induced abortion is usually stigmatised and frequently censured by political, religious, or other leaders. Hence, under-reporting is routine even in countries where abortion is legally available.^{7,8} The use of varying terms, such as induced miscarriage (*fausse couche provoqué*),⁹ menstrual regulation, mini-abortion, and regulation of a delayed or suspended menstruation¹⁰ further compounds the problem of producing reliable and comparable estimates of the prevalence of unsafe abortion.

Community studies around the world indicate a higher magnitude of unsafe abortion than do health statistics.^{3,11,12} In Zambia, the extent of maternal mortality from unsafe abortion is not generally known from health statistics; one study in which women were interviewed revealed that 69% of the respondents knew one or more women who had died from an unsafe illegal abortion.¹² Focus-group discussions and community-

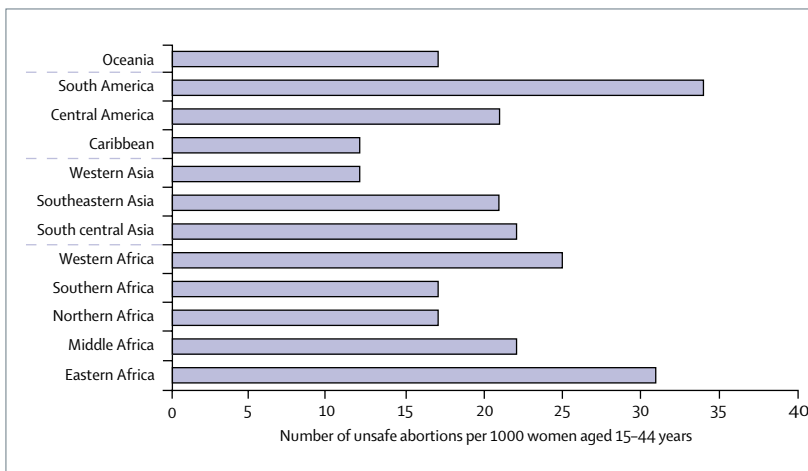


Figure 1: Estimated number of unsafe abortions per 1000 women aged 15–44 years, by subregion
Source: WHO.⁵ Australia and New Zealand are excluded from estimates of Oceania.

based studies in India¹¹ revealed self-reported abortions in 28% of women, which is higher than figures derived from national service-delivery data.

Estimates show that women in South America, eastern Africa, and western Africa are more likely to have an unsafe abortion than are women in other regions. Unsafe abortion rates per 1000 women aged 15–44 years (figure 1) provide a more comparable measure of unsafe abortion by region. In Asia, south-central and southeastern regions have similar unsafe abortion rates (22 and 21 per 1000 women, respectively), whereas the rate is about half (12 per 1000) in western Asia and negligible in eastern Asia (where abortion is legal on request and easily available).

Temporal trends in unsafe abortion have been inconsistent internationally (figure 2). Between 1995 and 2000, a decline of 5 or more percentage points took place in the unsafe abortion rate in eastern, middle, and western Africa, the Caribbean, and Central America. Other developing areas had no appreciable change in the rate of unsafe abortion.⁶

Unsafe abortions vary substantially by age across regions: adolescents (15–19 years) account for 25% of all unsafe abortions in Africa, whereas the percentage in Asia, Latin America, and the Caribbean is much lower (figure 3). By contrast, 42% and 33% of all unsafe abortions in Asia and Latin America, respectively, are in women aged 30–44 years, compared with 23% in Africa.¹³ For the developing regions as a whole, unsafe abortions peak in women aged 20–29 years. On the basis of WHO estimates, if current rates prevail throughout women's reproductive lifetimes, women in the developing world will have an average of about one unsafe abortion by age 45 years.¹³

Reasons for seeking abortion are varied: socioeconomic concerns (including poverty, no support from the partner, and disruption of education or employment); family-building preferences (including the need to postpone childbearing or achieve a healthy spacing between births); relationship problems with the husband or partner; risks to maternal or fetal health; and pregnancy resulting from rape or incest.¹⁴ More proximate causes include poor access to contraceptives and contraceptive failure.¹⁴

Deaths from unsafe abortion

Measurement of the worldwide prevalence of abortion-related mortality and morbidity is difficult. At a population level, national vital registration systems routinely undercount such deaths.¹⁵ Calculation of the proportion of maternal deaths due to abortion complications is even more challenging. Abortion-related mortality often happens after a clandestine or illegal procedure, and powerful disincentives discourage reporting. As a result, linking specific programmatic interventions to changes in maternal mortality at a population level is rarely feasible because of the difficulty in accurate measurement of deaths. Moreover, women might not report their condition or might not relate it to a complication of an earlier unsafe abortion.¹⁵

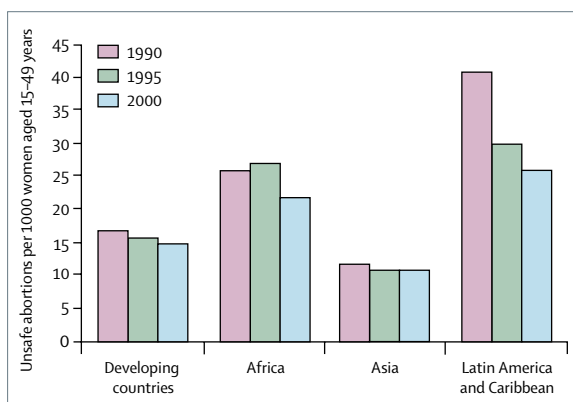


Figure 2: Estimated number of unsafe abortions per 1000 women aged 15-49 years, by region, 1990-2000

Source: Special tabulations using WHO database on unsafe abortion.⁶

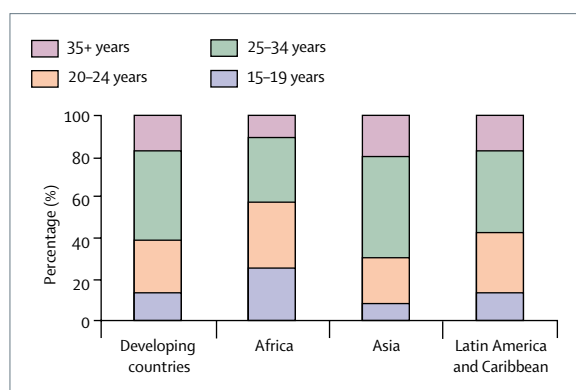


Figure 3: Percentage distribution of unsafe abortions by age group in the developing world and regions

Source: WHO.⁶

Worldwide, an estimated 68 000 women die as a result of complications from unsafe induced abortions every year—about eight per hour.⁶ This prevalence translates into an estimated case-fatality rate of 367 deaths per 100 000 unsafe abortions, which is hundreds of times higher than that for safe, legal abortion in developed nations. This ratio is higher in Africa (709), lower in Latin America and Caribbean (100), and close to the worldwide average in Asia (324). These differences presumably indicate regional differences in the safety of abortion provision, the severity of complications, and access to care thereafter.⁶ By use of different methods, a recent systematic review of causes of maternal mortality worldwide estimated that abortion accounted for 1–49% of such deaths.¹⁶ Irrespective of the research methodologies used, the public health message is clear: unsafe abortion kills large numbers of women.

About half of all deaths from unsafe abortion are in Asia, with most of the remainder (44%) in Africa.⁶ The unsafe abortion mortality ratio (the number of unsafe abortion-related deaths per 100 000 livebirths) varies across regions. For the developing world as a whole, this

ratio was estimated to be 60 in the year 2000. However, the ratio is much higher in eastern, middle, and western Africa (90–140), and is lower in northern and southern Africa, western and southeastern Asia, and Latin America and the Caribbean (10–40). Unsafe abortion is estimated to account for 13% of all maternal deaths worldwide, but accounts for a higher proportion of maternal deaths in Latin America (17%) and southeastern Asia (19%).

Morbidity from unsafe abortion

Morbidity is a much more common consequence of unsafe abortion than mortality, but is determined by the same risk factors. Complications include haemorrhage, sepsis, peritonitis, and trauma to the cervix, vagina, uterus, and abdominal organs (figure 4). High proportions of women (20–50%) who have unsafe abortions are hospitalised for complications.¹⁷ National studies show that the rate of hospitalisation varies from a low of three per 1000 women per year (in Bangladesh, where menstrual regulation is legally permitted) to a high of 15 in Egypt and Uganda.^{18,19}

Morbidity and hospitalisation rates have probably fallen since the early 1990s in response to safer abortion services. In Peru (1989–98) and in the Philippines (1994–2000), the abortion-related hospitalisation rate dropped—by 10% in the Philippines in 6 years and by 33% in Peru in 9 years—though the number of women hospitalised declined much more slowly.²⁰ Increased use of misoprostol (replacing more invasive unsafe methods) probably partly accounts for reduced complications.²¹ In Brazil, the number of women treated in public hospitals for abortion complications dropped by about 28% over 13 years (from 345 000 in 1992 to 250 000 in 2005).²² However, most of this decline took place between 1992 and 1995, and the number has varied little since then. Whereas increased use of misoprostol might have accounted for some of the early decline in abortion-related morbidity, the stability of the number suggests that most women who have an abortion



Figure 4: Loops of gangrenous small intestine protruding from the vagina after attempted abortion, 20-year-old woman

Source: Oye-Adeniran.¹⁰⁶ Reproduced with permission from *Reprod Health Matters* 2002; 10: 18–21.

Panel 2: Part inventory of unsafe abortion methods, by route of administration⁹³

Treatments taken by mouth

Toxic solutions

Turpentine

Laundry bleach

Detergent solutions

Acid

Laundry bluing

Cottonseed oil

Arak (a strong liquor)

Teas and herbal remedies

Strong tea

Tea made of livestock manure

Boiled and ground avocado or basil leaves

Wine boiled with raisins and cinnamon

Black beer boiled with soap, oregano, and parsley

Boiled apio (celery plant) water with aspirin

Tea with apio, avocado bark, ginger, etc

“Bitter concoction”

Assorted herbal medications

Drugs

Uterine stimulants, such as misoprostol or oxytocin (used in obstetrics)

Quinine and chloroquine (used for treating malaria)

Oral contraceptive pills (ineffective in causing abortion)

Treatments placed in the vagina or cervix

Potassium permanganate tablets

Herbal preparations

Misoprostol

Intramuscular injections

Two cholera immunisations

Foreign bodies placed into the uterus through the cervix

Stick, sometimes dipped in oil

Lump of sugar

Hard green bean

Root or leaf of plant

Wire

Knitting needle

Rubber catheter

Bougie (large rubber catheter)

Intrauterine contraceptive device

Coat hanger

Ballpoint pen

Chicken bone

Bicycle spoke

Air blown in by a syringe or turkey baster

Sharp curette

Enemas

Soap

Shih tea (wormwood)

Trauma

Abdominal or back massage

Lifting heavy weights

Jumping from top of stairs or roof

with misoprostol still seek treatment at public hospitals (Anibal Faundes, personal communication, July 5, 2006).

Severity of complications is another important measure of effects on health. A standardised measure of the severity of complications was used in South Africa before and after legalisation of abortion on request in 1996.²³ The proportion of women classified with severe complications (fever of 38°C or more, organ or system failure, generalised peritonitis, pulse 120 per min or more, shock, evidence of a foreign body, or mechanical injury) in South Africa fell substantially from 16·5% before legalisation to 9·7% after. Applying similar methods, a study in Kenya found that 28% of hospitalised women had severe complications. Gestational age at abortion is a simple predictor of risk: later abortions are associated with increased risks for the woman. Late abortions are common; for example, a third of women treated for abortion complications in public hospitals in Kenya were beyond the first trimester.²⁴ By contrast, spontaneous abortions are uncommon after the first trimester, suggesting that many of these complications stemmed from induced unsafe abortions.

Information on long-term health consequences of unsafe abortion is scarce. The WHO estimates that about

20–30% of unsafe abortions result in reproductive tract infections and that about 20–40% of these result in upper-genital-tract infection and infertility. An estimated 2% of women of reproductive age are infertile as a result of unsafe abortion, and 5% have chronic infections.⁶ Unsafe abortion could also increase the long-term risk of ectopic pregnancy, premature delivery, and spontaneous abortion in subsequent pregnancies. Little is known about women who have complications but who do not seek medical care. Clinicians estimate that the proportion of such women was 14% in Latin America, 19% in south and southeast Asia, and 26% in Nigeria.¹⁸ Similar studies in Guatemala and Uganda yielded estimates of about 20%.^{19,25}

Delays in recognising the need for care and in arranging transportation are common. On reaching a health-care facility, women with complications of unsafe abortion are often met with suspicion or hostility. Their treatment is deferred—sometimes indefinitely.²⁶ This disdain compounds the poor staff training, inoperative equipment, out-of-stock drugs, sporadic supplies of water and electricity, and transportation challenges hampering developing-country health-care facilities.

Life-threatening sepsis or haemorrhage might mean a hysterectomy. Gas gangrene from *Clostridium perfringens*

is common with insertion of foreign bodies, and tetanus threatens women who have not been immunised. Women with retained tissue and severe infections might receive only oral tetracycline until they are deemed stable enough for curettage in an operating theatre; many die needlessly during the wait. Delays are especially dangerous when bowel injuries cause peritoneal contamination.²⁷

Traditional methods

Nearly 5000 years ago, the Chinese Emperor Shen Nung described the use of mercury for inducing abortion.²⁸ Although one publication¹⁸ lists over 100 traditional methods used for inducing abortion, unsafe methods today can be divided into several broad classes: oral and injectable medicines, vaginal preparations, intrauterine foreign bodies, and trauma to the abdomen (panel 2). In addition to detergents, solvents, and bleach, women in developing countries still rely on teas and decoctions made from local plant or animal products, including dung. Foreign bodies inserted into the uterus to disrupt the pregnancy often damage the uterus and internal organs, including bowel. In settings as diverse as the South Pacific and equatorial Africa, abortion by abdominal massage is still used by traditional practitioners. The vigorous pummelling of the woman's lower abdomen is designed to disrupt the pregnancy but sometimes bursts the uterus and kills the woman instead.²⁹

The primitive methods used for unsafe abortion show the desperation of the women. Surveys done in New York City before the legalisation of abortion on request documented the techniques in common use.³⁰ Of 899 women interviewed, 74 reported having attempted to abort one or more pregnancies; 338 noted that one of their friends, relatives, or acquaintances had done so. Of those reported abortion attempts, 80% tried to do the abortion themselves. Nearly 40% of women used a combination of approaches. In general, the more invasive the technique, the more dangerous it was to the woman and the more likely it was to disrupt the pregnancy. Invasive methods, such as insertion of tubes or liquids into the uterus, were more successful than were other approaches. Coat hangers, knitting needles, and slippery elm bark were common methods; the bark would expand when moistened, causing the cervix to open. Another widely used method was to place a flexible rubber catheter into the uterus to stimulate labour.

Surveys suggest that miscellaneous methods and oral medications, such as laundry bleach, turpentine, and massive doses of quinine, were most commonly used in New York.³⁰ Injection of toxic solutions into the uterus with douche bags or turkey basters was common. Absorption of soap solutions into the woman's circulation could cause renal toxicity and death.³¹ Potassium permanganate tablets placed in the vagina were also common; these did not induce abortion but could cause severe chemical burns to the vagina, sometimes eroding through to the bowel.³²

Legal status of abortion

Increasing legal access to abortion is associated with improvement in sexual and reproductive health. Conversely, unsafe abortion and related mortality are both highest in countries with narrow grounds for legal abortion.³³ More than 61% of the world's population resides in countries where induced abortion is allowed without restriction or for a wide range of reasons such as protection of the woman's life, preservation of her physical or mental health, and socioeconomic grounds.³⁴ In 72 countries, most of which are in the developing world, 26% of the world's population lives where abortion is prohibited altogether or allowed only to save the woman's life.³⁴ Most of these restrictive laws originated from European colonial laws from previous centuries, although the European nations discarded their restrictive abortion laws decades ago.

Between 1995 and 2005, 12 countries increased access to legal abortion, including Albania, Benin, Burkina Faso, Cambodia, Chad, Ethiopia, Guinea, Guyana, Mali, Nepal, South Africa, and Switzerland.^{35,36} The strategies used to achieve reform vary by country. Nepal's reforms in 2002, for example, were part of an overall women's rights bill and permit legal abortion with no restriction in the first 12 weeks of pregnancy and afterwards on specific grounds. The previous law allowed no indications for abortion.³⁵ The post-apartheid movement for expanded equality in South Africa led to the 1996 act that allows legal abortion without restriction during the first 12 weeks of pregnancy and afterwards on numerous grounds. Only narrow indications for legal abortion had been previously allowed.³⁵ In early 2006, Colombia's constitutional court ruled in favour of expanded indications for legal abortion, including when a woman's life or health is in danger and in cases of rape or fetal malformation.³⁷

Panel 3: Prosecution in El Salvador

"After I came out of the coma, they moved me to the maternity hospital. My brother visited and asked me if the police had come to ask me questions. He said the police had come to our house and they had interrogated our relatives and neighbours. They had gone to where I worked. They asked everyone a lot of questions about me and who I was and if they knew whether I was pregnant and whether I'd had an abortion.

When I got home, the prosecutor came to see me, and he asked lots of aggressive questions. He talked to me like I was a criminal. I didn't want to answer because I was scared. He said if I didn't answer, even though I was in bad physical shape, he would put me in jail. He wanted me to tell him who the father of the child was and the name of the person who had done this to me. I didn't know her name. Then he made a date for me to come to the prosecutor's office."

*Anonymous woman in El Salvador*⁴⁰

Advocacy for increased access to safe legal abortion has increased in countries such as Argentina, Brazil, Indonesia, Jamaica, Kenya, Mexico, Mozambique, Nigeria, Trinidad and Tobago, Uganda, and Uruguay. These efforts are rooted in public health, human rights, and other arguments. Those involved include health and medical professionals, women's groups, legal and human rights advocates, young people, government officials, and, in some countries, trade unionists.³⁸

Several countries have restricted abortion laws in the past decade. El Salvador amended its penal code in 1998 to ban abortion for any legal indication; previous indications had included saving a woman's life, pregnancy resulting from rape, and fetal impairment (panel 3).³⁵ In 1997, Poland's Parliament approved legislation removing social and economic grounds for abortion.³⁵ Anti-abortion voices continue to protest against attempts at legal reform in countries as diverse as Nicaragua, Sri Lanka, and Uruguay. The recent legislation for safer access in Colombia prompted a Roman Catholic cardinal to suggest civil disobedience and to threaten excommunication of judges who voted to support safer laws.³⁹

Effect of law on health

The prevalence of unsafe abortions remains the highest in the 82 countries with the most restrictive legislations, up to 23 unsafe abortions per 1000 women aged 15–49 years. By contrast, the 52 countries that allow abortion on request have a median unsafe abortion rate as low as two per 1000 women of reproductive age.³³ Although the case-fatality rate from unsafe abortions indicates the general level of health care and the availability of post-abortion services, the rate remains the

highest in countries where abortion is legally restricted. In such countries, the median ratio for unsafe abortion mortality is 34 deaths per 100 000 livebirths; this ratio steadily decreases as legal grounds for abortion increase. The ratio falls to one or less per 100 000 livebirths in countries that allow abortion on request.³³ Even in countries where improved access to health care and emergency obstetric services has greatly reduced overall maternal mortality, restrictive abortion laws translate into abortion deaths constituting a disproportionately high share of maternal deaths (panel 4).⁴¹

Making abortion legal, safe, and accessible does not appreciably increase demand. Instead, the principal effect is shifting previously clandestine, unsafe procedures to legal and safe ones. Hence, governments need not worry that the costs of making abortion safe will overburden the health-care infrastructure.¹⁸ Countries that liberalised their abortion laws such as Barbados, Canada, South Africa, Tunisia, and Turkey did not have an increase in abortion. By comparison, the Netherlands, which has unrestricted access to free abortion and contraception, has one of the lowest abortion rates in the world.¹⁸

In several countries, legal inquiry, prosecution, and even imprisonment of women who have had an unlawful abortion is not uncommon.⁴⁰ Before the 2002 law change in Nepal, an estimated 20% of the women prisoners nationwide were in jail for charges relating to abortion or infanticide. Many women who had miscarriage, stillbirths, or induced abortions were jailed on charges of infanticide.⁴⁵

Enabling abortion legislation is necessary but not sufficient: a new law might not translate into widespread access to safe services. India and Zambia both legalised abortion in the early 1970s, but safe, legal abortion remains largely unavailable.⁴⁶ In India, access through the public health system is mainly restricted to cities. Despite a mandate to provide abortion services, in most states fewer than 20% of primary health care centres do so. Many centres only sporadically provide service either because of a shortage of trained physicians or functioning equipment.⁴⁷

Access to safe abortion is also mediated by women's awareness of the law. Knowledge is often poor, even in countries with longstanding liberal laws. Misperceptions about the specifics of the law are not uncommon, thus making women vulnerable to poor care, financial exploitation, and prosecution.^{45,48,49} Even where legal abortion is widely available on request, misperceptions about the legality of minors having sexual intercourse delay some adolescents from seeking care. In many cultures, perceptions of legality are affected by the stigma attached to premarital or extramarital sexual activity. In several south Asian countries, such pregnancies are commonly referred to as illegal or illegitimate, as are the abortions induced in these circumstances.⁵⁰ Misperceptions about legal requirements, such as the need for spousal authorisation and provider attitudes, could create barriers

Panel 4: Romania and South Africa

Widespread access to legal abortions on request in Romania from 1957 onwards led to a decline in unsafe abortions with an abortion mortality ratio of 20 per 100 000 livebirths in 1960.^{6,42} Mortality began to rise steadily as Ceausescu's pronatalist restrictive policy imposed in 1966 began to take effect (figure 5). By 1989 mortality ratios had risen seven-fold to peak at 148 deaths per 100 000 livebirths; abortion accounted for 87% of the deaths. When Ceausescu was deposed in 1989, the immediate change of laws reversed this trend. The mortality ratio fell by more than half to 68 within the first year of safer access itself. By 2002, mortality from unsafe abortions was as low as nine per 100 000 livebirths; abortion deaths accounted for less than half of maternal deaths.⁴³

Abortion became legal and available on request in South Africa in 1997.⁴⁴ The Choice on Termination of Pregnancy act No 92 was promulgated in South Africa on Oct 31, 1996, but went into effect on Feb 1, 1997. Since then, the resulting favourable environment has increased women's access to family planning, abortion, and post-abortion care services in the country. After the law was passed, abortion-related deaths dropped 91% from 1994 to 1998–2001.²³

The new law increased women's access to a broad range of options for the prevention and treatment of unwanted pregnancy. In particular, the law led to the increased promotion of family planning, the increased use of manual vacuum aspiration for abortion and post-abortion care, use of manual vacuum aspiration by nurses and midwives, and the introduction of medical abortion methods.

that do not exist in law. These, in turn, might drive unmarried women to unsafe providers (compromising medical safety for confidentiality^{47,51}) or to suicide.⁵²

Costs of unsafe abortion

Treatment of abortion complications burdens public health systems in the developing world. Conversely, ensuring women's access to safe abortion services lowers medical costs for health systems. In some low-income and middle-income countries, up to 50% of hospital budgets for obstetrics and gynaecology are spent treating complications of unsafe abortion.¹⁸ A review of medical records in 569 public hospitals in Egypt during 1 month noted that almost 20% of the 22 656 admissions to obstetrics and gynaecology departments were for treatment of an induced or reportedly spontaneous abortion.⁵³

Direct costs include health personnel, medications, blood, supplies and equipment, and overnight stays. The cost per woman to health systems for treatment of abortion complications in Tanzania is more than seven times the overall Ministry of Health budget per head of population.⁵⁴ Estimates from Uganda comparing costs of treatment of abortion complications with costs of providing safe, elective abortion show the potential resource-savings to health systems. Post-abortion care offered in tertiary hospitals by physician providers was estimated to cost health systems ten times more than elective abortion services offered by mid-level practitioners in primary care (Heidi Johnston, 2004; Ipas, Chapel Hill, NC, USA).

In sub-Saharan Africa, two studies attempted to estimate costs at the national level. A 1997 South African study estimated that the total yearly cost of treating unsafe abortion morbidity in public hospitals was ZAR 9.74 million (about US\$1.4 million).⁵⁵ A 2002 study in Nigeria estimated that the total national cost of direct medical care for treating abortion complication patients was NGN 1400 million (\$11.7 million).⁵⁶ A second study in Nigeria estimated that the national cost of treating unsafe abortion complications in 2005 was \$19 million (Akinrinola Bankole, unpublished data).

Use of manual vacuum aspiration for management of first-trimester incomplete abortions reduces costs. Studies in Bolivia, Mexico, and Peru showed that although the cost per patient for inpatient dilatation and curettage services ranged from \$66–151, a change to ambulatory manual vacuum aspiration reduced costs to \$33–66, a decrease of 56–72%.⁵⁷ Per-patient costs in Kenya fell by 23% in one hospital and 66% in another when post-abortion care services were changed from dilatation and curettage to manual vacuum aspiration in outpatients.⁵⁸ Reductions in overall costs per patient were attributable to shortened hospital stays, less staff time, and fewer medications.

Indirect costs

The indirect costs of unsafe abortion are substantial, yet more difficult to quantify. They include the loss of

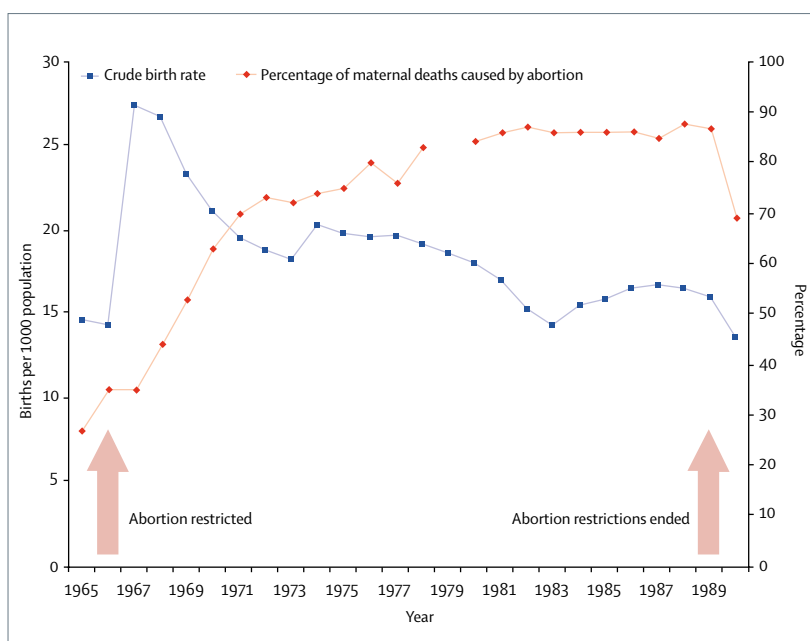


Figure 5: Livebirths and proportion of maternal deaths due to abortion, Romania, 1965–90

Source: David.⁴² Data unavailable for 1979.

productivity from abortion-related morbidity and mortality on women and household members; the effect on children's health and education if their mother dies; the diversion of scarce medical resources for treatment of abortion complications; and secondary infertility, stigma, and other sociopsychological consequences. For example, an estimated 220 000 children worldwide lose their mothers every year from abortion-related deaths.⁵⁹ Such children receive less health care and social care than children who have two parents, and are more likely to die.⁶⁰

Estimates of disability adjusted life-years (DALYs) provide an indicator of one part of the indirect costs, women's loss of productive life. An estimated 5 million DALYs are lost per year by women of reproductive age as a result of mortality and morbidity from unsafe abortion.⁶¹ However, this rate probably underestimates the true burden because of limitations in the methods of estimating DALYs resulting from maternal causes.⁵⁹

Stigma impairs health, both directly through harm to wellbeing and indirectly by hindering prompt access to medical care. Stigma related to abortion particularly affects adolescents and unmarried women because of their inexperience and few economic resources.²⁶ Social sanctions against sexual activity are especially problematic for unmarried women.

Levels of prevention

Preventive medicine is traditionally viewed in three levels.⁶² Primary prevention (the domain of public health) protects health by personal and community efforts, such as lowering serum cholesterol and discouraging smoking. Secondary prevention (the domain of

preventive medicine) includes early detection and prompt treatment of disease, for example, acute cardiac care for myocardial infarction. Tertiary prevention (rehabilitation) mitigates disability, an example being coronary artery bypass grafting. In general, primary prevention is preferable to secondary and tertiary prevention in terms of both cost and compassion: immunising against poliomyelitis is better than building iron lungs.

Primary prevention includes reduction in the need for unsafe abortion through contraception, legalisation of abortion on request, the use of safer techniques, and improvement of provider skills. Access to safe, effective contraception can substantially reduce—but never eliminate—the need for abortion to regulate fertility. The effect of national contraceptive programmes on reducing the rate of abortion is well documented. In seven countries (Bulgaria, Kazakhstan, Kyrgyzstan, Switzerland, Tunisia, Turkey, and Uzbekistan), abortion rates fell as use of modern contraception rose.⁶³ In another six countries (Cuba, Denmark, Netherlands, Republic of Korea, Singapore, and USA), abortion and contraception increased simultaneously; the uptake of effective contraception did not keep pace with couples' increasing desires for smaller family sizes.

In several of the six countries, abortion rates ultimately declined with continued contraceptive use and stabilisation of fertility rates at lower levels. Even with high rates of contraceptive use, however, unintended pregnancies will continue. No contraceptive method is 100% effective, and many couples in the developing world still encounter obstacles to contraception.⁶⁴ Every year, 80 million women worldwide have an unintended pregnancy, and 60% of these are aborted.¹⁸ Thus, the need for safe abortion will continue.

The developing world has seen a revolution in contraceptive use—from a mere 9% of couples using any method in 1960–65⁶⁵ to 59% in 2003.⁶⁶ Nevertheless, an estimated 27 million unintended pregnancies happen worldwide every year with the typical use of contraceptives. 6 million would happen even with perfect (ie, correct and consistent) use.⁶⁷ An estimated 123 million women have an unmet need for family planning.⁶⁸

All abortion patients—whether seeking treatment of a complication or an elective induced abortion—should be offered contraceptive counselling and a choice of appropriate methods. Results of many studies in Latin America and Africa have shown that after having an abortion patients will accept contraception at high rates.^{57,69-71} Contraceptive counselling and provision at the time of treatment reduced unintended pregnancies and repeat abortions by 50% over 1 year in Zimbabwe, compared with post-abortion patients who did not receive such services.⁷²

The advent of vacuum aspiration in the 1960s¹ revolutionised the primary prevention of complications in developing countries. This technology (figure 6) relies

on the use of a simple syringe with a plunger to generate negative pressure for uterine evacuation, and plastic cannulas of varying sizes. The amount of negative pressure obtained with manual vacuum aspiration is similar to that generated with large, expensive, electrical pumps, which makes this method especially suited for use in clinics, offices, and low-resource settings. Manual vacuum aspiration also has the advantage that the syringe can be cleaned, high-level disinfected, or sterilised and used repeatedly; similarly, cannulas can be discarded or re-used after appropriate disinfection or sterilisation.

Vacuum aspiration is safer than sharp curettage, and the WHO recommends vacuum aspiration as the preferred method for uterine evacuation before 12 weeks of pregnancy.⁶⁷ This method is faster, safer, more comfortable, and associated with shorter hospital stay for induced abortion than sharp curettage.^{73,74} Additional advantages compared with sharp curettage are its ease of use as an outpatient procedure, the need for less analgesia and anaesthesia,⁷⁵ and its lower cost per procedure especially if done on an outpatient basis.⁷⁶ In countries with a small number of physicians, vacuum aspiration can be safely and effectively used by mid-level health service providers, such as midwives.⁷⁷

The combined use of mifepristone and misoprostol has become the standard WHO-recommended medical regimen for early medication abortion,⁶⁷ and is better than either drug alone.⁷⁸ Misoprostol is a prostaglandin E₁ analogue marketed for the prevention and treatment of gastric ulcers. However, mifepristone can be expensive and is not available in much of the world, whereas misoprostol is cheap and widely available. Regimens with misoprostol alone as an abortifacient have varied widely, with reported success rates ranging between 87% and 97%.⁷⁹ Increased access to misoprostol has been associated with improved women's health in developing countries, and studies are being done to refine the regimen for misoprostol alone to induce abortion (panel 5).

Secondary prevention entails prompt and appropriate treatment of complications. This includes timely evacuation of the uterus after incomplete abortion. WHO



Figure 6: Manual vacuum aspiration syringe

has issued technical and clinical guidelines for the provision of safe abortion care⁶⁷ and treatment of abortion complications.¹ Misoprostol can be used for the management of incomplete abortion,⁸⁶ and vacuum aspiration is better than sharp curettage.^{87,88}

Post-abortion care is spreading worldwide. In Guatemala, with support from the Ministry of Health, the Centro de Investigación Epidemiológica en Salud Sexual y Reproductiva began in 1996 a series of training-of-trainers with teams of nurses and doctors around the country. Content included post-abortion assessment and diagnosis, uterine evacuation procedures and techniques, pain management, infection prevention, management of complications, referral to other sexual and reproductive health services, contraceptive counselling and provision, and follow-up care.⁸⁹

The results of a survey in Addis Ababa showed that almost 30% of maternal deaths in the city resulted from unsafe abortion.⁹⁰ To address the high maternal mortality rate (estimated to be 850 deaths per 100 000 livebirths), the Ministry of Health, Regional Health Bureaus, and several international non-governmental organisations joined forces to improve post-abortion care in the public-health sector. Interventions include clinical training of physicians and midwives, provision of manual vacuum aspiration and other supplies, reorganisation of services, supervisory visits to facilities, and improved record-keeping. Post-abortion care was implemented in 42 health-care facilities in three regions assessed from 2000 to 2004. Quality of care also improved.⁹¹ In 2004, Ethiopia revised its abortion law and in 2006 issued guidelines for safe abortion services.

Critics of post-abortion care worldwide complain that the preoccupation with secondary (rather than primary) prevention of unsafe abortion is myopic, tantamount to placing ambulances at the bottom of a cliff instead of erecting a fence at the top.

Tertiary prevention mitigates long-term damage. Rapid transfer to a hospital can be lifesaving.⁹² Prompt repair of uterine injury could preserve fertility. Acute renal failure and tetanus from unsafe abortions remain important causes of death and lengthy disability.⁹³ Repair of fistulas in bowel and bladder can end the suffering, stigmatisation, and abandonment that these injuries cause.

The public health imperative

The public health rationale to address unsafe abortion was first drawn to attention by the World Health Assembly four decades ago.⁹⁴ In 1994, the Programme of Action of the International Conference on Population and Development stated, "In circumstances where abortion is not against the law, such abortion should be safe." The Report of the Fourth World Conference on Women, held in Beijing in 1995, noted "unsafe abortions threaten the lives of a large number of women, representing a grave public health problem as it is primarily the poorest and youngest who take the highest risk".⁹⁶ At the Special Session of the

Panel 5: Misoprostol in South America

After introduction into Brazil in 1986, misoprostol became available over the counter. Soon, women recognised its effectiveness as an abortifacient and began to use the drug for this purpose. Women would self-administer the drug orally and then seek medical assistance if the uterine bleeding did not stop. By 1990, 70% of women treated in hospital for abortion complications in Brazilian hospitals reported having used misoprostol.⁸⁰ The report of a rapid increase in uterine evacuation procedures done in some hospitals as a result of abortions initiated by misoprostol⁸¹ led the Ministry of Health to restrict its sale in 1991. The State of Ceara banned the drug altogether. However, restricting access to the drug did not prevent its use; rather, the drug remained widely available in the black market at inflated prices. Consequently, the rate of abortion complications increased after restriction. Indeed, in Campinas, abortion-related deaths tripled after restricted access to misoprostol.⁸⁰

Women's use of misoprostol in Brazil decreased the severity of unsafe abortion complications, and to some extent also decreased the number of women admitted to hospital. Previously, women would insert foreign bodies into their cervix, which provoked bleeding and led to completion by curettage in hospital. Misoprostol is less likely to cause infection than are foreign bodies.⁸² One hospital recorded a rate of uterine infection of 4% in women who reported using misoprostol, compared with 8% in women who reported having a spontaneous abortion.⁸³

Use of medical abortion has also expanded in Peru.⁸⁴ Although the use of prostaglandins for abortion was infrequent in a 1989 survey, most key informants mentioned it in a similar survey in 1998,⁸⁵ even in remote regions of the country. The wide use of prostaglandins for abortion has been associated with improved health for women. In three other countries, women have widely accepted medical abortion because of its similarity to spontaneous abortion.²¹

UN General Assembly in June, 1999, governments agreed that "in circumstances where abortion is not against the law, health systems should train and equip health-service providers and should take other measures to ensure that such abortion is safe and accessible".⁹⁷ By investing in abortion safety and availability, governments throughout the world can save the lives of tens of thousands of women every year.^{6,18,98}

Increasingly, private foundations and donor governments, including the UK, Netherlands, Sweden, Norway, Denmark, and Finland, have funded activities to advance access to safe abortion. By contrast, the USA has since 1974 precluded use of development assistance for abortion services. In 2001, the US government re-introduced the even more restrictive Mexico City Policy, known by opponents as the Global Gag Rule. According to this policy, private organisations outside the USA are eligible for family planning assistance only if they agree not to engage in most abortion-related activities, even with their own funds.⁹⁹

International organisations increasingly regard the denial of safe abortion services as a human-rights violation. In 1999, the UN Committee on the Elimination of All Forms of Discrimination Against Women (CEDAW) determined that neglect of health services that only women need is discriminatory and a deficit that governments must remedy. Furthermore, CEDAW noted that criminalisation of abortion is a barrier that states should remove.¹⁰⁰

In 2005, the UN Human Rights Committee ruled against Peru for its denial of a legal abortion; the woman had an anencephalic fetus and was forced to continue the pregnancy to delivery.¹⁰¹ The Inter-American Commission on Human Rights ruled in favour of a 13-year-old Mexican girl's petition; she had been raped and subsequently denied access to a legally permitted abortion by state health and law enforcement officials in Mexico.¹⁰² As a result, the Mexican government will issue guidance for access to abortion for rape victims. Moreover, the government agreed to compensate the young woman and her son for health care, education, and professional development. The 2005 Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa is the first international human rights instrument to provide for abortion as a right.¹⁰³

Discussion

Unsafe abortion endangers health in the developing world, and merits the same dispassionate, scientific approach to solutions as do other threats to public health. Although the remedies are available and inexpensive, governments in developing nations often do not have the political will to do what is right and necessary. The beneficiaries of access to safe, legal abortion on request include not only women but also their children, families, and society—for present and future generations.

Women have always had abortions and will always continue to do so, irrespective of prevailing laws, religious proscriptions, or social norms.¹⁰⁴ Although the ethical debate over abortion will continue, the public-health record is clear and incontrovertible: access to safe, legal abortion on request improves health.⁷³ As noted by Mahmoud Fathalla, "Pregnancy-related deaths...are often the ultimate tragic outcome of the cumulative denial of women's human rights. Women are not dying because of untreatable diseases. They are dying because societies have yet to make the decision that their lives are worth saving."¹⁰⁵ Simply put, they die because they do not count.

Conflict of interest statement

DC, a gynaecologist, has done, taught, and studied abortions for 33 years. He has performed abortions as part of his duties as a medical school faculty member and as a private contractor for freestanding abortion clinics. He has served on the Board of Directors of the National Abortion Rights Action League and Planned Parenthood Federation of America. He is a member of the National Abortion Federation, the American College of Obstetricians and Gynecologists, the American Public Health Organization and other groups that support safe, legal abortion. He is a past chair of the Task Force on Postovulatory Fertility Control of the WHO, which conducts abortion research. He is an editor of a textbook on abortion and a chapter contributor to a gynecology text, both of which have provided modest royalties (less than \$1000 total). He has testified in defence of physicians in medical liability cases concerning abortion. He has testified before Congressional committees twice regarding abortion. He has received honoraria for speaking about abortion at medical meetings. He currently teaches and performs abortions at the University of North Carolina School of Medicine as part of his faculty duties. He receives a fixed salary from the university, which is not dependent upon the number of abortions he does. JB is an employee of Ipas, a global,

non-profit reproductive health organisation focused on safe abortion and women's reproductive rights. Ipas manufactures and distributes manual vacuum aspiration instruments worldwide. SS is employed by the Guttmacher Institute, an organisation committed to improving sexual health and rights, including improving access to safe and legal abortion services. FEO, MR, and BG are members of the steering committee of the International Consortium for Medical Abortion, which aims at expanding access to medical abortion in the context of safe abortion worldwide. BG is a full time salaried employee of Ipas and has never been a provider of abortion services. She has received financial support for and been the principal investigator on several several social science studies on maternal health and unsafe abortion. FEO is the Executive Project Director of the International Federation of Obstetricians and Gynecologists and the Honorary Adviser to the President of Nigeria on Maternal and Child Health. He is a member of the Abortion Research Consortium in Africa, and a consultant to several international organisations on abortion matters in Africa. Through the NGO which he founded in 1995, the Women's Health and Action Research Centre, he has received funding specifically from the Lucile and David Packard Foundation to build capacity for safe abortion service delivery among private practitioners in northern Nigeria. He has received very modest honoraria for speaking on abortion in Africa at several international fora. He receives a fixed salary from the university, which is not dependent on his research on abortion. IHS is a social scientist with the Special Programme in Human Reproduction, and coordinator of the Programme's Team on Preventing Unsafe Abortion. His duties include supporting research on social science and operations research in sexual and reproductive health, including users' perspectives on family planning and adolescent and reproductive health. He has given lectures with no financial remuneration from any source besides the fixed salary and associated benefits from WHO. All authors have no financial stake in any abortion clinic, and own no individual stocks in any drug company or medical supply house that might profit from abortion.

Acknowledgments

We thank Elisabeth Åhman, Patty Skuster, and Barbara Crane. I Shah is a staff member of the World Health Organization. The author is responsible for the views expressed in this publication and they do not necessarily represent the decisions, policies, or views of the World Health Organization.

References

- 1 World Health Organization. The prevention and management of unsafe abortion. Report of a Technical Working Group. http://whqlibdoc.who.int/hq/1992/WHO_MSM_92.5.pdf (accessed July 6, 2006).
- 2 Okonofua FE, Shittu SO, Oronsaye F, Ogunsakin D, Ogbomwan S, Zayyan M. Attitudes and practices of private medical providers towards family planning and abortion services in Nigeria. *Acta Obstet Gynecol Scand* 2005; **84**: 270–80.
- 3 Okonofua FE, Odimegwu C, Ajabor H, Daru PH, Johnson A. Assessing the prevalence and determinants of unwanted pregnancy and induced abortion in Nigeria. *Stud Fam Plann* 1999; **30**: 67–77.
- 4 Hogberg U, Joelsson I. Maternal deaths related to abortions in Sweden, 1931–1980. *Gynecol Obstet Invest* 1985; **20**: 169–78.
- 5 Henshaw SK, Singh S, Haas T. The incidence of abortion worldwide. *Int Fam Plann Persp* 1999; **25**: S30–8.
- 6 World Health Organization. Unsafe abortion: global and regional estimates of the incidence of unsafe abortion and associated mortality in 2000. 4th edition. Geneva, Switzerland: World Health Organization, 2004.
- 7 Wilcox AJ, Horney LF. Accuracy of spontaneous abortion recall. *Am J Epidemiol* 1984; **120**: 727–33.
- 8 Fu H, Darroch JE, Henshaw SK, Kolb E. Measuring the extent of abortion underreporting in the 1995 National Survey of Family Growth. *Fam Plann Perspect* 1998; **30**: 128–33.
- 9 Ravolamanana Ralisata L, Rabenjamina FR, Razafintsalama DL, Rakotonandrianina E, Randrianjafisamindrakotroka NS. [Post-abortionum peritonitis pelvipertonitis at the Androva Mahajanga University Hospital: 23 cases]. *J Gynecol Obstet Biol Reprod (Paris)* 2001; **30**: 282–7.
- 10 Nations MK, Misago C, Fonseca W, Correia LL, Campbell OM. Women's hidden transcripts about abortion in Brazil. *Soc Sci Med* 1997; **44**: 1833–45.

- 11 Varkey P, Balakrishna PP, Prasad JH, Abraham S, Joseph A. The reality of unsafe abortion in a rural community in South India. *Reprod Health Matters* 2000; 8: 83–91.
- 12 Koster-Oyekan W. Why resort to illegal abortion in Zambia? Findings of a community-based study in Western Province. *Soc Sci Med* 1998; 46: 1303–12.
- 13 Shah I, Ahman E. Age patterns of unsafe abortion in developing country regions. *Reprod Health Matters* 2004; 12: 9–17.
- 14 Bankole A, Singh S, Haas T. Reasons why women have induced abortions: evidence from 27 countries. *Int Fam Plann Perspect* 1998; 24: 117–27.
- 15 Benson J. Evaluating abortion-care programs: old challenges, new directions. *Stud Fam Plann* 2005; 36: 189–202.
- 16 Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. *Lancet* 2006; 367: 1066–74.
- 17 Liskin L. Complications of abortion in developing countries. *Popul Rep F* 1980; F105–55.
- 18 Alan Guttmacher Institute. Sharing responsibilities: women, society and abortion worldwide. New York: The Alan Guttmacher Institute, 1999.
- 19 Singh S, Prada E, Mirembe F, Kiggundu C. The incidence of induced abortion in Uganda. *Int Fam Plan Perspect* 2005; 31: 183–91.
- 20 Juarez F, Cabigon J, Singh S, Hussain R. The incidence of induced abortion in the Philippines: current level and recent trends. *Int Fam Plan Perspect* 2005; 31: 140–49.
- 21 Lafaurie MM, Grossman D, Troncoso E, Billings DL, Chavez S. Women's perspectives on medical abortion in Mexico, Colombia, Ecuador and Peru: a qualitative study. *Reprod Health Matters* 2005; 13: 75–83.
- 22 Brazil Ministerio da Saude. Sistema de informacoes hospitalares do SUS (SIH/SUS). <http://www.dataus.gov.br> (accessed July 5, 2006).
- 23 Jewkes R, Rees H, Dickson K, Brown H, Levin J. The impact of age on the epidemiology of incomplete abortions in South Africa after legislative change. *BJOG* 2005; 112: 355–9.
- 24 Gebreselassie H, Gallo MF, Monyo A, Johnson BR. The magnitude of abortion complications in Kenya. *BJOG* 2005; 112: 1229–35.
- 25 Singh S, Prada E, Kestler E. Induced abortion and unintended pregnancy in Guatemala. *Int Fam Plann Perspect* 2006; 32: 136–45.
- 26 Berer M. Making abortions safe: a matter of good public health policy and practice. *Bull World Health Organ* 2000; 78: 580–92.
- 27 World Health Organization. Complications of abortion. <http://www.who.int/bookorders/anglais/detart1.jsp?sesslan=1&codlan=1&codco=15&codcch=418> (accessed July 11, 2006).
- 28 Glenc F. Induced abortion—a historical outline. *Pol Tyg Lek* 1974; 29: 1957–58 (in Polish).
- 29 Ugboma HA, Akani CI. Abdominal massage: another cause of maternal mortality. *Niger J Med* 2004; 13: 259–62.
- 30 Polgar S, Fried ES. The bad old days: clandestine abortions among the poor in New York City before liberalization of the abortion law. *Fam Plann Perspect* 1976; 8: 125–7.
- 31 Burnhill MS. Treatment of women who have undergone chemically induced abortions. *J Reprod Med* 1985; 30: 610–14.
- 32 O'Donnell RP. Vesicovaginal fistula produced by potassium permanganate. *Obstet Gynecol* 1954; 4: 122–23.
- 33 Berer M. National laws and unsafe abortion: the parameters of change. *Reprod Health Matters* 2004; 12: 1–8.
- 34 Center for Reproductive Rights. The world's abortion laws 2005 poster. <http://bookstore.reproductiverights.org/worablaw20.html> (accessed July 5, 2006).
- 35 Center for Reproductive Rights. Abortion and the law: ten years of reform. http://www.crlp.org/pdf/pub_bp_abortionlaws10.pdf (accessed July 5, 2006).
- 36 Nunes FE, Delph YM. Making abortion law reform work: steps and slips in Guyana. *Reprod Health Matters* 1997; 9: 66–76.
- 37 Women's Link Worldwide. Colombia's highest court rules in favor of easing one of the world's most restrictive abortion laws. http://www.womenslinkworldwide.org/pdf/proj_news_051006releaseb.pdf (accessed July 5, 2006).
- 38 Hessini L. Global progress in abortion advocacy and policy: an assessment of the decade since ICPD. *Reprod Health Matters* 2005; 13: 88–100.
- 39 Catholic Online. Colombian bishops threaten civil disobedience, excommunication in wake of new abortion law. http://www.catholic.org/international/international_story.php?id=19824 (accessed July 10, 2006).
- 40 Hitt J. Pro-life nation. <http://www.nytimes.com/2006/04/09/magazine/09abortion.html?ei=5070&en=4eb39005afdd039a&ex=1152331200&pagewanted=print> (accessed July 6, 2006).
- 41 Briozzo L, Rodriguez F, Leon I, Vidiella G, Ferreiro G, Pons JE. unsafe abortion in Uruguay. *Int J Gynaecol Obstet* 2004; 85: 70–73.
- 42 David HP. Abortion in Europe, 1920–91: a public health perspective. *Stud Fam Plann* 1992; 23: 1–22.
- 43 Johnson BR, Horga M, Fajans P. A strategic assessment of abortion and contraception in Romania. *Reprod Health Matters* 2004; 12: 184–94.
- 44 Boonstra H, Gold R, Richard C, Finer L. Abortion in women's lives. <http://www.guttmacher.org/pubs/2006/05/04/AiWL.pdf> (accessed July 5, 2006).
- 45 Center for Reproductive Rights. Fourteen Nepalese women freed for abortion-related offenses; others continue to languish in prison. http://www.reproductiverights.org/ww_asia_nepal.html (accessed July 10, 2006).
- 46 United Nations. Abortion policies: a global review. Vol. III: Oman to Zimbabwe. New York: United Nations, Population Division, 2002.
- 47 Hirve SS. Abortion law, policy and services in India: a critical review. *Reprod Health Matters* 2004; 12: 114–21.
- 48 Garcia SG, Tatum C, Becker D, Swanson KA, Lockwood K, Ellertson C. Policy implications of a national public opinion survey on abortion in Mexico. *Reprod Health Matters* 2004; 12: 65–74.
- 49 Ganatra B, Hirve S. Induced abortions among adolescent women in rural Maharashtra, India. *Reprod Health Matters* 2002; 10: 76–85.
- 50 Ganatra B. Unsafe abortion in South and South-East Asia: a review of the evidence. In: Warriner IK, Shah IH, eds. Preventing unsafe abortion and its consequences: priorities for research and action. New York: Guttmacher Institute, 2006: 151–86.
- 51 Gallo MF, Gebreselassie H, Victorino MT, Dgedge M, Jamisse L, Bique C. An assessment of abortion services in public health facilities in Mozambique: women's and providers' perspectives. *Reprod Health Matters* 2004; 12: 218–26.
- 52 Fauveau V, Blanchet T. Deaths from injuries and induced abortion among rural Bangladeshi women. *Soc Sci Med* 1989; 29: 1121–27.
- 53 Huntington D, Nawar L, Hassan EO, Youssed H, Abdel-Tawab N. The postabortion caseload in Egyptian hospitals: a descriptive study. *Int Fam Plann Perspect* 1998; 24: 25–31.
- 54 Mangile GS, Leshabari MT, Kihwele DJ. Induced abortion in Dar es Salaam, Tanzania: the plight of adolescents. In: Mundigo AI, Indriso C, Eds. Abortion in the developing world. New Delhi: World Health Organization, 1999: 387–403.
- 55 Kay BJ, Katzenellenbogen J, Fawcus S, Abdool Karim S. An analysis of the cost of incomplete abortion to the public health sector in South Africa—1994. *S Afr Med J* 1997; 87: 442–47.
- 56 Adewole IF, Oye-Adeniran BA, Iwera N, Oladokun A, Gbadegesin A. Terminating an unwanted pregnancy—the economic implications in Nigeria. *J Obstet Gynaecol* 2002; 22: 436–37.
- 57 Billings DL, Benson J. Postabortion care in Latin America: policy and service recommendations from a decade of operations research. *Health Policy Plan* 2005; 20: 158–66.
- 58 Johnson BR, Benson J, Bradley J, Rabago Ordonez A. Costs and resource utilization for the treatment of incomplete abortion in Kenya and Mexico. *Soc Sci Med* 1993; 36: 1443–53.
- 59 Vlassoff M, Singh S, Darroch JE, Carbone E, Bernstein S. Assessing costs and benefits of sexual and reproductive health interventions. Occasional report No. 11. New York: The Alan Guttmacher Institute, 2004.
- 60 Safe Motherhood Inter-Agency Group. Maternal health: a vital social and economic investment. http://www.safemotherhood.org/facts_and_figures/good_maternal_health.htm (accessed July 6, 2006).
- 61 Singh S, Darroch JE, Vlassoff M, Nadeau J. Adding it up. The benefits of investing in sexual and reproductive health care. New York: The Alan Guttmacher Institute, 2003.
- 62 Last J, Spasoff RA, Harris SS, Thuriaux MC, eds. A dictionary of epidemiology. Fourth edition. Oxford: Oxford University Press, 2001.

- 63 Marston C, Cleland J. Relationships between contraception and abortion: a review of the evidence. *Int Fam Plan Perspect* 2003; **29**: 6–13.
- 64 New survey findings. The reproductive revolution continues. *Popul Rep M* 2003; **17**: 1–42.
- 65 Shah IH. The advance of the contraceptive revolution. *World Health Stat Q* 1994; **47**: 9–15.
- 66 United Nations Department of Economic and Social Affairs PD. World contraceptive use 2003. <http://www.un.org/esa/population/publications/contraceptive2003/wcu2003.htm> (accessed July 6, 2006).
- 67 World Health Organization. Safe abortion: technical and policy guidance for health systems. Geneva: World Health Organization, 2003.
- 68 Ross JA, Winfrey WL. Unmet need for contraception in the developing world and the former Soviet Union: an updated estimate. *Int Fam Plann Perspect* 2002; **28**: 138–43.
- 69 Langer A, Garcia-Barros C, Heimburger A, et al. Improving postabortion care with limited resources in a public hospital in Oaxaca, Mexico. In: Huntington D, Piet-Pelon NJ, eds. Post-abortion care: lessons from operations research. New York, NY: Population Council, 1999.
- 70 Solo J, Billings DL, Aloo-Obunga C, Ominde A, Makumi M. Creating linkages between incomplete abortion treatment and family planning services in Kenya. *Stud Fam Plann* 1999; **30**: 17–27.
- 71 Billings DL, Fuentes Velasquez J, Perez-Cuevas R. Comparing the quality of three models of postabortion care in public hospitals in Mexico city. *Int Fam Plan Perspect* 2003; **29**: 112–20.
- 72 Johnson BR, Ndhlovu S, Farr SL, Chipato T. Reducing unplanned pregnancy and abortion in Zimbabwe through postabortion contraception. *Stud Fam Plann* 2002; **33**: 195–202.
- 73 Cates W Jr. Legal abortion: the public health record. *Science* 1982; **215**: 1586–90.
- 74 Rogo K. Improving technologies to reduce abortion-related morbidity and mortality. *Int J Gynaecol Obstet* 2004; **85** (Suppl 1): S73–82.
- 75 Iyengar K, Iyengar SD. Elective abortion as a primary health service in rural India: experience with manual vacuum aspiration. *Reprod Health Matters* 2002; **10**: 54–63.
- 76 Jowett M. Safe Motherhood interventions in low-income countries: an economic justification and evidence of cost effectiveness. *Health Policy* 2000; **53**: 201–28.
- 77 Sibuye MC. Provision of abortion services by midwives in Limpopo Province of South Africa. *Afr J Reprod Health* 2004; **8**: 75–78.
- 78 Kulier R, Gulmezoglu AM, Hofmeyr GJ, Cheng LN, Campana A. Medical methods for first trimester abortion. *Cochrane Database Syst Rev* 2004; CD002855.
- 79 Blanchard K, Winikoff B, Ellertson C. Misoprostol used alone for the termination of early pregnancy. A review of the evidence. *Contraception* 1999; **59**: 209–17.
- 80 Costa SH. Commercial availability of misoprostol and induced abortion in Brazil. *Int J Gynaecol Obstet* 1998; **63** (Suppl 1): S131–39.
- 81 Coelho HL, Teixeira AC, Santos AP, et al. Misoprostol and illegal abortion in Fortaleza, Brazil. *Lancet* 1993; **341**: 1261–63.
- 82 Pollack AE, Pine RN. Opening a door to safe abortion: international perspectives on medical abortifacient use. *J Am Med Womens Assoc* 2000; **55**: 186–88.
- 83 Faundes A, Santos LC, Carvalho M, Gras C. Post-abortion complications after interruption of pregnancy with misoprostol. *Adv Contracept* 1996; **12**: 1–9.
- 84 Ferrando D. El aborto clandestino en el Peru: Hechos y cifras. Lima, Peru: Flora Tristan and Pathfinder International, 2002.
- 85 Alan Guttmacher Institute. Aborto clandestino: una realidad latinoamericana. New York: Alan Guttmacher Institute, 1994.
- 86 Zhang J, Gilles JM, Barnhart K, Creinin MD, Westhoff C, Frederick MM. A comparison of medical management with misoprostol and surgical management for early pregnancy failure. *N Engl J Med* 2005; **353**: 761–69.
- 87 Verkuyl DA, Crowther CA. Suction v. conventional curettage in incomplete abortion. A randomised controlled trial. *S Afr Med J* 1993; **83**: 13–15.
- 88 Forna F, Gulmezoglu AM. Surgical procedures to evacuate incomplete abortion. *Cochrane Database Syst Rev* 2001; CD001993.
- 89 Kestler E, Valencia L, Del Valle V, Silva A. Scaling up post-abortion care in Guatemala: initial successes at national level. *Reprod Health Matters* 2006; **14**: 138–47.
- 90 Kwast BE, Rochat RW, Kidane-Mariam W. Maternal mortality in Addis Ababa, Ethiopia. *Stud Fam Plann* 1986; **17**: 288–301.
- 91 Tesfaye S, Fetters T, Clark KA, McNaughton HL. Expanding our reach: an evaluation of the availability and quality of postabortion care services in three regions in Ethiopia between 2000 and 2004. Chapel Hill, NC: Ipas, 2006.
- 92 Grimes DA. Unsafe abortion: the silent scourge. *Br Med Bull* 2003; **67**: 99–113.
- 93 Grimes DA. Reducing the complications of unsafe abortion: the role of medical technology. In: Warriner IK, Shah IH, eds. Preventing unsafe abortion and its consequences. Priorities for research and action. New York: The Guttmacher Institute, 2006: 73–91.
- 94 WHO. Twentieth world health assembly resolution 20.14: health aspects of population dynamics. Geneva, Switzerland: World Health Organization, 1967.
- 95 UNFPA. Programme of action of the International Conference on Population and Development, paragraph 8.25. http://www.unfpa.org/icpd/icpd_poa.htm#ch8c (accessed July 5, 2006).
- 96 UN. Report of the Fourth World Conference on Women, Beijing, 4–15 September, 1995. New York: United Nations, 1995.
- 97 UNFPA. Key actions for the further programme of action of the International Conference on Population and Development, adopted by the twenty-first special session of the General Assembly, New York, June 30–July 2, 1999. New York: UNFPA, 1999.
- 98 Okonofua FE, Onwudiegwu U, Odutayo R. Pregnancy outcome after illegal induced abortion in Nigeria: a retrospective controlled historical study. *Afr J Med Med Sci* 1994; **23**: 165–69.
- 99 Crane BB, Dusenberry J. Power and politics in international funding for reproductive health: the US Global Gag Rule. *Reprod Health Matters* 2004; **12**: 128–37.
- 100 UN Committee on the Elimination of Discrimination against Women. General recommendation 24: women and health (20th session), paragraph 31(c). <http://www.un.org/womenwatch/daw/cedaw/recommendations/recomm.htm#recom24> (accessed July 5, 2006).
- 101 UN Human Rights Committee. View of the Human Rights Committee under article 5, paragraph 4, of the Optional Protocol to the International Covenant on Civil and Political Rights, 85th session, document CCPR/C/85/D/1153/2003, Nov 17, 2005. Geneva: United Nations, 2005.
- 102 Center for Reproductive Rights. Mexico admits responsibility for denying child rape victim's rights. http://www.reproductiverights.org/pr_06_0308MexicoPaulina.html (accessed July 5, 2006).
- 103 Center for Reproductive Rights. The protocol on the rights of women in Africa: an instrument for advancing sexual and reproductive rights. http://www.reproductiverights.org/pdf/pub_bp_africa.pdf (accessed July 5, 2006).
- 104 Stephenson P, Wagner M, Badea M, Serbanescu F. Commentary: the public health consequences of restricted induced abortion—lessons from Romania. *Am J Public Health* 1992; **82**: 1328–31.
- 105 Fathalla MF. Human rights aspects of safe motherhood. *Best Pract Res Clin Obstet Gynaecol* 2006; **20**: 409–19.
- 106 Oye-Adeniran BA, Umoh AV, Nnatu SN. Complications of unsafe abortion: a case study and the need for abortion law reform in Nigeria. *Reprod Health Matters* 2002; **10**: 18–21.