

Original Research Article in *The Lancet* – Author Version

**Induced abortion: incidence and trends worldwide
from 1995 to 2008**

*G Sedgh ScD, S Singh PhD, S K Henshaw PhD, A Bankole PhD: Guttmacher
Institute, New York, NY USA

I H Shah PhD, E Åhman MA: World Health Organization, Geneva, Switzerland

Published in *The Lancet*: February 18th, 2012 (Vol. 379, Issue 9816,
Pages 625-632)

Published online January 19th, 2012

DOI:10.1016/S0140-6736(11)61786-8

Abstract available on [The Lancet Web site](#)

*Corresponding Author:

Dr. Gilda Sedgh ScD

Guttmacher Institute

125 Maiden Lane, 7th Floor

New York, NY 10038

phone: 212.248.1111 fax: 212.248.1951

gsedgh@guttmacher.org

Declaration of Conflicting Interests

We declare that we have no conflicts of interest.

Abstract

Background

Data of abortion incidence and trends are needed to monitor progress toward improvement of maternal health and access to family planning. To date, estimates of safe and unsafe abortion worldwide have only been made for 1995 and 2003.

Methods

We used the standard WHO definition of unsafe abortions. Safe abortion estimates were based largely on official statistics and nationally representative surveys. Unsafe abortion estimates were based primarily on information from published studies, hospital records, and surveys of women. We used additional sources and systematic approaches to make corrections and projections as needed where data were misreported, incomplete, or from earlier years. We assessed trends in abortion incidence using rates developed for 1995, 2003, and 2008 with the same methodology. We used linear regression models to explore the association of the legal status of abortion with the abortion rate across subregions of the world in 2008.

Findings

The global abortion rate was stable between 2003 and 2008, with rates of 29 and 28 abortions per 1000 women aged 15–44 years, respectively, following a period of decline from 35 abortions per 1000 women in 1995. The average annual percent change in the rate was nearly 2.4% between 1995 and 2003 and 0.3% between 2003 and 2008. Worldwide, 49% of abortions were unsafe in 2008, compared to 44% in 1995. About one in five pregnancies ended in abortion in 2008. The abortion rate is lower in subregions where more women live under liberal abortion laws ($p < 0.05$).

Interpretation

The substantial decline in the abortion rate observed earlier has stalled, and the proportion of all abortions that are unsafe has increased. Restrictive abortion laws are not associated with lower abortion rates. Measures to reduce the incidence of unintended pregnancy and unsafe abortion, including investments in family planning services and safe abortion care, are crucial steps toward achieving the Millennium Development Goals.

Introduction

Information on global and regional abortion rates and trends can help identify gaps in contraceptive use. Although abortions done according to medical guidelines carry very low risk of complications,[1–3] unsafe abortions contribute substantially to maternal morbidity and death worldwide. [4–6] Monitoring abortion trends is thus crucial to assess improvement of maternal health, and the progress toward the UN Millennium Development Goal 5 (MDG 5), to reduce maternal mortality and achieve universal access to reproductive health.

Moreover, one of the many controversies surrounding abortion is whether restrictive abortion laws prevent women from obtaining abortions. Analyses of the association between abortion incidence and the legal status of abortion can clarify whether law is a factor that affects abortion incidence.

However, abortions are not documented in countries with highly restrictive abortion laws and are often under-reported elsewhere, especially where the practice is highly stigmatized. Therefore, estimation of regional and global incidence requires compilation of information from a range of sources and careful assessment of information for quality and completeness. Various data sources and estimation approaches have been assessed, refined, and applied over the years, and are now widely accepted as sources of reasonable national estimates. [4,7–9]

We estimated the incidence of safe and unsafe abortion globally and in all the major regions and subregions of the world in 2008. We assessed trends since 1995 and 2003, the only other years for which similar assessments were done. We also examine the associations of abortion incidence with the legal status of abortion across the world's subregions.

Methods

Definitions and data sources

We adhered to the definition of unsafe abortion established by WHO, namely, a procedure for termination of an unintended pregnancy done either by people lacking the necessary skills or in an environment that does not conform to minimum medical standards, or both. [10] As elaborated by WHO, [4,11] abortions done outside the bounds of law are likely to be unsafe even if they are

done by people with medical training for several reasons: such procedures are usually done outside facilities authorized to perform abortions, sometimes in unsanitary conditions; the woman might not receive appropriate postabortion care; medical back-up is unlikely to be immediately available should an emergency arise; and the woman might delay seeking an abortion or seeking care for complications because the abortion is clandestine. Thus, as in previous efforts to estimate abortion incidence and consistent with WHO practice, we used the operational definition of unsafe abortions, which is abortions done in countries with highly restrictive abortion laws, and those that do not meet legal requirements in countries with less restrictive laws. Safe abortions were defined as those that meet legal requirements in countries with liberal laws, or where the laws are liberally interpreted such that safe abortions are generally available. Countries with liberal laws were defined as those where abortion is legal on request or on socioeconomic grounds, either with or without gestational limits; and countries whose laws allow for abortion to preserve the physical or mental health of the woman, if these laws were liberally interpreted, as of 2008. To the best of our knowledge, Hong Kong Special Administrative Region, Israel, New Zealand, South Korea, Spain, and Ethiopia met the latter set of criteria. The classification of countries according to whether their abortion laws are liberal or restrictive is reviewed elsewhere. [12] Although the legal status of abortion and risk associated with the procedure are not perfectly correlated, it is well documented that morbidity and mortality resulting from abortion tend to be high in countries and regions characterized by restrictive abortion laws, [4–6] and is very low when these are liberal. [1–3]

We used empirical evidence of safe abortions done outside the bounds of the law and unsafe abortions done despite liberal laws when this information was available. In India, abortion is legally permitted and available under broad conditions, but many abortions nevertheless take place outside of health services legally authorized to do abortions; some of these are deemed safe and some unsafe. [13] In Cambodia, abortion is legal upon request through the first trimester of pregnancy, but half of all abortions nevertheless take place in women's homes and other settings outside of formal facilities; [14] we deemed

such abortions to be unsafe. In sub-Saharan Africa, abortion law is liberal in Zambia and South Africa, and abortion is legal if it is to preserve the health of the woman in seven other countries. With the exception of South Africa, however, these laws are largely not implemented, and most abortions in these countries occur under unsafe conditions. Some abortions in South Africa are also still unsafe, despite the more widespread provision of safe abortion services since the liberalization of abortion law in 1996. [15] Small percentages of abortions are also known to be unsafe in some eastern European and other countries with liberal laws that were formerly part of the Soviet Union. [16] There is evidence that some women rely on unsafe abortions in the USA despite the liberal abortion law, [17,18] and the same is probably true for other developed countries with liberal laws, but these numbers are negligible where they have been estimated.

For the global estimation of both safe and unsafe abortions, we gathered relevant information on abortion incidence in every country and territory, assessed the quality of the information, and made some adjustments to account for misreporting and under-reporting, usually on the basis of indicators related to abortion incidence and quality of reporting, from published studies and reports. We computed subregional and regional estimates as the sum of the estimates for all countries in these geographical areas.

Safe abortions

57 of the 84 countries and territories with liberal abortion laws have a mechanism for collection of statistics about procedures done. Statistics for 2008 were obtained mainly from published and unpublished reports, websites of official national reporting agencies, and questionnaires given to such agencies by the study team.

We assessed the quality of official reports using feedback from agencies implicated in data collection and from experts who were familiar with reporting of abortion in the countries, including demographers and social scientists, and program managers, providers, and policy advisers familiar with procedures of reporting of abortions in each country. Issues that affect abortion reporting and

assessments of the quality of reports from specific countries have been comprehensively reviewed elsewhere, [7,19] and these resources also served as the evidence base for adjustments to the national figures. Where experts deemed that statistics included at least 95% of all abortion procedures, as in several northern and western European countries, no adjustments were made to these reports. For countries with incomplete statistics, we used the same correction factor used to estimate incidence in 2003, when we did not have sufficient evidence of a change in completeness of reporting. The correction factors applied to official statistics ranged from 1.05 to 2.54 (indicating that the reported numbers were increased by 5–154%), and the average of the correction factors was 1.26.

For six countries with liberal laws, abortion estimates were only available from nationally representative surveys of women done within 5 years of the year of estimation. The rate of under-reporting from such surveys ranged from 15% to 69% according to studies that were able to validate their findings. [9,20,21] With no such studies validating findings for these six specific countries, we adjusted survey estimates upward by 20% to account for the minimum expected degree of under-reporting. For several countries, both survey-based estimates and incomplete official reports were available. We projected adjusted survey-based estimates for years earlier than 2008 to 2008 using trend data from official reports. When no evidence of a change in the abortion rate over time was available, either from official reports or other sources, we applied to 2008 the rate for the year nearest to 2008.

For 13 countries and minor territories having no abortion statistics or estimates, including 2% of the female population in countries with predominantly safe abortion, we applied a low-variant (10 abortions per 1000 women), medium-variant (20 abortions per 1000 women), or high-variant abortion rate (50 abortions per 1000 women), based on their contraceptive prevalence and fertility rates, and inferences drawn from information of abortion in similar settings.

Unsafe abortions

The compilation of studies and data on unsafe abortion is an ongoing activity of WHO's Special Program in Human Reproduction. To estimate abortion incidence, we gathered information from published and unpublished sources obtained from websites of national authorities and non-governmental organizations, data reported to WHO Headquarters and Regional Offices, searches of library databases, and through personal contacts with researchers worldwide. We gave preference to national estimates published in peer-reviewed journals or other reports using widely accepted methodologies; when these reports were absent, we prioritized nationally representative data, mainly hospitalization records. In the absence of national data, we adjusted information from subnational studies as needed to provide national estimates based on each study's selection criteria. We applied estimates for years other than 2008 to 2008 when there was no evidence to suggest changes in abortion levels. More national-level data were available to inform the estimates for 2008 than for 1995 or 2003, especially for western Asia, middle Africa, and central America, allowing for more accurate estimates for those subregions in 2008.

For countries with available data on numbers of women admitted to hospital for complications from induced and spontaneous abortions, we computed unsafe abortion incidence using a widely used technique that entails (1) subtraction of the likely number of spontaneous abortion cases, and (2) application of an adjustment factor to account for the estimated number of women having abortions who do not need or do not receive treatment. For several countries, published adjustment factors derived from surveys of knowledgeable professionals are available. [22] For others, the factor was assumed to be the same as that in a country with a similar abortion law and health-care infrastructure and a known adjustment factor.

As already noted, surveys of women generally underestimate abortion incidence because a large proportion of women do not report their abortions. Under-reporting is even greater in countries with restrictive laws than in countries with

liberal laws. Studies indicate that at most half of women in countries with restrictive abortion laws report their abortions, and we used this minimum adjustment for survey-based estimates.

For 11 countries representing 5% of women of reproductive age living where abortions are unsafe, we adjusted data from subnational studies to yield national estimates by weighting the results to match the rural and urban composition of the country. A few small countries for which no information was available were assumed to have the same abortion rate as other countries in the region with similar abortion laws, fertility and contraceptive use, or the average rate of other countries in the region to which they belong.

Certainty of estimates

Because few of the abortion estimates were based on studies of random samples of women, and because we did not use a model-based approach to estimate abortion incidence, it was not possible to compute confidence intervals based on standard errors around the estimates. Drawing on the information available on the accuracy and precision of abortion estimates that were used to develop the subregional, regional, and worldwide rates, we computed intervals of certainty around these rates (Available on request from authors). We computed wider intervals for unsafe abortion rates than for safe abortion rates. The basis for these intervals included published and unpublished assessments of abortion reporting in countries with liberal laws, [7,19] recently published studies of national unsafe abortion, [23–25] and high and low estimates of the numbers of unsafe abortion developed by WHO. [4] The body of countryspecific evidence on abortion has increased with time, and more recent regional and subregional estimates were therefore likely to be more precise than older estimates.

Statistical analysis

We calculated abortion rates (numbers of abortions for every 1000 women aged 15–44 years) using UN Population Division (UNPD) population estimates. [26] We

estimated the number of pregnancies as the sum of livebirths (also based on UNPD estimates), abortions, and spontaneous pregnancy losses (miscarriages and stillbirths). Using a model-based approach derived from clinical studies, we estimated that spontaneous pregnancy losses equaled 20% of all births plus 10% of all abortions. [27,28] Regions were defined as they are by the UN Population Division. [26]

We examined the associations of the abortion rates in the world's 18 subregions with access to legal abortion, measured as the percent of the female population aged 15–44 years living in countries or territories with liberal abortion laws in 2008. We did univariate linear regression analyses after ensuring that the assumptions of linear regression models were met. We used SPSS version 18 to do the statistical analyses.

Role of the funding source

The sponsors of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

An estimated 43.8 million abortions occurred in 2008, compared with 41.6 million in 2003, and 45.6 in 1995 (table 1). About 78% of all abortions took place in the developing world in 1995, and increased to 86% in 2008, whereas the proportion of all women of reproductive age who live in the developing world rose from 80% to 84% in the same interval. Since 2003, the number of abortions fell by 0.6 million in the developed world, but increased by 2.8 million in developing countries. The estimated annual number of abortions rose moderately in Africa and Asia, and slightly in the Latin America region; it fell slightly in Europe and North America and held steady in Oceania (table 1).

Although absolute numbers of abortions might increase as a result of population growth, the abortion rate per 1000 women is not affected by this factor. Some 28 abortions occurred for every 1000 women aged 15–44 years in 2008, compared

with 29 in 2003 (table 2). Taking into account the certainty intervals around these numbers, this difference was not deemed meaningful. This insubstantial change in the rate follows a period of notable decline from 35 abortions per 1000 women in 1995, representing an average annual decline of almost 2.4% between 1995 and 2003, compared with 0.3% between 2003 and 2008.

In 2008, the estimated rate was 24 in the developed world and 29 in the developing world. Abortion rates have been fairly stable at the regional level since 2003, following small declines in some regions, most notably Europe, between 1995 and 2003 (figure 1).

The abortion rates in the African subregions ranged from 15 (southern Africa) to 38 (eastern Africa) in 2008 (table 2). The fluctuation in the rates for middle and southern Africa since 1995 reflects differences in the quality of data available over time; the lower rate in southern Africa in 2008 also probably reflects in part a decrease in abortion incidence.

Abortion rates across the Asian subregions ranged from 26 (south central and western Asia) to 36 (southeastern Asia) in 2008 (table 2). The high rate in southeastern Asia is partly due to the high incidence in Vietnam, which comprises 15% of the population in this subregion. The estimated abortion rates held steady in the Asian subregions between 2003 and 2008 (table 2).

In 2008, the lowest subregional rate worldwide was in western Europe (12) and the highest was in eastern Europe (43; table 2). The rates in the European subregions were unchanged since 2003. The steady rates in Eastern and Southern Europe follow sharp drops in the rate between 1995 and 2003. The abortion rate declined modestly in Oceania between 1995 and 2008.

Worldwide, 49% of abortions were unsafe in 2008, up from 44% in 1995 (table 2). Nearly all (97%) abortions were unsafe in Africa in 2008 (table 2). The proportions of abortions that are unsafe vary widely across Asia, from a negligible proportion in eastern Asia to 65% in south central Asia (table 2). The estimated proportion of abortions that are unsafe increased most in western Asia, partly as a result of declines in the incidence of safe abortion. Some 91% of abortions in Europe are

safe (table 2). Practically all the unsafe abortions in Europe take place in eastern Europe, where 13% of abortions were unsafe in 2008.

The estimated worldwide proportion of pregnancies that end in abortion was 21% in 2008, 20% in 2003, and 22% in 1995 (table 3). In the developed world, abortion declined as a percent of all pregnancies from 36% in 1995, to 26% in 2008. It held steady at 19–20% of pregnancies in the developing world (table 3). The proportion of pregnancies that end in abortion was lower in developing regions than in developed regions, partly because birth rates were higher in developing regions. The sharp decline in the proportion of pregnancies that ended in abortion in the developed world since 1995 was concentrated in eastern Europe (data not shown). This proportion also declined modestly in North America and Oceania.

In 2008, the abortion rate was lower in subregions where larger proportions of the female population lived under liberal laws than in subregions where restrictive abortion laws prevailed (b coefficient for the association based on a linear regression model 0.11, $p < 0.05$; figure 2).

Discussion

Our findings show that the substantial decline in the abortion rate observed between 1995 and 2003 has tapered off, and the proportion of abortions that are unsafe has increased since 1995, such that nearly half of all abortions worldwide were unsafe in 2008.

Our estimates of the rates of unsafe abortion across countries and regions tend to align with independent subnational, national, and regional research of the incidence of abortion-related morbidity and mortality, where such evidence exists. However, among the abortions classified as either safe or unsafe, there is a spectrum of risk associated with the procedure that depends on factors such as training of providers, abortion methods used, and the extent to which abortions are done under hygienic conditions. This risk range is not represented in the simple classification system we used because detailed information about abortion provision was unavailable for most countries.

Evidence from various countries, including some with highly restrictive abortion laws, suggests that the use of misoprostol as an abortifacient has been spreading. [24,29–31] Although clandestine medical abortions are likely to be of lower risk than other clandestine abortions, there is substantial variation in medical abortion regimens used illegally, and complications such as prolonged and heavy bleeding and incomplete abortions are associated with use of incorrect dosages. [30] Thus, these procedures are on the whole classified as unsafe.

The safety of an abortion procedure is also affected by the gestational age at the time of the abortion. Women might delay seeking an abortion where abortion laws are restrictive or abortion is widely stigmatized, and the prevalence of late abortions might change with time. [32] Research on gestational age at abortion is extremely scarce and this represents a gap in research on unsafe abortion.

Statistics on abortion incidence are prone to misreporting for many reasons, as elaborated in reviews of abortion estimation methodologies. [8,9] These potential sources of error include omission of private sector abortions; inclusion of spontaneous abortions in some official reports; undercounting of medical abortions; under-reporting of induced abortions in surveys of women, and misclassification of abortion-related complications in hospitalization records. We used various sources, including published studies, models based on biological data, and input from key informants, to assess the magnitude of these biases and to correct for them. We expect that the range of random error in country-specific estimates narrows when these are aggregated to the subregional and regional levels. We developed certainty intervals to account for the remaining imprecision in the estimates.

Changes in abortion incidence between 1995 and 2008 are not explained by the age distribution of women 15–44 worldwide. The proportion of 15–44 year-olds who are aged 15–29 years (the age range at which abortion is most prevalent) [33,34] declined by less than 4% over these 13 years [35] whereas the abortion rate per 1000 women aged 15–44 years declined by 19%. Other trends that could affect the abortion rate, and for which representative data at the subregional and regional levels are not readily available, include a rise in women's age at marriage,

increased prevalence of sexual activity among unmarried women, and growing proportions of women in the labor force resulting in more prevalent and more strongly held desires to control the timing of births.

We found that the proportion of women living under liberal abortion laws is inversely associated with the abortion rate in the subregions of the world. Other studies have found that abortion incidence is inversely associated with the level of contraceptive use, especially where fertility rates are holding steady, [36–38] and there is a positive correlation between unmet need for contraception and abortion levels. [36] The unmet need for modern contraception is lower in subregions dominated by liberal abortion laws than in those dominated by restrictive laws, and this might help explain the observed inverse association between liberal laws and abortion incidence. [39] Global levels of unmet need and contraceptive use seem to have stalled in the past decade: the percent of married women with unmet need for contraception fell by 0.2 percentage points per year in 1990–2000, but essentially did not change in 2000–2009. [39] Family planning services seem to not to be keeping up with the increasing demand driven by the increasingly prevalent desire for small families and for better control of the timing of births. [40]

The most recent progress report on the MDGs shows that the gap between developed and developing countries is largest with respect to maternal health. [41] This gap is mirrored in the sharp difference in the incidence of unsafe abortion between the developed and developing regions. Within developing countries, more liberal abortion laws are associated with fewer health consequences from unsafe abortion. Abortion mortality fell greatly after the liberalization of the abortion law in South Africa. [42,43] In Nepal, where abortion was made legal on broad grounds in 2002, abortion-related complications fell from 54% to 28% of all maternal morbidities treated at relevant facilities between 1998 and 2009. [44] Recent national trends in abortion-related morbidity and mortality in Ethiopia, where the law was liberalized in 2005, are not yet known, but access to equipment and training of providers in safe abortion care increased since 2005, [45] and a study in one large hospital found that the ratio of abortion complications to livebirths declined significantly between 2003 and 2007. [46]

Various developing countries have broadened the grounds under which abortion is legal in recent years. [47] However, a liberal abortion law alone does not ensure the safety of abortions. Other necessary steps include the dissemination of knowledge about the law to providers and women, the development of health-service guidelines for abortion provision, the willingness of providers to obtain training and provide abortion services, and government commitment to provide the resources needed to ensure access to abortion services, including in remote areas.

Although research indicates that the annual number of maternal deaths has declined in recent years, the WHO estimates that the proportion of maternal deaths due to unsafe abortion remained at 13% in 2008 as in 2003. [4] Death due to unsafe abortion remains an important and avoidable occurrence, as do the health and social and economic consequences of unsafe abortion. [12,48]

Constraints on accurately measuring abortion levels have become more prevalent over the years where private sector abortions, medical abortions, and the stigmatization of abortion have become more common, as all these factors tend to increase the level of underreporting. If abortion estimation is to remain feasible, investments must be made in further refining and applying research methods for measuring abortion incidence.

We found that abortions continue to occur in measurable numbers in all regions of the world, regardless of the status of abortion laws. Unintended pregnancies occur in all societies, and some women who are determined to avoid an unplanned birth will resort to unsafe abortions if safe abortion is not readily available, some will suffer complications as a result, and some will die. Measures to reduce the incidence of unintended pregnancy and unsafe abortion—including improving access to family planning services and the effectiveness of contraceptive use, and ensuring access to safe abortion services and post-abortion care—are crucial steps toward achieving the MDGs.

Contributors

GS and EA compiled information sources and led the estimation of the incidence of safe abortion (GS) and unsafe abortion (EA). SS, IHS, SKH, and AB provided technical assistance during the data collection and estimation of abortion incidence. GS wrote and revised the report. All other authors provided substantive input on drafts of the report. All authors have seen and approved the final version of the report.

Acknowledgments

This study was funded by the UK Department of International Development, the Dutch Ministry of Foreign Affairs, and the John D and Catherine T MacArthur Foundation. The estimation of unsafe abortion was developed and commissioned by WHO and some of these estimates have been published previously.⁴ The estimation of safe abortion and the compilation of worldwide levels was led by the Guttmacher Institute. The authors alone are responsible for the views expressed in this paper and they do not necessarily represent the decisions, policy, or views of their institutions or those of funding agencies. We thank Alyssa Tartaglione, Rubina Hussain, and Michelle Eilers for their assistance with obtaining and managing data and preparing the manuscript.

References

- [1] Bartlett LA, Berg CJ, Shulman HB, et al. Risk factors for legal induced abortion-related mortality in the United States. *Obstet Gynecol* 2004; 103: 729–37.
- [2] Henshaw SK. How safe is therapeutic abortion? In: Teoh ES, Ratnam SS, Macnaughton M, eds. *The Current Status of Gynaecology and Obstetrics Series*, vol 5. Carnforth, UK: Parthenon Publishing Group, 1993: 31–41.
- [3] Grimes DA. Estimation of pregnancy-related mortality risk by pregnancy outcome, United States, 1991 to 1999. *Am J Obstet Gynecol* 2006; 194: 92–94.
- [4] WHO. *Unsafe abortion: global and regional estimates of the incidence of unsafe abortion and associated mortality in 2008*, 6th edn. Geneva: World Health Organization, 2011.
- [5] Grimes DA, Benson J, Singh S, et al. Unsafe abortion: the preventable pandemic. *Lancet* 2006; 368: 1908–19.
- [6] Singh S. Hospital admissions resulting from unsafe abortion: estimates from 13 developing countries. *Lancet* 2006; 368: 1887–92.
- [7] Sedgh G, Singh S, Henshaw SK, Bankole A. Legal abortion worldwide in 2008: levels and recent trends. *Int Perspect Sex Reprod Health* 2011; 37: 84–94.
- [8] Singh S, Remez L, Tartaglione A, eds. *Methodologies for estimating abortion incidence and abortion-related morbidity: a review*. New York, Paris: Guttmacher Institute, International Union for the Scientific Study of Population; 2010.
- [9] Rossier C. Estimating induced abortion rates: a review. *Stud Fam Plann* 2003; 34: 87–102.
- [10] WHO. *The prevention and management of unsafe abortion. Report of a technical working group*. Geneva: World Health Organization, 1992 (WHO/MSM/92.5).
- [11] Shah I, Ahman E. Unsafe abortion in 2008: global and regional levels and trends. *Reprod Health Matters* 2010; 18: 90–101.

- [12] Singh S, Wulf D, Hussain R, Bankole A, Sedgh G. Abortion worldwide: a decade of uneven progress. New York: Guttmacher Institute, 2009.
- [13] Duggal R, Ramachandran V. Summary and key findings, abortion assessment project-India. Mumbai: Center for Enquiry into Health and Allied Themes (CEHAT) and Healthwatch, 2004.
- [14] Fetters T, Samandari G. An estimate of safe and unsafely induced abortion in Cambodia. Paper presented at the XXVI International Population Conference of the IUSSP; Marrakech, Morocco; Sep 27–Oct 2, 2009.
- [15] Harries J, Stinson K, Orner P. Health care providers' attitudes towards termination of pregnancy: a qualitative study in South Africa. *BMC Public Health*, 2009, Vol. 9, Art. 296, <http://www.biomedcentral.com/1471-2458/9/296> (accessed April 6, 2011).
- [16] Centers for Disease Control and Prevention (CDC) and ORC Macro. Reproductive, maternal and child health in Eastern Europe and Eurasia: a comparative report (revised 2005). Calverton, MD, USA: CDC and ORC Macro, 2003.
- [17] Grossman D, Holt K, Peña M, et al. Self-induction of abortion among women in the United States. *Reprod Health Matters* 2010; 18: 136–46.
- [18] Jones RK. How commonly do US abortion patients report attempts to self-induce? *Am J Obstet Gynecol* 2011; 204: 23, e1–4.
- [19] Sedgh G, Henshaw SK. Measuring the incidence of abortion in countries with liberal laws. In: Singh S, Remez L, Tartaglione A, eds. Methodologies for estimating abortion incidence and abortion-related morbidity: a review. New York: Guttmacher Institute; and Paris: International Union for the Scientific Study of Population, 2010: 23–33.
- [20] Jones EF, Forrest JD. Underreporting of abortion in surveys of US women: 1976 to 1988. *Demography* 1992; 29: 113–26.

[21] Jones RK and Kost K, Underreporting of induced and spontaneous abortion in the United States: an analysis of the 2002 National Survey of Family Growth. *Stud Fam Plann* 2007; 38: 187–97.

[22] Singh S, Prada E, Juarez F. The abortion incidence complications method: a quantitative technique, In: Singh S, Remez L, Tartaglione A, eds. *Methodologies for estimating abortion incidence and abortion-related morbidity: a review*, New York: Guttmacher Institute; and Paris: International Union for the Scientific Study of Population, 2010, pp. 71–85.

[23] Singh S, Feters T, Gebreselassie H, et al. The estimated incidence of induced abortion in Ethiopia, 2008. *Int Perspect Sex Reprod Health* 2010; 36: 16–25.

[24] Juarez F, Singh S, Garcia SG, Olavarrieta CD. Estimates of induced abortion in Mexico: what's changed between 1990 and 2006? *Int Fam Plan Perspect* 2008; 34: 158–68.

[25] 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.

[26] UN Department of Economic and Social Affairs. *World population prospects: the 2008 revision*. New York: United Nations, 2009.

[27] Harlap S, Shiono PH, Ramcharan S. "A Life Table of Spontaneous Abortions and the Effects of Age, Parity and Other Variables," in Hook EB and Porter I, eds. *Human embryonic and fetal death*, Academic Press, New York, 1980, Table 1, pp. 148 and 157.

[28] Bongaarts J, Potter RG. *Fertility, Biology and Behavior: An Analysis of the Proximate Determinants*, Academic Press, New York, 1983, pp. 71–72 and 85–86.

[29] Miller S, Lehman T, Campbell M, et al. Misoprostol and declining abortion-related morbidity in Santo Domingo, Dominican Republic: a temporal association. *BJOG* 2005; 112: 1291–96.

- [30] Clark S, Blum J, Blanchard K, Galvão L, Fletcher H, Winikoff B. Misoprostol use in obstetrics and gynecology in Brazil, Jamaica, and the United States. *Int J Gynaecol Obstet* 2002; 76: 65–74.
- [31] Lafaurie MM, Grossman D. El aborto con medicamentos en América Latina: Las experiencias de las mujeres de México, Colombia, Ecuador y Perú, Bogotá, Colombia: Population Council, 2005.
- [32] Guttmacher Institute. Readings on induced abortion volume 2: a world review, 2000. New York: Guttmacher Institute, 2001: 165–70.
- [33] WHO and Department of Reproductive Health and Research. Unsafe abortion: global and regional estimates of the incidence of unsafe abortion and associated mortality in 2003. 2007. Geneva: World Health Organization, 1–43.
- [34] Bankole A, Singh S, Haas T. Characteristics of women who obtain induced abortion: a worldwide review. *Int Fam Plan Perspect* 1999; 25: 68–77.
- [35] United Nations. World Population Prospects: The 2008 Revision. New York: United Nations; 2009.
- [36] Westoff CF. A new approach to estimating abortion rates. DHS Analytical Studies No. 13. Calverton, Maryland: Macro International Health, 2008.
- [37] Westoff CF. Recent trends in abortion and contraception in 12 countries, DHS Analytical Studies, Princeton, NJ, USA: Office of Population Research, Princeton University; and Calverton, MD, USA: ORC Macro, 2005, No. 8.
- [38] Marston C, Cleland J. Relationships between contraception and abortion: a review of the evidence. *Int Fam Plan Perspect* 2003; 29: 6–13.
- [39] United Nations, Department of Economic and Social Affairs, Population Division (2011). World Contraceptive Use 2010. http://www.un.org/esa/population/publications/wcu2010/WCP_2010/Data.html (accessed Dec 19, 2011).

- [40] Singh S, Darroch JE, Ashford LS, Vlassoff M. Adding it up: the costs and benefits of investing in family planning and maternal and newborn health. New York: Guttmacher Institute, 2009.
- [41] United Nations. The millennium development goals report. New York: United Nations, 2010.
- [42] Jewkes R, Rees H. Dramatic decline in abortion mortality due to the Choice on Termination of Pregnancy Act. *S Afr Med J* 2005; 95: 250.
- [43] Sedgh G, Henshaw S, Singh S, Ahman E, Shah IH. Induced abortion: estimated rates and trends worldwide. *Lancet* 2007; 370: 1338–45.
- [44] Suvedi, Bal Krishna, Ajit Pradhan, et al. Nepal maternal mortality and morbidity study 2008/2009: summary of preliminary findings. Kathmandu, Nepal: Family Health division, Department of Health Services, Ministry of Health, Government of Nepal, 2009.
- [45] Benson J, Alemayehu T, Otsea K, Healy J. Monitoring safe abortion services in Ethiopia: testing a model to improve service availability, use and quality. International Union for the Scientific Study of Population, 2009.
- [46] Gebrehiwot Y, Liabsuetrakul T. Trends of abortion complications in a transition of abortion law revisions in Ethiopia. *J Public Health (Oxf)* 2009; 31: 81–87.
- [47] Boland R, Katzive L. Developments in laws on induced abortion: 1998-2007. *Int Fam Plan Perspect* 2008; 34: 110–20.
- [48] Singh S. Global consequences of unsafe abortion. *Womens Health (Lond Engl)* 2010; 6: 849–60.
- [49] Henshaw SK, Singh S, Haas T. The incidence of abortion worldwide. *Int Fam Plann Perspect* 1999; 25: S30–38.
- [50] Singh S, Sedgh G, Hussain R. Unintended pregnancy: worldwide levels, trends, and outcomes. *Stud Fam Plann* 2010; 41: 241–50.

Table 1. Estimated number of induced abortions (in millions) worldwide and by region, subregion and year.

Region and Subregion ⁽¹⁾	2008	2003	1995
World	43.8	41.6	45.6
Developed countries ⁽²⁾	6.0	6.6	10.0
Excluding Eastern Europe	3.2	3.5	3.8
Developing countries ⁽²⁾	37.8	35.0	35.5
Excluding China	28.6	26.4	24.9
Estimates by region and subregion			
Africa	6.4	5.6	5.0
Eastern Africa	2.5	2.3	1.9
Middle Africa	0.9	0.6	0.6
Northern Africa	0.9	1.0	0.6
Southern Africa	0.2	0.3	0.2
Western Africa	1.8	1.5	1.6
Asia	27.3	25.9	26.8
Eastern Asia	10.2	10.0	12.5
South-central Asia	10.5	9.6	8.4
South-eastern Asia	5.1	5.2	4.7
Western Asia	1.4	1.2	1.2
Europe	4.2	4.3	7.7
Eastern Europe	2.8	3.0	6.2
Northern Europe	0.3	0.3	0.4
Southern Europe	0.6	0.6	0.8
Western Europe	0.4	0.4	0.4
Latin America	4.4	4.1	4.2
Caribbean	0.4	0.3	0.4
Central America	1.1	0.9	0.9
South America	3.0	2.9	3.0
Northern America	1.4	1.5	1.5
Oceania	0.1	0.1	0.1

¹ Regions and subregions as defined by the United Nations.

² Developed regions are defined here to include Europe, North America, Australia, Japan and New Zealand; all others are classified as developing.

Table 2. Estimated safe and unsafe abortion rates* worldwide and by region, subregion and year.

Region and Subregion	2008				2003				1995			
	Total	Safe	Unsafe	% Unsafe	Total	Safe	Unsafe	% Unsafe	Total	Safe	Unsafe	% Unsafe
World	28	14	14	49	29	15	14	47	35	20	15	44
Developed countries	24	22	1	6	25	24	2	7	39	35	4	9
Excluding Eastern Europe	17	17	^	^	19	18	1	3	20	20	1	3
Developing countries	29	13	16	56	29	13	16	55	34	16	18	54
Excluding China	29	8	22	74	30	8	22	73	33	8	25	76
Estimates by region and subregion												
Africa	29	1	28	97	29	^	29	98	33	^	33	99
Eastern Africa	38	2	36	96	39	^	39	100	41	^	41	100
Middle Africa	36	^	36	100	26	^	26	100	35	^	35	100
Northern Africa	18	^	18	98	22	^	22	100	17	1	17	96
Southern Africa	15	7	9	58	24	5	18	77	19	^	19	100
Western Africa	28	^	28	100	27	^	27	100	37	^	37	100
Asia	28	17	11	40	29	18	11	38	33	21	12	37
Eastern Asia	28	28	^	^	28	28	^	^	36	36	^	^
South-central Asia	26	9	17	65	27	9	18	66	28	6	22	78
South-eastern Asia	36	14	22	61	39	16	23	59	40	16	24	60
Western Asia	26	11	16	60	24	16	8	34	32	18	13	42
Europe	27	25	2	9	28	25	3	11	48	43	6	12
Eastern Europe	43	38	5	13	44	39	5	12	90	78	12	13
Northern Europe	17	17	^	^	17	17	^	^	18	17	1	8
Southern Europe	18	18	^	^	18	15	3	18	24	22	3	12
Western Europe	12	12	^	^	12	12	^	^	11	11	^	^
Latin America	32	2	31	95	31	1	30	96	37	2	35	95
Caribbean	39	21	18	46	35	19	16	45	50	27	23	47
Central America	29	^	29	100	25	^	25	100	30	^	30	100
South America	32	^	32	100	33	^	33	100	39	^	39	100
Northern America	19	19	^	^	21	21	^	^	22	22	^	^
Oceania	17	14	2	15	18	15	3	16	21	17	5	22

* Abortions per 1,000 women aged 15-44.

^ Rate or percent less than 0.5.

Table 3. Estimated percent of all pregnancies* that ended in abortion, worldwide and by region, subregion and year.

Region and Subregion	2008	2003	1995
World	21	20	22
Developed countries	26	28	36
Excluding Eastern Europe	17	19	20
Developing countries	20	19	20
Excluding China	18	17	16
Estimates by region			
Africa	13	12	12
Asia	22	22	21
Europe	30	32	42
Latin America	25	22	23
Northern America	19	21	22
Oceania	14	16	17

*Pregnancies include live births, abortions and miscarriages.

Figure 1. Trends in abortion rate by geographic region, 1995 to 2008

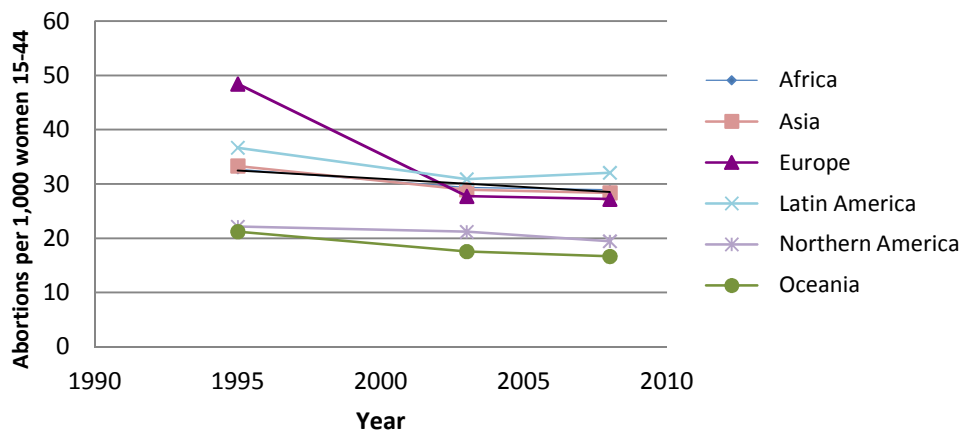


Figure 2. The association of the abortion rate with the prevalence of liberal abortion laws by subregion, 2008.

