

# Attitudes and Intentions Regarding Abortion Provision Among Medical School Students in South Africa.

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Voluntary induced termination of pregnancy is a common medical procedure worldwide. An estimated 42 million abortions are performed annually; nearly 20 million are considered medically unsafe.[1–4] Estimates suggest that 97% of unsafe abortions occur in the developing world, and that unsafe abortion is the leading cause of maternal deaths in Africa, which has the world's highest case-fatality rates.[2,3,5,6]

After a 1994 study found that an estimated 45,000 South African women per year were admitted to public hospitals as a result of incomplete or unsafe abortion,[7, 8] the country legalized abortion in 1996. Prior to this change in the law, abortion had been legal in very limited circumstances under the Sterilization Act of 1975, requiring the approval of three physicians. The 1996 law specifies that a woman can obtain an abortion on request within the first 12 weeks of pregnancy.[9] Between 13 and 20 weeks' gestation, a woman can obtain an abortion if at least one of four criteria is satisfied: continuing the pregnancy would pose a risk to the woman's mental or physical health; there is significant risk that the unborn child would have a mental or physical handicap; the pregnancy was the result of rape or incest; or having the child would be detrimental to the woman's socioeconomic condition.[9] Beyond 20 weeks, abortion is sanctioned only when the woman's life is endangered. In addition, although medical providers can conscientiously object to performing abortions, providers who are unwilling or unable to offer abortion services are legally obligated to inform women of their rights and to refer them to other providers.

As part of a series of progressive human rights initiatives undertaken by the post apartheid government, the 1996 law extended abortion provision to all provinces in South Africa, and free abortion services were provided in public clinics and hospitals.[9] Although the legalization of abortion often leads to a considerable decrease in maternal morbidity and mortality through the resulting decline in unsafe abortions,[10] it does not necessarily ensure effective implementation of and access to medically safe abortion services. One global survey estimated that approximately 60% of the world's population lives in countries where abortion is officially legal but considerable barriers to getting an abortion remain, despite high demand.[11] In South Africa, one national survey of 15–24-year-olds found that 65% of women who had ever been pregnant reported having had at least one unwanted pregnancy, but only 3% had received an abortion in a medical facility.[12] In one major city, only one-third of all abortions requested over a two-year period had actually been performed.[13] Estimates suggest that as many as 125,000 unsafe abortions (out of approximately 200,000 total abortions) are performed annually in South Africa, and that 26% of maternal deaths result from unsafe abortion.[3,14–17] There is also concern that barriers in access to abortion services have led to an elevated rate of second-trimester abortions (about 20% of all procedures),[18,19] and these later abortions are inherently more dangerous.

Barriers to access lead to a significant public health burden, in terms of both cost and poor health outcomes associated with medically unsafe abortions, as well as the strain placed on providers to meet the high demand for abortion without compromising quality of care. Evidence that midwives and nurses can safely provide first-trimester abortions has increased the use of such providers in South Africa, which has shifted some of the burden from doctors in hospitals to midlevel providers in community health centers.[20–23] In addition, the increased use of medication abortion has helped to relieve the bottleneck of abortion service provision.[24,25] However, in spite of South Africa’s policy-making efforts, staff, infrastructure and budgetary constraints have limited the effectiveness and timeliness of the rollout of abortion services in the country.[26,27] Yet the greatest barrier to implementing the abortion law has been the lack of health personnel willing to train to become abortion providers.[28,29]

Data from present and future health care providers regarding their abortion attitudes, beliefs and practice intentions can yield insight about the potential supply of the abortion providers and can point to opportunities for training, values clarification and recruitment of practitioners. As the next generation of health care providers, medical students are a critical component of service provision, and a better understanding of their attitudes, beliefs and intentions regarding abortion may help inform the development of training programs and policies regarding abortion care.

Studies in the United States and the United Kingdom have shown associations between medical students’ attitudes toward abortion and a number of individual characteristics, including religious beliefs, gender, age, sexual experience, exposure to abortion, extent of medical training in abortion services and future practice intentions.[30–34] However, these findings may not be generalizable to South Africa or other African nations, and may not accurately reflect the nuances of African health systems and cultures. Furthermore, little research has been conducted on abortion in developing nations, and to help address this gap in the literature, the current study assessed attitudes and beliefs about abortion provision and future practice intentions of South African medical students. This research expands the scope of an earlier study that assessed attitudes and beliefs about abortion among students at a small medical school in rural South Africa.[35]

## **METHODS**

### **Sampling and Data Collection**

We developed a self-administered questionnaire for all students enrolled in the medical training programs at the University of Cape Town (UCT; years 1–6) and Walter Sisulu University (WSU; years 1–5)\* in 2005 and 2007, respectively. These settings were selected to capture the racial, ethnic, geographic, cultural and socioeconomic diversity of South African medical students and the communities served by these medical centers. UCT and WSU are in an urban and a rural area, respectively, on opposite sides of the country. The former school is located in one of the two wealthiest South African provinces, where annual per capita disposable income is US\$3,282, with 32% of the population living in poverty; the latter school is

in one of the poorest provinces, where per capita income is US\$1,081, with 72% of the population living in poverty. In South Africa, most medical students attend medical school within their home province. Regarding race and ethnicity, UCT is a historically white university, whose student population reflects the greater number of whites living in the Western Cape, whereas WSU is a historically black university, reflecting the greater number of Africans or blacks living in the Eastern Cape.[36,37] We believe these schools encompass South Africa's diverse medical student population.

Arrangements were made with faculty members and lecturers to designate an appropriate time to administer the questionnaire. Following an explanation of the purpose and intention of the study, informed consent was obtained from students. The questionnaire was administered during a required course for each year cohort and took approximately 20 minutes; responses were anonymous. We excluded students if they were absent when the questionnaire was disseminated. Class rosters were used to determine the underlying population size and overall survey response rate.

## Survey Development and Measures

The survey consisted of five domains: social and demographic characteristics; knowledge of the country's abortion law; attitudes and beliefs about abortion provision; medical curriculum and training in abortion services; and future intentions pertaining to abortion provision. This study focuses primarily on students' attitudes, beliefs and practice intentions. The instrument was based on literature on the knowledge, attitudes, beliefs and practice intentions regarding abortion care of medical providers and medical students worldwide.[32–35,38–47] According to Cook et al.,[39] the wording of questionnaires designed to capture knowledge, attitudes and beliefs about abortion is of critical importance. In their analysis of several types of survey questions from abortion polls in the United States, they found that when questions were too general, responses “overstate the strength of sentiments for positions at either end of the scale,”[39] (p. 145) whereas more specific questions allow for a considerably more nuanced assessment of subjects' attitudes and feelings. We therefore included as many specific questions as possible, and also inserted several general questions to gauge consistency and internal validity across survey items.

The instrument was pilot-tested among faculty members in women's health and among public health students, and was revised repeatedly according to the feedback received. The final instrument—a structured, 63-item, paper-and-pencil survey—was written in English, as this was the primary language used in medical programs.

Independent variables included the institution, gender, year in medical school (collapsed into three groups of the clinical years: 1–2, 3–4 and 5–6), religious affiliation, religious attendance (regular, semi regular, not often or never), relationship status (single and never in a relationship, not in one currently, presently in one, or other), experience of sexual intercourse, and race or ethnicity. Ethnic and racial classifications in South Africa are historically and politically distinct from those in other countries; we used the widely recognized categories of white, African or black, coloured (i.e., of mixed race, including Cape Malay), Indian and other.

The survey included 25 questions about students' attitudes, beliefs and practice intentions regarding abortion provision (see Table 2). The majority solicited five-point Likert-scaled responses along a continuum from "strongly agree" to "strongly disagree." Questions were phrased in both the positive and the negative to ensure the consistency of answers; relevant items were reverse-coded for statistical analysis so that low scores reflected unsupportive responses and high scores indicated supportive ones. Prior to conducting factor analyses, we created three summary scales reflecting general support for abortion provision (five items), conditional support for abortion provision (nine items), and intention to act according to personal attitudes and beliefs (six items); scores represent averages of the relevant items on a scale of 1–5. In addition, responses to all individual items were averaged to produce a score for the overall level of support for abortion provision.

We tested the internal reliability of students' responses and confirmed that the three-component support model demonstrated good fit with the observed data on the basis of confirmatory factor analysis and a structural equation modeling framework using MPLUS version 6.1 (Confirmatory Fit Index, 0.95; Tucker-Lewis Index, 0.95; both should be  $\geq 0.95$  for a good fit); however, one fit index (Root Mean Squared Error of Approximation) was outside the good-fit criteria (0.10 instead of  $< 0.06$ ). Alternative models were tested, yet none showed significant improvement in fit. The internal consistency of the three scales was also good for group-level measurement: Cronbach's alphas for the general support, conditional support and intention to act scales were 0.92, 0.80 and 0.79, respectively.

## Analysis

Frequencies were tabulated, and where appropriate, outliers and inconsistencies were checked against the original questionnaires. Data were analyzed for descriptive outcomes, including proportions and means. Bivariate associations between attitudes, beliefs and intentions regarding abortion provision and institution and year in medical school were examined using cross-tabulation and Pearson's chi-square tests and Fisher's exact tests, as appropriate.

In multivariate analyses, ordinary least-squares regression was used to identify associations between individual-level characteristics and the degree of support for abortion provision, as represented by the three summary scales of general support, conditional support and intention to act according to one's attitudes and beliefs. Ordinal logistic regression analysis was used to estimate the average marginal effects of individual characteristics on two additional survey items: whether providers should be allowed to refuse to perform an abortion (where 1 = "strongly agree" and 5 = "strongly disagree"), and whether providers who object to abortion should be required to refer patients to another provider (where 1 = "strongly disagree" and 5 = "strongly agree"). In a nonlinear context, a marginal effect is a partial derivative that describes the average change in the value of a dependent variable as a result of a one-unit change in an independent variable, while holding all other variables at their mean values or at specific values of interest (e.g., for a subpopulation).[48] To generate average marginal effects in an ordered logistic regression, we employed the *margins* command in Stata postestimation to produce estimates of the change in the probability of observing any one of the five possible response outcomes.

The multivariate models controlled for all individual-level characteristics; age was not included as a covariate because it was highly collinear with the year in medical school. Although few data were missing, complete case analysis was used to avoid possible biases and inappropriate assumptions associated with multiple imputation. Statistical analyses were conducted using Stata version 11, and institutional review board approval was obtained from the research ethics committee within the Faculty of Health Sciences at each university.

## RESULTS

### Sample Characteristics

In total, 1,308 students completed the questionnaire; 882 attended the University of Cape Town, and 426 attended Walter Sisulu University. Response rates at the two universities were 79% and 84%, respectively. At the time, this sample represented about 15% of the medical student population in South Africa.<sup>[37]</sup> As expected, the two student populations were quite diverse and were different from each other. The majority of students at both UCT and WSU were female (63% and 55%, respectively— [Table 1](#), page 156). One-third of UCT students were African or black, and three in 10 were white; in contrast, 84% of WSU students were African or black, and 1% were white. Although the majority of medical students identified themselves as non-Catholic Christian (55%–72%, respectively), the religious composition of the two samples differed: Larger proportions at UCT than at WSU were Muslim (14% vs. 1%) or agnostic or atheist (7% vs. 1%). Similar proportions of students reported regular attendance at religious services (44% and 36%, respectively). Most respondents had previously been in a relationship (36% and 30%) or were currently involved (39% and 42%, respectively), while one-fifth at each university had never been in a relationship. A smaller proportion of UCT students than of WSU students had ever had intercourse (40% vs. 68%). In general, respondents' relationship experience and sexual experience increased with years of schooling.

### Support for Abortion Provision

Mean scores of students' general and conditional support for abortion provision were 3.4 and 3.3, respectively, indicating that, on average, their views were modestly supportive or tolerant (not shown). The mean score for students' intention to act according to their attitudes and beliefs regarding abortion was 3.4. Overall, UCT students scored higher than WSU students on general support for abortion regardless of specific circumstances (3.5 vs. 3.2), while the two samples had similar scores on the conditional support (3.3 for each) and intention to act scales (3.4 and 3.3, respectively).

Among the items included in the general support for abortion provision scale, 70% of all students agreed that a woman should have the right to decide for herself whether to have an abortion, and 48% believed that the South African government should provide abortions as part of free, public health care ([Table 2](#), page 157). Although

40% of students agreed that safe, voluntary abortion should be legal and accessible, 43% disagreed with this position. Several items in the conditional support scale received widespread support among students: belief that abortion should be legal if a woman's physical or mental health is endangered by pregnancy (83% and 69%, respectively), if the fetus has a congenital defect or malformation (65%), if the pregnancy was the result of rape or incest (64% and 52%, respectively) and if a woman is not married (62%). However, sizable minorities said they would impose various restrictions on abortion provision or try to discourage patients from having the procedure, and 22% of all students believed that abortion should not be allowed for any reason.

Among items included in the intention to act scale, 23% of students agreed with the statement "I intend to provide legal abortion services to women once I am qualified," while 51% disagreed. Seven in 10 of all students said they would refer patients for abortion services in situations where they could or would not provide services themselves, and only 11% said they would not refer patients under any circumstances. About a third of respondents said they would not perform an abortion under any circumstances, and a third indicated that they would try to discourage a patient from having an abortion. Nearly nine in 10 respondents believed that providers who conscientiously object to abortion should be allowed to refuse to perform the procedure, yet seven in 10 agreed that such providers should be required to refer patients to a provider who offers abortion services. Regarding family and peer influences, 22% of students said their families had strongly influenced their beliefs about abortion, whereas only 12% said their friends had been very influential in shaping their views (not shown).

In comparisons of students' beliefs and attitudes by year in medical school, nearly two-thirds of first-year students said they did not intend to provide abortion services once they were qualified to do so, whereas 45–60% of students in the other year cohorts had the same attitude (not shown). Intentions regarding patient counseling varied significantly by year: While 49% of first-year students agreed or strongly agreed that they would try to discourage a patient from having an abortion, only 13% of sixth-year students stated this intention ( $p < .01$ ). In addition, students in the last year of medical school were more likely than those in the first year to disagree or strongly disagree with the statement "I would try to convince other health care providers not to perform abortions" (74% vs. 42%,  $p < .001$ ).

## Multivariate Findings

In multivariate analysis, all three measures of support for abortion provision—general and conditional support, and intention to act according to attitudes and beliefs—were positively associated with being female (coefficients, 0.1–0.3), being in the third to sixth year of training (0.2–0.4), being other than non-Catholic Christian (0.1–1.1), being single and in a current relationship (0.2–0.3), and ever having had sexual intercourse (0.3–0.4; [Table 3](#)). In contrast, the three support measures were negatively associated with being white instead of African or black (–0.2 for each), and with increasing frequency of attendance at religious services (–0.3 to –0.4). In addition, being a medical student at UCT rather than WSU was associated with a higher probability of reporting general support for abortion provision (0.3).

In ordinal logistic regression analysis, compared with students enrolled at Walter Sisulu University, those at the University of Cape Town had an increased probability of strongly agreeing with the statement that providers should be allowed to refuse to perform abortions (by 16 percentage points—[Table 4](#)); students who were white or coloured, or who attended religious services more frequently, also had an elevated probability of strongly agreeing with this position (by 10–15 percentage points). In contrast, compared with non-Catholic Christian students, Jewish students were less likely to strongly agree with this statement (by 29 percentage points). When students were asked whether providers who object to abortion should be required to refer patients to another provider, those who were female, a third- or fourth-year student, coloured, or Hindu, Jewish, atheist or agnostic—as well as those in a relationship or sexually experienced—had an increased probability of strongly agreeing with this statement (by 8–29 percentage points—[Table 5](#)).

## DISCUSSION

A majority of medical school students believed that women should have the right to decide whether to have an abortion, and that abortion is warranted when a woman's physical or mental health is at risk, when fetal congenital defects are suspected or when the pregnancy resulted from rape. A majority also believed that providers who object to abortion provision should be required to refer women to providers who offer the procedure. These are reassuring findings, given that South African law requires medical providers to inform women of their abortion rights and to refer them for services, and may indicate that medical schools are successfully educating future providers about their legal responsibilities to patients. For the majority of surveyed students, patients' rights to referral appeared to supersede providers' personal objections to abortion provision. However, a sizeable minority said they would impose various restrictions on provision or try to convince patients not to obtain an abortion, and a fifth of all students believed that abortion should not be provided for any reason. When asked whether safe, voluntary abortion should be legal and accessible, more than four in 10 students disagreed with this position, while a similar proportion supported it.

Although we did not collect longitudinal data, our findings suggest that medical socialization and education about abortion may lead to greater acceptability and tolerance. Indeed, the curricula at both the University of Cape Town and Walter Sisulu University provide greater exposure to abortion topics in the later years of training. Our results are consistent with those of a study that examined the opinions of medical students in a small medical school in rural South Africa.[\[35\]](#) In a study among preclinical students at the University of Washington that reported a shift in attitude with increasing medical education, Rosenblatt et al. suggested that life experience and medical education afforded students “a broader understanding of the vagaries of existence that make abortions at times unavoidable.”[\[44\]](#)(p. 199) In another U.S. study, among the 20% of medical students who reported a positive change in attitude toward abortion provision, the majority of the shift in opinion was attributed to training received during the clinical years.[\[34\]](#)

In addition, more advanced medical students were more likely than younger students to be sexually experienced and to have been in a romantic relationship, which may

have affected their views on unexpected pregnancy and abortion. In this study, students who had had intercourse or been in a relationship were more likely than their counterparts to favor legal, free and accessible abortion, to support a woman's right to decide whether to have an abortion, and to intend to provide abortions or refer women for services in the future. Although sexual experience was associated with more tolerant attitudes toward abortion among medical students in a U.S. study,[33] sexual experience among medical students in the previously cited South Africa study was not correlated with such attitudes.[35]

Our findings of associations between religious affiliation or attendance of services and abortion views were similar to those reported among students attending a medical school in rural South Africa: Compared with non-Catholic Christian students, those who self-identified as Hindu, Jewish, agnostic, atheist or affiliated with "other" religions were more tolerant of abortion provision, less willing to support restrictive legal barriers and more supportive of government provision of free abortion on request.[35] Christian and Muslim respondents were more likely than others to believe that abortion was morally unacceptable for any reason and to say that they would never perform the procedure or refer patients for an abortion. They also tended to be much less supportive of patients' rights when answering questions about providers' conscientious objection. Religious affiliation has been found to be strongly associated with abortion-related attitudes among clinicians and medical students.[33–35,38,39,41–47] However, some studies have suggested that health care providers recognize the distinction between personal and professional attitudes toward abortion, and believe that a personal religious objection would not prevent them from providing legal services to women, including nondirective counseling, referrals, and surgical and medication abortion.[35,45,46]

## Limitations and Strengths

This study has several limitations. First, responses from a self-administered survey may not be indicative of actual behavior, particularly regarding future intentions, as current expectations may differ from behaviors and practices years from now. Furthermore, external issues, such as facility-based constraints preventing abortion provision, may be deterrents to access to abortion services in the future, despite the clinician's training and willingness to perform abortions. A comprehensive assessment of long-term practices and beliefs would require a large-scale cohort study beginning in medical school with follow-up through professional practice, and future research in this area should consider such an effort. However, by describing attitudes and intentions during medical training, we have shown that a significant proportion of students are willing to provide abortion services in the future, which may point to opportunities for improved educational experiences or values clarification workshops on abortion and abortion training.

Second, because respondents were asked sensitive questions about abortion, social desirability bias may have influenced some responses. We attempted to minimize such bias by administering the questionnaire privately and anonymously. Furthermore, the questionnaire was explicitly designed to avoid lending weight to any particular view about abortion, and questions were pilot-tested and repeatedly rephrased to identify and modify any items that may have been biased toward a

particular opinion. Should any response bias have occurred, however, it is unlikely to have been significant in any particular direction; despite South Africa's current abortion law, there is no clear social consensus about abortion.

A third limitation is that our findings may not be generalizable to other student populations in South Africa or other countries. In particular, the views of students training to be midlevel providers (e.g., nurses, midwives or physician assistants) may differ from those of medical students, and these midlevel health professionals are increasingly important in abortion provision in South Africa.[20–23] Future studies should therefore assess abortion attitudes and practice intentions of students in other health professions. In addition, medical students in South Africa may differ demographically or otherwise from future medical providers elsewhere. Knowledge, attitudes and beliefs about abortion and abortion provision can be quite different from country to country and should be considered in the appropriate political, religious, cultural and educational context.

We believe our study is the first to sample two very different medical institutions, which represent a sizeable component of the future South African medical workforce. We achieved a high level of response by recruiting students directly through course lectures, which most attend regularly. An additional strength is the instrument itself, which was designed carefully, piloted extensively, and tested for internal reliability and consistency.

## Conclusions

Without enough willing providers, abortion services can never be fully available and accessible to the extent required by South African law. The legalization of abortion provision is not enough; effective strategies to improve access to abortion care must be carefully planned, strategically implemented, and regularly monitored and evaluated. A coherent, national effort to improve abortion training and service delivery is needed, and must involve private and public practitioners, the Department of Health, academic training and research institutions, and nongovernmental health organizations. Academic medical institutions must ensure that students understand the laws and responsibilities that govern their professional actions with respect to abortion care (regardless of their personal views), and must provide appropriate abortion training to those who are willing to offer these services. In addition, incentives—such as higher pay and increased institutional support—may help improve abortion access and availability, and may also diminish the stigmatization and discrimination that some providers experience. Furthermore, it is critical that guidelines for the provision and management of abortion care, as well as the National Strategic Plan for the Implementation of the Choice on Termination of Pregnancy Act,[49] be disseminated to health care providers, for evidence suggests that many facilities and providers in South Africa lack this vital clinical information.[50] Finally, in light of the essential role of midlevel providers in the delivery of abortion care in South Africa, additional studies examining the knowledge, attitudes, beliefs and intentions of these clinicians in training would be an important contribution to the field.

## FOOTNOTES

\*The University of Cape Town has a six-year academic program, whereas Walter Sisulu University has a five-year program.

## REFERENCES

1. Schenker JG and Cain JM, FIGO Committee Report. FIGO Committee for the Ethical Aspects of Human Reproduction and Women's Health. International Federation of Gynecology and Obstetrics, *International Journal of Gynaecology & Obstetrics*, 1999, 64(3):317–322. [PubMed](#)
2. Sedgh G et al., Induced abortion: estimated rates and trends worldwide, *Lancet*, 2007, 370(9595):1338–1345. [PubMed](#) [http://dx.doi.org/10.1016/S0140-6736\(07\)61575-X](http://dx.doi.org/10.1016/S0140-6736(07)61575-X)
3. Aahman E and Shah I, eds., *Unsafe Abortion: Global and Regional Estimates of the Incidence of Unsafe Abortion and Associated Mortality in 2008*, sixth ed., Geneva: World Health Organization, 2011.
4. Crane BB and Hord-Smith CE, *Access to Safe Abortion: An Essential Strategy for Achieving the Millennium Development Goals to Improve Maternal Health, Promote Gender Equality, and Reduce Poverty*, Chapel Hill, NC, USA: Ipas, 2006.
5. Hord C and Wolf M, Breaking the cycle of unsafe abortion in Africa, *African Journal of Reproductive Health*, 2004, 8(1):29–36. [PubMed](#) <http://dx.doi.org/10.2307/3583302>
6. Grimes DA et al., Unsafe abortion: the preventable pandemic, *Lancet*, 2006, 368(9550):1908–1919. [PubMed](#) [http://dx.doi.org/10.1016/S0140-6736\(06\)69481-6](http://dx.doi.org/10.1016/S0140-6736(06)69481-6)
7. Rees H et al., The epidemiology of incomplete abortion in South Africa, *South African Medical Journal*, 1997, 87(4):432–437. [PubMed](#)
8. Kay BJ et al., An analysis of the cost of incomplete abortion to the public health sector in South Africa—1994, *South African Medical Journal*, 1997, 87(4):442–447. [PubMed](#)
9. South African Government, Choice on Termination of Pregnancy, Act No. 92, Nov. 12, 1996, art. 2(b).
10. van Bogaert LJ, The limits of conscientious objection to abortion in the developing world, *Developing World Bioethics*, 2002, 2(2):131–143. [PubMed](#) <http://dx.doi.org/10.1111/1471-8847.00046>
11. Benagiano G and Pera A, Decreasing the need for abortion: challenges and constraints, *International Journal of Gynaecology & Obstetrics*, 2000, 70(1):35–48. [PubMed](#) [http://dx.doi.org/10.1016/S0020-7292\(00\)00228-9](http://dx.doi.org/10.1016/S0020-7292(00)00228-9)
12. MacPhail C et al., Contraception use and pregnancy among 15–24 year old South African women: a nationally representative cross-sectional survey, *BMC Medicine*, 2007, Vol. 5, Art. 31, <<http://www.biomedcentral.com/1741-7015/5/31>>, accessed July 5, 2012.

- 13.** Mendes JF, Basu D and Basu JK, Addressing the demand for termination of pregnancy services in district health facilities in Johannesburg, *South African Medical Journal*, 2010, 100(10):614. [PubMed](#)
- 14.** Epidemiology and Surveillance Directorate, *Statistical Notes: Choice on Termination in South Africa*, Pretoria, South Africa: National Department of Health, 2009.
- 15.** Blaauw D and Penn-Kekana L, Maternal health, in: Fonn S and Padarath A, eds., *South African Health Review*, Durban, South Africa: Health Systems Trust, 2010, pp. 3–28.
- 16.** Daulaire N et al., *Promises to Keep: The Toll of Unintended Pregnancies on Women's Lives in the Developing World*, Washington, DC: Global Health Council, 2002.
- 17.** Statistics South Africa, *Mid-Year Population Estimates, 2010*, Pretoria, South Africa: Statistics South Africa, 2010.
- 18.** Morroni C and Moodley J, Characteristics of clients seeking first- and second-trimester terminations of pregnancy in public health facilities in Cape Town, *South African Medical Journal*, 2006, 96(7):574. [PubMed](#)
- 19.** Harries J et al., Delays in seeking an abortion until the second trimester: a qualitative study in South Africa, *Reproductive Health*, 2007, 4:7. [PubMed](#)  
<http://dx.doi.org/10.1186/1742-4755-4-7>
- 20.** Berer M, Provision of abortion by mid-level providers: international policy, practice and perspectives, *Bulletin of the World Health Organization*, 2009, 87(1):58–63. [PubMed](#) <http://dx.doi.org/10.2471/BLT.07.050138>
- 21.** Sibuyi MC, Provision of abortion services by midwives in Limpopo province of South Africa, *African Journal of Reproductive Health*, 2004, 8(1):75–78. [PubMed](#)  
<http://dx.doi.org/10.2307/3583309>
- 22.** Warriner IK et al., Rates of complication in first-trimester manual vacuum aspiration abortion done by doctors and mid-level providers in South Africa and Vietnam: a randomised controlled equivalence trial, *Lancet*, 2006, 368(9551):1965–1972. [PubMed](#) [http://dx.doi.org/10.1016/S0140-6736\(06\)69742-0](http://dx.doi.org/10.1016/S0140-6736(06)69742-0)
- 23.** Yarnall J, Swica Y and Winikoff B, Non-physician clinicians can safely provide first trimester medical abortion, *Reproductive Health Matters*, 2009, 17(33):61–69. [PubMed](#) [http://dx.doi.org/10.1016/S0968-8080\(09\)33445-X](http://dx.doi.org/10.1016/S0968-8080(09)33445-X)
- 24.** Cooper D et al., Medical abortion: the possibilities for introduction in the public sector in South Africa, *Reproductive Health Matters*, 2005, 13(26):35–43. [PubMed](#)  
[http://dx.doi.org/10.1016/S0968-8080\(05\)26203-1](http://dx.doi.org/10.1016/S0968-8080(05)26203-1)
- 25.** Gresh A and Maharaj P, A qualitative assessment of the acceptability and potential demand for medical abortion among university students in Durban, South Africa, *European Journal of Contraception & Reproductive Health Care*, 2011, 16(2):67–75. [PubMed](#) <http://dx.doi.org/10.3109/13625187.2010.546534>

26. Althaus FA, Work in progress: the expansion of access to abortion services in South Africa following legalization, *International Family Planning Perspectives*, 2000, 26(2):84–86. <http://dx.doi.org/10.2307/2648272>
27. Dickson KE et al., Abortion service provision in South Africa three years after liberalization of the law, *Studies in Family Planning*, 2003, 34(4):277–284. PubMed <http://dx.doi.org/10.1111/j.1728-4465.2003.00277.x>
28. Dickson-Tetteh K and Billings D, Abortion care services provided by registered midwives in South Africa, *International Family Planning Perspectives*, 2002, 28(3):144–150. <http://dx.doi.org/10.2307/3088257>
29. Hord CE and Xaba M, *Abortion Law Reform in South Africa: Report of a Study Tour, May 13–19, 2001*, Johannesburg, South Africa: Ipas South Africa, 2002.
30. Abdel-Aziz E, Arch BN and Al-Taher H, The influence of religious beliefs on general practitioners' attitudes towards termination of pregnancy—a pilot study, *Journal of Obstetrics & Gynaecology*, 2004, 24(5):557–561. PubMed <http://dx.doi.org/10.1080/01443610410001722644>
31. Aiyer AN et al., Influence of physician attitudes on willingness to perform abortion, *Obstetrics & Gynecology*, 1999, 93(4):576–580. PubMed [http://dx.doi.org/10.1016/S0029-7844\(98\)00467-0](http://dx.doi.org/10.1016/S0029-7844(98)00467-0)
32. Espey E, Ogburn T and Dorman F, Student attitudes about a clinical experience in abortion care during the obstetrics and gynecology clerkship, *Academic Medicine*, 2004, 79(1):96–100. PubMed <http://dx.doi.org/10.1097/00001888-200401000-00020>
33. Klamen DL, Grossman LS and Kopacz DR, Attitudes about abortion among second-year medical students, *Medical Teacher*, 1996, 18(4):345–346. PubMed <http://dx.doi.org/10.3109/01421599609034191>
34. Stennett RA and Bongiovi ME, Future physicians' attitudes on women's reproductive rights: a survey of medical students in an American university, *Journal of the American Medical Women's Association*, 1991, 46(6):178–181. PubMed
35. Buga GA, Attitudes of medical students to induced abortion, *East African Medical Journal*, 2002, 79(5):259–262. PubMed <http://dx.doi.org/10.4314/eamj.v79i5.8865>
36. Iputo JE, Faculty of health sciences, Walter Sisulu University: training doctors from and for rural South African communities, *MEDICC Review*, 2008, 10(4):25–29. PubMed
37. Burch VC, Medical education in South Africa: assessment practices in a developing country, unpublished dissertation, Rotterdam, Netherlands: Erasmus University Rotterdam, 2007, <<http://repub.eur.nl/res/pub/10152/>>, accessed July 10, 2012.
38. Carlton CL, Nelson ES and Coleman PK, College students' attitudes toward abortion and commitment to the issue, *Social Science Journal*, 2000, 37(4):619–625. [http://dx.doi.org/10.1016/S0362-3319\(00\)00101-4](http://dx.doi.org/10.1016/S0362-3319(00)00101-4)

39. Cook EA, Jelen TG and Wilcox C, Measuring public attitudes on abortion: methodological and substantive considerations, *Family Planning Perspectives*, 1993, 25(3):118–121 & 145. PubMed <http://dx.doi.org/10.2307/2136159>
40. Francome C, Attitudes of general practitioners in Northern Ireland toward abortion and family planning, *Family Planning Perspectives*, 1997, 29(5):234–236. PubMed <http://dx.doi.org/10.2307/2953401>
41. Francome C and Freeman E, British general practitioners' attitudes toward abortion, *Family Planning Perspectives*, 2000, 32(4):189–191. PubMed <http://dx.doi.org/10.2307/2648236>
42. Kumar R et al., Comparative analysis of knowledge, attitudes and perceptions about induced abortions among medical and non-medical students of Karachi, *Journal of the Pakistan Medical Association*, 2002, 52(10):492–494. PubMed
43. Mogilevkina I, Tydén T and Odland V, Ukrainian medical students' experiences, attitudes, and knowledge about reproductive health, *Journal of American College Health*, 2001, 49(6):269–272. PubMed <http://dx.doi.org/10.1080/07448480109596313>
44. Rosenblatt RA et al., Medical students' attitudes toward abortion and other reproductive health services, *Family Medicine*, 1999, 31(3):195–199. PubMed
45. Schwarz EB et al., Willing and able? Provision of medication for abortion by future internists, *Women's Health Issues*, 2005, 15(1):39–44. PubMed <http://dx.doi.org/10.1016/j.whi.2004.08.011>
46. Shotorbani S et al., Attitudes and intentions of future health care providers toward abortion provision, *Perspectives on Sexual and Reproductive Health*, 2004, 36(2):58–63. PubMed <http://dx.doi.org/10.1363/3605804>
47. Simpson B et al., Prenatal testing and pregnancy termination in Sri Lanka: views of medical students and doctors, *Ceylon Medical Journal*, 2003, 48(4):129–132. PubMed
48. Cameron AC and Trivedi PK, *Microeconometrics Using Stata*, College Station, Texas, USA: Stata Press, 2009.
49. South Africa Department of Health and Ipas South Africa, *National Strategic Plan for the Implementation of the Choice on Termination of Pregnancy Act*, Pretoria, South Africa: Department of Health and Ipas South Africa, 2004.
50. Mitchell EMH et al., *A Facility Assessment of Termination of Pregnancy (TOP) Services in Limpopo Province, South Africa*, Chapel Hill, NC, USA: Ipas, 2004.