# THE COST TO THE HEALTH SYSTEM OF UNSAFE ABORTION IN ETHIOPIA

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Synopsis: Post-abortion care consumes significant health resources in Ethiopia. Investing more in family planning programs to prevent unwanted pregnancies would bring net financial benefits.

## Abstract

This paper estimates the cost of unsafe abortion in Ethiopia focusing on the provision of post-abortion care (PAC) by the health system. In 2008, 14 public and private health facilities, representing three levels of health care, were surveyed. Detailed cost information on drugs, supplies, material, personnel time, and out-of-pocket expenses were collected from key informants at the facilities. Sensitivity analysis was used to determine the likely ranges of various costs. The average cost per client, across five types of abortion complications, was $36.21. The annual direct cost nationally ranged from $6.5 to $8.9 million. Including indirect costs and satisfying all demand raised the estimated annual national cost to $47 million. Post-abortion care consumes a large portion of the total expenditure in reproductive health in Ethiopia. Investing in strategies to reduce unwanted pregnancies would be cost-beneficial to the health system.

## I. Introduction

In Ethiopia, deaths of women from complications of pregnancy or childbirth is unacceptably high and the maternal mortality ratio, estimated to be 470 per 100,000 live births, is very high [1]. One of the leading causes of maternal mortality is unsafe abortion. In 2005, the Ethiopian Parliament amended the law on abortion to permit abortion in a wider set of circumstances than previously. Despite the revised law, unsafe abortion continues to be a major contributor to the case load of the maternal and gynecological services of the Ethiopian health system. Although post-abortion care (PAC) services in Ethiopia have shown recent signs of improvement [2, 3], treating the complications of unsafe abortion often requires expensive treatment in terms of skilled personnel, surgical procedures, expensive drugs and supplies, and prolonged hospital stays [4, 5, 6].

The costs involved in treating post-abortion complications have received relatively little research attention. Isolated costing studies have used a variety of methodologies and have

provided scant guidance to policy makers [7]. A recent study has compiled results from this body of research and produced, *inter alia*, a range of health-system costs for Sub-Saharan Africa [8]. However, no such nationally comprehensive estimates are available for Ethiopia, although one study of a selection of major health facilities in 2000 estimated that the annual cost of treating abortion complications in Ethiopia was almost $8 million [9]. This paper will address this knowledge gap by presenting estimates of national and regional costs to the health system[1] of providing post-abortion care, based on research conducted in 2008. Such estimates were made possible by adding a costing component to a larger study that documented the incidence of safe and unsafe abortion, as well as associated morbidities [10, 11].

## II. Data and Methods

***Data:*** Fourteen health facilities were purposively selected in this study to represent three levels of health facilities, both public and private sectors, and rural and urban settings. A variety of facility types were included: three primary health care centers, five public hospitals, three private clinics, one private hospital and two NGO clinics selected purposively to represent urban and rural locations for each facility type. Due to cost and time considerations, it was not possible to collect data from a large number of health facilities within each facility type. However, facility types (hospitals, health centers, NGO and private facilities) were selected and classified due to their central purchasing and similar salary scales. Sensitivity analyses were used to test for variability across facility categories attributable to staff seniority and benefits that are not as easily standardized. While still modest, this study is the largest abortion costing study to date in Ethiopia and the first to include nationally representative abortion complications data.

[1] "Health system" is defined here to include the public health structure as well as private and NGO health facilities.

Detailed cost information on drugs, supplies, materials and personnel time was collected. In their totality, these inputs comprise the direct costs of treating cases of post-abortion complications. Indirect costs (overhead and capital costs) and some information on out-of-pocket expenses were also collected. Data collection of costs was further broken down into five major abortion complications as used in a seminal WHO study on the Mother-Baby Package [12]: sepsis, shock, incomplete abortion, laceration of cervix/vagina and perforations of the uterus.[2] With regard to treatments actually received, the following is the percentage distribution of the five complications representative of national abortion morbidity in Ethiopia in 2008 [11]:

| | |
|---|---|
| Incomplete abortion | 87% |
| Sepsis | 16% |
| Shock | 4% |
| Cervical/vaginal lacerations | 0.4% |
| Uterine perforation | 0.3% |

Information on drugs, materials and supplies used in the provision of PAC was gathered from a questionnaire divided into six sections, one for each post-abortion complication and one for legal abortion procedures. It also collected information separately for in-patients and out-patients. For each complication, 50-80 detailed probes solicited information on (a) the percentage of patients with a particular complication who needed the specific input and (b) the average amount of the input that a typical or average patient was given during the full course of treatment. The reference year for this study's estimates is 2008, given that most of the fieldwork was conducted in that year.[3]

To provide the information needed to estimate the incidence of abortion and abortion morbidity in Ethiopia, we relied on the main study which collected data at the national level

[2] The category "uterine perforations" also includes cases of other lower abdominal perforations as well as hysterectomies.

[3] All costs are given in US 2008 dollars.

using two distinct methodologies [10, 11]. That study developed and published national estimates of the incidence of safe and unsafe induced abortion and of the number of women treated in facilities for post-abortion complications. These published estimates are inputs into this paper.

***Methodology:*** The methodology used in this study is designed to produce robust cost estimates with an economy of data-collection effort and expense. The methodology, the *Post-Abortion Care Costing Methodology* (PACCM), is a variant of "the ingredient approach" and is under continuing development at Guttmacher Institute. The methodology is based on the WHO's Mother-Baby Package which estimates costs of maternal and newborn health interventions [13]. The methodology began as a rapid-assessment approach for estimating the cost to the health system in Nigeria of unsafe abortion [14]. It was subsequently developed into a more comprehensive approach for measuring the cost of unsafe abortion through a three-country pilot study undertaken in 2007-2008 in Ethiopia, Pakistan and Mexico [15]. The pilot study resulted in the development of a study design, data collection instruments and analysis methods, specifically oriented to measuring the cost of unsafe abortion. This improved methodology is used in the present costing study.

A key feature of the PACCM is its reliance on a key-informant approach to estimation. The respondents interviewed were experts who were knowledgeable about post-abortion care in the facilities where they work, generally through years of on-the-ground experience. For questions related to PAC treatment, the respondents interviewed were heads of gynecology departments of hospitals or directors of reproductive health. For administrative questions, such as salaries, overhead costs, etc., administrators were interviewed. Respondents were requested to give their considered estimates of many detailed inputs that, in total, constitute a complete intervention for a specific post-abortion complication. The averages of the respondents' estimates were assumed to yield a good approximation of the true values of the various rates and amounts of specific inputs.

*Drugs and supplies costs*. Because the exact presentations, chemical strengths and packaging are not found in any centralized price list, we made the simplifying assumption that the prices of drugs, materials and supplies collected from a variety of international sources are reliable estimates of the true costs of these inputs at the level of the facility. Several factors that influence final costs are thus ignored, some of which would add to the final costs and some of which would subtract from them. For example, no attempt was made to measure spoilage, stocking costs or transportation costs.[4] On the other hand, discounted prices, which may be available to centralized procurement agencies that purchase drugs and supplies in bulk, were also not taken into account. We consulted various standard price lists [16, 17, 18, 19, 20, 21]. Prices were extrapolated to 2008 by using World Bank GDP deflators [22].

*Personnel costs*. Reimbursements for labor in the health sector in Ethiopia are complex, making personnel costs difficult to assess. Salaries differ by public or private employment, by length of service, by level of training and by location. We collected data on pay scales within the public health service including allowances, subsidies and incentive payments. We also gathered data from seven private clinics as well as general data on salaries and benefits from the largest private-sector organization providing PAC in Ethiopia. Data on salaries for the public sector came from the headquarters level—the Federal Ministry of Health.

For each category of health worker we estimated minimum and maximum monthly salaries and used simple averages as central estimates of labor costs. Salary ranges, professional allowances, housing allowances, transportation allowances and duty fees[5] were considered in this calculation to approximately account for the mix of benefits and seniority in the health system at large.

[4] Foreign donors may sometimes procure drugs and supplies free of charge to developing countries. We do not take such contingencies into account since we are concerned in this paper with how much PAC costs, not with who pays for it.

[5] We assumed that health professional received duty fees between four and eight times per month.

A full year of work in this sector was assumed to comprise 1,760 hours.[6] An adjustment was made for time spent by workers in activities not related to the provision of health care (administration, training, travel, etc.), which ranged from 2% of work time for general physicians to 14% for laboratory technicians. We added an allowance of 2000 ETB to monthly costs of professional-level cadres, as a conservative estimate of the value of a housing subsidy paid to medical personnel. Several other benefits, such as health insurance and communication allowance, were not estimated. Thus, personnel costs used in this study are likely to be underestimates.

*Indirect costs*. Overhead costs and capital costs also form part of the total cost of supplying PAC services. These costs should be added to the direct costs of providing PAC services in the same proportion that PAC services are to all services provided by the health care system. After reviewing the quality of the data collected, it was decided not to present estimates of indirect costs here. The experience gained in this study has, nevertheless, allowed improvements to be made in the PACCM which should allow indirect costs to be included in subsequent studies.

## III. Results

The main study of abortion incidence in Ethiopia found that almost 4 million pregnancies occurred nationally in 2008 [10]. Of these, 42% or about 1.7 million were unplanned. This large number of unwanted pregnancies led to an estimated 382,000 induced abortions in 2008. Just over one quarter of these abortions were carried out in health facilities under safe conditions [11]. Because of the large number of abortions performed under unsafe conditions, an estimated 58% of all induced abortions in 2008 (about 220,000) resulted in complications that required medical care. However, only about one quarter of these women, an estimated 52,600, were able to reach health facilities and receive the needed post-abortion treatment for their

[6] 52 weeks x 5 work days = 260 days per year. Minus: 10 holidays, 20 days' vacation, 10 days sick leave. Assuming an 8-hour day, 220 x 8 = 1760 hours worked per year.

complications. Thus, an estimated 170,000 women needing PAC received no care within the Ethiopian health system.

The focus of this analysis is on the actual costs to the health system of providing treatment to the 52,600 women who were able to access care as well as the additional costs if all 220,000 women needing PAC were to receive adequate care.

*Costs of Drugs and Supplies*. The costs of drugs and supplies used in treating cases of shock, sepsis and incomplete abortion vary between $13 and $20 per intervention (Table 1). For treatment of cervical and vaginal lacerations and uterine perforations, the average per-intervention cost of drugs and supplies ranges from $63 to $84.[7] Inputs of drugs and supplies increase with the care level of facilities, from about $17 to $42 for in-patients, partially because more severe complications tend to be concentrated in higher level facilities since lower-level facilities lacking the required personnel, supplies and infrastructure are more likely to refer critical patients.[8] We also note from Table 1 that out-patient costs of drugs and supplies are lower than in-patient costs. Again, severe cases would likely have a higher rate of hospitalization than less severe ones.

*Costs of Personnel*. Several factors are used in calculating personnel costs: the percentage of cases that need the attention of each category of health worker; the number of minutes health personnel spent attending patients; and salaries, allowances and benefits; and an upward adjustment to take into account time spent by health workers in general tasks not related to the direct provision of services.

[7] Because only one of 14 facilities provided treatment for post-abortion vaginal and cervical lacerations rather than stabilizing patients and referring them, data on this complication was not used. Instead, input costs were estimated to be 75% of input costs for treating uterine perforations.

[8] Other effects may also be influencing this relationship: Higher level facilities may have better access to a wider range of drugs, technology and equipment and may therefore achieve a better standard of care than lower level facilities.

The average number of minutes different cadres of workers spent in treating specific complications and attending patients is shown in Table 2. Uncomplicated incomplete abortions needed the least input of labor (100 minutes, counting all types of staff), while treating a uterine perforation consumed the most, more than 22 hours in all, including 15.5 hours by nurses and midwives. No significant variation was detected by level of facility (not shown).

Table 1 (middle panel) presents the personnel unit costs broken down by type of complication and category of worker. Overall, the cost of labor per PAC intervention was around $11. Uncomplicated incomplete abortions had the lowest average cost of labor ($6.50). The cost of labor for treating sepsis and shock ranged from $18 to $22 and the labor cost for repairing a perforated uterus amounted to $71. The cost of the labor inputs of obstetricians and gynecologists accounted for around half of the total labor costs, while nurses/midwives constituted over a quarter of total labor inputs, although proportions varied by type of complication.

*Other Direct Input Costs*. Data were also collected on three other direct costs: emergency transport costs, hospitalization costs and operating theater costs. Although we classify these costs under "direct costs", part of them may reflect indirect costs (overhead and capital).[9] The lower panel of Table 1 displays estimates of these costs. Emergency transportation, measured as the cost of petrol only, ranges from $0.23 to $0.33 for all treatments except for incomplete abortion for which the cost was estimated to be zero. Hospitalization costs for shock and sepsis are far higher than for complications requiring surgical interventions. However, the cost of operating theaters largely offset the lower hospitalization costs of surgical procedures.

*Total Direct Costs*. The total costs of direct inputs per intervention by type of complication are shown at the bottom of Table 1. Incomplete abortions are the least costly PAC treatment, on average costing $24. Treatment of shock and sepsis have direct costs of $40 , while treating the

[9] For example, the cost of hospitalization covers lodging and meals, which are direct costs, but it may also include coverage of the cost of amortization of the capital cost of constructing the facility. In the Ethiopian context these items may also have public subsidization built into them, further obscuring the true costs.

most serious complications, uterine perforations and allied illnesses, cost almost $153 in direct inputs alone. The overall average direct cost per intervention is $31, reflecting the fact that the majority of interventions are to treat incomplete abortions, the least costly intervention.

*Indirect Costs*. As mentioned, we judged the data gathered on indirect costs to be of insufficient completeness to use in this analysis. Indirect costs are, however, an important component of total costs. In the UNFPA Reproductive Health Costing Tool, for instance, indirect costs[10] are roughly twice the magnitude of direct costs in Sub-Saharan Africa [19]. In other studies, one quarter to one third of total PAC costs were indirect [6]. Thus, the costs reported here must be considered substantial under-estimates of total costs since they omit almost all indirect costs.

*Out-of-pocket Expenses*. Some data were collected on out-of-pocket (OOP) expenses, even though the main purpose of this study was to investigate not who pays PAC expenses (government, donors, tax payers) but how much is spent on PAC. The OOP costs reported here represent only a partial picture of the financial burden women and their households face in accessing treatment for post-abortion complications. Many other costs may be involved during care seeking and post-treatment care [23].

Table 3 presents three out-of-pocket measures: the cost of out-patient procedures or fees for use of minor theaters, such as those equipped with gynecological examination tables; drugs and supplies purchased by the patients; and an estimate of total out-of-pocket expenditure. The extra fees charged by facilities for out-patient services and minor procedures are sizable, averaging about $10 per patient. Out-of-pocket costs for drugs and supplies are also substantial ($4 to $17) and, on average, represent over one third of the estimated direct costs for drugs and supplies reported by facilities ($6.08 out-of-pocket compared to an estimate of $18.64 across all types of complication).

[10] Indirect costs are also called “program and system costs” and comprise overhead costs for program management, supervision, health education, monitoring and evaluation, advocacy, human resources training, information systems, commodity supply systems, and capital costs for maintaining and expanding the physical capacity of health facilities [19].

Estimates of overall out-of-pocket expenditures range from $21 for incomplete abortion to $36 for sepsis. For shock, sepsis and incomplete abortion, these data indicate that fees paid by patients cover almost the whole direct cost of the interventions. For the surgical treatment of lacerations and perforations, OOP expenditure amounts to almost one fifth of total direct costs. Overall, we find that patients pay for 78% of the direct costs of PAC. We caution, however, that these findings need to be bolstered with better data collected from patients themselves, since our data come from estimates made by key informants.

*Costs per Case*. The above cost estimates refer to single interventions, but women who present at health facilities with post-abortion complications often need two or more treatments to address multiple complications. Many women who have more invasive injuries such as lacerations or perforations also suffer from sepsis and/or shock. Around two-thirds of surveyed women presented with only a single condition, while one third were diagnosed with two or more conditions. Using this information on multiplicity of complications, we calculate that average direct input costs on a cost-per-case (or cost per patient) basis amounted to $36.21 across all types of complication.

*National and Regional Total Costs of PAC*. Using estimates for costs per case, national and regional total annual costs for treating post-abortion complications were calculated for 2008. Estimates of actual annual expenditure on PAC in 2008 (direct costs only) for the 52,600 women who received post-abortion care are shown in Table 4. National totals, regional totals, and totals by category of direct cost are estimated for all types of abortion-related complications. Thus, the total national expenditure on PAC is estimated to be $7.6 million. The largest amount was spent in Oromiya region ($2.8 million), followed by SNNP region and Amhara region. By far the largest expenditure went into the treatment of incomplete abortion ($5.8 million). On the other hand, little money was spent on surgical procedures (to repair lacerations or perforations)—only about $380,000, less than 5% of total expenditure. In terms of categories of spending, drugs and medical supplies consumed the bulk of spending, $6.3 million or 83%.

These spending figures under-estimate the real total expenditure on PAC because they only take into account the costs of direct inputs into specific treatments. Even if indirect costs were assumed to comprise only one third of total expenditure—a decidedly conservative estimate—the total bill for PAC would exceed $11 million.

Table 4 also shows how much money would be needed, again only in terms of direct input costs, if all women suffering post-abortion complications received treatment in health facilities. The total expenditure would jump to $31.6 million and in the Oromiya region alone $11.2 million would need to be expended. The national bill for drugs and supplies would rise to $26 million. If we again assumed that unmeasured indirect costs were one third of total expenditure, the total bill of treating unsafe abortions would amount to around $47 million.[11]

*Sensitivity Analysis*. Sensitivity testing was carried out on both costs per intervention and national costs. We selected eight parameters deemed hardest to measure accurately (listed in Table 5). The central estimates from these data are shown in the second column. We then selected minimum and maximum values that were roughly 20-25% below and above the central estimates. We made several ad hoc decisions regarding maxima and minima depending on other factors. For example, we are convinced that our estimates of salaries and allowances underestimate the true levels of remuneration in the health sector, so we made the minima for labor costs only 10% less than the central estimates, while the maxima were 25% greater. In the case of the share of PAC cases in the public system, we felt that the share would not vary greatly so we made the maximum and minimum only 10% lesser or greater than the central estimate.[12]

[11] Using regional estimates of PAC costs, Sundaram *et al*. estimated a PAC cost per case of $96, which included both direct and indirect costs [24]. The national total for all women needing treatment would then be $21 million.

[12] We refer to eight parameters, but two of them, salaries and distribution of post-abortion complications, are actually sets of values—seven salaries for the seven categories of health workers, and five percentages for the five types of post-abortion complications. No attempt was made to vary values within these sets of parameters.

The sensitivity procedure that we followed was to recalculate all cost estimates for each permutation of the eight parameters. With eight parameters each assuming two values (a maximum and a minimum), there were $\mathbf{2^8 = 256}$ permutations in total. Table 6 summarizes the results of these 256 tests for costs per intervention for the five types of complication and for the overall average. The lowest estimate for the cost per uterine evacuation, for instance, is $22 while the highest is $26. For treatment of shock, for example, the range of costs is $39-43; for treatment of sepsis it is $38-45; for uterine evacuations $23-25; for treatment of lacerations of the vagina or cervix $112-126; and for treating perforations $149-168.

The 256 sensitivity tests were repeated for national costs by type of treatment (Table 6, lower panel). Again using the first and third quartile estimates from the sensitivity tests as the probable boundaries of the true costs to the health system, we find wider ranges here than in the case of costs per intervention. For example, the total cost of treating post-abortion cases of sepsis ranges from $734,000 to $1.7 million. Overall, across all complications, the total cost of PAC likely lies in the range $6.5 million to $8.9 million, the central estimate being $7.6 million.

## IV. Conclusion and Implications

We estimate that the direct cost of treating post-abortion complications in Ethiopia in 2008 stood at $7.6 million. Given the uncertainty of some of the assumptions made in computing this estimate, we used sensitivity analysis to show that this cost most likely would lie in the range $6.5 million to $8.9 million. However, our analysis was not able to include indirect components of the total cost of PAC, namely overhead and capital costs. If we conservatively estimate indirect costs as one third of total costs, then the estimate of the total cost of PAC would be rise to $11.5 million ( in the interval $9.8 to $13.4 million).

For 2007/2008, the national health accounts of Ethiopia estimated a total expenditure by the health system of $1,189 million and a total expenditure in reproductive health of $150.9 million

[25].[13] Of this amount, $42 million was expended by the national and regional governments from general revenues, $38 million was spent by households themselves and $66 million came from donor governments and international NGOs. These figures include both direct and indirect cost components. Thus, our estimates show that the cost of treating post-abortion complications from unsafe procedures is around 7-8% of total spending on reproductive health and equivalent to around 27% of government spending in this area.[14] The cost of unsafe abortion to the health system is a very substantial one.

We also estimated that total direct costs of PAC would amount to $31.6 million if all women with complications were able and willing to access facility-based care. Including indirect costs would raise this total to as much as $47 million. We must bear in mind, however, that this estimate is based on expert opinion, not population-based data, and also that women not attending health facilities may have less severe symptoms on average than those that do. Despite the uncertainty concerning the size of this notional cost, there is no doubt that treating all women who have an unmet demand for PAC would cost an amount that is equal to, or even greater than, what governments in Ethiopia now expend annually on all aspects of reproductive health.

It needs to be emphasized that this study looks at only one element of the cost of unsafe abortions—that is, the immediate cost of treating post-abortion complications. There are many other substantial costs involved [6] including treatment of longer-term morbidities—especially the high cost of infertility treatment—as well as the economic cost to Ethiopian households and society of productive time lost through abortion-related morbidity and mortality.

In Ethiopia, 37% of all health expenditure comes from private (household) spending while, in the reproductive health sector, this share falls to 25% [25]. Yet the limited data available on

[13] The biggest share of total health expenditure belonged to the HIV/AIDS sector: $240 million, or 20% of all spending on health [25].

[14] Since our data indicate that around four fifths of spending on PAC is actually out-of-pocket, government spending on PAC would be substantially less than 27% of its expenditure on reproductive health.

out-of-pocket expenses for PAC shows that PAC patients contributed more than 75% of the total direct costs of treatment. Women suffering the consequences of unsafe abortion seem to pay much more from their own pockets for care than is the case in other areas of reproductive health. There is, therefore, an equity issue with respect to post-abortion patients which should be explored in the future with more extensive data.

Ultimately, better health policy should be aimed at preventing the root cause of unsafe abortion in Ethiopia, which continues to be the large number of unintended pregnancies. About 1.6 million unintended pregnancies occur every year in Ethiopia, due largely to unmet need for contraception [24]. A cost-benefit analysis in Nigeria showed that extra spending on family planning would lead to large net benefits (savings) from reduced expenditure in PAC services [14]. A similar argument can be made here. The direct costs for supplying the methods of contraception most widely used in Ethiopia for one year are in the range $5.00 to 8.00 [24]. If we compare this to the overall direct cost-per-case for treating post-abortion complications, $36, we can see that there is a large cost-benefit advantage to preventing unwanted pregnancies in Ethiopia. The benefit-cost ratio would be in the order of 6:1; that is, every dollar spent in family planning would save six dollars in PAC services.

The renewed efforts of the Ethiopian government on increasing contraceptive counseling and use—for example by significantly expanding the cadre of health extension workers—is therefore to be applauded, not only because this policy will reduce unmet need for contraception, but also because it will generate fiscal savings that will benefit Ethiopian society by freeing resources to tackle other urgent health-care needs.

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## VI. Tables

| Table 1. Average cost of direct inputs for PAC provision by type of complication (US dollars, 2008) | | | | | | |
|---|---|---|---|---|---|---|
| | **Shock** | **Sepsis** | **Uterine Evacuation** | **Cerv./Vag. Lacerations *** | **Uterine Perforations** | **All Complications** |
| **Average cost of drugs and supplies used in PAC treatment** | | | | | | |
| *In-patient care* | | | | | | |
| Primary care level (clinics) | $19.84 | $14.28 | $16.51 | N/A | N/A | ***$16.88*** |
| Secondary care level (district hospitals) | $19.64 | $18.46 | $16.06 | $62.45 | $83.27 | ***$39.97*** |
| Tertiary care level (main hospitals) | $21.45 | $28.35 | $14.93 | $63.03 | $84.03 | ***$42.36*** |
| ***Weighted average across all facilities*** | ***$20.08*** | ***$17.33*** | ***$16.17*** | ***$62.74*** | ***$83.65*** | ***$39.99*** |
| *Out-patient care* | | | | | | |
| Primary care level (clinics) | $14.07 | $10.43 | $17.79 | N/A | N/A | ***$14.10*** |
| Secondary care level (district hospitals) | $14.81 | $14.26 | $17.28 | N/A | N/A | ***$15.45*** |
| Tertiary care level (main hospitals) | $17.93 | $22.62 | $16.60 | N/A | N/A | ***$19.05*** |
| ***Weighted average across all facilities*** | ***$14.84*** | ***$13.11*** | ***$17.51*** | ***N/A*** | ***N/A*** | ***$15.15*** |
| | | | | | | |
| | | | | | | |
| **Average cost of personnel for PAC provision by cadre** | | | | | | |
| Auxiliary/Attendant | $0.32 | $0.42 | $0.08 | $0.00 | $0.00 | ***$0.13*** |
| Nurse/Midwife | $6.76 | $7.86 | $1.44 | $18.78 | $25.04 | ***$3.28*** |
| General Physician | $3.63 | $5.15 | $1.20 | $1.58 | $2.11 | ***$1.84*** |
| Obstetrician | $7.16 | $7.73 | $3.50 | $28.33 | $37.78 | ***$5.33*** |
| Anaesthetist | $0.22 | $0.11 | $0.00 | $4.04 | $5.39 | ***$0.20*** |
| Lab Technician | $0.21 | $0.22 | $0.21 | $0.31 | $0.41 | ***$0.21*** |
| Health officer | $0.13 | $0.09 | $0.05 | $0.00 | $0.00 | ***$0.06*** |
| ***Total*** | ***$18.42*** | ***$21.58*** | ***$6.48*** | ***$53.04*** | ***$70.72*** | ***$11.06*** |
| | | | | | | |
| | | | | | | |

| **Average cost of various facility inputs related to the provision of PAC** | | | | | | |
|---|---|---|---|---|---|---|
| Emergency transportation (cost of petrol) | $0.23 | $0.27 | $0.00 | $0.25 | $0.33 | $0.06 |
| Hospitalization (24+ hour stay) | $5.70 | $3.92 | $0.07 | $0.19 | $0.25 | ***$0.79*** |
| Operating theatre (fee) | $0.00 | $0.00 | $0.00 | $3.14 | $4.19 | ***$0.14*** |
| ***Total other direct costs*** | ***$5.94*** | ***$4.18*** | ***$0.07*** | ***$3.58*** | ***$4.78*** | ***$0.98*** |
| | | | | | | |
| ***Total direct cost per complication*** | ***$39.70*** | ***$40.40*** | ***$23.69*** | ***$114.86*** | ***$153.15*** | ***$30.69*** |

* Due to insufficient data for this complication, costs are estimated as 75% costs of uterine perforations.

| Table 2. Average number of minutes spent on each type of complication by each category of worker | | | | | |
|---|---|---|---|---|---|
| | All facilities | | | | |
| | **Shock** | **Sepsis** | **Uterine Evacuation** | **Cerv./Vag. Lacerations** | **Uterine Perforations** |
| Auxiliary/Attendant | 21 | 27 | 5 | 0 | 0 |
| Nurse/Midwife | 214 | 238 | 47 | 698 | 930 |
| General Physician | 30 | 43 | 10 | 17 | 23 |
| Obstetrician | 48 | 50 | 25 | 225 | 300 |
| Anaesthetist | 3 | 1 | 0 | 68 | 90 |
| Lab Technician | 10 | 10 | 10 | 17 | 23 |
| Health officer | 3 | 2 | 1 | 0 | 0 |
| ***Total*** | ***331*** | ***376*** | ***101*** | ***1,024*** | ***1,365*** |

**Table 3. Out-of-pocket expenses related to the provision of PAC by type of complication (in $2008)**

| | Shock | Sepsis | Uterine Evacuation | Cervical and Vaginal Lacerations | Uterine Perforations | All Complications |
|---|---|---|---|---|---|---|
| Outpatient procedure/minor theatre | $9.79 | $5.86 | $10.84 | N/A | N/A | $9.67 |
| Out-of-pocket expenditure for other drugs and supplies | $9.01 | $16.98 | $4.12 | $5.03 | $6.70 | $6.08 |
| Average total fee paid by client | $34.89 | $35.98 | $21.29 | $21.37 | $28.49 | $23.81 |
| ***Out-of-pocket expenses as percent of direct costs*** | ***88%*** | ***89%*** | ***90%*** | ***19%*** | ***19%*** | ***78%*** |

| Table 4. Annual expenditure (direct costs) on post-abortion care by expenditure category: current level of care versus 100% access to care ($2008) | | | | | | |
|---|---|---|---|---|---|---|
| | **Shock** | **Sepsis** | **Incomplete Abortion** | **Cervical and Vaginal Lacerations** | **Uterine Perforations** | **All Complications** |
| **Current level of access to PAC** | | | | | | |
| Drugs and supplies | $213,000 | $912,000 | $4,851,000 | $245,000 | $82,000 | $6,303,000 |
| Personnel (cost of labor inputs) | $39,000 | $155,000 | $902,000 | $39,000 | $10,000 | $1,144,000 |
| Transport, hospitalization, OT fees | $14,000 | $83,000 | $10,000 | $2,000 | $4,000 | $113,000 |
| ***All Direct Costs*** | ***$265,000*** | ***$1,151,000*** | ***$5,763,000*** | ***$286,000*** | ***$95,000*** | ***$7,560,000*** |
| **If 100% access to PAC** | | | | | | |
| Drugs and supplies | $889,000 | $3,816,000 | $20,291,000 | $1,025,000 | $342,000 | $26,363,000 |
| Personnel (cost of labor inputs) | $162,000 | $649,000 | $3,772,000 | $162,000 | $41,000 | $4,786,000 |
| Transport, hospitalization, OT fees | $59,000 | $347,000 | $43,000 | $8,000 | $15,000 | $472,000 |
| ***All Direct Costs*** | ***$1,110,000*** | ***$4,813,000*** | ***$24,105,000*** | ***$1,196,000*** | ***$397,000*** | ***$31,620,000*** |

**Table 5. Minimum and maximum values for parameters used in sensitivity analysis**

| *Parameter* | *Estimated value* | *Minimum value* | *Maximum value* |
|---|---|---|---|
| 1. % of evacuation procedures that are MVA | 56% | 50% | 62% |
| 2. % distribution of post-abortion complications: | | | |
| a. shock | 4% | 2% | 6% |
| b. sepsis | 16% | 10% | 24% |
| c, incomplete abortion | 93% | 87% | 100% |
| d. laceration of vagina/cervix | 4% | 2.00% | 6% |
| e. perforation of uterus | 1% | 0.50% | 2% |
| 3. % of all PAC cases treated in hospitals | 40.20% | 30% | 50% |
| 4. % of all PAC cases treated in public system | 75.08% | 68% | 83% |
| 5. Total work hours per year (health workers) | 1760 | 1670 | 1940 |
| 6. Salaries and allowances | | 10% lower | 25% greater |
| 7. % of PAC cases that are hospitalized | 23% | 17% | 29% |
| 8. Price of blood (500ml) | $30.00 | $24.00 | $36.00 |

| Table 6. Sensitivity Analysis of Costs per Intervention and Total Costs (US dollars, 2008) | | | | | | |
|---|---|---|---|---|---|---|
| | **Shock** | **Sepsis** | **Uterine Evacuation** | **Cerv./Vag. Lacerations** | **Uterine Perforations** | **All Complications** |
| ***Cost per Intervention*** | | | | | | |
| **Lowest estimate** | $34 | $34 | $22 | $105 | $140 | $26 |
| **1st Quartile** | $39 | $38 | $23 | $112 | $149 | $29 |
| **Median** | $40 | $41 | $24 | $119 | $158 | $31 |
| **3rd Quartile** | $43 | $45 | $25 | $126 | $168 | $34 |
| **Highest estimate** | $49 | $51 | $26 | $133 | $177 | $38 |
| ***Central Estimates*** | ***$40*** | ***$40*** | ***$24*** | ***$115*** | ***$153*** | ***$31*** |
| | | | | | | |
| ***Total Costs (US$, thousands)*** | | | | | | |
| **Lowest estimate** | $118 | $675 | $5,115 | $127 | $42 | $6,078 |
| **1st Quartile** | $136 | $734 | $5,471 | $146 | $48 | $6,523 |
| **Median** | $254 | $1,204 | $5,885 | $272 | $112 | $7,727 |
| **3rd Quartile** | $402 | $1,708 | $6,185 | $436 | $191 | $8,937 |
| **Highest estimate** | $456 | $1,892 | $6,772 | $492 | $216 | $9,828 |
| ***Central Estimates*** | ***$265*** | ***$1,151*** | ***$5,763*** | ***$286*** | ***$95*** | ***$7,560*** |