The Cost of Postabortion Care and Legal Abortion In Colombia

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CONTEXT: *Although Colombia partially liberalized its abortion law in 2006, many abortions continue to occur outside the law and result in complications. Assessing the costs to the health care system of safe, legal abortions and of treating complications of unsafe, illegal abortions has important policy implications.*

METHODS: *The Post-Abortion Care Costing Methodology was used to produce estimates of direct and indirect costs of postabortion care and direct costs of legal abortions in Colombia. Data on estimated costs were obtained through structured interviews with key informants at a randomly selected sample of facilities that provide abortion-related care, including 25 public and private secondary and tertiary facilities and five primary-level private facilities that provide specialized reproductive health services.*

RESULTS: *The median direct cost of treating a woman with abortion complications ranged from $44 to $141 (in U.S. dollars), representing an annual direct cost to the health system of about $14 million per year. A legal abortion at a secondary or tertiary facility was costly (medians, $213 and $189, respectively), in part because of the use of dilation and curettage, as well as because of administrative barriers. At specialized facilities, where manual vacuum aspiration and medication abortion are used, the median cost of provision was much lower ($45).*

CONCLUSIONS: *Provision of postabortion care and legal abortion services at higher-level facilities results in unnecessarily high health care costs. These costs can be reduced significantly by providing services in a timely fashion at primary-level facilities and by using safe, noninvasive and less costly abortion methods.*

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Induced abortion is legally restricted and highly stigmatized in most Latin American countries, including Colombia, where the procedure was prohibited prior to 2006. However, on May 10, 2006, the Constitutional Court of Colombia issued a ruling that lifted the ban on all abortions, allowing the procedure under three limited circumstances. Abortion is permitted when a physician certifies that the life or health of the pregnant woman is threatened, when a physician certifies that the fetus has an abnormality incompatible with life, or when a pregnancy results from rape or incest that has been duly reported to the authorities.[1] Soon after the liberalization of the abortion law, the Colombian Ministry of Health and Social Protection released guidelines for the provision of legal abortion services,[2] adapted from the World Health Organization (WHO) guidelines recommended for health systems worldwide.[3] In October 2009, however, the Council of State (one of the four entities of the judicial branch) challenged the Ministry of Health and Social Protection's authority to regulate abortion; it suspended the use of the guidelines[4] and, in 2013, annulled them completely. As a consequence, although health facilities are still required to provide legal abortions, there are no official government guidelines on the recommended methods of care.*

In addition, women seeking a legal abortion frequently encounter significant administrative and legal barriers. Delays are common, providers often ask for unnecessary documents or additional permission from the judicial system before proceeding, and some institutions refuse to provide legal abortions entirely (which is not permitted under the law).[5]

Because of these barriers, as well as the restrictive nature of the abortion law, many women put their lives and health at risk by resorting to unsafe abortion. According to the most recent estimate, about 99% of abortions in Colombia are performed outside the law.[6] These abortions are more likely than legal abortions to be carried out in unsafe conditions by untrained providers, and to lead to both immediate complications and long-lasting health consequences.[7] Although evidence suggests that abortion is safer now than it was two decades ago, the treatment rate for complications of induced abortion increased from 7.2 to 9.1 per 1,000 women aged 15–44 between 1989 and 2008.[†6,8] Poor rural

*In April 2013, the National Superintendent of Health instructed providers to observe the principles of the Constitutional Court ruling; however, the instructions did not provide clinical guidance, such as recommendations on the type of procedures that should be used (source: Morales Cobo, Circular externa 000003, Bogotá, Colombia: Superintendencia de Salud, 2013).

†Plausible factors underlying the increase in the treatment of abortion complications include improvements in women's access to postabortion care and increased use of misoprostol, which is commonly administered in incorrect dosages when used under clandestine conditions (source: reference 8).

women are especially likely to experience abortion complications, as these women are the most likely to self-induce or to seek the help of unskilled providers to terminate their pregnancy.[8] Illegal—and likely unsafe—abortions continue to place a heavy burden on Colombian women's well-being and on the country's health system.[9]

In general, medical providers in Colombia continue to rely more on dilation and curettage (D&C) than on manual vacuum aspiration (MVA) to treat incomplete abortions and perform legal abortions, despite the fact that D&C is more time-consuming than MVA, typically requires the use of general anesthesia and, in Colombia, often results in overnight hospital stays. In 2008, just one-fifth of legal abortions in Colombia were carried out using MVA, and more than 90% of facilities offering postabortion care* were more likely to treat complications with D&C than with MVA.[6] In contrast, WHO recommends that MVA be used to treat incomplete abortions that take place in the first trimester,[10] which is when most abortions in Colombia likely occur.[11] The high prevalence of D&C is probably due to Colombian physicians' longstanding use of, and preference for, this procedure,[6] and to a widespread lack of adequate MVA training and equipment. In fact, just 11% of facilities that provide postabortion care or perform legal abortions had MVA equipment in late 2007.[12]

The health consequences of unsafe abortion in Colombia are substantial: Each year about 70 women die, and thousands more are hospitalized, as a result of clandestine unsafe procedures.[6] However, very little research has been done on the economic impact of unsafe abortion on the health system. A recent study found that the provision of postabortion care presents a significant burden to health systems in Latin America and Africa, as the average direct cost per case was around US$115 (in 2006 dollars, after weighting for complication severity).[13] In addition, a systematic review of operations research in Latin America found that, in general, the cost of inpatient D&C is much higher than that of outpatient MVA.[14] This finding has been supported by recent studies in Peru[15] and Mexico.[16]

Even fewer studies have compared the cost of postabortion care with that of legal abortion, especially in Latin America. A 2005 Mexican study estimated the cost of postabortion care at three types of hospitals and the cost of safe illegal induced abortions at a private clinic.[16] The investigators found that the cost of providing a safe illegal abortion was less than that of treating abortion complications, and that costs were lower when MVA was used rather than D&C. Several factors explained the latter finding: MVA usually can be done using local anesthesia and, compared with D&C, results in lower operating expenditures and requires less personnel time for patient care after the procedure. To our knowledge, no similar studies have been undertaken for Colombia.

This study has multiple aims. Our first objective was to estimate the costs incurred by health care facilities in treating complications of unsafe abortion. We provide estimates of both direct costs (salaries of medical personnel, drugs and supplies) and indirect costs (overhead and capital). All costs are presented by type of postabortion complication and by type of facility. Our second objective was to estimate the total annual cost to the health system of providing postabortion care. Finally, we compare the cost of treating complications of unsafe abortion with the cost of providing legal abortion services, and explore some of the factors driving these differences. This comparison is made by facility level, and for direct costs only, as the number of legal abortions is currently too small to reliably calculate indirect costs.

METHODS

We estimated costs using the Post-Abortion Care Costing Methodology, an approach piloted in small studies in Mexico, Ethiopia and Pakistan in 2008.[17] Since then, larger studies have been conducted in Ethiopia, Uganda and Rwanda.[18–20] The methodology is a variant of the "ingredients approach" of costing,[21] and relies primarily on data provided by key informants—health care providers who are experts on abortion and postabortion care and are knowledgeable about the provision of these services at their facilities. As a consequence, the method yields reliable estimates, rather than exact values, of costs.

Sample Selection

Data were collected from 30 health facilities in Colombia that provide abortion-related services. The facilities were located in Colombia's five largest cities—Bogotá, Medellin, Cali, Barranquilla and Bucaramanga—each of which is located in a different one of the country's five main regions.† Fieldwork was carried out from January to April 2012.

The study used the same sampling frame as a 2008 national study on abortion incidence in Colombia.[6] The sampling frame consisted of all secondary and tertiary health facilities that provide both postabortion care and legal abortion services, as well as private (not-for-profit nongovernmental) facilities specializing in abortion and reproductive health services. The latter facilities provide only primary-level and ambulatory services, including family planning, treatment for incomplete abortions, counseling for unwanted pregnancies and, since 2006, legal abortion. Public primary-level facilities were excluded from the sampling frame because they do not typically provide postabortion care or perform legal abortions.

A stratified, random-sample design was used to obtain a sample that comprised facilities from all regions and relevant facility types, as well as to minimize selection bias. We stratified facilities in the sampling frame by region and type of facility, and randomly selected three tertiary and

*In this article, we use the term postabortion care only to refer to the treatment of abortion complications at health facilities; while important, other aspects of comprehensive postabortion care, such as counseling and contraceptive provision, are not addressed.

†Although small health facilities exist in some rural areas and small towns of Colombia, they typically do not treat women with abortion complications; instead, they refer patients to secondary and tertiary hospitals in urban centers.

two secondary facilities in each of the five cities.* In addition, for each city, we purposively selected the private specialized facility with the largest caseload. The final sample comprised 14 tertiary health facilities (five public and nine private), 11 secondary facilities (all public) and five private specialized facilities.

Data

The data used in this study were obtained primarily from face-to-face interviews with key informants at the selected facilities. Additional data were obtained from secondary sources, such as international price databases and a previous abortion incidence study.[6] At each facility, multiple key informants were interviewed, depending on their areas of expertise; at a minimum, a high-level administrator and the head obstetrician-gynecologist were interviewed. Study questionnaires were pretested in January 2012 with staff at a tertiary hospital in Bogotá. All data were double entered by two trained staff to minimize errors. The study received ethical clearance from the Institutional Review Board of the Guttmacher Institute, and was supported by the Ministry of Health and Social Protection in Colombia.

• *Questionnaire data.* Two structured questionnaires were administered to participants. The first, Questionnaire A, collected information on the labor, overhead and capital costs associated with the provision of postabortion care and legal abortion services. For each of the five main types of abortion complications—incomplete abortion; sepsis; shock; cervical or vaginal laceration; and uterine perforation†—informants estimated the proportion of postabortion care patients at their facility who receive treatment for that complication, the proportion of cases that are attended by each type of health care provider at their facility and the average number of minutes each type of provider spends attending the patient during the course of treatment (from admission to discharge).

Informants also provided information on the average salary of each type of health worker (including fringe benefits such as health insurance, pensions, etc.) and the average proportion of time each worker spends carrying out administrative duties, such as filling out paperwork or attending meetings. To collect information on indirect costs of providing postabortion care, we asked respondents to provide information on the useful life of medical equipment, capital costs for constructing new facilities and various overhead costs at their facility.

The content of Questionnaire A was tailored to the level of health facility in which it was administered; in addition, a similar questionnaire was administered to key informants at the Ministry of Health and Social Protection to gather general information about the provision of postabortion care and legal abortion at tertiary and secondary facilities.

The second questionnaire, Questionnaire B, collected detailed information on the drugs, medical supplies and materials used to provide abortion-related care. For each type of complication, as well as for legal abortion, respondents estimated the proportion of patients who receive each type of drug or medical supply used to treat the condition, as well as the quantity of drug typically administered. Similar information was collected on laboratory tests. The list of drugs and supplies was based on findings from previous studies in other countries, and on items listed in WHO's *Mother-Baby Package Costing Spreadsheet;*[22] respondents were asked to supply information about additional drugs or supplies not listed but typically used to treat complications at their facility.

• *Prices of drugs and lab tests.* Because drugs are not procured from a centralized or regulated source in the Colombian health system, no single, authoritative list of drug prices was available for use in the study. Instead, we used a variety of international sources to estimate prices of drugs, materials and supplies. When they were available, we used prices from the International Drug Price Indicator Guide,[23] which compiles prices from various international sources. Otherwise, we averaged the prices listed in other international drug and supply catalogues.[24–28] When no international prices were available, we gathered data from health facilities in Colombia to estimate the prices paid by facilities in our sample. For blood products, we used the prices the Red Cross charged to facilities in Colombia.

To estimate the costs of lab tests, we used typical prices charged to hospitals by two private laboratories in Colombia. These prices were averaged and then adjusted to remove the laboratories' overhead and capital costs, in order to avoid double counting such costs (most facilities in our sample had laboratories on site).

• *Number of postabortion care cases in 2012.* The most recent reliable estimates of the number of women treated for complications of abortion at secondary and tertiary facilities in Colombia were for 2008.[29] To obtain estimates for 2012, we adjusted the 2008 figures according to the rate of population growth among women aged 15–44 between 2008 and 2012.[30] From this calculation, we estimate that about 102,000 women were treated for complications at higher-level facilities in Colombia in 2012 (71% at secondary facilities and 29% at tertiary facilities).

ANALYSES

For each facility, we estimated, by complication type, four main components of costs associated with providing postabortion care: labor, medical supplies, capital and overhead (Appendix Table A, page 121). The process for calculating these costs is described in detail below. The first two components, labor and medical supplies, represent what we define here as direct costs: costs to the health facility pertaining specifically to the treatment provided. These costs were also estimated for provision of legal abortion.

*It was not possible to use random selection in Bucaramanga because not enough facilities met the criterion of providing both postabortion care and legal abortion services; in this city, all five facilities were selected.

†We used the World Health Organization's classifications for abortion complications (source: reference 22).

In addition, for postabortion care only, we estimated the indirect costs to the health facility of providing treatment. These estimates represent the proportion of the facilities' annual overhead and amortized capital costs that can be attributed to providing such care. Although other non–treatment-related costs exist, overhead and capital costs have been shown in previous studies to be responsible for a substantial portion of the economic burden to the health system of providing postabortion care.[13,16,18,31] We were not able to estimate indirect costs for the provision of legal abortion, as these procedures currently represent too small a proportion of the overall caseload at secondary and tertiary facilities to allow for reliable estimates. We thus limit our comparison of the costs of legal abortion and those of postabortion care to direct costs.

Estimating Direct Costs

•*Labor.* This component represents the salary cost of the time health workers spend treating and caring for the patient over the full course of their stay. The cost was calculated separately for each type of health worker and for each type of postabortion complication, as well as for legal abortion. As not all of a health worker's time is spent providing care, we adjusted these costs to account for time the worker spends on administrative duties.[6] The final labor cost for treatment at a given facility is the sum of the cost of all workers involved in the treatment.

•*Medical supplies.* This component represents the cost of all drugs administered, supplies used and lab tests performed over the course of a treatment. For each of these inputs, we calculated an average cost by multiplying the unit cost of the input by the proportion of patients receiving the input and the typical number of units used. These costs are calculated separately for inpatients and outpatients, as the quantity of drugs that a patient receives differs widely between the two groups.

For each facility, the average cost of each input was then summed to yield the total average cost of drugs, supplies and lab tests for outpatients, as well as for inpatients. The final cost per treatment is the weighted average of these two results.

Estimating Indirect Costs

•*Capital.* This component represents the cost of constructing and equipping the facility, including the purchase of furniture, vehicles, and specialized machines and equipment such as X-ray machines. Because these estimates are rough approximations based on responses from senior administrators, we calculated the median total cost for each facility type. This cost was then amortized over the median estimated useful lifetime of that facility type, and adjusted for inflation.*

•*Overhead.* The overhead cost includes the estimated wages paid to all nonmedical staff, as well as expenditures on outsourcing, maintenance, electricity, insurance, and other sundry goods and services. The facility's annual expenditure on nonmedical wages was calculated from estimates (collected in Questionnaire A) of the number of staff members of each type at a facility, as well as their average salaries; the costs of other items were asked about directly in the questionnaire.

*We assumed a constant annual inflation rate of 3%.

Total Costs

For each cost component, and for each type of complication, we calculated the median cost by level of facility. Direct costs were then weighted by the distribution of complications at a given facility type to arrive at a cost per treatment. Because a patient may have more than one abortion complication (for example, both sepsis and laceration of the uterus), we also separately calculated an estimated cost per case by weighting according to the prorated distribution of complications.

Indirect costs were weighted according to the proportion of patients at each facility type who received postabortion care (estimated by key informants at the Ministry of Health and Social Protection). They were then divided by the average annual number of women receiving postabortion care at that facility type to arrive at a cost per case. The 2008 incidence study estimated that secondary facilities treat an average of 495 postabortion care cases per year, while tertiary facilities treat an average of 408 cases;[29] we used these estimates on the assumption that the conditions of provision have not changed drastically during this four-year period.

The total cost to the national health system of postabortion care was calculated by applying the median direct and indirect costs per case to the estimated number of women who were treated for complications at higher-level facilities in 2012.

Sensitivity Analysis

To test the sensitivity of our findings to variation in the cost inputs estimated by our key informants, we conducted a one-way sensitivity analysis, varying each input variable individually while holding all others at their baseline values; this allowed us to examine the effect of each of these variables on the final estimated median cost per case. Minimum and maximum values for each variable were set at 25% above and below the observed value for each facility type.

Limitations

The Post-Abortion Care Costing Methodology relies on the opinions and estimates of experts. The methodology is intentionally designed as a low-cost approach that generates reliable cost estimates, but that gives up a certain amount of precision in exchange for low data-collection costs. The validity of the data thus depends on the accuracy of the estimates given by our key informants, who have extensive experience in providing postabortion care and legal abortion. The need for informant accuracy is particularly important for estimates of the number of minutes a spe-

cific type of provider spends treating a complication, the number of units of medication used and provider salaries, all of which may vary widely within and between facility types. To minimize the effect of outlier values, we removed estimated values more than two standard deviations from the mean; in addition, as our sample was small and some estimates were highly skewed, we present our results as medians rather than as means to minimize the impact of outliers. As the methodology does not allow us to carry out significance tests or calculate standard errors, we present only point estimates.

Our approach makes the simplifying assumption that the prices of drugs, materials and supplies, which we obtained from a variety of international sources, are reliable estimates of the costs of these inputs to facilities. Although this approach has the advantage of providing approximate prices for a large number of items, systematic price differences could bias our final estimates. Similarly, our estimates of laboratory costs were obtained from prices charged by two private laboratories in Bogotá, and may not reflect costs in the country as a whole. To account for the uncertainty around these and other costs, and to explore the effect that it might have on our final estimates, we conducted an extensive sensitivity analysis, the results of which are presented below.

Finally, since our focus was to estimate costs to the health system, we did not collect data on costs to women or their households. Such costs are important but are outside the scope of this study.

TABLE 1. Median direct cost (in 2012 US$) of treating abortion complications, by facility type, according to type of complication, Colombia, 2012

Cost category/complication	Facility type			
	Private specialized	Secondary	Tertiary	Weighted average of secondary and tertiary facilities*
MEDICAL COSTS				
Incomplete abortion	7	19	18	19
Perforation	na	92	224	130
Sepsis	na	62	88	70
Shock	na	274	365	300
Laceration	na	24	54	33
Cost per treatment	7	36	54	41
Cost per case	7	33	47	37
LABOR COSTS				
Incomplete abortion	38	80	69	77
Perforation	na	432	593	479
Sepsis	na	270	322	285
Shock	na	201	238	212
Laceration	na	169	173	170
Cost per treatment	38	112	117	113
Cost per case	38	103	103	103
Total direct cost per case	**$44**	**$136**	**$151**	**$141**

*Specialized private facilities are omitted because these primary facilities treat a relatively small proportion of postabortion care cases in the country. *Notes:* Sum of medical and labor costs may not add up to total cost because of rounding. Cost per treatment is the average cost weighted by the distribution of complications at the given facility type; cost per case accounts for patients presenting with multiple abortion complications by prorating the distribution of complications and then using this distribution to calculate the weighted average. na=not applicable.

RESULTS

Costs of Postabortion Care

• *Direct costs.* Overall, the total median direct cost of postabortion care was $141 per case—$136 for procedures performed at secondary facilities and $151 for those done at tertiary facilities (Table 1).* These costs were about one-third as high at private specialized facilities ($44), in part because such facilities treat only mild complications (incomplete abortions). Differences were still apparent, however, in analyses restricted to the treatment of incomplete abortions: The cost of drugs, supplies and medical staff salaries at specialized facilities was about half that at secondary and tertiary facilities ($96). As would be expected, the direct cost of treating more severe types of abortion complications was higher than the cost of treating incomplete abortions. Costs were highest for perforations ($609) and shock ($512), followed by sepsis ($355) and lacerations ($203).

Labor costs were the main driver of the direct costs of postabortion care, accounting for more than two-thirds of the total direct cost at all three types of facilities (68–85%, not shown). The proportion of direct costs accounted for by labor was relatively constant across type of postabortion complication; the only exception was shock, for which the cost of medical supplies accounted for around three-fifths (59%) of the total. This was largely attributable to the high cost in Colombia of blood products, which represented a disproportionate share of the total medical supply cost for shock.

• *Indirect and total costs.* Capital costs and overhead costs, although difficult to measure, were a large part of the total cost of supplying postabortion care (Figure 1).

Adding the direct and indirect costs, the estimated total cost per postabortion case treated at secondary and tertiary facilities was $429. The total cost was slightly lower at tertiary ($397) than at secondary facilities ($441). Direct costs accounted for a third of the total, while indirect costs account for the remainder. Overhead costs, in particular, were a significant component of the cost of postabortion care, accounting for about half of the total cost of providing such services at the tertiary level (47%) and around three-fifths of the total cost at secondary facilities (59%).

• *Cost to the National Health System.* By applying the median direct cost per case to the estimated number of women receiving postabortion care in tertiary and secondary facilities in 2012, we estimate that approximately $14.4 million was spent that year on the treatment of abortion complications (not shown). This does not include indirect costs, which, as stated previously, account for around two-thirds of the cost to Colombia's health system. Including these indirect costs, we estimate that approximately $44 million was spent in 2012 on postabortion care in Colombia.

*All costs are in 2012 U.S. dollars, calculated using the average exchange rate ($1,794 COL=US$1) during the fielding period (source: Banco de la República, Tasa de cambio del peso colombiano (TRM), 2012, <http://www.banrep.gov.co/series-estadisticas/see_ts_trm.htm#tasa>, accessed Dec. 20, 2012.

Costs of Legal Abortion

• *Direct costs.* The estimated direct cost of legal abortion at specialized facilities is $45; it is four to five times as much at higher-level facilities, ranging from $189 at tertiary facilities to $213 at secondary facilities (Table 2). As with postabortion care, labor costs were the main driver of the direct cost of providing legal abortion, accounting for more than four-fifths of the total cost at all three facility types (85–90%, not shown).

In part, the large difference between higher-level facilities and private specialized facilities in the direct cost of legal abortion is related to the methods of abortion used at these facilities. Inpatient D&C, either alone or in combination with abortion medication (e.g., misoprostol), was the method most commonly used at secondary and tertiary facilities; eight in 10 legal abortions at these facilities were carried out using this technique, and few used misoprostol (Table 3, page 120). In contrast, private specialized facilities generally used outpatient MVA, misoprostol or a combination of the two. They also performed, on average, a far greater number of abortions than did higher-level facilities (906 vs. 6–12).

Comparison Between Costs of Legal Abortion And Postabortion Care

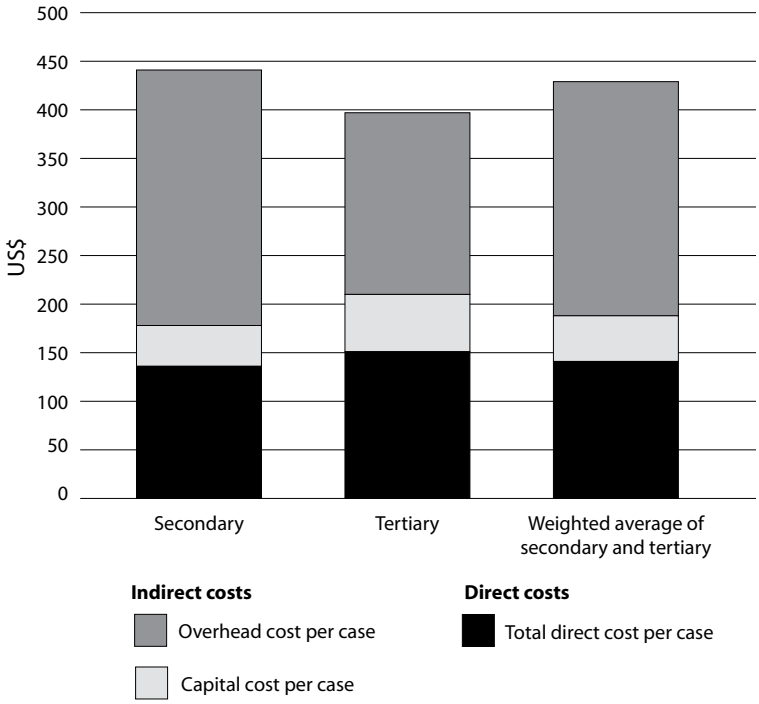
The direct cost of providing a legal abortion at a secondary or tertiary facility in Colombia ($189–$213; Table 2) was greater than that of treating complications of unsafe abortion at such facilities ($141; Table 1). At private specialized facilities, however, providing a legal abortion cost the same amount as providing postabortion care ($44–45). Even if the comparison between providing legal abortion and postabortion care at higher-level facilities is limited to the treatment of incomplete abortion, which under normal circumstances should be an identical procedure (at these facilities, inpatient D&C is typically used for both the treatment of incomplete abortion and the provision of legal abortion), the cost of providing legal abortion was significantly higher than the cost of treating an incomplete abortion.

The cost of labor was largely responsible for the higher price of legal pregnancy termination than of postabortion care at higher-level facilities. While the costs of medical supplies for legal abortion at secondary and tertiary facilities ($21–22; Table 2) were similar to the corresponding costs of treating incomplete abortion at these facilities ($18–19; Table 1), labor costs were more than twice as high ($168–191 vs. $69–80). At specialized facilities, the costs of both medical supplies ($7) and labor ($38) were much lower than the corresponding costs at higher-level facilities, and were identical to the estimated direct cost of treating incomplete abortion.

The higher cost of labor at tertiary and secondary facilities was largely driven by the greater amount of time providers at these facilities spent on each case during the course of treatment. The total number of minutes that all types of providers spent treating a typical case of legal abortion was more than twice the number of minutes spent for incomplete abortions (Table 4, page 120), at both secondary facilities (804 vs. 347) and tertiary facilities (950 vs. 452). At specialized facilities, the number of minutes spent providing a legal abortion was similar to the time spent treating incomplete abortion (243 vs. 197), and was less than a third of the number spent at higher-level facilities.

The differences between the amount of time providers at higher-level facilities spent with patients who received legal abortions and the amount they spent with patients who were treated for incomplete abortion were in part due to the longer hospital stays for the former (an average of three days, and in some cases as long as seven days) than for the latter (an average of one day; data not shown). In contrast, specialized facilities provide legal abortion only as an outpatient service.

FIGURE 1. Direct and indirect costs of postabortion care (in 2012 US$), by level of facility, Colombia, 2012



Sensitivity Analysis

Among medical supplies, variations in the cost and number of units of packed red blood cells had the greatest effect on our direct cost estimates, reducing or increasing the total cost per postabortion complication case by about $2;

TABLE 2. Direct cost of providing a legal abortion (in 2012 US$), by type of facility

Type of cost	Private specialized	Secondary	Tertiary
Medical supplies	7	22	21
Labor	38	191	168
Total	**$45**	**$213**	**$189**

TABLE 3. Percentage distribution of legal abortions, by method, and mean number of women receiving legal abortions and postabortion care—all according to facility type, Colombia, 2011

Measure	Private Specialized	Secondary	Tertiary
PERCENTAGE DISTRIBUTIONS			
Method of legal abortion			
Dilation and curettage*	0	87	86
Manual vacuum aspiration*	79	0	4
Misoprostol	21	13	10
Total	100	100	100
MEANS			
No. of legal abortions per facility	906	6	12
No. of postabortion care cases per facility	72	495	408

*Alone or in combination with abortion medication.

changes in the cost or quantity of any other single medical supply affected the total cost by less than $1. Among labor costs, variation in the number of minutes spent by an obstetrician-gynecologist treating incomplete abortion had the greatest effect on our estimates, modifying the total cost by approximately $6 in either direction. Variation in the number of minutes spent by nurses treating the same complication, the average salary for nurses, and the proportion of time nurses spent on administrative duties each affected the total estimates by $3–5.

In general, our indirect cost estimates were the estimates most sensitive to changes in key inputs. In particular, varying the proportion of patients admitted for treatment of complications of unsafe abortion had a large effect on our estimates of indirect costs, modifying the total by about $72 at each extreme. Thus, indirect cost estimates should be interpreted with caution, and should be considered only a general indicator of the likely high overhead and capital costs associated with the provision of postabortion care.

TABLE 4. Mean number of minutes providers spent treating incomplete abortions and providing legal abortions, by type of facility and provider

Type of facility/provider	Incomplete abortion	Legal abortion
Private specialized	**197**	**243**
Doctors	52	53
Nurses/auxiliary nurses	88	100
Other	56	89
Secondary	**347**	**804**
Doctors	85	155
Nurses/auxiliary nurses	121	389
Other	141	259
Tertiary	**452**	**950**
Doctors	77	145
Nurses/auxiliary nurses	190	502
Other	184	303

Notes: Estimates include all time spent treating patients during the entire course of treatment. Sum of minutes for individual provider types may not equal total because of rounding.

DISCUSSION

Data on the costs of providing legal abortion and treating complications of unsafe abortion are limited for much of the world, including Colombia. The current study provides data on abortion costs in Colombia and is timely given the change in the country's abortion law and the rise in the rate of treatment for induced abortion complications in recent years.[6] In the light of WHO recommendations on service delivery of safe abortion and treatment of incomplete abortion, results from this study suggest the need for serious reflection on the way legal abortion and postabortion care are provided to women in Colombia.

Because abortion complications in Colombia are less severe than they were 20 years ago,[6,8,32] the time and resources health professionals spend treating women for these complications are likely lower than in the past. According to respondents in our study, incomplete abortion was by far the most prevalent complication treated at participating facilities in 2011 (86%; not shown). Shock and sepsis accounted for 9% and 4% of complications, respectively; laceration and perforation each accounted for fewer than 1%. However, despite the diminished severity of abortion complications, our findings indicate that the economic cost to the health system is still very high.

The total cost of treating abortion complications is, in general, higher in Colombia than in other developing countries.* A Peruvian study using prospective data estimated that the direct cost of treating an incomplete abortion ranged from $20 to $50.[15] A recent study in Uganda estimated a similar direct cost ($39) for postabortion care.[20] In Mexico City, which is more economically comparable to Colombia than are the aforementioned countries, the estimated direct cost of treating an incomplete abortion in 2005 varied from $32 to $68 when the procedure was carried out using D&C at higher-level facilities.[16] If we assume an annual inflation rate of 3%, costs in 2012 would range from $39 to $84 per incomplete abortion treated.

These estimates, on average, are substantially lower than the estimated direct cost of treating incomplete abortion in Colombia ($96). This could be due in part to the use of D&C by most facilities in Colombia, but is also likely due to high labor costs, as the salaries of health professionals reported by our key informants (not shown) were often higher than those seen in comparable countries.[33,34] Experts with whom we informally discussed these findings considered our salary estimates to be realistic; further research is needed to understand why medical salaries are higher in Colombia than elsewhere in Latin America.

A significant proportion (66%) of the cost of providing postabortion care is attributable to indirect costs. This is in line with findings from studies in Uganda, Rwanda and Mexico, which found that overhead and capital costs were

*We limit our comparisons to direct costs, as it is difficult to make valid comparisons between our estimates of indirect costs and those of previous analyses (in part because the measured components of these costs differ across studies, and because of the high degree of uncertainty associated with these types of estimated costs).

responsible for about two-thirds of total costs.[16,19,20] To some extent, these indirect costs represent the substantial burden that treatment of abortion complications puts on facilities. It is thus key to reduce the incidence of postabortion complications in Colombia by preventing unsafe abortion through better family planning services and counseling; this will allow facilities to redirect resources to less easily preventable conditions.

The overall direct cost of providing legal abortion at secondary and tertiary facilities in Colombia is greater than the cost of treating abortion complications ($189–$213 vs. $141). At specialized private facilities, however, legal abortion is provided at less than one-fourth of this cost ($45). Several factors contribute to the high price of legal abortion at secondary and tertiary facilities. First, although guidelines from WHO[2] recommend that MVA and medication abortion be used to provide first-trimester abortions, and that D&C be used only if the other methods are unavailable or unsuitable, our findings indicate that eight in 10 legal abortion procedures at secondary and tertiary facilities are carried out using D&C. This is a clear indication that higher-level facilities are not complying with the clinical advice to use vacuum aspiration. D&C is more invasive, painful and expensive than MVA, and it generally requires hospitalization.[35–37] There is strong evidence that lower-level facilities can provide first-trimester abortion services safely on an outpatient basis using MVA, without the need for obstetrician-gynecologists or other high-level staff.[38] Currently, however, specialized private facilities are the only primary-level facilities that perform legal abortion, and are the only facilities of any level that use MVA or medication (such as misoprostol) to perform most legal abortions.

An additional factor affecting the cost of legal abortion provision in higher-level facilities is that administrative delays often cause legal abortions to be performed at later gestational ages. Prompt care is the exception, not the rule, in such facilities,[5] and Colombian women who attempt to exercise their right to have a legal abortion often must overcome significant administrative barriers before obtaining one. At higher-level facilities, the protocol to perform abortions at later gestations requires the approval of a committee and the presence of specialists such as anesthesiologists, gynecologists, internists, psychiatrists and perinatologists. In contrast, at the specialized facilities in our sample, these higher-level staff rarely took part in abortions (not shown). The participation of multiple specialists at higher-level facilities may lead to abortions being performed at later gestational ages than necessary. Although no data on gestational age are available from our study or from official statistics, records from La Mesa por la Vida y la Salud de las Mujeres* provide a general idea of the magnitude of the delays women may experience when attempting to obtain a legal abortion. From May 2006 to December 2012, a total of 439 women came to La Mesa seeking information about abortion, help obtaining one, or both. Of these women, 207 succeeded in obtaining a legal procedure, and 59% of them had delays ranging from one to 12 weeks.[39] Eliminating or decreasing these delays could contribute to reducing costs.

The number of procedures that a facility performs may also affect the cost of legal abortion. On average, private specialized facilities provided 906 legal abortions per year, while secondary and tertiary facilities provided only 6–12. Therefore, some of the cost differential between facility types may be due to the savings provided by economy of scale. However, as noted earlier, other factors, such as the abortion method used and delays in processing abortion request, also contribute to the large cost differential.

Our findings provide evidence that the government could reduce costs to the health system and improve the quality of provision of both legal abortion and postabortion care. The difference in cost between private specialized facilities and higher-level facilities suggests that legal abortions could be provided more cheaply if barriers were eliminated and if the procedure were performed on an outpatient basis at primary-level public and private facilities by skilled but mid-to-low-level health care providers using MVA or misoprostol. In addition, to reduce the cost of postabortion care, the government could require that facilities switch from complex, invasive abortion methods like D&C to simpler, more appropriate procedures such as medication abortion and MVA; could encourage women to obtain abortions as outpatients at primary health care centers, rather than at secondary or tertiary facilities; and promote abortion provision by nonspecialized providers, including medical doctors who are general practitioners. In addition, to eliminate delays and facilitate timely provision of services, it is important that the government educate women about their right to have safe, legal abortions.

APPENDIX TABLE A. Description of costs by category

Category	Types of costs
Labor	Salaries for time spent providing treatment and treatment related-services, when applicable, by the following staff: Nurses, auxiliary nurses, obstetrician-gynecologists, anesthesiologists, psychiatrists, other physicians, psychologists, sonographers, lab technicians, surgical assistants, pharmacists, pharmacy employees, social workers, internists, perinatalogists and bacteriologists.
Medical Supplies	*Drugs:* Analgesics, antibiotics, anesthetics/sedatives, misoprostol, oxygen, uterotonics and other emergency medications. *Supplies:* Gloves, gauze, needles, syringes, intravenous solutions, intravenous tubing, catheters, surgical sutures, gauze pads, surgical gowns and drapes, disposable bed sheets and covers for stirrups, disinfectant solutions, cleansers, lubricants. *Lab tests:* Supplies for drawing blood for lab tests, cost of laboratory tests adjusted for overhead.
Capital	Annual amortized cost of building and equipment (adjusted for inflation).
Overhead	Nonmedical and administrative labor costs, biowaste disposal, laundry service, meal service, grounds maintenance, utilities, telecommunications, fuel and vehicle maintenance, insurance, travel expenses, printed materials, reference materials for staff, central archives, bank commissions, maintenance of information technology.

*La Mesa por la Vida y la Salud de las Mujeres is a group of Colombian institutions and individuals that, among other activities, provide legal support to women who have difficulties obtaining a legal abortion and other services.

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RESUMEN

Contexto: *Aunque Colombia liberalizó parcialmente su ley de aborto en 2006, muchos abortos continúan ocurriendo fuera de la ley y resultan en complicaciones. Analizar los costos que para el sistema de salud representan los abortos legales y seguros, así como el tratamiento de las complicaciones derivadas del aborto ilegal e inseguro, tiene importantes implicacio-*

nes para la formulación de políticas.
Métodos: *Se utilizó la Metodología de Estimación de Costos de la Atención Postaborto para calcular los costos tanto directos como indirectos de la atención postaborto, así como de los costos directos de los abortos legales en Colombia. Los datos sobre costos estimados se obtuvieron a través de entrevistas estructuradas con informantes clave en una muestra seleccionada aleatoriamente de instituciones de salud que proveen atención relacionada con el aborto, incluidas 25 instituciones públicas y privadas de segundo y tercer nivel de atención, así como cinco instituciones privadas de primer nivel, que proveen servicios especializados de salud reproductiva.*
Resultados: *La mediana del costo directo de la atención de una mujer con complicaciones de aborto fluctuó entre $44 y $141 (dólares estadounidenses), lo que representa un costo directo para el sistema de salud de cerca de $14 millones de dólares anuales. Un aborto legal en una institución de segundo o tercer nivel resultó costoso (medianas de $213 y $189 respectivamente), en parte debido al uso del procedimiento de dilatación y curetaje, así como a barreras administrativas. En las instituciones privadas especializadas de primer nivel en donde se usa la aspiración manual endouterina y el aborto con medicamentos, la mediana del costo de la prestación del servicio fue mucho más baja ($45).*
Conclusiones: *La prestación de servicios de atención postaborto y de aborto legal, en instituciones de salud de los niveles más altos, resulta en costos innecesariamente altos. Estos costos pueden reducirse en forma significativa al proveer servicios de manera oportuna en instituciones de primer nivel y mediante el uso de métodos de aborto seguro, no invasivos y menos costosos.*

RÉSUMÉ

Contexte: *Malgré la libéralisation partielle de la loi sur l'avortement en Colombie en 2006, les procédures clandestines restent fréquentes, de même que les complications qui en résultent. L'évaluation des coûts, pour le système de soins de santé, de l'avortement légal médicalisé et du traitement des complications de procédures clandestines non médicalisées, présente d'importantes implications de politique.*
Méthodes: *La méthodologie PACCM d'évaluation du coût des soins après avortement a servi à produire une estimation des coûts directs et indirects des soins après avortement et des coûts directs de l'avortement légal en Colombie. Les données relatives aux coûts estimés proviennent d'entretiens structurés avec les informateurs clés d'un échantillon aléatoire d'établissements prestataires de soins de l'avortement, composé de 25 établissements de niveau secondaire et tertiaire publics et privés et de cinq établissements de soins primaires privés prestataires de services de santé génésique spécialisés.*
Résultats: *Le coût direct médian du traitement d'une femme atteinte de complications après avortement varie entre 44 et 141 dollars américains, soit un coût direct au système de santé d'environ 14 millions de dollars par an. L'avortement légal en établissement de soins secondaires ou tertiaires est coûteux (coût médian de 213 et 189 dollars, respectivement), en partie en raison du recours à la dilatation et curettage, ainsi que des obstacles administratifs. Dans les établissements spécialisés, qui pratiquent l'aspiration manuelle sous vide et l'avortement médicamenteux, le coût médian de la procédure est nettement moindre (45 dollars).*
Conclusions: *La prestation de soins après avortement et les services d'avortement légaux dans les établissements de plus haut niveau donnent lieu à des coûts inutilement élevés. Ces coûts peuvent être réduits significativement moyennant l'assurance de services en temps opportun dans les établissements de soins de santé primaires et le recours à des méthodes d'avortement sûres, non invasives et moins onéreuses.*

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