I. EMERGENCY TREATMENT

I. EMERGENCY TREATMENT

Introduction

The most frequent need for women seeking postabortion care (PAC) is treatment for complications related to miscarriage or induced abortion. Most women who seek care for postabortion complications present at facilities with vaginal bleeding. Bleeding is usually caused by products of conception still attached to the uterine lining or incomplete abortion. The solution to this complication is to evacuate or remove these remaining products from the uterus. Risk of death is significantly elevated for women needing PAC who do not undergo "treatment shortly after hospital admission" (Goyaux et al., 2001: 570).

The principal methods used today to evacuate the uterine cavity are dilation and curettage, also referred to as sharp curettage or D&C, and vacuum aspiration (VA). The choice of which method to use in any particular site or case depends on established protocols, the duration of the gestation, and availability of equipment and supplies and trained staff. However, the WHO has endorsed vacuum aspiration as the safest technique for uterine evacuation. Most recently, the WHO has advised that the preferred surgical technique for abortion up to 12 weeks of pregnancy is vacuum aspiration, and that "Where sharp curettage is currently practiced, all possible efforts should be made to replace sharp curettage with vacuum aspiration to improve the safety and quality of care. Additionally, at sites where sharp curettage continues to be used, managers must ensure that proper pain management procedures are followed, and that staff are well trained and receive adequate supervised clinical practice to maintain their skills (WHO, 2003: 34).

Sharp curettage is usually performed in an operating room by a surgically trained provider (usually a doctor/surgeon) with general anesthesia. It consists of dilating the cervical opening with graduated metal instruments and emptying the uterus with a spoon-shaped metal instrument (curette).

VA can be performed in an outpatient setting in a clinic or emergency room with the appropriate conditions, by a lower level, well trained provider using pre-evacuation analgesia and local anesthesia. Due to this, VA usually results in a shorter facility length of stay, which, in turn, lowers costs to the system and the client.

There are two methods to perform VA: electric vacuum aspiration (EVA) and manual vacuum aspiration (MVA). In both methods, the cervix is dilated either with plastic or metal instruments and the uterus is evacuated using a plastic cannula, applying sufficient vacuum to aspirate all the remaining pregnancy products from the uterus (Solter et al., 2000).

a) EVA uses an electric pump.

b) MVA uses a large syringe which can produce a sufficient vacuum through a series of valves. The important benefits of MVA are that electricity is not needed, the equipment is portable, and it is easily processed for reuse. Also, there is less risk of hemorrhage, infection, and trauma, as compared to EVA.

c) The WHO recommends that doctors, midwives, and medical assistants be trained in VA for treatment of incomplete abortion (WHO, 1994).

Although both sharp curettage and VA are safe, there has been a movement to switch from sharp curettage to VA because VA causes fewer complications and can be performed at lower level facilities without operating rooms. With hospital policy changes, as well as use of systemic analgesia instead of general anesthesia, it may be possible to perform sharp curettage as an ambulatory outpatient procedure in hospitals. However, VA is still the method endorsed by the WHO.

As noted in the USAID Postabortion Care Strategy Paper, while MVA is safer, less costly, and as effective as sharp curettage for treating postabortion complications, MVA does not equal PAC. Where MVA is not available, sharp curettage is an effective practice to provide life-saving emergency care (p. 15).

Newer research has focused on the use of medical management of incomplete abortion using the synthetic prostaglandin misoprostol which can be administered orally or intra-vaginally. To date, most of this research has included care for women who have experienced a miscarriage, but new research is being conducted in its use with women who have an incomplete induced abortion. Misoprostol has the potential to assist in emergency treatment of incomplete abortion at the lowest-level health facilities by lower-level trained providers, and established supervisory and referral systems. Research on misoprostol is included in section I.C.3 of this module.

I.A. PRIVACY AND CONFIDENTIALITY IN HISTORY AND PHYSICAL ASSESSMENT

Summary of Evidence	Supporting Research	Gray Type
Women need privacy and confidentiality during the taking of their history and physical assessment. ☑ Enough evidence for action: One study.	A study in Bolivia in 1993, which interviewed 30 PAC patients in four hospitals, found women wanted privacy and confidentiality during the taking of their history and physical assessment. (Rance, 1994: 6).	IV

I.B. TRIAGE

Summary of Evidence	Supporting Research	Gray Type
Triage during emergency treatment.	No PAC-related studies found on this topic.	

I.C. MEDICAL TREATMENT

I.C.1. VA and Sharp Curettage

According to a 2002 Cochrane review, "Vacuum aspiration can be performed without the need for a fully equipped and staffed operating theater as it can be done with or without electricity, under local anesthesia or sedation. It can therefore be performed in settings with limited resources, saving time and money, and possibly minimizing complications. Eliminating the need for transport to a better equipped facility might decrease the severity of an infection, or decrease blood loss and the subsequent need for transfusions" (Forna and Gulmezoglu, 2003: 5). It is critical to ensure that all equipment used in emergency treatment of abortion complications are sterilized prior to reuse to decrease any risk of transmission of HIV, malaria, or bacteria which could cause sepsis.

Both sharp curettage and VA are safe and effective. "Large scale studies in the 1970s showed rates of both total and major complications from electric vacuum aspiration to be half that of sharp curettage, although low complications were seen for both procedures" (Koontz et al., 2003: 8). Some of the complications related to sharp curettage are not due to the procedure itself but to the use of general anesthesia, which provides overall muscle relaxation, including for the uterus. This muscle relaxation makes it easier for perforation and increased blood loss due to lack of constriction of uterine blood vessels and other complications.

Koontz et al. (2003) outlines the following which are included for the total costs of sharp curettage procedures: 1) overhead costs associated with staying in the emergency room (initial assessment), the surgical obstetrics unit (the procedure), and the gynecology ward (postoperative recovery and discharge); 2) cost of time of personnel involved in patient care; 3) cost of medications given during the hospital stay, including anesthesia, pain medications, blood transfusion, contraception, discharge medications, and any other medication given; 4) cost of standard supplies and disinfection (with separate estimates for sharp curettage and MVA); 5) cost of equipment used for each MVA procedure (with the cost of sharp curettage equipment estimated at zero); and 6) costs of services from other departments that were calculated based on specific resources each patient used such as labs, meals, and ultrasound, as well as more rarely used resources such as chest x-ray, electrocardiograph, and internal medicine consults.

As reflected in this section, most comparative studies on methods of emergency treatment related to PAC have involved comparing MVA and sharp curettage. While VA and MVA carry a lower risk of morbidity; however, some complications may require the use of sharp curettage.

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
MVA is as effective as sharp curettage for treatment of first trimester incomplete abortion. ☑ Enough evidence for action: One study.	A prospective, longitudinal study from 1990–1991 conducted in Harare, Zimbabwe, found that MVA was as safe as sharp curettage for treatment of incomplete abortion, with 0.7 percent resulting in incomplete evacuations with MVA and zero percent resulting in incomplete evacuations with sharp curettage. Sharp curettage tended to be utilized when a woman presented with a more complicated case. For example, 17 percent had sepsis as compared to 11 percent for those who had MVA. At follow-up, only 0.3 percent of those who had MVA had extreme pain as compared to 2.7 percent of those treated with sharp curettage. In this study, 834 women were treated with MVA and 589 women were treated with sharp curettage for treatment of incomplete abortion. Only women with fewer than 12 weeks of gestation, determined by bimanual pelvic examination of uterine size, were included. At time of discharge, patients were scheduled for a two-week follow-up appointment and examined for post procedural complications. Home visits were made for those who did not return for follow-up appointments. Physicians received a five-day training course in MVA, including use of analgesics for pain relief. Over a three-month period, data were collected on 1,000 consecutive patients treated for PAC with sharp curettage; one year after the initiation of the study, the same data were collected on 834 PAC patients treated with MVA, of which 589 were included in the analysis, as they had under 12 weeks gestation. Results were based on assessments made at the two-week follow-up (Mahomed et al., 1994).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Women undergoing MVA procedures had significantly decreased bleeding seven days post evacuation than women undergoing sharp curettage. ☑ Enough evidence for action: One study.	A study (year not specified) of 300 postabortion patients treated with MVA in Nairobi, Kenya, indicated that the use of MVA significantly decreases bleeding after seven days post-evacuation compared to those treated with sharp curettage. The patients treated with MVA were asked to stay in the ward for a minimum of six hours for observation after evacuation and then were sent home, whereas hospital stay for the sharp curettage patients was one to three days in the ward. Clinical findings seven days after evacuation reported that 70.3 percent of the women treated with MVA were without signs of vaginal bleeding compared to 64.6 percent of the group treated with sharp curettage. In addition, 3.3 percent of the MVA patients experienced some bleeding in comparison to 5.6 percent of the sharp curettage patients (Kizza et al., 1990).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Women who receive VA treatment for incomplete abortion had shorter procedures, had significantly lower blood loss and less incidence of moderate to severe pain than women treated with sharp curettage. ☑ Enough evidence for action: One study, one review.	A randomized study in South Africa of 357 women presenting with incomplete abortions found that those who received VA had significantly lower blood loss, a quicker procedure, and less pain than those who underwent sharp curettage (Verkuyl and Crowther, 1993).	II
	A Cochrane Collaboration review of two trials (Tan et al., 1969 and Verkuyl and Crowther, 1993) found that vacuum aspiration compared with sharp curettage was associated with decreased blood loss, fewer cases of blood loss greater than or equal to 100 mls, and fewer cases of post-operative hemoglobin level less than 10 g/dl. Compared with women undergoing sharp curettage, women undergoing vacuum aspiration were less likely to report moderate to severe pain. Additionally, the duration of VA procedures was shorter than that of sharp curettage. The trials were relatively small, with 193 women in the Tan, 1969 study and 357 in the Verkuyl, 1993 study (Tan et al., 1969; Verkuyl and Crowther, 1993 reviewed in Forna and Gulmezoglu, 2003).	II
MVA has low complication rates. ☑ Enough evidence for action: Two studies.	A study of 12,888 MVA procedures in 21 countries found an immediate complication rate of 0.8 per 100 procedures and no deaths (Laufe, 1977 cited in Baird and Flinn, 2001).	II
	A study of 1,896 women in Ethiopia from August 1993 to April 1995 compared the efficacy of MVA versus sharp curettage. Immediate complications such as perforation, hemorrhage, shock, and infection were significantly higher in the sharp curettage group whereas nausea and vomiting occurred more often in the MVA group. All MVA patients reported less pain than sharp curettage patients. MVA proved to be more friendly and applicable in smaller uterine sizes than sharp curettage and did not severely damage the endometrial lining (Lukman et al., 1996).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
The use of systemic analgesia with sharp curettage for incomplete abortions with dilated cervix up to 14 weeks is safe, effective, has a smaller chance of requiring a blood transfusion, and does not require the use of the operating theatre. ☑ Strong evidence: One study.	A prospective randomized clinical trial in 1992 in South Africa comparing 142 patients with use of sharp curettage for uncomplicated incomplete abortion with systemic analgesia of fentanyl and midazolam to sharp curettage with general anesthesia found that use of systemic analgesia of fentanyl and midazolam was safe, effective, and acceptable and had a significantly smaller chance of requiring a blood transfusion. Use of systemic analgesia did not require an operating theater, but "the danger of respiratory depression still exists and the evacuation room must therefore be equipped with a resuscitation unit and a pulse oximeter for continuous oxygen saturation monitoring" (de Jonge et al., 1994: 483). Ninety-seven of the 99 patients who were available for their six-week follow-up visit stated they were pleased that they had not had general anesthesia; only two would have preferred it.	I
The use of general anesthesia with suction curettage is associated with increased risks of blood loss, cervical injury, uterine perforation, and subsequent abdominal hemorrhage. ☑ Strong evidence: One study. Two studies.	A study in the US compared the safety of suction curettage among 36,430 women receiving local anesthesia and 17,725 women receiving general anesthesia. Total complication rates for the two groups were the same; however women who received general anesthesia experienced greater rates of hemorrhage, cervical injury, and uterine perforation. Local anesthesia was associated with increased febrile and convulsive morbidity. (Grimes et al., 1979; Greenslade et al., 1993b cited in Baird and Flinn, 2001). occurred more often in the MVA group. All MVA patients reported less pain than sharp curettage patients. MVA proved to be more friendly and applicable in smaller uterine sizes than sharp curettage and did not severely damage the endometrial lining (Lukman et al., 1996).	IV

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage can reduce the length of hospital stays. ☑ Strong evidence: Seven studies.	A study of 339 postabortion patients in Oaxaca, Mexico, (year not specified) found that introducing MVA resulted in reducing the length of hospital stay from 20.7 to 17.4 hours. Following hospital protocol, no attempt was made to determine whether or not the patient's abortion was spontaneous or induced in nature. At baseline, MVA was being used zero percent of the time and increased to 78.1 percent at post-intervention. Sharp curettage at baseline was the most utilized technique at 89.6 percent and decreased to 20.8 percent. Use of a combination of sharp curettage and MVA was 10.4 percent at baseline and decreased to 1.1 percent. Guidelines were modified to stipulate using MVA with local anesthesia if a patient's uterus was determined to be smaller than 12 cm. Finally, all operating rooms became functional 24 hours a day to reduce waiting times (Langer et al., 2002; Langer et al., 1999; Brambila et al., 1999).	III
	A 1991 rapid assessment in Kenya and Mexico found that MVA required less hospital time than sharp curettage. Data were collected between January and June 1991 in four hospitals in Kenya and five hospitals in Mexico using direct observation to document actual time and resources from the beginning to the end of patients' hospital stays. All women included in the study had incomplete abortions with a uterine size related to gestation of less than 13 weeks. The study design planned for at least 15 women from each hospital to be observed, but because of small caseloads this was not possible in all of the hospitals. Among the hospitals in Kenya, the hospital with the longest average stay for MVA (23.9 hr) was 42 percent shorter than the hospital with the shortest average stay for sharp curettage (40.9 hr.). In Mexico, at the one hospital that performed both MVA and sharp curettage, MVA patients stayed an average of 45 percent less time than sharp curettage clients (11.4 hours versus 20.6, respectively) (Johnson et al., 1993).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage can reduce the length of hospital stays. ☑ Strong evidence: Seven studies.	A study conducted from 1997–1978 in Burkina Faso found that treating patients with MVA led to significantly shorter hospital stays for PAC patients. Before the intervention, patients were treated with sharp curettage or digital curage. The mean treatment time was 73 minutes and patients spent an average of 36 hours in the hospital, in large part recovering from the sharp curettage and general anesthesia. When providers were trained and began to use MVA, treatment time dropped to 23 minutes and patients left the hospital after an average of 19 hours. As part of this pre-post intervention study, researchers trained staff at two large hospitals in Ouagadougou and Bobo-Dioulasso to provide PAC and reorganized services to make them available at one location. Training for physicians, nurses, and midwives covered manual vacuum aspiration (MVA), family planning methods, infection prevention, and communication with patients. Staff also participated in the development of policies and standards for PAC services. To measure changes in knowledge and behavior, researchers interviewed 330 patients with abortion complications and 78 providers before the intervention, and 456 patients and 41 providers after the intervention, and collected information on hospital costs (Ministry of Health, Burkina Faso, 1998).	III
	A study conducted during 1999 of the introduction of MVA to treat incomplete abortion at a regional hospital in El Salvador found that compared to sharp curettage, use of MVA and associated changes in protocol led to a significant reduction (28 percent) in time spent by the PAC patient in the hospital. Time spent in the hospital was reduced from 27.2 hours for sharp curettage PAC patients to 19.7 hours for MVA patients. Hospital cost, length of stay, complication rates, and family planning acceptance following PAC were compared in a prospective, randomized controlled study of 154 women assigned to either sharp curettage or MVA (Koontz et al., 2003).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage can reduce the length of hospital stays. ☑ Strong evidence: Seven studies.	A 1996–1998 intervention study in a referral hospital in Lima, Peru, tested a model where all PAC services were provided in an obstetrics and gynecology emergency room on an outpatient basis. Doctors were trained in MVA and improved clinical practices, counseling on medical care and family planning, and provision of contraceptive methods. Pre-intervention patients spent the majority of their time (an average of 20.1 hours, or 60 percent of the total stay) in the obstetric and gynecology ward, following the sharp curettage procedure. Post-intervention recovery times were reduced to 2.7 hours. This increased somewhat to 3.5 hours three years later, in part due to an occasional practice of hospitalizing patients until their fees are paid. The original study utilized a pre-post intervention design with no control group. A follow-up assessment of the same outcomes was conducted in 2000–2002 to assess the sustainability of the intervention without outside assistance. The average length of stay at baseline was 33.3 hours, which declined to 6.4 hours after the intervention and remained fairly constant at 6.7 hours three years later. Data collection included review of the surgical logbook for 455 patients, clinical histories and exit interviews of 323 patients, a time-motion study of 52 patients from arrival at the emergency room until departure, 17 random inventories of supplies and equipment, and 13 in-depth interviews with providers and policymakers (Benson and Huapaya, 2002).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage can reduce the length of hospital stays. ☑ Strong evidence: Seven studies.	A 1999–2001 intervention study conducted in Bolivia's three largest maternity hospitals found that the average length of hospitalization for women treated with MVA was much lower than with sharp curettage. Pre-intervention women treated with sharp curettage were hospitalized for an average of 34 hours in La Paz, 34.3 in Santa Cruz, and 38.6 in Sucre. The average length of stay after the intervention was 10.7 hours using MVA (a decrease of 68 percent) and 49.1 hours using sharp curettage in La Paz, 4.4 hours using MVA (a decrease of 87 percent) and 26.2 hours using sharp curettage in Santa Cruz, and 19.9 hours using MVA (a decrease of 48 percent) and 45.9 hours using sharp curettage in Sucre. The bulk of the difference came from the shorter recovery time required for MVA with local anesthesia compared to sharp curettage with general anesthesia. However, treatment time was marginally shorter with MVA, and pre-procedure waiting time for women treated with MVA dropped by about two hours in all three hospitals, to 1.7–3.5 hours post-intervention, while it remained constant or increased for women treated with sharp curettage who waited between 3.4 (Santa Cruz) and 22.4 hours (Sucre). The pre-post intervention study was conducted in maternity hospitals in La Paz, Santa Cruz, and Sucre. Due to differences in infrastructure, size, and staff and population characteristics, comparisons were made between pre- and post-intervention results within but not between hospitals. The intervention consisted of reorganization of services to ambulatory care; PAC training on information and counseling (health status, uterine evacuation procedure, postabortion contraception, and care after leaving the hospital) and appropriate technologies and technical performance; and refresher training and supportive supervision. Data were collected through 935 client exit interviews, 269 three-month follow-up interviews with clients, 439 client observations, review of 768 clinical records, 47 provider interviews, 204 provider questionnaires, 138 male partner interviews, and 424 client flow observations to assess costs (Billings et al., 2003b).	III

I.C.1.A. EFFECTIVENESS AND SAFETY OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage can reduce the length of hospital stays. ☑ Strong evidence: Seven studies.	A study in Senegal from 1997–1998 that trained providers to use MVA to treat patients for abortion complications found that the average length of hospitalization decreased significantly in all three study hospitals, despite wide variation among hospitals. During the pre-intervention phase, digital curage was used to treat 52.8 percent of patients, while sharp curettage and EVA were used for 43.7 percent and 3.5 percent of patients, respectively. After the intervention to train providers to use MVA, use of digital curage, sharp curettage, and EVA dropped to 24.9 percent, 23.8 percent, and zero percent, respectively, whereas MVA was used for 51.4 percent of patients. All forms of treatment were carried out in the hospital. After the change in treatment protocol switched to favor MVA, mean hospital stays almost decreased by half in two of the hospitals, dropping from 40 hours to 21 hours in one hospital, and from 73 hours to 39 hours in the other hospital. The third hospital had much longer average stays before and after the intervention, but nevertheless decreased from 136 hours (or 5.7 days) to 104 hours (or 4.3 days). Physicians, nurses, and midwives at three teaching hospitals in Dakar received training in clinical management of abortion complications including MVA and infection prevention, family planning, and counseling. To measure the impact of the intervention, researchers in this pre-post intervention study interviewed 320 patients and 204 providers before the intervention and 543 patients and 175 providers after the intervention. A time-motion study was conducted to assess costs for 35 patients (Centre de Formation et de Recherche en Santé de la Reproduction and Clinique Gynécologique et Obstétricale CHU A. le Dantec, 1998).	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage along with associated changes in protocols and an improved service delivery model can significantly reduce costs of care in most cases. ☑ Strong evidence: Nine studies.	A study conducted during 1999 of the introduction of MVA to treat incomplete abortion at a regional hospital in El Salvador found that compared to sharp curettage, use of MVA and associated changes in protocol led to a significant cost savings of 13 percent (Koontz et al., 2003). See Appendix I, Koontz et al. for a description of the intervention.	III
	A study in Oaxaca, Mexico, (year not specified) found that use of MVA decreased the average cost of PAC by almost 32 percent. Using sharp curettage as the procedure of choice cost $264.47 per patient as compared to $180.22 using MVA. These costs include the intervention costs (e.g., project costs), supplies (e.g., syringes), training time, supervision, and monitoring. "The results of this study show that the improved service-delivery model achieved significant cost savings and simultaneously improved quality of care for patients undergoing postabortion treatment" (Brambila et al., 1999: 121). In terms of the procedure used for uterine evacuation, MVA was being used zero percent of the time at baseline and increased to 78.1 percent at post-intervention. Sharp curettage at baseline was the most utilized technique at 89.6 percent and decreased to 20.8 percent, and a combination of sharp curettage and MVA was 10.4 percent at baseline and decreased to 1.1 percent. Length of hospital stays was reduced by 36 percent. In terms of which procedure to use, guidelines were modified to stipulate the standard protocol of MVA usage with a local anesthesia if a patient's uterus was determined to be smaller than 12 cm. Finally, all operating rooms became functional 24 hours a day to reduce waiting times (Langer et al., 2002 and Langer et al., 1999). See Appendix I, Langer et al. for a description of the intervention.	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage along with associated changes in protocols and an improved service delivery model can significantly reduce costs of care in most cases. ☑ Strong evidence: Nine studies.	A 1996–1998 intervention study in a referral hospital in Lima, Peru, showed that providing PAC services in an obstetrics and gynecology emergency room on an outpatient basis was successful and resulted in lower costs than did providing PAC as an inpatient service. Doctors were trained in MVA and improved clinical practices, counseling on medical care and family planning, and provision of contraceptive methods. Prior to the intervention, the hospital recovered US$52.98 in patient fees out of a cost of US$118.73, requiring the facility to subsidize an average US$65.75 per PAC patient. Following the intervention, the average cost recovery was US$37.40 from an average cost of US$45.13, with the hospital subsidizing US$7.73 per patient. Three years later, the hospital underwrote only US$0.70, as costs were reduced to an average of US$33.45 per patient, and patient fees accounted for US$32.75. "The actual cost recovery to Hospital Carrión is likely to be slightly less because some medications and supplies purchases are made in private pharmacies, rather than from the hospital pharmacy. The hospital and patient cost data suggest, however, that the Hospital Carrión is now recovering almost its full cost of providing PAC services" (Benson and Huapaya, 2002: 29). Researchers found that differences in costs were primarily related to length of hospitalization, and therefore greatly reduced by the shorter length of stay accompanying the shift to MVA use (Benson and Huapaya, 2002). See Appendix I, Benson and Huapaya, for a description of the intervention.	III
	A study from 1997–1978 in Burkina Faso found that dilation and curettage, the primary treatment prior to the intervention, cost 20,106 CFA, the equivalent of about US$34, while the average cost per patient for MVA was 8,546 CFA, or approximately US$15. MVA lowered costs for both the hospital and patients due to shorter hospital stays, less use of general anesthesia, and less staff time (Ministry of Health, Burkina Faso, 1998). See Appendix I, Ministry of Health, Burkina Faso, for a description of the intervention.	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage along with associated changes in protocols and an improved service delivery model can significantly reduce costs of care in most cases. ☑ Strong evidence: Nine studies.	A 1999–2001 intervention study conducted in Bolivia's three largest maternity hospitals found that treating women with MVA cost much less than treatment with sharp curettage. Cost components considered were personnel (salaries and benefits), medication, supplies, and hospitalization, and were assessed using client flow analysis, observing a sample of patients from arrival to discharge. Pre-intervention costs for women treated with sharp curettage ranged from US$59.35 in Santa Cruz to US$88.77 in Sucre. Costs for treatment with MVA after the intervention were 45 percent lower in Sucre (US$48.74), 62 percent lower in La Paz (US$24.92), and 75 percent lower in Santa Cruz (US$15.67). The drop in costs was primarily due to much shorter duration of hospitalization, although costs for personnel decreased by half or more in all three hospitals, and costs for medication and supplies decreased modestly in La Paz and Santa Cruz. The intervention had mixed effects on the cost of treatment with sharp curettage. In two hospitals, costs actually increased 11 percent and 26 percent after the intervention due to longer hospitalization, while in the Santa Cruz costs dropped by 18 percent for sharp curettage, compared to 75 percent for MVA treatment. The pre-post intervention study was conducted in maternity hospitals in La Paz, Santa Cruz, and Sucre (Billings et al., 2003b). See Appendix I, Billings et al., 2003b Bolivia, for a description of the intervention.	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage along with associated changes in protocols and an improved service delivery model can significantly reduce costs of care in most cases. ☑ Strong evidence: Nine studies.	A 1991 rapid assessment in Kenya and Mexico found that MVA used fewer resources and required less hospital time than sharp curettage. The study identified and analyzed the differences in the costs of MVA and sharp curettage used in the treatment of incomplete first-trimester abortions. Data were collected between January and June 1991 in four hospitals in Kenya and five hospitals in Mexico using direct observation to document actual time and resources from the beginning to the end of patients' hospital stays. All women included in the study had incomplete abortion with a uterine size related to less than 13 weeks gestation. The protocol required that MVA not be performed for pregnancies of more than 12 weeks. The study design planned for at least 15 women from each hospital to be observed, but this was not possible because of small caseloads in all of the hospitals. Cost components studied were staff, drugs, and hospitalization. Cost at the four Kenyan hospital ranged from US$2.94 to US$5.24 for MVA (a 23 percent difference) and US$3.99 to US$15.25 for sharp curettage (a 66 percent difference). In the Mexican hospital that performed both MVA and sharp curettage, the average cost for an MVA client was US$65.73, 17 percent less than the hospital with the lowest cost for sharp curettage (US$79.23) and 72 percent less than the hospital with the highest cost for sharp curettage (US$235.90). Hospital costs accounted for the largest proportion of total cost, yet even when hospitalization costs were excluded, the cost of MVA was less than the cost for sharp curettage. Personnel costs were the second greatest contributor to average cost (Johnson et al., 1993).	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage along with associated changes in protocols and an improved service delivery model can significantly reduce costs of care in most cases. ☑ Strong evidence: Nine studies.	A 1992 study in Tanzania found that MVA was more cost effective than sharp curettage. Data on 199 patients (107 treated with MVA and 92 treated with sharp curettage), collected between September and November 1992 at Muhimbili Medical Center, showed that direct costs and resource utilization for MVA was 61 percent less than those for sharp curettage. Cost of drugs, infusions, and syringes was 93.1 percent less for MVA patients (80.7 compared to 1,171.1 Tanzanian shillings (Tshs)); total direct cost was 50 percent less; pre-evacuation waiting time was 55.1 percent less for MVA (3.8 hours compared to 8.5 hours); duration of procedure was 46.4 percent less for MVA (10.2 minutes compared to 19 minutes); and duration of hospital stays was 40.5 percent less for MVA (10.7 hours compared to 18 hours). "In principle longer pre-evacuation waiting times have been associated with increased incidence of septic abortion and hemorrhagic shock as immediate complications. … The longer the duration of the procedure the higher the cost" (Magotti et al., 1995: 250). The MVA equipment was purchased for the study, but the sharp curettage equipment, because it was already available in the hospital, was not included in the total direct costs. However, the monthly depreciation value of both sets of equipment, based on replacement value, was similar (Tshs 1,250 for MVA equipment and Tshs 1,500 for sharp curettage equipment.) Hospitalization costs, although known to contribute heavily to medical costs, were not included because of the absence of a clear pricing policy. Patients included in the study were diagnosed with an incomplete abortion during the time of data collection with uterine size related to less than 16 weeks gestation. MVA was performed on even numbered days and sharp curettage was performed on odd numbered days. One MVA patient needed re-evacuation (Magotti et al., 1995).	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Using MVA for PAC instead of sharp curettage along with associated changes in protocols and an improved service delivery model can significantly reduce costs of care in most cases. ☑ Strong evidence: Nine studies.	A 1994 quasi-experimental study conducted in one U.S. hospital found that MVA costs less compared to sharp curettage. Data collected on all patients presenting with incomplete abortion between January 1990 and July 1992 showed that MVA use reduced total hospital costs by 41 percent (US$827 compared to US$1,404), anesthesia charges by 93 percent, admission charges by 92 percent, and expenses related to sterile supplies by 54 percent. The study found that "eliminating the need for a staff- and cost-intensive operating theater…resulted in considerable cost reductions, without sacrificing standards for clinical care" (Blumenthal et al., 1994: 266). From January 1990 to September 1991, patients suspected of having incomplete abortion with uterine size less than or equal to 12 weeks gestational size were treated with sharp curettage in the operating room. From October 1991 to July 1992, incomplete abortion patients (mean gestational age not given) were treated with MVA in the gynecology exam room, or, when not available, on the labor corridor in a labor and delivery room or procedure room. Costs were compared through itemizing hospital bills (Blumenthal and Remsburg, 1994).	III
	In the one year following a study in Nairobi, Kenya, where MVA was introduced in a wider scale with over 3,000 patients being evacuated, the savings calculated were estimated at Ksh.5.1 million (US $300,000) by not utilizing an operating theater or using sharp curettage and anesthesia. This amount was equivalent to the sum of basic salaries of about 200 nurses annually (Kizza et al., 1990).	III

I.C.1.B. COST COMPARISONS OF MVA, VA, AND SHARP CURETTAGE

Summary of Evidence	Supporting Research	Gray Type
Switching to MVA from sharp curettage can cause an initial increase in cost due to improved quality of care resulting in increased cost for supplies and medications. ☑ Needs more research: One study..	A study in Egypt found an 8 percent increase in the total per-patient cost in one hospital and a 32 percent increase in another hospital after switching from sharp curettage to MVA, due to an increase in the cost of supplies and medicines associated with the use of MVA, which were not offset by reductions in length of hospital stay. "These increases are due to the relatively inefficient use of medical supplies and pain control medication in the pre-intervention, and the improvements in the quality of care during the post intervention that required a more intensive use of medical supplies" (Nawar et al., 1999: 136).	III
MVA can be performed safely in a primary care setting with a referral system available for those requiring higher-level care. ☑ Enough evidence for action: One study.	A 2001–2003 operations research study in health centers in Senegal found that 57 percent of PAC patients were treated with MVA in the 14 months after it was introduced. This pre-post intervention study introduced an integrated three-element PAC model in 18 primary care sites in two predominantly rural regions in Senegal to test the feasibility of making services more immediately accessible to women in rural areas and to assist with the development of national standards of care for PAC services. Following the intervention, 460 patients were treated for complications of abortion at the study sites. Of these, 326 women had gestational age of less than 14 weeks and were considered suitable cases for MVA treatment, and 266, or 57 percent, were treated with MVA. Thirty-four women, or 10 percent of those eligible for MVA, experienced severe complications such as closing of the cervix and were referred to the secondary-level district hospital. It is important to note that not all postabortion patients can be treated with MVA. During this study, 134 of the 400 women requiring care were beyond the first trimester, which is the WHO-recommended limit for MVA use (Dabash, 2003). See Appendix I, Dabash 2003, Senegal, for a description of the intervention.	III

I.C.2.A. EFFECTIVENESS AND SAFETY OF FOOTPUMP SUCTION VACUUM ASPIRATION

Summary of Evidence	Supporting Research	Gray Type
MVA and Footpump suction evacuation (FSE) are equally effective for uterine evacuation following first or second trimester incomplete abortion. ☑ Needs more research: One study	A prospective comparative analysis in South Africa of women allocated either to MVA or Footpump suction evacuation (FSE) following first or second trimester incomplete abortion found that both methods were equally effective for uterine evacuation. The Menox footpump (Menox AB, Gothenburg, Sweden) was used. Sixty-five women received MVA and 56 received FSE. The volume of products of conception obtained in both groups was similar. Four women in the MVA group and one in the FSE group required antibiotics. In two cases women allocated to FSE required MVA as a result of the footpump valve being clogged. In four cases, women who received MVA required sharp curettage because of a faulty or incomplete syringe apparatus (Gaertner et al., 1998).	III

I.C.2.B. COST COMPARISONS OF FOOTPUMP SUCTION VACUUM ASPIRATION

Summary of Evidence	Supporting Research	Gray Type
Cost Comparisons with Footpump Suction Vacuum Aspiration.	No PAC-related data found on this topic.	

I.C.3. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR PAC

Misoprostol is a prostaglandin E1 analogue originally approved by the United States Food and Drug Administration for the prevention and treatment of gastric ulcer during long-term use of nonsteroidal anti-inflammatory drugs. Because it acts to contract the uterus, misoprostol is currently used off-label for a variety of obstetric and gynecologic indications (Goldberg et al., 2001).

Studies that have examined its potential use in evacuating the uterus following early pregnancy failure (incomplete spontaneous abortion or missed abortion) demonstrate the efficacy, safety and acceptability of misoprostol for this indication (Beucher et al., 2003). Side effects are generally mild, short-lived and dose-related and include chills, fever, nausea, vomiting, diarrhea and headache. Gastrointestinal side effects are more common with oral compared to vaginal administration. Bleeding is increased compared to surgical management but not significantly. Pain needs to be relieved by analgesics. Questions remain about the optimal dose and route of administration (Winikoff, 2005).

Though most published trials of medical management of early pregnancy failure were conducted in industrialized countries in well-equipped facilities, the greatest potential use of misoprostol for PAC may be in resource-constrained environments where surgical care is not readily available (Winikoff 2005). Misoprostol is relatively inexpensive, has a long shelf-life, is heat stable and requires no special storage facilities. Misoprostol treatment as an alternative to surgery appears to be acceptable to women where it has been tested (Zhang et al., 2005; Ngoc et al., 2004). Studies suggest that using misoprostol instead of surgery in an outpatient setting reduces the cost of services (Graziosi et al., 2005).

Despite encouraging results, medical management has several drawbacks. A number of women treated with misoprostol will still need to undergo surgical evacuation due to treatment failure. Treatment success rates are higher with longer periods of observation and thus concerns exist about how to manage potential losses to follow up (Weeks et al., 2005). It is important to keep in mind that not all PAC clients may be appropriate candidates for medical management. For example, medical management with misoprostol, according to one source (Ipas, 2004) is contraindicated when a patient has a known allergy to prostaglandins, an IUD is in place (prior to removal), or when there are signs of endometritis, sepsis or ectopic pregnancy. In clinical studies, women with clinical or laboratory evidence of severe anemia were considered ineligible for medical evacuation because of the small but real risk of hemorrhage (Ipas, 2004). Lastly, it may be possible to control bleeding problems more quickly with a surgical procedure (Ipas, 2004). Thus medical management needs to be seen as a potential option within a system of PAC services that include close monitoring and access to higher level surgical services.

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with both expectant and surgical management	
Use of misoprostol to evacuate the uterus after early pregnancy failure can completely evacuate the uterus reducing the need for surgical evacuation. ☑ Strong evidence: Two studies.	A meta-analysis was conducted of 13 randomized controlled clinical trials that reported a comparison of misoprostol and curettage, misoprostol and expectant management, or expectant management and curettage for early pregnancy loss. Combined data in women with missed abortion managed expectantly or treated with misoprostol showed complete evacuation rates of 28 percent (49/173; range 14-47%) and 81 percent (242/298; range 60-83%) respectively. In women with incomplete abortion, these rates were 94 percent (31/33; range 80-100%) and 99 percent (75/76; range 99-100%) respectively. Both expectant management and misoprostol treatment reduce the need for surgical evacuation for early pregnancy loss, but for women with missed abortion misoprostol seems to be much more effective that expectant management (Graziosi et al., 2004).	I
	This study in Denmark from 1999 to 2000 compared treatment of spontaneous abortion by expectant management, 400 mcg of vaginal misoprostol, and surgical evacuation. Seventy-eight women were enrolled and reevaluated after treatment on days 8 and 14. Successful evacuation of the uterus was achieved in 14/17 (82%) of women in the expectant management group; in 28/31 (90%) of women in the misoprostol treatment group; and 29/30 (97%) of women in the surgical management group (Grønlund et al., 2002).	III

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with expectant management or placebo	
Medical management of early pregnancy failure using misoprostol is more effective than expectant management in reducing the need for surgical evacuation. ☑ Strong evidence: Four studies.	This randomized controlled trial in South Africa enrolled 104 women with pregnancy failure and assigned them to receive either 600 mcg misoprostol or placebo vaginally. Repeat doses were offered if evacuation was not complete the following day. At Day 7, women who had not experienced complete evacuation of the uterine contents were given surgical evacuation. The overall success rate in the misoprostol arm was 88.5 percent compared to 44.2 percent in the placebo arm. There was no significant difference in success rates between the two arms among women experiencing an incomplete abortion (100% vs. 85.7%). However, women experiencing a missed abortion had a much higher success rate with misoprostol (87%) as compared to placebo (29%) (Bagratee et al., 2004).	II
	This randomized controlled trial in Hong Kong enrolled 60 women with pregnancy failure. Women in the medical arm received 400 mcg of vaginal misoprostol on days 1, 3 and 5. The control group was treated with expectant management only. Final outcome was assessed at day 15. Eighty-three percent of women in the misoprostol group avoided surgical evacuation compared to 48 percent of the control group (Ngai et al., 2001).	II
	This randomized controlled trial in Canada enrolled 50 women with missed abortion. Women received either one to two 800 mcg doses of vaginal misoprostol or placebo. Outcome was assessed one week after misoprostol administration. Eighty percent of women in the misoprostol group and 16 percent of women in the placebo group had successful expulsion of products of conception and did not require surgical intervention (Wood and Brain 2002).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with expectant management or placebo	
Medical management of early pregnancy failure using misoprostol is more effective than expectant management in reducing the need for surgical evacuation. ☑ Strong evidence: Four studies.	This prospective, observational study in Hong Kong enrolled 252 women diagnosed with incomplete abortion. All women were first treated with expectant management. Two weeks after the initial diagnosis, women who were found to still have significant retained products of conception were given 400 mcg oral misoprostol every 4 hours for a total of 3 doses. They were reassessed the following morning for complete evacuation. One hundred forty one women had retained products at the two week follow up and were treated with misoprostol. Of those women, 88 (62%) did not require surgical intervention (Chung et al., 1995).	III

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with expectant management or placebo	
Misoprostol given either orally or vaginally for treatment of early pregnancy failure can completely evacuate the uterus 50 to 96 percent of the time reducing the need for surgical intervention. ☑ Strong evidence: Eight studies.	This randomized controlled trial in the US enrolled 652 women with a diagnosed first trimester pregnancy failure to receive either 800 mcg of misoprostol vaginally or to undergo vacuum aspiration in a 3:1 ratio. The misoprostol group received treatment on day 1, a second dose on day 3 if expulsion was incomplete and vacuum aspiration on day 8 if expulsion was still incomplete. Of the women who completed the trial according to the protocol, 84 percent treated with misoprostol and 97 percent treated with vacuum aspiration had completed uterine evacuation by day 8 (Zhang et al., 2005).	II
	This randomized controlled trial in Hong Kong enrolled 635 women and compared the efficacy of misoprostol for treatment of incomplete abortion to that of surgical evacuation. Women in the misoprostol arm received 400 mcg of oral misoprostol every 4 hours up to a dose of 1200 mcg. Evaluation of success was made the following morning. Of the 371 women who received misoprostol, 159 (50%) expelled the products of conception and did not require surgical intervention (Chung et al., 1999).	II
	This randomized controlled trial in Uganda enrolled 330 women with a clinically diagnosed incomplete abortion and assigned them to receive either manual vacuum aspiration or 600 mcg of misoprostol orally to complete uterine evacuation. Follow up was conducted on Day 14. Misoprostol successfully completed the uterine evacuation in 96.3 percent of the available cases. Nearly 30 percent of women in both arms of the trial were lost to follow up (Weeks et al., 2005).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with expectant management or placebo	
Misoprostol given either orally or vaginally for treatment of early pregnancy failure can completely evacuate the uterus 50 to 96 percent of the time reducing the need for surgical intervention. ☑ Strong evidence: Eight studies.	This randomized controlled trial in the United Kingdom of 80 women compared surgical evacuation to medical management with 800 mcg of vaginal misoprostol for early pregnancy failure. This study included women with both incomplete and missed abortions. Follow up was conducted 10 days following treatment administration. Misoprostol was successful in 82.5 percent (33/40) patients. None of the patients in the surgical arm required repeat evacuation (Demetroulis et al., 2001).	II
	This randomized controlled trial in South Africa enrolled 50 women who presented with incomplete abortion to receive either medical management consisting of a single dose of 400 mcg oral misoprostol or surgical curettage. The outcome was assessed 12 hours after misoprostol administration. After 12 hours, only 3 (13%) of the women in the misoprostol group had achieved complete evacuation of the uterus (deJonge et al 1995).	II
	This randomized controlled trial in South Africa enrolled 94 women diagnosed with incomplete abortion to receive 600 mcg misoprostol vaginally or surgical curettage. The overall success rate of medical management was 91.5 percent; one-third of women (15 of 47) had complete uterine evacuations after only one dose of misoprostol and 8.5 percent required surgical intervention to remove retained products of conception after 1 week because of treatment failure. The success rate in the surgical arm was 100 percent. Women in the medical arm experienced a longer duration of bleeding and a greater need for analgesia. More women who received medical treatment would recommend it or choose it in the future than in the surgical arm (Moodliar et al., 2005).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with expectant management or placebo	
Misoprostol given either orally or vaginally for treatment of early pregnancy failure can completely evacuate the uterus 50 to 96 percent of the time reducing the need for surgical intervention. ☑ Strong evidence: Eight studies.	This randomized controlled trial in the US enrolled 50 women who were assigned either surgical or medical treatment with misoprostol 800 mcg vaginally which could be repeated at 24 and 48 hours if significant products of conception remained in the uterus. The outcome was measured 72 hours after misoprostol administration. Sixty percent (15/25) women in the medical group had successful uterine evacuation and did not require curettage (Muffley et al., 2002).	II
	This randomized controlled trial in Turkey enrolled 80 women who were assigned either surgical curettage or medical treatment with misoprostol 200 mcg vaginally plus 200 mcg orally four times daily for a maximum of five days. The overall success rate was 93.3 percent for the misoprostol group and 100 percent for the surgical group (Sahin et al., 2001).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Misoprostol compared with expectant management or placebo	
Misoprostol given either orally or vaginally for treatment of early pregnancy failure can completely evacuate the uterus 50 to 96 percent of the time reducing the need for surgical intervention. ☑ Strong evidence: Eight studies.	This randomized controlled trial in Thailand enrolled 169 women with diagnosed incomplete abortion. Women received either a single or repeated dose of 600 mcg misoprostol taken orally. Follow up was conducted two weeks following misoprostol administration. There was no difference in efficacy between the two treatments: 66 percent of women in the single dose arm and 70 percent of women in the repeat dose arm experienced complete expulsion without the need for surgical intervention (Blanchard et al., 2004).	II
	This small randomized controlled trial in the US enrolled 20 women to receive either 400 mcg of oral misoprostol (12 women) or 800 mcg vaginal misoprostol (8 women) for treatment of early pregnancy failure. The dose was repeated in 24 hours if a gestational sac was still present. After an additional 24 hours, women failing to expel the products of conception were given a surgical evacuation. Successful expulsion occurred in 25 percent (3/12) in the oral group and 88 percent (7/8) in the vaginal group (Creinin et al., 1997).	II
	This randomized controlled trial in Vietnam enrolled 300 women presenting with a diagnosed incomplete abortion. Women received either a single 600 mcg or repeated oral dose (600 mcg x 2) of misoprostol. Final assessment of success was made at day 10. There were no significant differences in success rates in the two treatment arms. Misoprostol effectively evacuated the uterus for nearly all women (94.6%). Most women reported bleeding for four days and pain from cramps lasting one day. Women indicated that the side effects were tolerable (96%) and that their experience was satisfactory (95%) (Nguyen et al., 2005).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Comparisons of dosage regimens and routes of administration	
Misoprostol may be administered orally, sublingually, or vaginally with good results. Optimal dose/ route combinations have not been firmly established. ☑ Strong evidence: Eight studies.	This randomized controlled trial in Vietnam enrolled 200 women with a missed abortion confirmed by ultrasonography to receive 800 mcg of misoprostol either orally or vaginally. All women returned for follow up two days later. Efficacy was high in both groups and not statistically significant (oral 89%; vaginal 92.9%) (Ngoc et al., 2004).	II
	This randomized controlled trial in Hong Kong enrolled 201 women to receive 800 mcg of misoprostol either orally or vaginally with a repeat dose 4 hours later if products of conception had not been passed. Final outcome was assessed the day after treatment. The success rate was similar in both groups: 61.1 percent in the vaginal group and 64.4 percent in the oral group (Pang et al., 2001).	II
	This randomized controlled trial in Hong Kong enrolled 80 women with silent miscarriage to receive 600 mcg of misoprostol either sublingually or vaginally. The dose was repeated every three hours for a maximum of three doses. The success rate in both groups was 87.5 percent. Final determination of success was obtained at days 7 and 43 (Tang et al., 2003).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
	Comparisons of dosage regimens and routes of administration	
Misoprostol may be administered orally, sublingually, or vaginally with good results. Optimal dose/ route combinations have not been firmly established ☑ Strong evidence: Eight studies.	This randomized controlled trial in Hong Kong enrolled 180 women with silent miscarriage (<13 weeks) to receive 600mcg of sublingual misoprostol every three hours for a maximum of three doses and then to receive either (i) no extended course of misoprostol or (ii) an extended course of 400mcg sublingual misoprostol daily for one week. The success rates for complete uterine evacuation were similar in both groups: 92.2 percent for the no extended course group compared to 93.3 percent for the extended course group. An additional one week course of misoprostol did not improve the success rate nor shorten the duration of vaginal bleeding. It did increase the incidence of diarrhea but other side effects were similar in the two groups (Tang et al., 2006).	II
	A prospective observational study of 25 women diagnosed with missed abortions in Hungary found that an intravaginal dose of 200 micrograms of misoprostol repeated every four hours, up to a maximum dosage of 800 micrograms, was effective in completing uterine evacuation within 10 hours of initiating the regimen in 88 percent of the patients. Five women had complete abortions after receiving the first dose of misoprostol, 13 after the second dose, four after the third, and none after the fourth. Three of 25 women (12%) failed to abort even after all four doses were administered and subsequently required surgical evacuation (Zalányi, 1998).	III

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
Use of misoprostol to evacuate the uterus after early pregnancy failure can increase patient satisfaction. ☑ Needs more research: Three studies.	This randomized controlled trial of 80 women described previously compared surgical evacuation to medical management with 800 mcg of vaginal misoprostol for early pregnancy failure. All patients treated successfully in the misoprostol group expressed satisfaction with the treatment as compared to only 58 percent of women in the surgical group (Demetroulis et al., 2001).	II
	This randomized controlled trial of 94 women described previously compared surgical curettage to medical management with 600 mcg vaginal misoprostol. More women who received medical treatment would recommend it or choose it in the future than in the surgical arm (Moodliar et al., 2005).	II
	This randomized controlled trial of 80 women with incomplete spontaneous abortion described previously compared surgical curettage with medical management with 200 mcg of vaginal misoprostol followed by another 200 mcg of oral misoprostol taken four times daily for a maximum of five days. Only 2.5 percent of women in the misoprostol group were dissatisfied with their treatment compared to 35 percent in the surgical group (Sahin et al., 2001).	II
Side effects of misoprostol include chills, fever, nausea, vomiting, diarrhea and headache but are generally mild and self-limiting.	This randomized controlled trial of 80 women with incomplete spontaneous abortion described previously compared surgical curettage with medical management with 200 mcg of vaginal misoprostol followed by another 200 mcg of oral misoprostol taken four times daily for a maximum of five days. All women included in the study experienced abdominal cramps and pain, vaginal bleeding, and some passage of products of conception as a result of incomplete miscarriage. The two comparison groups were reviewed after 10 days and reported that women in the misoprostol group experienced an average of 6.5 days of bleeding and the surgically treated group experienced 4.9 days of bleeding. Two patients undergoing surgery (5%) and one patient in the misoprostol group (1%) developed pelvic infection which resolved with antibiotic therapy (Sahin et al., 2001).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
Women experiencing first trimester pregnancy failure treated with misoprostol experience slightly more blood loss compared to women treated with surgical evacuation but the difference is not clinically significant.	Seventy-seven women diagnosed with early pregnancy failure were enrolled in this prospective cohort study and randomized to receive either 800 mcg of dry or moistened (2 ml saline) vaginal misoprostol. Self-reported bleeding and sanitary product usage were recorded in a daily diary over a two-week period. Hemoglobin was assessed at enrollment and 2 weeks later. Women reported bleeding or spotting every day for the 14 days observed. Self-assessed heavy bleeding days were few (median 3) and usually occurred immediately after treatment. The mean decrease in hemoglobin was 0.5 g/dl. Sanitary pad use was highly variable and not related to changes in hemoglobin (Davis et al., 2004).	III
	This randomized controlled trial described previously enrolled 201 women to receive 800 mcg of misoprostol either orally or vaginally with a repeat dose 4 hours later if products of conception had not been passed. There were no differences between the groups in the incidence of fever, nausea, or vomiting. The incidence of diarrhea was elevated in the oral group. Both groups experienced similar durations of bleeding, surgical evacuation, and need for analgesia although the vaginal misoprostol group reported a slightly longer duration of pelvic pain (two days compared with one day) (Pang et al., 2001).	II
	This randomized controlled trial described previously enrolled 80 women who were assigned either surgical curettage or medical treatment with misoprostol 200 mcg vaginally plus 200 mcg orally four times daily for a maximum of five days. The average number of days of bleeding was 6.45 in the misoprostol group compared with 4.90 in the curettage group. There were no statistically significant differences in hemoglobin between the two groups (Sahin et al., 2001).	II

I.C.3.A. EFFECTIVENESS AND SAFETY OF MISOPROSTOL FOR SPONTANEOUS AND MISSED ABORTIONS

Summary of Evidence	Supporting Research	Gray Type
Women experiencing first trimester pregnancy failure treated with misoprostol experience slightly more blood loss compared to women treated with surgical evacuation but the difference is not clinically significant.	This randomized controlled trial described previously compared surgical evacuation to medical management with 800 mcg of vaginal misoprostol for early pregnancy failure. The number of women who experienced significant abdominal pain did not differ between the groups nor did duration and severity of bleeding (4.7 days in the misoprostol group versus 4.9 days in the curettage group). Post-treatment hemoglobin levels were also comparable (Demetroulis et al., 2001).	II
Use of misoprostol for treatment of uncomplicated early pregnancy failure is less costly than either expectant management or surgical intervention. ☑ Needs more research.	An analysis designed to simulate the clinical outcome and health care resource utilization of surgical evacuation, misoprostol and expectant care for women presenting with uncomplicated spontaneous abortion in the first trimester of pregnancy was undertaken using clinical inputs from the scientific literature and cost analyses from the perspective of a public health care provider in Hong Kong. The results showed that misoprostol was the least costly alternative per patient, followed by expectant care and surgical evacuation. (You and Chung, 2005).	III

I.C.3.B. COST COMPARISONS OF MISOPROSTOL FOR PAC

Summary of Evidence	Supporting Research	Gray Type
Cost comparisons between misoprostol.	No PAC-related data found on this topic.	

I.C.4. USE OF PROPHYLACTIC ANTIBIOTICS FOR INCOMPLETE ABORTION

Summary of Evidence	Supporting Research	Gray Type
There is not enough evidence to determine whether women presenting with incomplete abortion should be routinely provided prophylactic antibiotics. ☑ Needs more research: One study	A Cochrane Collaboration review of one trial (Seeras, 1989) found that there is not enough evidence to determine whether women presenting with incomplete abortion should routinely be provided with prophylactic antibiotics. No differences were found in postabortion infection rates between treatment and control groups, but compliance with antibiotic treatment was very low, with only 17.4 percent of participants taking the antibiotics, and even then not completely following instructions. The treatment group received 500 milligrams of tetracycline capsules four times a day for one week. The study monitored 140 women admitted with incomplete abortion in a hospital in Harare, Zimbabwe. The search was conducted using the Cochrane Fertility Regulation Group search strategy and consisted of electronic searches of MEDLINE and POPLINE and keyword searches of the Cochrane controlled trials register (May et al., 2003).	I

I.C.5. PAIN MANAGEMENT

Pain control is used to ensure that a woman undergoing treatment for miscarriage or incomplete abortions "suffer(s) the minimum of anxiety and discomfort as well as the least risk to her health" (Margolis et al., 1993: 1). Pain has both physiological and psychological aspects. Adequate pain management requires medication for physiological pain and counseling for the psychological aspects of pain. "Physiologically, there are two types of pain for MVA patients: the deep, intense pain which accompanies the cervical dilation and stimulation of the internal cervical os and a diffuse lower abdominal pain with cramping from the movement of the uterus. Pain medication falls into three categories, namely analgesics, which alleviate the pain in the receptors of the spinal cord and brain; anesthetics, which numb physical sensation; and anxyolitics, which do not actually reduce pain but do reduce anxiety. Women also need supportive counseling and reassurance…. However, counseling should not be seen as a replacement for alleviation of pain" (Solo, 2000: 45, 46, 48). Protocols for sharp curettage usually call for general anesthesia (WHO, 1994).

I.C.5.A. EFFECTIVENESS AND SAFETY OF PAIN MANAGEMENT TECHNIQUES

Summary of Evidence	Supporting Research	Gray Type
Women require pain management for emergency treatment with sharp curettage and MVA. ☑ Strong evidence: Three studies.	A study in Kenya (year not specified) found that only 3 percent of women who had MVA and 44 percent of women who had sharp curettage received pain medication. Nearly all patients experienced pain and 60 percent described it as extreme (Solo and Billings, 1997 cited in Ringheim, 1999).	III
	A prospective longitudinal study from 1990–1991 conducted in Harare, Zimbabwe, found that 38 percent of the 834 women treated with MVA for incomplete abortion reported experiencing severe pain during the procedure, but virtually all MVA patients (93.6 percent) received no pain medication (Mahomed et al., 1994).	III
	A 2001–2003 operations research study in Senegal found that women received little or no pain medication during MVA. Reported pain was high: 65 percent of women said they felt strong pain, and 15 percent felt moderate pain during the procedure. These rates dropped after the intervention, when 74 percent of women were given a local anesthetic during treatment. (Virtually all women were prescribed pain medication, but medications were not always available or affordable). Forty percent of women post-intervention reported strong pain and 25 percent reported moderate pain during the procedure, with the remaining 35 percent reporting minimal or no pain (Dabash, 2003). See Appendix I, Dabash 2003, Senegal, for a description of the intervention.	III

I.C.5.A. EFFECTIVENESS AND SAFETY OF PAIN MANAGEMENT TECHNIQUES

Summary of Evidence	Supporting Research	Gray Type
Use of paracervical block using 1% lignocaine showed marked reduction in pain for PAC patients undergoing MVA treatment. ☑ Strong evidence: Two studies.	A randomized double blind clinical trial conducted in 1997 at the Marie Stopes Health Center in Nairobi, Kenya found that PAC patients receiving paracervical block with 1% lignocaine markedly less pain than placebo patients. Intra and postoperative assessment of pain was made using McGill's and facial expression scales The untreated group experienced significantly more pain than the treated group, especially lower abdominal pain and backache. The pain was especially marked intraoperatively, less so 30 minutes post-operatively. "During the MVA procedure for example, those in the untreated group were 10 times more likely to have severe abdominal pain than those treated with lignocaine (lidocaine)" (Egziabher et al., 2002: 533). Following MVA, abdominal pain remained moderate to severe for 47.9 percent of those receiving the placebo, while 31 percent of the treatment group did not have any abdominal pain at all and 53.5 percent had mild pain. One hundred forty-two patients were included in the study. Seventy-one PAC patients received paracervical block with 1 percent lignocaine and 71 received a placebo of paracervical block with sterile water. PAC patients had less than 16 weeks of gestation with no evidence of infection (Egziabher et al., 2002).	II
	A 2001–2003 operations research study in Senegal found that women received little or no pain medication during uterine evacuation. Reported pain was high: 65 percent of women said they felt strong pain, and 15 percent felt moderate pain during the procedure. These rates dropped after the intervention, when 74 percent of women were given a local anesthetic during treatment. (Virtually all women were prescribed pain medication, but medications were not always available or affordable). Forty percent of women post-intervention reported strong pain and 25 percent reported moderate pain during the procedure, with the remaining 35 percent reporting minimal or no pain (Dabash, 2003). See Appendix I, Dabash 2003, Senegal, for a description of the intervention.	III

I.C.5.A. EFFECTIVENESS AND SAFETY OF PAIN MANAGEMENT TECHNIQUES

Summary of Evidence	Supporting Research	Gray Type
There is no significant difference in severity of pain for MVA PAC patients receiving paracervical block with 1% lidocaine compared to those receiving no anesthesia. Neither the paracervical block technique nor psychological support alone is sufficient in pain management for PAC patients undergoing MVA. ☑ Needs more research: One study.	A randomized controlled trial conducted in the Dominican Republic in 2002 showed that PAC patients undergoing MVA and receiving paracervical block reported no significant difference in severity of pain experienced compared to those receiving no anesthesia. A randomized sample of 215 women with incomplete abortion, an open cervix, and pregnancies of 12 weeks or less gestational age were randomized into two groups—one of which received no anesthesia (108) and one which received two 5ml injections of 1 percent lidocaine paracervical block in the cervix-vaginal joint (107). Analgesics were not used for either group during the procedure, although some participants experiencing severe preoperative pain received analgesics six hours prior to the procedure. Both groups received counseling and psychological support before, during, and after the procedure. Anxiety and pain were measured during the preoperative, intraoperative, and postoperative periods using the visual analog scale, as well as by an external observer during the intraoperative period. Although the data showed an estimated 9 percent reduction of severe pain in the group receiving paracervical block, no statistically significant differences were found between the two groups regarding the level of anxiety and preoperative pain, the degree of intraoperative pain reported by the patient, nor the degree of pain evaluated by the observer. It was found that neither the paracervical block nor psychological support along "were sufficient for controlling pain from endouterine evacuation using manual vacuum aspiration, and the manual vacuum aspiration technique was associated with severe pain in approximately 50 percent of the patients." Further randomized comparative studies were recommended to "determine the effectiveness of other paracervical block techniques and the efficacy of the use of analgesics in patients suffering from incomplete abortion treated with manual vacuum aspiration" (Gómez, P.I. et al., 2004).	II

I.C.5.A. EFFECTIVENESS AND SAFETY OF PAIN MANAGEMENT TECHNIQUES

Summary of Evidence	Supporting Research	Gray Type
Use of systemic analgesia and patient controlled sedation can effectively manage pain for MVA procedures for women with incomplete spontaneous abortions. ☑ Needs more research: One study.	A study in the UK from 1998–2000 of 57 women found that pain during MVA could be managed effectively by using patient controlled systemic pain medication. Forty-one women diagnosed with missed abortions and 16 with incomplete abortions in their first trimester underwent treatment with MVA. Eight hundred micrograms of vaginal misoprostol was administered to all patients three hours prior to the procedure for the purpose of ripening the cervix and a rectal dose of 100 milligrams diclofenac sodium was given for pain. Forty-two women elected systemic analgesia and 15 opted for patient-controlled sedation. The success rate of the procedure was 100 percent, and both systemic analgesia and patient-controlled anesthesia were associated with high patient satisfaction and acceptability. All 57 women reported they would recommend MVA to a friend or relative (Gazvani et al., 2004).	III
Women who experience spontaneous abortions without surgery report the need for analgesia. ☑ Needs more research: One study.	A study in Canada from 1997–1998 with 50 women who had spontaneous abortions without surgery found that the women reported the need for pain relief. On a scale from 0 to 10, the mean worst pain score was 5.9 (Wiebe and Jannsen, 1999).	IV

I.C.5.B. COST COMPARISONS OF PAIN MANAGEMENT TECHNIQUES

Summary of Evidence	Supporting Research	Gray Type
Cost comparisons of pain management techniques.	No PAC-related data found on this topic.	