



Prevention and Treatment of Postpartum Hemorrhage

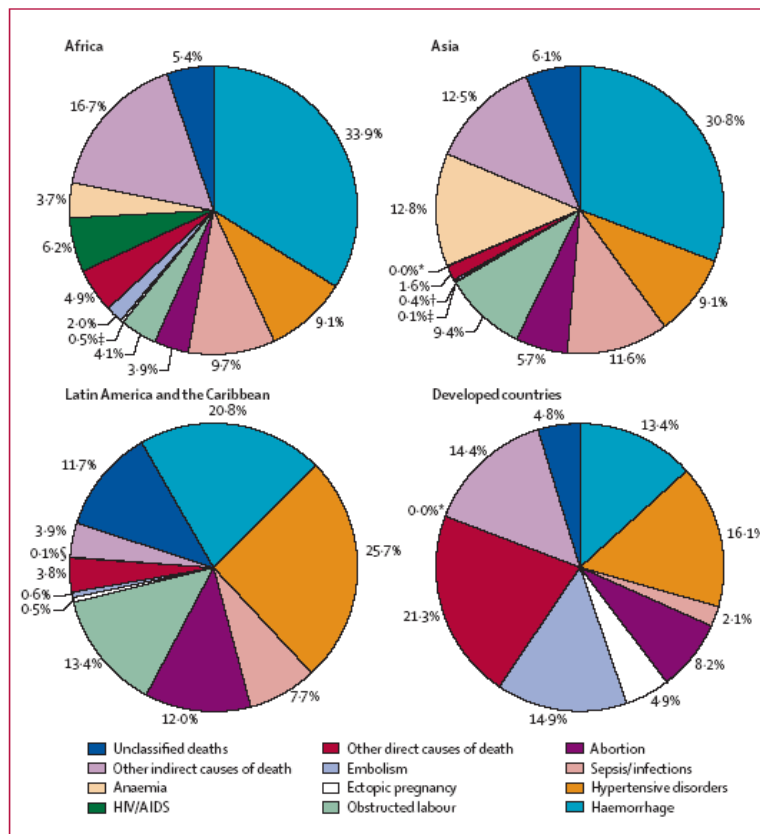
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**Section I:
Postpartum hemorrhage: an overview**

Bleeding after childbirth or postpartum hemorrhage (PPH) is an important cause of maternal death, accounting for nearly one quarter of all maternal deaths worldwide (Figure 1). A recent systematic review found that 34 percent and 31 percent of maternal mortality in Africa and Asia, respectively, is due to hemorrhage¹. PPH is defined as vaginal bleeding in excess of 500 ml after childbirth. Excess vaginal bleeding occurring within the first 24 hours after childbirth is termed immediate PPH. On the other hand, increased vaginal bleeding between the 2nd to 42nd day after childbirth is labeled as delayed or secondary PPH. If vaginal blood loss exceeds 1000 ml, the condition is considered as severe PPH.



Source: Lancet 2006; 367: 1066–74

¹ Khan S K et al. WHO analysis of causes of maternal death: a systematic review. Lancet 2006; 367: 1066–74

These definitions of PPH are problematic due to the following reasons:

- a. Accurate measurement of blood loss is extremely difficult. Blood can be mixed with amniotic fluid (watery liquid surrounding and cushioning the baby inside womb) or urine and dispersed on towels, linen, clothes, sponges, delivery bed, floor etc.
- b. Severity of PPH for an individual woman depends on the hemoglobin level of the woman. A woman with normal hemoglobin level can tolerate an amount of blood loss that can be fatal for an anemic woman.
- c. Bleeding may occur at a slow rate over several hours. This condition may not be recognized immediately.
- d. There may not be visible vaginal bleeding. In case of ruptured uterus, bleeding can be within the abdominal cavity.

The causes of immediate PPH include uterine atony (failure of the uterus to contract adequately after birth); tears of the genital tract (cervix, vagina or perineum); retention of placental tissue; inversion of uterus; and ruptured uterus. Uterine atony is the most common cause of primary PPH (75%-90%)². It should be noted that in some cases of retained placenta there could be no bleeding per vagina. In case of ruptured uterus bleeding can be vaginal as well as intra-abdominal (inside abdominal cavity). The major causes of delayed or secondary PPH are infection of the lining of the uterine cavity and retained placenta. PPH is mostly unpredictable but preventable; up to 90 percent of women who experience PPH have no identifiable risk factors.

Consequences of mortality and morbidity from postpartum hemorrhage:

Postpartum bleeding can kill even a healthy woman within two hours, if unattended. It is the quickest of maternal killers. As mentioned earlier nearly 25 percent of more than 500,000 maternal deaths globally, and up to 60 percent in some countries, are due to PPH. There are 14 million cases of obstetric hemorrhage every year, the majority of which occur postpartum³.

When a woman dies or becomes ill or injured either during or shortly after giving birth, the consequences have the potential to affect not only the woman herself, but also her family and her community in a variety of ways. Morbidity and mortality can have health effects and psychological costs for women, children, and other family or household members. In addition, children's schooling, supervision, and care may be affected by their mother's morbidity or mortality. There are also potential family or household economic costs associated with illness and death, including changes in labor allocation, productivity, consumption, investment, and direct costs, such as medical or funeral expenditures.

Community and even societal norms and behaviors may also be affected by illness or death, especially if the sick or deceased woman is or was a prominent member of the community. As for all adult illness and death, the response from the household, community, and society determines whether a family, community, or society can cope with the consequences of maternal morbidity and mortality. The consequences may differ substantially depending on the roles of the family member who is sick or who dies.

Anemia in pregnancy reduces a woman's ability to survive bleeding during and after childbirth. On the other hand, women who survive PPH are likely to suffer from anemia and other complications. Anemia and iron deficiency cause weakness, fatigue, and reduced physical ability to work. Economic analysis show that for every \$1 spent on iron supplementation programs for pregnant women, there is a return of US \$24 in decreased disability and increased wages over a woman's lifetime⁴.

Women suffering from PPH may receive blood transfusions and are susceptible to the associated risks of transfusion reactions or infection with HIV or hepatitis. Bleeding that cannot be controlled using drugs often requires surgery, including hysterectomy. Such procedures are costly and painful and may be

² Allam M., B-Lynch C. The B-Lynch and other uterine compression suture techniques. *International Journal of Gynecology & Obstetrics*, Volume 89, Issue 3, Pages 236-241

³ World Health Organization (1998). *Mother-baby package*

⁴ Based on the quantitative relationship, one can estimate the percent of maternal mortality attributable to iron deficiency anemia (IDA) in a given country when maternal mortality ratio, prevalence of anemia, and number of births per year are known. (PROFILES, IDA Calculator at www.fantaproject.org).

emotionally devastating to the woman and her family. In addition, they carry the risk of infection, reactions to anesthesia and other complications. The consequences of maternal death or ill health are summarized in the table below:

Table-1: Potential Effects on Children, Families and Households, and Communities and Society Due to Maternal Morbidity and Maternal Mortality

Potential Effects	On Children	On Families and Households	On Communities and Society
Demographic	<ul style="list-style-type: none"> • Death 	<ul style="list-style-type: none"> • Loss of deceased • Dissolution or reconstitution of family/household 	<ul style="list-style-type: none"> • Loss of deceased • Increased number of one-parent households • Increased number of orphans
Health	<ul style="list-style-type: none"> • Illness • Injury • Malnutrition • Poor hygiene 	<ul style="list-style-type: none"> • Reduced allocation of labor to health maintaining activities • Poor health for surviving household members 	<ul style="list-style-type: none"> • Change in the allocation of labor to health maintaining activities
Psychological	<ul style="list-style-type: none"> • Depression • Other psychological problems 	<ul style="list-style-type: none"> • Depression • Other psychological problems • Grief of loved ones 	<ul style="list-style-type: none"> • Grief • Loss of community cohesion
Social	<ul style="list-style-type: none"> • Social isolation • Reduced education • Reduced parental supervision and care 	<ul style="list-style-type: none"> • Social isolation • Changes in care for children, elderly, and disabled 	<ul style="list-style-type: none"> • Changes in responsibility for care of children, elderly, and disabled • Loss of community/societal leaders • Changes in women’s rights, health policy, other public policy

Source: Reed HE, Koblinsky MA, Mosley WH. The Consequences of Maternal Morbidity and Maternal Mortality: Report of a Workshop. Published by National Research Council (2000).

**Section II:
Interventions to prevent and treat postpartum hemorrhage**

Prevention of postpartum hemorrhage

Deborah Armbruster and Malay K Mridha

The primary intervention shown to reduce the incidence of PPH is active management of the third stage of labor (AMTSL). Other preventive measures include reducing the incidence of prolonged labor (through the use of the partograph and timely intervention, when needed), minimizing the trauma associated with instrumental delivery, avoiding routine episiotomy, and detecting and treating anemia during pregnancy.

1. Active Management of Third Stage of Labour:

Research has demonstrated that Active Management of Third Stage of Labor (AMTSL) is a safe, feasible, and low-cost intervention and can prevent up to 60 percent of postpartum hemorrhage⁵. AMTSL consists of three components: a) Administration of a uterotonic drug (Oxytocin being the drug of choice) within one minute of birth of the baby, b) Controlled cord traction to assist with prompt delivery of the placenta, and c) Massage the uterus after delivery of the placenta. Though facility-based service providers are the primary users of AMTSL, it can be practiced in community-settings by appropriately trained health service providers. If all three components cannot be practiced, AMTSL can be customized depending on the settings, availability and skill of service providers, and supplies of uterotonic drugs. Some of the strategies for implementing AMTSL are given below.

⁵ McCormick ML, Sanghvi HCG, Kinzie B, McIntosh N. Averting maternal death and disability: Preventing postpartum hemorrhage in low-resource settings. International Journal of Gynecology and Obstetrics. 2002;77:267–275.

Strategy-1: Uterotonic drug (Oxytocin or Misoprostol), controlled cord traction, and uterine massage

The World Health Organization (WHO) recommends that AMTSL should be offered by skilled birth attendants (SBAs) to all women. If SBAs are not available, controlled cord traction should not be administered. WHO also recommended Oxytocin as the drug of choice for AMTSL. In places, where Oxytocin is unavailable, Misoprostol can be used as an alternative.

Strategy-2: Uterotonic drug (Oxytocin or Misoprostol), maternal effort, and uterine massage

Controlled cord traction is the component of AMTSL for which clinical training is required due to the potential risks of tearing of the cord from the placenta and inversion of the uterus. This is why controlled cord traction should be practiced only by SBAs or health-care providers such as auxiliary nurse-midwives, community midwives, village midwives and health visitors who have acquired appropriate skills and have been specially trained to competence.

As adequate numbers of SBAs are not available in the community settings of many countries of the world, controlled cord traction (CCT) could be replaced by maternal effort along with a uterotonic and uterine massage. Oxytocin will still be the drug of choice in these situations. If oxytocin is not available or the skill of birth attendants for giving injections is limited, misoprostol can be administered soon after the birth of the baby. Misoprostol is particularly appropriate for community settings since it can be given orally or rectally and not affected by temperature (though it is affected by humidity).

As an alternate to CCT, providers can be trained in the techniques of maternal effort. In a major trial on AMTSL, midwives successfully used either controlled cord traction or maternal effort when providing AMTSL⁶. With maternal effort, the mother pushes down only when she feels a contraction. This can eliminate the concerns about inappropriate tension on the cord by the provider while administering CCT and providers other than SBAs can administer this technique. Moreover, CCT should not be used unless a uterotonic has been administered⁷.

One of the initial steps after delivery of the placenta is to check that the uterus is firm and to massage it, as needed, to be sure it stays firmly contracted. It is critical that the uterus stays contracted so that the bleeding vessels at the placental site remain ligated. Uterine atony, 'failure of the uterus to contract properly following delivery'⁸, is responsible for 70 to 90 percent of postpartum hemorrhage. As the authors of Williams Obstetrics state, 'the hour immediately following delivery is critical... Consequently, the uterus and perineum should be frequently evaluated'⁹. After the initial check and massage following delivery of the placenta, the uterus should be checked every 15 minutes for at least two hours to ensure that it remains firm and contracted. These first hours after birth are the most dangerous for the mother, with the majority of maternal mortality occurring within 24 hours postpartum. Regular monitoring of the uterus and the status of mother (and newborn), including vaginal bleeding, are essential components of quality postpartum care.

Even if the health service provider is unable to provide uterine massage, the woman and/or family members can be taught techniques of uterine massage as a Home-Based Life Saving Skill (HBLSS). Experience from Ethiopia suggests that techniques taught as HBLSS can be a useful adjunct in a comprehensive prevention and treatment program for PPH¹⁰.

Strategy-3: Uterotonic drugs (Oxytocin or Misoprostol)

The use of a uterotonic drug (Oxytocin or Misoprostol) should become routine for all postpartum women, particularly for women delivering in communities. In Indonesia a study was completed on community-based distribution of Misoprostol in West Java that proved the feasibility and acceptability of

⁶ Rogers J, Wood J, McCandlish R, Ayers, S, Truesday A, Elbourne D. Active versus expectant management of third stage of labour: the Hinchingsbrooke randomized controlled trial. *Lancet*. 1998; 351:693–699.

⁷ <http://www.midwife.org.nz/index.cfm/3,108,271/third-stage-consensus-may-2006.pdf>

⁸ Varney H, Kriebs JM, Geger CL. Varney's Midwifery, Fourth Edition. Boston: Jones and Bartlett Publishers; 2004.

⁹ Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Gilstrap L, Wenstrom KD. Williams Obstetrics, Twenty-second Edition. New York: McGraw-Hill Medical Publishing Division; 2005.

¹⁰ Sibley L, Buffington ST, Haileyesus D. The American College of Nurse Midwives' Home-based lifesaving skills program: a review of the Ethiopia field test [published erratum appears in J Midwifery Women's Health 2004;49(6):following table of contents]. *J Midwifery Women's Health* 2004;49:320-8.

this approach to PPH prevention¹¹. A study in Belgaum, India, reported that oral misoprostol is associated with significant decreases in the rate of acute postpartum haemorrhage and mean blood loss; the drug's low cost, ease of administration, stability, and a positive safety profile makes it a good option in resource-poor settings.¹² Pilot programs on community-based distribution of Misoprostol in Nepal¹³, Afghanistan¹⁴ and Bangladesh^[U1] have shown similar results. Bangladesh is considering a national program for distributing Misoprostol for deliveries in the community¹⁵.

Data from a systematic review of uterotonic drugs (oxytocin, ergometrine, methylergometrine, and Syntometrine) revealed that administration of a uterotonic drug alone is effective in preventing 40 percent of PPH¹⁶. The randomized controlled trial in Belgaum, India found oral misoprostol 600 mcg reduced PPH by 47 percent. WHO recommends that in the absence of active management of the third stage of labour, a uterotonic drug (oxytocin or misoprostol) should be offered by a health worker trained in its use for prevention of PPH.

Strategy-4: Uterine massage

In some settings there are no uterotonics, uterine massage may be the only option. Women without the option of a uterotonic drug should be taught the value of uterine massage and how to evaluate if they are bleeding too much. The International Confederation of Midwives (ICM) and the International Federation of Gynaecology and Obstetrics (FIGO) recommend that when no uterotonics are available to either skilled or non-skilled birth attendant, management of third stage of labor should include: waiting for signs of separation of the placenta (cord lengthening, small blood loss, uterus firm and globular on palpation at the umbilicus); encouraging maternal effort to bear down with contractions and, if necessary, to encourage an upright position; and uterine massage after the delivery of the placenta as appropriate.

Abdel-Aleem and colleagues conducted a randomized trial to determine the effectiveness of intermittent uterine massage starting prior to the delivery of the placenta for 60 minutes to reduce postpartum blood loss and the need for additional uterotonics with 200 women at the Assiut University Hospital in Egypt. The study compared uterotonics without massage versus uterotonics plus intermittent massage for 60 minutes. The trial showed that persistent uterine massage reduced the amount of blood loss and the use of additional uterotonics. The authors stated that routine uterine massage (every 10 minutes for one hour) has profound public health implications in terms of prevention of postpartum hemorrhage¹⁷.

Key messages for prevention of postpartum hemorrhage

- Active management of the third stage of labor (AMTSL) should be offered by skilled birth attendants (SBA) to all women
- Oxytocin is the drug of choice for AMTSL in preference to ergometrine, methylergometrine, misoprostol and carboprost/sulprostone. In the absence of other components of AMTSL, a uterotonic drug (oxytocin or misoprostol) should be offered to all women by a health worker trained in its use for the prevention of PPH
- Because of the benefits to the baby, the cord should not be clamped earlier than necessary for applying cord traction in AMTSL (around 3 minutes)
- A 10 country nationally representative AMTSL survey found that AMTSL is practiced between 0.3 percent to 32 percent by SBAs, significantly less than needed to dramatically reduce maternal mortality from PPH
- Nepal, Indonesia, and Afghanistan have pilot-tested community-based PPH prevention programs that successfully and safely distributed misoprostol to women. These programs can be a model for other countries to prevent PPH at the community level

¹¹ Sanghvi H et al. Prevention of postpartum hemorrhage study: West Java, Indonesia . JHPIEGO, 2004.

¹² Derman RJ et al. Oral misoprostol in preventing postpartum haemorrhage in resource-poor communities: a randomised controlled trial. Lancet 2006; 368: 1248–53.

¹³ Community -Based Maternal and Neonatal Care. Summative Report. Nepal Family Health Program. December 2007.

¹⁴ Sanghvi, H. Preventing Postpartum Hemorrhage at Homebirth: Global Experience and Evidence. Presentation at USAID Africa SOTA meeting, Johannesburg, 2008.

¹⁵ A Quaiyum. Personal communication, 2007.

¹⁶ Prendiville WJ, Elbourne D, McDonald S. Active versus expectant management in the third stage of labour. Cochrane Database of Systematic Reviews 2000, Issue 3. Art. No.: CD000007. DOI: 10.1002/14651858.CD000007.

¹⁷ Abdel-Aleem H, Hofmeyr GJ, Shokry M, El-Sonoosy E. Brief Communication: Uterine massage and postpartum blood loss. International Journal of Gynaecology & Obstetrics. 2006; 93:238–239.

Implementing Active Management of Third Stage Labor (AMTSL)

How to use uterotonic agents?

- Following delivery, palpate the abdomen to rule out the presence of additional fetuses and give oxytocin 10 IU intramuscularly (IM). Oxytocin is preferred to other uterotonics because it is effective 2–3 minutes after injection; and having minimal secondary effects, it can be used in all women.
- If oxytocin is not available, other uterotonics can be used such as ergometrine 0.2mg IM; syntometrine (1 ampoule) IM; or misoprostol 400–600µg orally. Oral administration of misoprostol should be reserved for situations when safe administration and/or appropriate storage conditions for injectable oxytocin and ergot alkaloids are not possible.
- Uterotonics require proper storage:
 - Ergometrine: 2–8°C, protected from light and freezing
 - Misoprostol: room temperature, in a closed container
 - Oxytocin: 15–30°C, protected from freezing
- Counseling on the secondary effects of these drugs should be given
- **Warning!** Do not give ergometrine or syntometrine (which contains ergometrine) to women with pre-eclampsia, eclampsia, or high blood pressure

How to use controlled cord traction?

- Clamp the cord close to the woman's perineum (once pulsation stops in a healthy newborn) and hold it in one hand
- Place the other hand just above the woman's pubic bone and stabilize the uterus by applying counter-pressure during controlled cord traction
- Keep a slight tension on the cord and wait for a strong uterine contraction (2–3 minutes)
- With the strong uterine contraction, encourage the mother to push and very gently pull downward on the cord to deliver the placenta
- Continue to apply counter-pressure to the uterus

If the placenta does not descend during 30–40 seconds of controlled cord traction, do not continue to pull on the cord:

- Gently hold the cord and wait until the uterus is well contracted again
- With the next contraction, repeat controlled cord traction with counter-pressure

Never apply cord traction (never pull) without applying counter-traction (push) above the pubic bone on a well-contracted uterus.

- As the placenta is being delivered, hold it in two hands and gently turn it until the membranes are twisted. Slowly pull to complete the delivery
- If the membranes tear, gently examine the upper vagina and cervix wearing sterile or disinfected gloves, and use a sponge forceps to remove any pieces of membrane that are present
- Carefully examine the placenta to ensure that none of it is missing. If a portion of the maternal surface is missing, or there are torn membranes with vessels, suspect retained placenta fragments and take appropriate action

How to perform uterine massage?

- Immediately massage the fundus of the uterus abdominally until the uterus is contracted
- Palpate for a contracted uterus every 15 minute and repeat uterine massage as needed during the first 2 hours
- Ensure that the uterus does not become relaxed (soft) or boggy after you stop uterine massage

Source: International Journal of Gynecology and Obstetrics (2006) 94, 243–253

2. Use of partograph:

The WHO recommends that the provider uses the partograph for women giving birth in maternal care facilities. One study in Indonesia assessed the effectiveness of promoting the use of the WHO partograph by midwives for labor in a maternity home by comparing outcomes after birth. The study found that partographs were correctly completed in 92 percent of cases. The use of the partograph significantly increased the referral rate, and reduced the number of vaginal examinations, oxytocin use and obstructed labor¹⁸. Other studies have shown that use of partograph can be highly effective in reducing complications from prolonged labor for the mother and for the newborn. Prolonged labor, augmented labor, caesarean sections/ operative interventions, neonatal morbidity and intrapartum fetal deaths can be reduced with the use of the partograph. Easy and early recognition of poor progress of labour (with the use of partograph) and the prevention of prolonged labour significantly reduce the risk of postpartum hemorrhage and sepsis, and eliminate obstructed labour, uterine rupture and thereby reduce maternal mortality¹⁹.

3. Minimization of perineal tear during instrumental delivery:

In some cases of vaginal delivery, instrumental aid by the use of forceps or vacuum extraction may be necessary to complete the delivery of the baby. The vacuum extractor is significantly less likely to cause serious maternal injury than forceps. These maternal injuries during childbirth are injuries to the perineum (the genital area) including extension of episiotomy, vaginal lacerations and injury to the perineal body (the main support for the pelvic floor muscles)²⁰. Thus, current evidence suggests that when assisted vaginal delivery is required, the ventouse or vacuum extractor should be chosen first, principally because it is significantly less likely to injure the mother²¹ and cause PPH.

4. Prevention of perineal tear during normal delivery:

Perineal trauma during childbirth is one of the causes of postpartum hemorrhage. It is prevented or minimized by avoiding episiotomy (the incision made to enlarge the birth canal during labor), and for women who are giving birth for the first time, performance of perineal massage during the weeks before childbirth²². Restrictive use of episiotomy in uncomplicated vaginal births, as compared with routine episiotomy, is associated with reduced risk of injuries and need for repair of these injuries²³. It follows that reduction in incidences of perineal tears will reduce cases of bleeding from hospital-inflicted injuries and subsequently may reduce cases of postpartum hemorrhage. Studies have also compared different ways to give perineal care during birth. One such study compared the hands-on method (the left hand of the service provider puts pressure on the infant's head, and the right hand is placed against the perineum) and hands-poised method (the service provider guides the baby through the birth without touching the perineum, prepared to apply light pressure on the infant's head). The study recommended that a policy of hands-poised care is more suitable for preserving the perineum during birth and is a safe and effective birthing alternative for women²⁴.

5. Detection and treatment of anemia during pregnancy:

Anemia in pregnant women reduces a women's ability to survive bleeding during and after childbirth. On average, 45 percent of pregnant women and 49 percent of children under five years of age are anemic in developing regions.²⁵ As an underlying risk factor for maternal and perinatal mortality and

¹⁸ Fahdhy M, Chongsuvivatwong V. Evaluation of World Health Organization partograph implementation by midwives for maternity home birth in Medan Indonesia. *Midwifery*. 2005 Dec; 21(4):301-10.

¹⁹ Dangal G. Preventing Prolonged Labor by Using Partograph. *The Internet Journal of Gynecology and Obstetrics*. 2007. Volume 7 Number 1.

²⁰ Johanson RB, Menon V. Vacuum extraction versus forceps for assisted vaginal delivery (Cochrane Review). In: *The Reproductive Health Library*, Issue 10, Update Software Ltd, Oxford, 2007.

²¹ Chalmers JA, Chalmers I. The obstetric vacuum extractor is the first instrument of first choice for operative vaginal delivery. *Br J Obstet Gynaecol*. 1989 May; 96(5):505-6

²² Eason . E, Labercoque. M, Wells. G and Feldman P. Preventing perineal trauma during childbirth: a systematic review. *Obstet Gynecol*. 2000 Mar;95(3):464-71.

²³ Jerker Liljestrand. Episiotomy policies in vaginal births: RHL commentary (last revised: 20 October 2003). *The WHO Reproductive Health Library*, No 10, Update Software Ltd, Oxford, 2007.

²⁴ Mayerhofer K. et al. Traditional care of the perineum during birth. A prospective, randomized, multicenter study of 1,076 women. *J Reprod Med*. 2002 Jun;47(6):477-82.

²⁵ Mason, Rivers and Helwig. Recent trends in malnutrition in developing regions: Vitamin A deficiencies, anemia, iodine deficiency, and child underweight, *Food and Nutrition Bulletin* 26: 57-162, 2005.

morbidity, iron deficiency anemia (IDA) was estimated to be associated with 22 percent of maternal death and 24 percent of perinatal deaths occurring annually around the world²⁶. Therefore, diagnosis and management of anemia may also prevent death of women from PPH. Correction of anemia may depend more on timely initiation of iron and folic acid supplementation than on amount of supplements²⁷. All pregnant women should be advised to take iron and folic acid supplements preferably at least from the 9th week of pregnancy.

Treatment of postpartum hemorrhage

Malay K Mridha, Suchismita Roy

In spite of preventive measures some women will still require treatment for excessive bleeding. Timely and appropriate referral and transfer to basic or comprehensive Emergency Obstetric Care (EmOC) facilities for treatment is essential to save lives of these women.

Standard management of postpartum hemorrhage includes intravenous infusion of Hartmann's solution or normal saline, additional use of uterotonics (intramuscularly and through intravenous infusion of normal saline), bimanual compression of the uterus (external and internal), compression of the aorta through the abdomen, blood transfusion, monitoring the patient's condition, and establishing a cause. After establishment of cause of PPH, treatment is targeted at the cause e.g., manual removal of placenta in case of retained placenta, repositioning of uterus in case of uterine inversion. Surgical management of PPH has traditionally relied on hysterectomy and ligation of internal iliac arteries. Over the past few years a number of new and simpler techniques have emerged. These techniques include: undersuturing the placental bed, uterine compression sutures, tamponade, uterine artery ligation, arterial embolization, and utero-ovarian artery anastomosis ligation. Community members or Traditional Birth Attendants (TBAs) can learn external bimanual compression, which in addition to stimulating contraction of the uterus, places continuous pressure on the uterine veins and on the lower part of the uterus for reduction of further bleeding²⁸.

Misoprostol in the Treatment of Post-partum Haemorrhage

The rapidity of deterioration and severity of PPH means that women with severe PPH cannot survive long distance referral. Therefore service providers at the primary-level units must have the capacity to provide immediate resuscitation and treatment. Misoprostol can be an alternative where injection of oxytocin is unavailable. Though there is currently insufficient evidence available to recommend any specific misoprostol dose for treatment of postpartum hemorrhage, a recent review suggested 600 µg misoprostol orally or sublingually for the treatment of PPH. However, the authors of the same review recommended that misoprostol should be used only after the provider has exhausted all standard PPH treatments (oxytocin drip, uterine massage, and/or compression). All potential causes for PPH should be explored to assure that the PPH is not due to another factor besides uterine atony. Moreover, if misoprostol has been given as prophylaxis for PPH, misoprostol should not be used for treatment of PPH unless at least two hours have elapsed since the first dose. If the initial dose was associated with pyrexia or marked shivering, then at least six hours should lapse before the second dose is given²⁹.

Misoprostol dosages for select indications in maternal health

- Post abortion care (0–12 weeks): 600 µg orally stat Leave to work for 2 weeks (unless heavy bleeding or infection)
- Induction of labour (live fetus > 24 weeks): 25 µg vaginally 4-hrly or 50 µg orally 4-hrly (Do not use if previous cesarean section)
- PPH prophylaxis: 600 µg orally stat (Exclude second twin before administration. and Do not repeat within 2 h)
- PPH treatment: 600 µg orally stat (Limited evidence for benefit — use conventional oxytocics first)
- Cervical ripening prior to instrumentation: 400 µg vaginally 3 h before procedure

Source: International Journal of Gynecology and Obstetrics (2007)

²⁶ Stoltzfus, Mullany and Black. Iron Deficiency Anemia: Comparative quantification of health risks: Global and regional burden of disease attributable to selected major risk factors. WHO 2004.

²⁷ Jong-Im Lee, Jeong-A Lee, and Hyeon-Sook Lim. Effect of time of initiation and dose of prenatal iron and folic acid supplementation on iron and folate nutriture of Korean women during pregnancy. Am J Clin Nutr 2005;82:843–9.

²⁸ Varney H, Kriebs JM, Geger CL. Varney's Midwifery, Fourth Edition. Boston: Jones and Bartlett Publishers; 2004.

²⁹ Blum J et al. Treatment of postpartum hemorrhage with misoprostol. Int J Gynaecol Obstet. 2007 Dec;99 Suppl 2:S202-5.

Delivering the interventions for prevention of PPH in the community and facility

Deborah Armbruster and Malay K Mridha

Intervention strategy	Service provider	Requirements	Constraints	Supervision	Education of women/families
AMTSL (All 3 components)	<ul style="list-style-type: none"> SBAs 	<ul style="list-style-type: none"> Training on all three components of AMTSL Drug storage facility 	<ul style="list-style-type: none"> Ministry of health policies can limit cadres using AMTSL and Misoprostol 	<ul style="list-style-type: none"> Skills and compliance in administering all three components Injection safety Drug storage facility 	<ul style="list-style-type: none"> Health education and demonstration on uterine massage
Uterotonic drug (Oxytocin or Misoprostol), maternal effort, and uterine massage	<ul style="list-style-type: none"> Trained community health workers (including TBAs) 	<ul style="list-style-type: none"> Training on the use of Oxytocin or Misoprostol, signs of separation of the placenta Drug storage facility 	<ul style="list-style-type: none"> Ministry of health policies can limit cadres using AMTSL and Misoprostol 	<ul style="list-style-type: none"> Skills and compliance in administering drugs, observing separation of placenta, giving uterine massage Injection safety Drug storage facility 	<ul style="list-style-type: none"> If mothers are given misoprostol, educate them on timing, dosage, route, storage, side effects e.g., fever and shivering
Uterotonic drug (Oxytocin or Misoprostol)	<ul style="list-style-type: none"> Trained community health workers (including TBAs) 	<ul style="list-style-type: none"> Training on the use of Oxytocin or Misoprostol Drug storage facility 	<ul style="list-style-type: none"> Ministry of health policies can limit use of Oxytocin and Misoprostol 	<ul style="list-style-type: none"> Skills and compliance in administering drugs Injection safety Drug storage facility 	<ul style="list-style-type: none"> If mothers are given misoprostol, educate them on timing, dosage, route, storage, side effects e.g., fever and shivering
Uterine massage	<ul style="list-style-type: none"> Trained community health workers (including TBAs) Women or family members 	<ul style="list-style-type: none"> Health education and demonstration on uterine massage 	<ul style="list-style-type: none"> Transferring the skill to women and families 	<ul style="list-style-type: none"> May not be required but helpful to check technique 	<ul style="list-style-type: none"> Health education and demonstration on uterine massage

Section III: Progress towards reduction of postpartum hemorrhage: experience from the field

Java, Indonesia³⁰:

“Safety, Acceptability, Feasibility and Program Effectiveness (SAFE) Demonstration Project of Community-Based Distribution of Misoprostol for Prevention of Postpartum hemorrhage in Rural Indonesia”

In Indonesia, where many women give birth at home without the care of a skilled provider, PPH is estimated to be the cause of 45 percent of maternal deaths.

³⁰ Sanghvi H.2006.Preventing Postpartum Haemorrhage at Home Birth: Community based Approaches. Preventing Maternal Mortality from Postpartum Haemorrhage in Africa:Moving from Research to Practice .Report of a conference in Entebbe, Uganda, 4-7 April 2006.JHPIEGO: Baltimore, Maryland.

This recent study conducted by JHPIEGO's Maternal and Neonatal Health (MNH) Program and its collaborators in Indonesia, with funding from USAID, offers compelling evidence of the effectiveness of a community-based intervention to prevent postpartum hemorrhage (PPH). In the study, trained community volunteers provided women and communities with information about prevention of PPH and the drug misoprostol (which controls bleeding following childbirth), distributed the medication to the women, and provided follow up support.

The community-based approach was found to be safe and acceptable to the women studied, contributing to their willingness and ability to use the drug appropriately.

Summary of the Indonesia Community-based distribution program:

- Safety: No woman took the medication at the wrong time
- Acceptability: Women who used the medication said they would recommend it and would purchase the drug for future births
- Feasibility: Community volunteers successfully offered information about PPH and safely distributed the medication
- Effectiveness: The combination of skilled providers using oxytocin and community distribution of misoprostol allowed for 94 percent coverage with a method to prevent PPH.

Kigomo, Tanzania³¹:

“Innovative Treatment Approaches: Options at Home Birth”

A field intervention trial was conducted in Kigoma, Tanzania, to:

- Determine the safety of household management of PPH with 1000 mcg of misoprostol
- Assess the reduction in referrals as a result of the administration of misoprostol
- Assess the need for additional interventions

In the study, TBAs were trained to identify PPH (blood loss greater than 500 mL) and follow the study protocol. Blood loss measurement was standardized and women identified with PPH in the intervention area were given 5 tablets (1000 mcg) of misoprostol rectally and referred if no significant change in blood loss was observed. TBAs in non-intervention areas referred women to the nearest facility after establishing PPH.

Findings showed that:

- Less than 2 percent women in the intervention area required referral compared to 19 percent in the non-intervention area.
- Of those referred, 1 percent from the intervention area compared to 95 percent from the non-intervention area required additional interventions due to PPH (e.g. IV fluids, blood transfusion, manual removal of placenta, repair of tears, hysterectomy and other medical care)

This study demonstrated that administration of misoprostol is a simple technology that can be easily taught and used successfully at home birth.

In conclusion, PPH programs in general can benefit from use of misoprostol to manage PPH because misoprostol:

- Is a relatively inexpensive prostaglandin analogue
- Offers alternative routes of administration
- Is easy to store and remains stable at field conditions
- Can be administered to patients easily and quickly
- Is relatively safe and effective
- Can be easily used when skilled attendants are not available

³¹ Prata N.2006. Innovative Treatment Approaches: Options at Home Birth. Preventing Maternal Mortality from Postpartum Haemorrhage in Africa: Moving from Research to Practice. Report of a conference in Entebbe ,Uganda, 4-7 April 2006.JHPIEGO: Baltimore, Maryland.

Guinea-Bissau³²:

“Preventing Postpartum Haemorrhage at Primary Health centers: Guinea-Bissau”

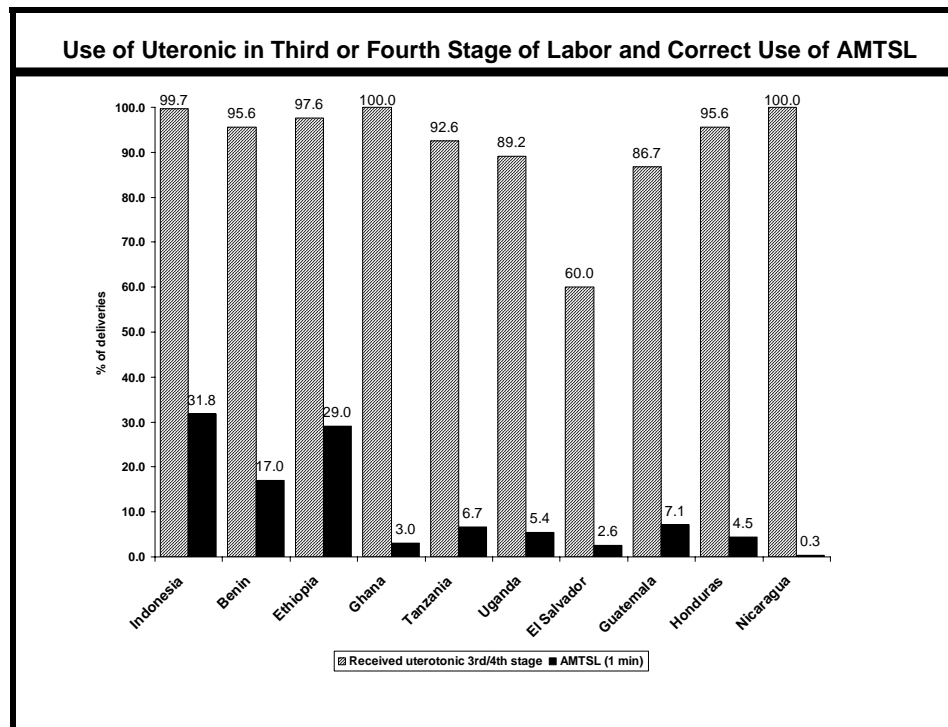
In Guinea-Bissau, 42 percent maternal deaths are from PPH with 55 percent women dying at home or on the road and 52 percent never being seen by a trained health worker.

A randomized, double-blind clinical trial of sub-lingual misoprostol in Guinea-Bissau was conducted at a local health center comparing the effect of 600 mcg of sub-lingually administered misoprostol with a placebo after birth of the baby. AMTSL was used, replacing oxytocin injection with three 200mcg-tablets of misoprostol sublingually within two minutes of delivery.

- Sublingual misoprostol was shown to reduce the frequency of severe PPH
- More women experienced side-effects of shivering and pyrexia in the misoprostol group. There were few complaints of nausea and few women suffered from vomiting and diarrhoea in either group. Overall, most women tolerated the side-effects well
- If the drug is found to be equally beneficial and safe, sublingual misoprostol should be offered to all women in labor in the beginning of the third stage when injectable uterotonics are not available

Findings from a Survey of AMTSL in Ten Countries:^{33, 34}

Use of AMTSL in a nationally representative sample survey of facility-based deliveries was recently documented in 10 countries by the Prevention of Postpartum Hemorrhage Initiative (POPHI). These countries were selected based on geographic representation and varying indicators of maternal health and health infrastructure. The study also explored policies associated with use of AMTSL across these countries in order to aid the development of international strategies to decrease PPH via expanded use of AMTSL. The following figure provides a snapshot of findings about AMTSL practices in the countries.



³² Hoj L.2006. Innovative Treatment Approaches: Options at Home Birth. Preventing Maternal Mortality from Postpartum Haemorrhage in Africa: Moving from Research to Practice. Report of a conference in Entebbe, Uganda, 4-7 April 2006.JHPIEGO: Baltimore, Maryland.

³³ Stanton C, Armbruster D et al. Lost Opportunities in the prevention of postpartum hemorrhage; Use of active management of the third stage of labor in seven developing countries (unpublished), The POPHI Project, Washington, DC, 2008.

³⁴ Mutungi A, Mfinanga S and Getachew A.2006.Status of PPH Prevention in Africa : Results of a Survey in Two Countries. Preventing Maternal Mortality from Postpartum Haemorrhage in Africa :Moving from Research to Practice. Report of a conference in Entebbe, Uganda, 4-7 April 2006.JHPIEGO: Baltimore, Maryland.

Although the results of this study suggest great variation between countries regarding management practices for the third stage of labor, six clear patterns emerged from these diverse countries: 1) prophylactic use of a uterotonic drug during the third or fourth stages of labor is nearly universal. In most cases, oxytocin is the drug of choice. Use of misoprostol was negligible; 2) the practice of immediate fundal massage after delivery of the placenta and follow-up palpation is very low in most countries, suggesting limited surveillance of women during the hours that account for the majority of maternal deaths worldwide; 3) incorrect use of AMTSL is due to multiple deficiencies in practice; 4) there was no evidence that AMTSL was being selectively practiced for women considered high risk. However, the data were somewhat suggestive of higher use of AMTSL in national hospitals relative to lower level facilities; 5) potentially harmful practices that can actually increase the risk of postpartum hemorrhage or other third stage complications are very common and were observed in 48-94 percent of deliveries; and 6) AMTSL in-service training provides no evidence that these trainings have contributed to use of AMTSL.

The recommendations from the study included:

- Revise the national standard treatment guidelines to include all components of AMTSL according to the ICM/FIGO definition.
- Develop standardized, competency-based in-service and pre-service training curricula; ensure that training on AMTSL includes pharmacy personnel and addresses scientific drug quantification and storage.
- Conduct high-level advocacy, including statements on policies and adequate supplies.
- Set intervention priorities, focusing on regions with lower use of AMTSL and types of providers with low practice rates.
- Emphasize the elimination of potentially harmful practices
- Ensure that oxytocin at the 10 IU dose is used at all levels for AMTSL.
- Advocate for the correct use of AMTSL throughout the countries

Zambia:³⁵

“Case Study: Introducing Active Management of Third Stage of Labor in Peripheral Hospitals in Zambia”

Zambia has a maternal mortality ratio of 729 per 100,000 live births, and bleeding is the leading cause of maternal mortality. Forty-three percent of deliveries occur in a health facility. More than 90 percent of pregnant women have at least one ante-natal care visit, and more than 70 percent have three or more visits.

One of the first steps in introducing AMTSL was revising and strengthening midwifery and nursing education. AMTSL was integrated into pre-service curricula as routine practice, clinical practice sites were strengthened, and tutors and clinical instructors received knowledge and skills updates. Next, AMTSL was incorporated with the various national guidelines e.g., National Safe Motherhood Guidelines, Standard Treatment Guidelines etc.

In summary:

- In Zambia, AMTSL was incorporated with pre-service curricula and national guidelines.
- It was then introduced in five hospitals and 14 health centers in four districts
- After training 97 percent of providers said they had knowledge of the procedure and 93 percent said they had used the procedure
- The Zambia experience demonstrated that AMTSL can be effectively introduced into delivery sites, even in low-resource settings
- A costing study demonstrated that AMTSL is both a life-saving and a cost-saving procedure. Implementing AMTSL in more than 100,000 deliveries in Zambia was estimated to result in a net savings of more than \$145,000 and to avert a significant number (467) of maternal deaths.

³⁵ Mtonga V, Kaseba-Sata C and Hughes R. 2006. Case Study: Introducing Active Management of Third Stage of Labor into Peripheral Hospitals in Zambia. *Preventing Maternal Mortality from Postpartum Haemorrhage in Africa: Moving from Research to Practice*. Report of a conference in Entebbe, Uganda, 4-7 April 2006. JHPIEGO: Baltimore, Maryland.

- Investments in human resources (i.e. skilled attendants), however, are needed to effectively implement and sustain AMTSL.

A number of valuable lessons were learned in this program:

- Simply putting AMTSL into the national guidelines is not sufficient. Rather, initial support for adoption and implementation is necessary, and then continuing supportive supervision is required to solidify and sustain change.
- For a maternal health intervention like AMTSL to be successful, the health system must function effectively; and skilled attendants must be trained, supervised and motivated; available and accessible; and adequately equipped and supplied.

The challenges in introducing and institutionalizing AMTSL relate to the need for:

- Human resources, both skilled attendants and teachers/tutors in the pre-service setting.
- Infrastructure and equipment
- Logistics systems and procurement practices
- Supervision and quality assurance

Burkina Faso:³⁶

“Training in Active Management of Third Stage of Labor”

An innovative, competency-based training approach can produce safe and competent providers of active management of third stage of labor. The course content and the results and challenges of strengthening AMTSL in Burkina Faso are described.

In Burkina Faso, 24 percent of maternal deaths are due to hemorrhage, particularly PPH. AMTSL is one important strategy that can prevent PPH.

JHPIEGO’s approach to training, called ‘mastery learning’ comprises three stages:

- Knowledge update
- Standardization of skills
- Post-training follow-up

The following supplies and equipment are required:

- Learning guide and checklist for the procedure
- Anatomic model (pelvic obstetrical model)
- Plastic model of the placenta with an umbilical cord
- Straight forceps (clamps)
- Cloth model of the placenta with membranes and umbilical cord
- Oxytocin(10 IU ampoule and 5cc syringe)
- Consumables and infection prevention supplies.

The knowledge update for AMTSL should include:

- Concept of ‘best practices’ and justifications for their use
- Description of the materials needed
- The three steps of the procedure
- Advantages of the technique
- Information about how to avoid potential accidents and incidents

³⁶ Zerbo A.2006. Preventing Maternal Mortality from Postpartum Haemorrhage in Africa: Moving from Research to Practice. Report of a conference in Entebbe, Uganda, 4-7 April 2006.JHPIEGO: Baltimore, Maryland.

Challenges encountered in Burkina Faso during the training were:

- Shortages of anatomic models for the number of students being trained (only 3 models for 81 students)
- Few competent instructors and shortages of coaches at the clinical sites
- Lack of prepared training sites

In addition, the length of time allotted to the training was found to be inadequate for some new students.

Plans are currently under way to incorporate AMTSL in all pre-service nursing, midwifery and medical curricula in Burkina Faso; strengthen the capacity of the training centers; advocate for the availability of oxytocin; obtain anatomic models; and increase the number of trained coaches at clinical training site who can perform AMTSL to standard. through these efforts, high quality teaching of ATMSL can be achieved.

Key Commitments to Prevent Postpartum Hemorrhage³⁷

At a regional meeting held in Uganda to advocate for the prevention of postpartum hemorrhage in Africa in 2006, several participating countries developed action plans. Below is a summary of their commitments:

Country	Key Commitments
Angola	<ul style="list-style-type: none"> • Advocate with stakeholders for comprehensive and innovative interventions for PPH prevention and treatment • Conduct needs assessment on availability and quality of AMTSL • Train health personnel in AMTSL and comprehensive interventions for PPH prevention and treatment • Include oxytocin and misoprostol in essential drug list as first-line drugs for AMTSL • Develop tools and strengthen mechanisms for continual monitoring, supervision and evaluation • Raise awareness in community about PPH and danger signs
Benin	<ul style="list-style-type: none"> • Disseminate policy document • Train providers in AMTSL • Plan supervision and update training of supervisors • Make emergency kits available in all community maternities • Provide adequate supply of protective clothing, and encourage providers to use it during deliveries • Raise awareness of communities of PPH and train CHWs in birth preparedness/ complication readiness (BP/CR)
Burkina Faso	<ul style="list-style-type: none"> • Advocate for including AMTSL in policies, norms and protocols (PNP) • Implement subsidy for births and EmOC • Strengthen training of providers, including use of uterotonic drugs • Raise awareness of community about danger signs of PPH and their right to quality services • Increase the number of CHWs trained in BP/CR
Cameroon	<ul style="list-style-type: none"> • Advocate for inclusion of AMTSL in national policies and service guidelines • Advocate to add misoprostol to essential drug list and allow distribution by CHWs • Train and supervise staff (in-service and pre-service training) in AMTSL, including proper use of uterotonic drugs • Train CHWs in prevention of PPH • Educate community about danger signs of PPH and need for blood donation
DR Congo	<ul style="list-style-type: none"> • Adopt national AMTSL protocol • Create pilot committee to promote prevention of PPH at community level

³⁷Sanghvi H and Lewison. 2006. Preventing Maternal Mortality from Postpartum Haemorrhage in Africa: Moving from Research to Practice. Report of a conference in Entebbe, Uganda, 4-7 April 2006. JHPIEGO: Baltimore, Maryland.

Country	Key Commitments
Ethiopia	<ul style="list-style-type: none"> • Train trainers in AMTSL and develop AMTSL job aids • Increase use of AMTSL at institutional births
Ghana	<ul style="list-style-type: none"> • Advocate for “skilled attendance at birth for all” to be theme for the next national Safe Motherhood Week celebrations • Update and disseminate protocol for AMTSL recommending oxytocin as first-line drug • Advocate for registration of misoprostol, including for treatment of PPH. • Continue advocacy to address all factors that hamper access to skilled attendance at birth
Guinea-Bissau	<ul style="list-style-type: none"> • Advocate with stakeholders for comprehensive and innovative interventions for PPH prevention and treatment • Conduct needs assessment on availability and quality of AMTSL • Train health personnel in AMTSL and comprehensive interventions for PPH prevention and treatment • Include oxytocin and misoprostol in essential drug list as first-line drugs for AMTSL • Develop tools and strengthen mechanisms for continual monitoring, supervision and evaluation • Raise awareness in community about PPH and danger signs
Kenya	<ul style="list-style-type: none"> • Register misoprostol for prevention and treatment of PPH • Develop operational standards for PPH and AMTSL • Conduct clinical skills updates and on-the-job training • Educate communities about PPH and the need for community transport plans
Madagascar	<ul style="list-style-type: none"> • Revise PNP to include AMTSL • Provide oxytocin as an essential drug, and advocate for use of misoprostol • Working in a pilot zone, train providers in AMTSL and update knowledge of PPH and skills of CHWs • Use existing health mutual network to finance care of emergencies • Raise community awareness of PPH and importance of establishing a transport system and plans for emergencies
Malawi	<ul style="list-style-type: none"> • Make oxytocin first-line drug for AMTSL and introduce misoprostol for treatment of PPH • Advocate for wider scope of practice for skilled birth attendants in treatment of PPH • Strengthen logistics management system and pre-service and in-service training for treatment of PPH
Mali	<ul style="list-style-type: none"> • Train regional providers in use of uterotonic drugs • Update knowledge of pharmacists and those in charge of management and storage of uterotonic drugs • Address regulatory problems related to distribution of misoprostol by CHWs • Increase in two provinces the number of trained CHWs who understand PPH. • Educate communities about danger signs of PPH
Mauritania	<ul style="list-style-type: none"> • Propose revision of Norms and Procedures to include AMTSL • Make available birthing kits, cesarean sections and a system for care of the indigent • Make uterotonic drugs regularly available in sufficient quantity • Conduct national training of trainers in AMTSL • Educate communities about danger signs of PPH
Mozambique	<ul style="list-style-type: none"> • Advocate with stakeholders for comprehensive and innovative interventions for PPH prevention and treatment • Conduct needs assessment on availability and quality of AMTSL • Train health personnel in AMTSL and comprehensive interventions for PPH prevention and treatment • Include oxytocin and misoprostol in essential drug list as first-line drugs for AMTSL

Country	Key Commitments
	<ul style="list-style-type: none"> Develop tools and strengthen mechanisms for continual monitoring, supervision and evaluation Raise awareness in community about PPH and danger signs
Nigeria	<ul style="list-style-type: none"> Review policies and guidelines to update information on AMTSL Alert National Agency for Food and Drug Administration and Control about take uterotonic drugs Develop guidelines and protocols for AMTSL by midwives and doctors. Pilot test use of misoprostol for management of PPH in home births in three states
Rwanda	<ul style="list-style-type: none"> Advocate to add oxytocin to list of essential drugs Advocate for development and dissemination of PPH care and treatment protocols Integrate AMTSL into services at two sites, and meet with five private clinics about PPH Ensure management at district pharmacies to avoid stock-outs of uterotonic drugs Educate communities about PPH
Senegal	<ul style="list-style-type: none"> Advocate for adequate equipment and appropriate distribution of essential drugs such as uterotonic drugs Create health mutuals Advocate for better planning and more funds to protect maternal and child health at local level
Tanzania	<ul style="list-style-type: none"> Advocate for including AMTSL using oxytocin in national policies and guidelines Revise training curricula and conduct training workshops to increase number of providers trained in AMTSL Standardize storage and logistics of uterotonic drugs Provide supportive supervision to ensure that AMTSL is practiced correctly
Uganda	<ul style="list-style-type: none"> Review and update policies and guidelines with current information AMTSL Conduct situation analysis on the practice of AMTSL, and bridge the gap Carry out supportive supervision and modeling of AMTSL, beginning in seven districts
Zambia	<ul style="list-style-type: none"> Conduct training in AMTSL and management of PPH Register misoprostol and pilot test its use at the community level in one district Strengthen emergency preparedness Strengthen infection prevention practices especially use of personal protective equipment during deliveries Engage the community in prevention and management of PPH

Further information on prevention and treatment of PPH can be extracted from:

Prevention of postpartum hemorrhage initiative (POPHI): <http://www.pphprevention.org/>
http://www.who.int/reproductive-health/publications/pph/recommendations_pph.pdf

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Contributing writers: Deborah Armbuster, Malay K Mridha, Suchismita Roy

Reviewers: Lily Kak, Marge Koblinsky, Patricia Gomez, Neal Brandes

Editors: Malay K Mridha, Suchismita Roy



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