

OUT LOOK

Preventing Postpartum Hemorrhage: Managing the Third Stage of Labor

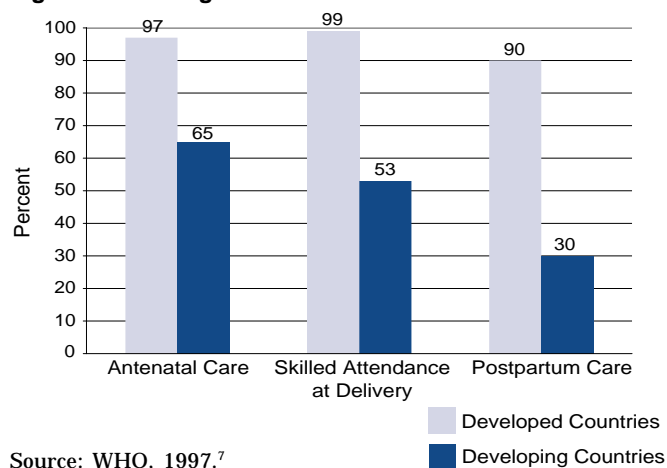
Pregnancy and childbirth involve significant health risks, even for women with no preexisting health problems. Approximately 40 percent of pregnant women experience pregnancy-related health problems, and 15 percent of all pregnant women suffer long-term or life-threatening complications.¹ The World Health Organization (WHO) estimates that, in 1995, nearly 515,000 women died from complications of pregnancy and childbirth.² Most of these deaths occur in developing countries, often because women lack access to life-saving care. A woman living in a developing country is much more likely to receive antenatal care than she is to have skilled care during labor, childbirth, or the postpartum period (see Figure 1). Yet more than half of all maternal deaths occur within 24 hours of delivery, mostly from excessive bleeding (see Figure 2).³ Severe bleeding, or hemorrhage, is the single most important cause of maternal death worldwide. At least one-quarter of all maternal deaths are due to hemorrhage; the proportions range from less than 10 percent to nearly 60 percent in various countries (see Table 1).⁴ Even if a woman survives postpartum hemorrhage (PPH), she can be severely anemic and suffer from continuing health problems.

Where maternal mortality is high and resources are limited, the introduction of low-cost, evidence-based practices to prevent and manage PPH can improve maternal and infant survival. This issue of *Outlook* reviews one of the effective interventions, management of the third stage of labor (the period between the birth of the infant and delivery of the placenta). The discussion also highlights a new international resource manual for doctors and midwives, *Managing Complications in Pregnancy and Childbirth*.⁵ This manual provides specific information on proven best practices to improve maternal and neonatal health care, including practices for preventing and managing excessive postpartum bleeding. Strategies for developing, disseminating, and implementing such guidelines, as called for by the international Safe Motherhood Initiative, also are described.

Postpartum Hemorrhage

There are an estimated 14 million cases of pregnancy-related hemorrhage every year; at least 128,000 of these women bleed to death.⁶ Most of these deaths occur within

Figure 1. Coverage of maternal health services.



four hours of delivery⁴ and are a result of problems during the third stage of labor. PPH is defined as blood loss after childbirth in excess of 500 ml; severe PPH is defined as blood loss greater than 1,000 ml. In practice, however, it is difficult to measure blood loss accurately, and the amount often is underestimated. Nearly half of women who deliver vaginally lose 500 ml or more of blood, and those undergoing cesarean section normally lose 1,000 ml or more.⁸ For many women this amount of blood loss does not lead to adverse effects, but effects vary from woman to woman. For severely anemic women, blood loss of even 200 to 250 ml could prove fatal. This is an especially important consideration given the prevalence of severe anemia among women in many developing countries.

The most common cause of immediate severe PPH (that is, occurring within 24 hours of delivery) is uterine atony (failure of the uterus to properly contract after delivery).⁹ Retained placenta, vaginal or cervical lacerations, and uterine rupture or inversion also contribute to PPH. Delayed PPH (occurring more than 24 hours after childbirth) often results from infection, incomplete shrinking of the uterus, or retained placental fragments.

The period following the birth of the baby and the first hours postpartum are crucial in the prevention, diagnosis, and management of bleeding. Compared with other maternal risks such as infection, bleeding can rapidly become life-threatening. A woman with severe bleeding will die quickly if she does not receive proper medical care, which can include drugs, simple clinical procedures, blood transfusion, and/or surgery. In areas with limited access to skilled medical or midwifery care, transportation, and emergency services, delays in obtaining skilled care are common and the risk of death from PPH is high. Early PPH often can be managed with basic essential obstetric care, but delay can lead to further complications requiring

comprehensive emergency obstetric services. These services often are available only at a referral hospital and may require that the woman be transported a long distance, again increasing her risk of death.

Women who survive PPH often suffer from severe anemia if the condition is not managed appropriately.⁴ Life-saving blood transfusions are associated with risks of transfusion reactions and transmission of infections. Surgery, such as hysterectomy, carries its own risks from infection, anesthesia, and other complications, as well as high financial costs.

It is impossible to consistently identify women at highest risk of PPH, although several factors have been associated with an increased risk of hemorrhage, including previous PPH, pre-eclampsia, multiple gestation, and obesity. (Placenta previa and placental abruption are risk factors for antepartum hemorrhage.) Labor and delivery-related factors that increase blood loss include episiotomy, cesarean section, and prolonged labor.^{10,11} Nonetheless, two-thirds of PPH cases occur in women with no identifiable risk factors.¹² Reliance on risk factors to classify women at high risk has not decreased mortality from PPH. Furthermore, relying on risk assessment can lead to unnecessary management of women classified as “high risk,” which can be detrimental to women as well as health systems.

All women must be encouraged to develop a birth-preparedness and complication-readiness plan, and to deliver with a skilled provider who can provide PPH-prevention care. The family and community should be aware of the major danger signals, including any bleeding during pregnancy. All women should be closely monitored following childbirth for signs of abnormal bleeding, and caregivers must be able to ensure access to life-saving interventions, if necessary.

Table 1. Maternal Deaths Due to PPH: Selected Countries

Country	Maternal Deaths Due to PPH (%)	Maternal Deaths per 100,000 Live Births
Hong Kong	30	7
India	16	570
Indonesia	43	650
Philippines	53	280
Burkina Faso	59	930
Egypt	32	170
Kenya	16	650
Morocco	29	610
Nigeria	20	1000
South Africa	15	230
Brazil	20	220
Guatemala	2	200
Honduras	33	220
Mexico	24	110

Source: AbouZahr, 1998.⁴

Active Management of the Third Stage of Labor

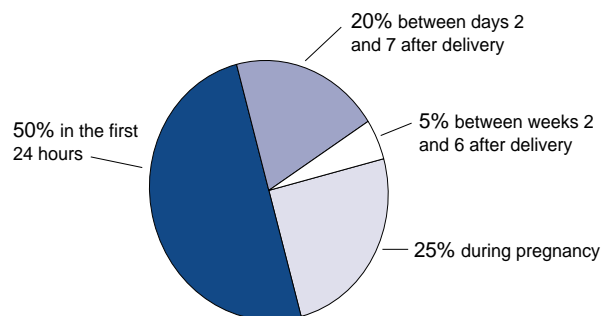
Most cases of PPH occur during the third stage of labor. During this time, the muscles of the uterus contract and the placenta begins to separate from the uterine wall. The amount of blood lost depends on how quickly this occurs. The third stage typically lasts between 5 and 15 minutes.^{13,14} After 30 minutes, the third stage of labor is considered to be prolonged, indicating a potential problem. If the uterus is atonic and does not contract normally, the blood vessels at the placental site do not adequately constrict, and severe bleeding results.

Active management of the third stage of labor consists of interventions designed to speed the delivery of the placenta by increasing uterine contractions and to prevent PPH by averting uterine atony. The usual components are: (1) giving a uterotonic (uterus-contracting) drug within one minute of birth of the newborn; (2) clamping and cutting the umbilical cord soon after birth; and (3) applying controlled cord tension (also referred to as controlled cord traction) to the umbilical cord while applying simultaneous counter-pressure to the uterus through the abdomen. After delivery of the placenta, massaging the fundus of the uterus through the abdomen also can help the uterus contract to minimize further bleeding. Active management of the third stage of labor is commonly used in the United Kingdom, Australia, and several other countries.¹⁴

In contrast to active management, expectant management (also known as conservative or physiological management) of the third stage of labor involves waiting for signs that the placenta is separating from the uterine wall (for example, observing a gush of blood), and allowing it to deliver spontaneously. Expectant management is the common practice in parts of Europe, the United States, and Canada. Expectant management also is the norm in the majority of home births in developing countries.¹⁴

Several large-scale, randomized, controlled studies (carried out in well-equipped maternity hospitals) have compared the effects of active and expectant management. Although the studies used different protocols and definitions of active management, their results are informative. For example, in a trial carried out in Dublin, Ireland, 705 women were actively managed with 0.5 mcg ergometrine and controlled cord tension, while 724 were managed physiologically. The trial found less PPH and fewer cases of low hemoglobin among women actively managed. There was a higher incidence of manual removal of placenta, nausea, vomiting, and severe after-birth pains among actively managed women, however.¹⁵ In a trial carried out in Abu Dhabi, 827 women received controlled cord tension and 10 mcg intramuscular oxytocin, while 821 had minimal intervention (oxytocin only after delivery of placenta). Those actively managed had significantly lower incidence of PPH and retained placenta, as well as less

Figure 2. Timing of maternal deaths.



Source: UNICEF, 1999.¹⁶

need for additional uterotonic drugs.¹⁷ In a British study, 846 women were actively managed with 5 mcg oxytocin and 0.5 mcg ergometrine, as well as controlled cord tension, while 849 women were physiologically managed. Those actively managed had significantly less PPH and shorter third-stage labor.¹⁸ In another British trial, 748 women received oxytocin and/or ergometrine and controlled cord traction, while 764 did not receive either intervention unless indicated. Active management resulted in a significant reduction in PPH. There was more vomiting among those actively managed, however.¹⁹ None of these studies showed an increased incidence of serious complications associated with active management.¹⁴

A meta-analysis of these studies, available through the Cochrane database and WHO's Reproductive Health Library,²⁰ confirmed that active management was associated with reduced maternal blood loss (including PPH and severe PPH), reduced postpartum anemia, and decreased need for blood transfusion.¹⁴ Active management also was associated with a reduced risk of prolonged third-stage labor, and less use of additional therapeutic uterotonic drugs.

Uterotonic drugs. The injection of a uterotonic drug immediately after delivery of the newborn is one of the most important interventions used to prevent PPH. The most commonly used uterotonic drug, oxytocin, has proven to be very effective in reducing the incidence of PPH and prolonged third-stage labor.^{21,22} Syntometrine (ergometrine combined with oxytocin) appears to be even more effective than oxytocin alone. Syntometrine is associated with more side effects, such as headache, nausea, vomiting, and increased blood pressure, however.²³ Women with high blood pressure (or pre-eclampsia or eclampsia, which affect approximately 10 percent of all women) cannot use ergometrine. Compared with oxytocin, ergometrine is less stable at room temperature and tends to lose its potency more rapidly, especially in tropical climates.²⁴

Prostaglandins also are effective in controlling bleeding, but generally are more expensive and have various side

effects, including diarrhea, vomiting, and abdominal pain (see box on misoprostol below).²⁵ The choice of which uterotonic drug to use for management of bleeding depends on the clinical judgment of the provider, availability of drug options, and an assessment of the trade-offs between the anticipated benefits and side effects.

Cord clamping. In active management of the third stage of labor, the umbilical cord is immediately clamped and cut following delivery to allow for other active management interventions. In expectant management, cord clamping is usually done after the cord has stopped

Misoprostol for Prevention of PPH

Misoprostol (Cytotec®) is a synthetic analog of prostaglandin E₁, originally marketed for the prevention and treatment of peptic ulcer disease. In many regions, it also is being widely used in obstetrics and gynecology.^{26,27} Like other uterotonics, misoprostol causes the uterus to contract, and thus can reduce postpartum bleeding. Misoprostol has a range of potential benefits including ease of administration (oral or rectal), low cost, and stability. Its effectiveness compared to other uterotonic drugs in reducing postpartum hemorrhage has been the subject of several recent and ongoing studies.

Several small clinical studies have suggested that 400 to 600 mcg of misoprostol (administered orally) may be as effective in reducing postpartum hemorrhage as oxytocin or syntometrine;^{28,29} another found it less effective.³⁰ Several studies have found misoprostol to be as effective as oxytocin, but associated with shivering and elevated temperature.^{13,31,32}

A WHO multi-center study found that misoprostol was not as effective as oxytocin in reducing maternal bleeding when administered as part of active management of the third phase of labor in hospital settings. Compared with women who received oxytocin, women receiving misoprostol (600 mcg orally) immediately after delivery had a higher rate of blood loss of 1,000 ml or more (4 vs. 3 percent), required additional uterotonics more frequently, and had a higher incidence of shivering and elevated temperature.³³ The study did not address use of misoprostol for treatment of PPH (the study focus was prevention); the authors did not feel there was significant evidence to recommend use of misoprostol for preventing PPH when injectable oxytocin is available. In contrast, a commentary accompanying the article noted that, despite its lower effectiveness, misoprostol still should be considered as a useful option in settings where women generally receive no uterotonic drugs.³⁴

pulsating. While there appears to be no difference between the two practices in the effect on the mother, immediate clamping can reduce the amount of placental blood transferred to the newborn. It has been estimated that early cord clamping prevents 20 to 50 percent of fetal blood from flowing from the placenta to the infant (the amount of blood flow also is affected by gravity and whether the infant is held above or below the level of the placenta after delivery).³⁵ The reduced flow of blood results in lower hematocrit and hemoglobin levels in the newborn, and may have an effect on the frequency of iron-deficiency anemia in infancy.³⁶ One study found that waiting to clamp the cord until it stopped pulsating reduced by half the rate of infant anemia at two months of age.³⁷ Some studies have pointed to a potential for increased neonatal respiratory distress following early cord clamping.³⁵ Administration of an oxytocic drug without immediate cord clamping can potentially lead to over-transfusion of the infant, but this issue has not been adequately studied. One possible advantage of early clamping for the infant is the potential for a reduction in the transmission of blood-borne diseases such as HIV.

Controlled cord tension. Controlled cord tension involves very gently pulling downward on the cord once the uterus has contracted, while simultaneously putting pressure on the uterus by pushing on the abdomen just above the pubic bone. This practice aids in the separation of the placenta from the uterus and in its delivery. Done only during a uterine contraction, this gentle pulling on the cord encourages the placenta to descend and be delivered. Tension on the cord should be discontinued after 30 to 40 seconds if the placenta does not descend, but can be attempted again with the next uterine contraction.

For the woman, the potential risks associated with controlled cord tension are the risk for the uterus to invert (when the upper part of the uterus is pulled through the cervix) and for the cord to separate from the placenta. In the five major controlled trials on active versus expectant management, no cases of uterine inversion or cord separation were recorded.¹⁴ For controlled cord tension to be performed safely, it is crucial to provide personnel with consistent training and guidelines.

Implementing active management. As described above, the large, randomized studies in developed countries suggest a clear advantage of active management of the third stage of labor in reducing PPH. The feasibility of widespread active management in developing countries requires consideration of the costs as well as the storage and distribution requirements of drugs and supplies, the availability of trained personnel, and the quality of the health facilities.³⁸ Active management also depends on the availability of uterotonic drugs, syringes, and needles. Long-term storage of oxytocin and

ergometrine requires refrigeration, which may be unavailable in some settings. Active management also requires the presence of a skilled attendant at delivery. Only about half of pregnant women in developing countries deliver with the help of a skilled attendant, and only 40 percent deliver in a hospital or health center.³⁹ A recent study in Indonesia demonstrated that oxytocin in a pre-filled single-dose injection device (Uniject™) enabled trained village midwives to provide prophylactic oxytocin to mothers delivering at home.⁴⁰

Where women commonly give birth in the care of trained providers, active management may save lives. Prior to instituting a policy of active management of the third stage of labor in a maternal clinic setting, operations research assessing its feasibility should be implemented. Training of personnel in all elements of active management and in the skills required to treat potential complications of the mother and newborn are crucial prerequisites to implementing an active-management policy. Ensuring injection safety also is essential.

Ensuring Safe Motherhood Through Global Standards of Care

Among the priorities established during the Safe Motherhood Technical Consultation in Sri Lanka in 1997, and the International Symposium on Safe Motherhood in Washington, D.C., in 1998, were ensuring skilled attendance at every delivery and improving access to quality maternal health services.^{1,41} The *Managing Complications in Pregnancy and Childbirth* manual featured on page 6 contributes to these goals by helping to institutionalize and formalize the types of skills required of doctors and midwives at referral hospitals.

Standards of care define a specific level of performance based on state-of-the-art practices supported by current scientific knowledge.⁴² Guidelines for policies and service delivery explain how these standards are to be achieved. Together, standards and guidelines can be used to improve provider performance and quality of care.

Development of national guidelines. *Managing Complications of Pregnancy and Childbirth* and other international evidence-based resource materials serve as models for updated national policy and service-delivery guidelines. Effective development and implementation of new standards and guidelines generally includes several steps:

- Identifying stakeholders and gaining consensus on the need for change.
- Forming a national advisory group.

- Developing and revising draft national policy and service-delivery guidelines based on international and national resource materials.
- Reviewing guidelines (including those by key stakeholders outside the advisory group).
- Officially endorsing guidelines.
- Disseminating guidelines broadly.

This process ensures that national guidelines address the problems at hand, and that the solutions are appropriate within the national context. The Maternal and Neonatal Health (MNH) Program of JHPIEGO has been helping countries develop new guidelines based on *Managing Complications in Pregnancy and Childbirth*. In Uganda, for example, maternal

and neonatal health care guidelines were developed through a series of participatory activities involving more than 30 Ugandan health care providers and decision-makers. The resulting document, *Essential Maternal and Neonatal Care Clinical Guidelines for Uganda*, provides basic standards for improving maternal and neonatal survival. The participatory process through which the guidelines were developed ensured that they reflect and respond to the real needs and concerns of Ugandans.⁴²

Also in collaboration with the MNH program, Indonesian leaders recently launched the *National Resource Document for Maternal and Neonatal Health* at a workshop attended by one hundred stakeholders, including specialists in obstetrics and gynecology, teaching faculty from medical and midwifery schools, and ministry of health representatives.⁴² This document will be distributed to all medical and midwifery schools and reproductive health training programs in Indonesia. Pre-service and in-service training materials based on the document already are being used to direct the care of newborns and women during pregnancy, childbirth, and the postpartum period.

Implementation and use of guidelines. Once new guidelines are accepted and distributed, it is necessary to ensure their implementation and use. Support systems are needed to make sure providers have the skills, equipment, and supplies necessary to implement the standards of care. This requires systems for training and supervising staff, ensuring logistical support, and monitoring and evaluating new service-delivery approaches. For example, training programs (supported by the MNH program) based on *Managing Complications in Pregnancy and Childbirth* are being implemented in Africa, Asia, and Latin America to develop a core group of faculty and trainers. Once these experts complete their

“If mothers received postpartum care as assiduously as they receive prenatal care, maternal mortality would decrease.”— Li et al., 1996³



New Manuals on Providing Maternal and Newborn Care

A new set of global guidelines for maternal and newborn health provides skilled caregivers with the information they need to provide basic care and manage complications of pregnancy and childbirth. WHO and the JHPIEGO Corporation are developing four evidence-based technical manuals that form an essential maternal and newborn health package. These manuals contribute to the Integrated Management of Pregnancy and Childbirth (IMPAC) component of WHO's "Making Pregnancy Safer" strategy.

The first manual, *Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors*, was developed by WHO and JHPIEGO. This document reflects internationally established best practices and has been endorsed by the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the World Bank, the International Confederation of Midwives (ICM), and the International Federation of Gynecology and Obstetrics (FIGO). The manual provides overall guidance on the care needed by women presenting with complications during pregnancy, childbirth, or the immediate postpartum period, and immediate problems of newborns.

The manual is designed to be used by skilled midwives and physicians facing a complication such as vaginal bleeding after childbirth or obstructed labor. The main text is arranged by symptom rather than disease to facilitate its use in treating women presenting with specific problems. As is appropriate

for low-resource settings, the manual emphasizes rapid clinical assessment and decision-making, with little reliance on laboratory or other tests. It summarizes the main steps of the procedures necessary to manage a condition and highlights the most effective and least expensive therapies.

The manual is a valuable asset in managing postpartum bleeding. Under the symptom "vaginal bleeding after childbirth," for example, the manual provides information on the general management of the patient; a chart for diagnosis of the bleeding (see Table 2); and specific instructions for management of each diagnosis (for example, bimanual compression of the uterus and administration of oxytocic drugs for an atonic uterus). The manual provides instructions for all procedures necessary to manage bleeding (such as manual removal of the placenta, repair of cervical tears, repair of vaginal and perineal tears, correcting uterine inversion, repair of ruptured uterus, uterine and utero-ovarian artery ligation, and postpartum hysterectomy). Appendices include a list of the essential drugs for managing complications in pregnancy and childbirth, and an index arranged for use in emergency situations.

The remaining three manuals that will be published in the next one to two years are:

Essential Care Practice Guide for Pregnancy, Childbirth, and Newborn Care (WHO). This manual is being developed for health care personnel at all levels, especially at the primary-care level, and will cover essential routine and emergency care of women and newborns during pregnancy, labor, childbirth, and the postpartum and postabortion periods.

Basic Maternal and Newborn Care: A Guide for Skilled Caregivers (JHPIEGO, with assistance from the American College of Nurse-Midwives and Basic Support for Institutionalizing Child Survival [BASICS]). This manual is aimed at midwives, nurses, and other health care professionals who provide maternal and neonatal health care. It covers antenatal care, early detection of pregnancy-related complications, normal labor and childbirth, and normal postpartum care (including care of the newborn).

Management of Newborn Problems: A Guide for Doctors, Nurses, and Midwives (WHO and JHPIEGO with assistance from BASICS). This manual is being written for doctors, midwives, and nurses at institutions offering comprehensive essential obstetric care; it covers treatment of principal newborn problems, including possible severe infections and low birth weight.

For copies of *Managing Complications of Pregnancy and Childbirth* and more information about forthcoming manuals, contact the RHR Documentation Centre, Department of Reproductive Health and Research, WHO, Avenue Appia 20, CH-1211 Geneva 27, Switzerland. E-mail: rhrpublications@who.int. Telephone: +41 22 791 4447/3346. Fax: +41 22 791 4189. More information about the USAID-funded Maternal and Neonatal Health Program of JHPIEGO is available online at <http://www.mnh.jhpiego.org>.

12 to 18 months of training, they will serve as technical experts and be available to assist in pre- and in-service trainings within their respective regions.

As the main beneficiaries, community members also need to participate in the implementation of new guidelines. If women, their families, and their community leaders are educated about the new standards of care, they will gain a better understanding of the process of pregnancy, labor, and delivery, as well as potential complications. They will come to expect—and demand—the new level of service. Indeed, the participation of community members (for example in transporting a woman suffering from PPH to a health care facility) is required to implement certain guidelines effectively. Similarly, the community's role in monitoring and evaluating whether or not the new guidelines and standards are appropriate and being implemented correctly is key.

Conclusion

Postpartum hemorrhage is an unpredictable and rapid cause of maternal death worldwide. Current evidence indicates that—where appropriately trained birth attendants, necessary equipment, and injection safety can be ensured—active management of the third stage of labor (uterotonic drugs, cord clamping, and controlled cord tension) will significantly reduce the incidence of PPH.⁴³ Together with the prevention and treatment of anemia and skilled attendance at all deliveries, active management can prevent PPH in thousands of women worldwide each year. Those cases that cannot be prevented require the immediate intervention of skilled, well-equipped providers.

Ongoing operations research is helping to determine the best approaches for managing postpartum bleeding and

its complications in various settings, including the service-delivery requirements for safe and effective active management of the third stage of labor. As the information that providers need to prevent and manage PPH is disseminated through new national guidelines, more women will receive the obstetric care they need. Resources such as *Managing Complications in Pregnancy and Childbirth* can further fulfill the need for clear and accurate information.⁵ When included in a continuum of pre- and post-natal care, appropriate management of the third stage of labor will improve the survival and quality of life of mothers and infants worldwide.

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Table 2. Vaginal Bleeding After Childbirth

Presenting Symptom and Other Symptoms and Signs Typically Present	Symptoms and Signs Sometimes Present	Probable Diagnosis
<ul style="list-style-type: none"> • Immediate PPH* • Uterus soft and not contracted 	<ul style="list-style-type: none"> • Shock 	Atonic uterus
<ul style="list-style-type: none"> • Immediate PPH* 	<ul style="list-style-type: none"> • Complete placenta • Uterus contracted 	Tears of cervix, vagina, or perineum
<ul style="list-style-type: none"> • Placenta not delivered within 30 minutes after delivery 	<ul style="list-style-type: none"> • Immediate PPH* • Uterus contracted 	Retained placenta
<ul style="list-style-type: none"> • Portion of maternal surface of placenta missing or torn membranes with vessels 	<ul style="list-style-type: none"> • Immediate PPH* • Uterus contracted 	Retained placental fragments
<ul style="list-style-type: none"> • Uterus fundus not felt on abdominal palpation • Slight or intense pain 	<ul style="list-style-type: none"> • Inverted uterus apparent at vulva • Immediate PPH[†] 	Inverted uterus
<ul style="list-style-type: none"> • Bleeding occurs more than 24 hours after delivery • Uterus softer and larger than expected for elapsed time since delivery 	<ul style="list-style-type: none"> • Bleeding is variable (light or heavy, continuous or irregular) • Anemia 	Delayed PPH

*Bleeding may be light if a clot blocks the cervix or if the woman is lying on her back.

[†]There may be no bleeding with complete inversion.

Source: *Managing Complications in Pregnancy and Childbirth*.⁵ The manual gives specific instructions for managing each diagnosis.

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