

PARTICIPANT'S GUIDE

Prevention, Recognition, and Management of Postpartum Hemorrhage

Clinical and Community Action to Address Postpartum Hemorrhage

- 1 Introduction
- 2 Causes of PPH and Introduction to Pathfinder's Model for Clinical and Community Action to Address PPH
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- 7 Data Collection and Record Keeping
- 8 Community Mobilization



Prevention, Recognition, and
Management of Postpartum
Hemorrhage

Participant's Guide

Pathfinder International

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Unit 1: Introduction

Participant Handout 1.1: Terms Related to Postpartum Hemorrhage

Active management of third stage of labor (AMTSL): includes 3 components: a) administration of a uterotonic within 1 minute after birth of the newborn; b) after delayed cord clamping (once the cord stops pulsating, or within 2-3 minutes), delivery of the placenta by controlled cord traction; c) followed by uterine massage.

Uterotonic: A drug that stimulates uterine contractions. Drugs such as oxytocin, ergometrine and misoprostol have strong uterotonic properties and have long been used to prevent and treat uterine atony and reduce the amount of blood lost during and after childbirth. The use of a uterotonic drug immediately after the delivery of the newborn (i.e., in the third stage of labor) is one of the most important interventions used to prevent postpartum hemorrhage (PPH).

Uterotonic stability: is defined by how well the uterotonic maintains active ingredient potency and other measures, like pH, when stored over time. Because reduced potency of uterotonic drugs may have serious, life-threatening consequences, it is critically important to consider the likely storage conditions and stability of each of the uterotonic drugs when choosing a uterotonic. This is of a particular importance for tropical countries (i.e. India and Nigeria) and where refrigeration and protection from light are not always available and reliable. The stability of oxytocin is mainly affected by temperature; the stability of ergometrine is mainly affected by temperature and light.

Controlled Cord Traction: A two-handed delivery of the placenta, involving gentle, firm and steady tension downward cord traction with one hand and upwards and backwards uterine counter-pressure with the other hand supporting the uterus above the pubis, performed only on a contracted uterus.

Uterine Massage: Immediately after the delivery of the placenta, the skilled birth attendant massages the uterine fundus until the uterus is firmly contracted.

Blood Drape (BD): The blood drape is a funneled-shaped, plastic bag-like device that is placed under the woman's buttocks and tied around her at 2 places (at the waist and at the hips) immediately after the delivery of the baby (once separated from the mother). The funneled portion collects blood, and has two markings at 350 ml (warning sign) and 500ml (take action sign) that alert the provider to the amount of blood lost. Tying the drape properly around the woman is important because it ensures that the blood is being collected only in the lower, funneled part of the drape. The blood drape will enable the attendant to assess blood loss and facilitate early diagnosis of PPH and transfer the woman for appropriate treatment.

Postpartum Hemorrhage (PPH): Vaginal bleeding after delivery that exceeds 500 ml, or that is less than 500 ml and causes symptoms. Severe PPH is vaginal bleeding greater than 1,000 ml. Bleeding immediately after delivery, within the first 24 hours, is called **primary PPH** and bleeding after 24 hours is called **secondary PPH**.

Crystalloid Fluids: Ringers Lactate, Normal Saline, or Hartmann's Solution, used for fluid replacement for PPH.

Non-Pneumatic Anti-Shock Garment (NASG): A garment that can be placed around the hips, lower abdomen and legs of a woman who has an obstetric hemorrhage and/or is in hypovolemic shock, which creates pressure (to her lower extremities and directly to the uterus) that will stabilize her (shunt blood to her vital organs) until she can be treated at an appropriate higher-level facility. (Note: the NASG is never to be removed unless under skilled medical supervision.)

Emergency Hysterectomy: Surgical removal of the uterus to stop intractable obstetrical hemorrhage that is often caused by an adherent placenta. Emergency hysterectomy is a life saving procedure.

Hypovolemic Shock: Clinical signs of decompensation of the circulatory system, due to excessive blood loss. The blood loss may be revealed/apparent (as in PPH from uterine atony) or partially concealed (as in placental abruption or ruptured uterus). The vital signs change so the pulse is fast and weak > 110 BPM, low systolic blood pressure < 90 mmHG, and the patient may be pale, diaphoretic (excessive sweating), confused, agitated, or unconscious.

Participant Handout 1.2: Participants and Venue for Training

All Px who are higher-level facility staff will be trained in AMTSL (including the appropriate use of uterotonics), how to estimate blood loss using the blood drape and other methods including visual estimation, and how to place the NASG and transfer a woman in the NASG.

All Skilled Birth Attendants (SBAs) should be trained in prevention and management of PPH, and in use of misoprostol if oxytocin is not available.

The use of the most effective uterotonic available should be encouraged. For example, if oxytocin is not available and/or not stored in appropriate conditions, misoprostol may be used for prophylaxis of PPH.

Only staff at facilities that can provide surgery and blood transfusions will be trained to manage patients in the NASG and to remove the NASG once the woman is stable.

Staff who are trained to use these intervention techniques will be encouraged and provided techniques to transfer skills to others within their facility with the assistance of this program.

Training venues: Trainings will be conducted as close as possible to where the trainees live and work. Trainers will, for the most part, continue as supervisors and, along with project staff, will provide ongoing technical assistance and supportive supervision to ensure that trained staff retain their skills and transfer them to others, continue to use the project technologies, document the number of women treated, and effectively transfer women to higher-level facilities if necessary.

Participant Handout 1.3: Some Simple Dos and Don'ts for Effective Participation:

Do:

- Ask a question when you have one
- Feel free to share an example
- Request an example if a point is not clear
- Search for ways in which you can apply a general principle or idea to your work
- Try to evaluate how well you are performing a skill based on new techniques you are learning
- Think of ways you can share the knowledge gained during this training with your subordinates and co-workers
- Be skeptical—don't automatically accept everything you hear
- Participate in the discussion
- Respect the ideas of other Px

Don't:

- Try to develop an extreme problem just to prove the trainer doesn't have all the answers • Close your mind by saying, "This is all fine in theory, but..."
- Assume that all topics covered will be equally relevant to your needs
- Take extensive notes; the handouts will satisfy most of your needs
- Try to show how much you know by monopolizing class time
- Engage in side talk
- Interrupt others
- Let your mobile phone ring during class

Participant Handout 1.4: “Where Are We?” and “Reflections”

Where Are We?

Starting each day with “Where are We?” is our opportunity to share insights, answer questions, clarify issues, resolve problems, and review particularly important material we need to remember so that each of us (Px and trainers alike) can get the most out of the course and each day’s experiences.

At the beginning of every day, Housekeeping Team members will provide each Px with two pieces of different colored paper. On one piece of paper, Px should write which topic from the previous day’s training they found most useful and how they will apply that information to their work. On the other piece of paper, they should write a question or concept from the previous day’s training that needs clarification. The Px conducting the exercise can help group the second pieces of paper by topic.

Problems identified during the “Where Are We?” session should be resolved, either by the team or the trainers, before continuing (when possible), since unresolved issues may hinder the learning process for Px.

The exercise is not a review of the previous day, but is used to identify the highlights and main points in each day’s experiences. The Px conducting the review should prepare and use it as an opportunity to share his/her insights, clarify issues, resolve problems, or review important material. Problems identified during the exercise are to be resolved before continuing with training.

Reflections

At the end of each day, we take time to look over what we have done to:

- N Examine what it means to us individually, and
- N Explore how what we have learned can be applied in our place of work or a broader setting.

We close each day’s activities with a session of “Reflections” on the day. As in “Where Are We?” each Px will be given two different colored cards to complete anonymously. On one card, Px should write what they liked about the day and what went well. On the other card, Px should write the things that they hope will improve. These comments should primarily address the training content, not the food or breaks.

The Housekeeping Team and the training team will review the results at the end of the day. One of the trainers will announce the results the following day and will explain how the training team responded to the suggestions.

At the end of each day, that day’s Housekeeping Team will meet briefly (<15 min.) with the trainers to evaluate Px inputs and suggestions for improvement. This helps trainers evaluate the training with the guidance of px feedback, including the perspectives of the housekeeping team.

Participant Handout 1.5: Pre-Test

There are a total of 50 correct answers. Each correct answer is worth 2 points.

1. List at least 4 causes of uterine atony.

2. List the 4 elements of the *Pathfinder International Model for Clinical and Community Action to Address Postpartum Hemorrhage*.

Multiple Choice Questions: Circle all the correct answers

3. Which of the following is a type of obstetric hemorrhage:
- a. Antepartum hemorrhage
 - b. Postpartum hemorrhage
 - c. A ruptured ectopic pregnancy
 - d. Retained placenta
 - e. All of the above
4. When a woman presents in hypovolemic shock, how much fluid should you infuse in the first 20 minutes?
- a. 250 mL
 - b. 500mL
 - c. 1000mL
 - d. 1500mL
5. Please mark all the steps in active management of third stage labor:
- a. Administration of a uterotonic within 1 minute of delivery of the baby
 - b. Controlled cord traction to deliver the placenta
 - c. Delivery of the baby
 - d. Uterine massage following delivery of placenta to ensure that the uterus is contracted
 - e. None of the above

6. What is the oral and sublingual dose of misoprostol administered to prevent postpartum hemorrhage?
 - a. 200 µg
 - b. 400 µg
 - c. 600 µg
 - d. 800 µg

7. When is the blood drape placed underneath the woman's buttocks and tied around her waist and hips?
 - a. Before delivery of the baby
 - b. After the delivery of the placenta
 - c. Immediately after the delivery of the baby

8. What does the red line on the blood drape indicate to the provider?
 - a. To get prepared to transfer the woman to a higher-level facility
 - b. To immediately transfer the woman to a higher-level facility
 - c. To start observing the bleeding every 20 minutes
 - d. None of the above

9. How can you ensure that the NASG is free of the HIV virus?
 - a. Put it out in the sun to dry
 - b. Decontaminate the garment with a 0.05% chlorine solution
 - c. Wash the garment with soap and water or in a washing machine
 - d. All of the above

10. How is misoprostol commonly administered to prevent PPH?
 - a. Injectable
 - b. Oral tablets
 - c. Vaginally

11. The 4 delays include:
 - a. Delay in recognizing that there is a problem
 - b. Delay in the decision to seek care
 - c. Delay in reaching a facility that can provide life-saving treatment
 - d. Delay at the facility, once reached, in providing the quality emergency treatment the woman requires.
 - e. All of the above

True/False Questions: Circle either T (true) or F (false)

12. T F A blood collection drape is a tool for measuring blood loss that can be used on all women who deliver.
13. T F Obstetric hemorrhage is one of the leading causes of maternal mortality.
14. T F Postpartum hemorrhage can be caused by genital tract or perineal lacerations.
15. T F Two-thirds of postpartum hemorrhage cases occur in women with no identifiable risk factors.
16. T F When collecting data for research it is important to get the patient's permission to use their information.
17. T F The most common side effect of misoprostol is shivering.
18. T F The NASG is an inflatable device that shunts blood to the brain, heart, and lungs and stabilizes hypovolemic patients.
19. T F The NASG is made of neoprene and Velcro.
20. T F The NASG shunts blood from the veins of the abdomen and lower extremities to the vital core organs (heart, lungs, kidneys, and brain).
21. T F If the woman experiences difficulty breathing with the NASG, the provider may adjust the abdominal panel.
22. T F Because the NASG is so effective, only 500 mL of crystalloid fluids should be given in the first hour.
23. T F Only one person, using as much strength as possible, should apply the pelvic and abdominal sections of the NASG.
24. T F When removing the NASG, start at the abdominal segment.
25. T F When applying the NASG, start at the abdominal segment.
26. T F The NASG can be disinfected and washed 30 times.
27. T F 40-50% of PPH can be prevented using AMTSL.
28. T F Misoprostol needs to be refrigerated.
29. T F Misoprostol works by helping the uterus contract, squeezing the blood vessels closed.
30. T F All women must be encouraged to develop a birth preparedness and complication-readiness plan, and to deliver (if possible) with a skilled provider.

Matching: Write the correct letter next to the matching definition

31. ____ is defined by how well it maintains active ingredient potency and other measures like pH when stored over time.	A. Blood Drape
32. ____ A two handed delivery of the placenta, involving gentle downward cord traction with one hand and upwards and backwards uterine counter-pressure with the other, performed only on a contracted uterus.	B. Uterotonic
33. ____ A funnel shaped plastic sheeting to catch blood with markings at 350 ml and 500 ml that is placed under the woman after delivery of the baby to enable the attendant to assess blood loss.	C. Hypovolemic Shock
34. ____ Surgical removal of the uterus to stop intractable obstetric hemorrhage.	D. Uterotonic stability
35. ____ A drug that stimulates uterine contractions.	E. Non-pneumatic Anti-Shock Garment (NASG)
36. ____ Excessive bleeding immediately after delivery, within the first 24 hours.	F. Crystalloid Intravenous (IV) Fluids
37. ____ Vaginal bleeding after delivery that exceeds 500 ml, or that is less than 500 ml and causes symptoms of shock.	G. Controlled Cord Traction
38. ____ Clinical signs of decompensation of the circulatory system, due to excessive blood loss.	H. Postpartum Hemorrhage (PPH)
39. ____ A garment that can be placed around the legs, pelvis, and abdomen of a woman who is in hypovolemic shock, compressing the blood vessels in her lower extremities and the uterus, that will stabilize her (shunt blood to her vital organs) until she can be treated at an appropriate higher-level facility.	I. Emergency (Caesarean) Hysterectomy
40. ____ Ringers Lactate, Hartmann's Solution, Normal Saline used for fluid replacement for PPH.	J. Primary Postpartum Hemorrhage
41. ____ Includes 3 components: a) Administration of a uterotonic within 5 minutes after the birth of a newborn, b) delivery of the placenta by controlled cord traction (after the cord has stopped pulsing), c) followed by uterine massage.	K. Active Management of the Third Stage of Labor (AMTSL)

UNIT 2:
Causes Of Postpartum Hemorrhage and
Introduction to the Pathfinder International
Model for Clinical and Community Action to
Address Postpartum Hemorrhage

Participant Handout 2.1: The Definition of Maternal Mortality

Maternal mortality is defined as:

The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Maternal death is described in terms of a maternal mortality ratio (MMR). More than half of all deaths among women are due to pregnancy-related causes. Worldwide, maternal deaths occur at a rate of 400 per 100,000 live births. Maternal mortality is distributed disparately among regions and among countries: for example, in sub-Saharan Africa, maternal death occurs in 900 of every 100,000 live births. The table below shows a selection of countries with high and low maternal mortality indicators, relative to their regions.

Maternal Mortality Indicators in Select Countries

Country or Region	Maternal Deaths per 100,000 live births	Lifetime Risk of Maternal Death (1 in __)
Sub-Saharan Africa	920	22
Angola	1400	12
Botswana	380	130
Burundi	1100	16
Ethiopia	720	27
Ghana	560	45
Guinea	910	19
Kenya	560	39
Mozambique	520	45
Nigeria	1100	18
South Africa	400	110
Tanzania	950	24
Uganda	550	25
South Asia	500	59
Bangladesh	570	51
India	450	70
East Asia and Pacific	150	350
Papua New Guinea	470	55
Vietnam	150	280
Lat. Amr. & Carib.	130	280
Bolivia	290	89
Brazil	110	370
Ecuador	210	170
Guatemala	290	71

Peru	240	140
Mid. East & N. Afr.	210	140
Egypt	130	230
Jordan	62	450
Yemen	430	39
Industrialized Countries	8	8000
United Kingdom	8	8200
USA	11	4800
World	400	92

These numbers listed may be much lower than the actual incidence of maternal death. If a woman gives birth at home or if she dies after leaving the facility at which she gave birth, it is likely that her death will not be recorded as due to maternal causes.

While maternal mortality indicators do vary dramatically within regions, 99% of all maternal deaths occur in developing countries and are more likely to happen where a skilled birth attendant is not at the delivery. Among deliveries with no SBA, maternal mortality is between 1,000 to 1,500 per 100,000 live births. More than half of maternal deaths occur during the postpartum period. Effective prevention and management of postpartum complications can significantly reduce overall maternal mortality.

MDG 5: Reduce Maternal Mortality

Millennium Development Goal (MDG) 5 aims to reduce global maternal mortality by 75% by 2015. Individual countries and, in some countries, individual districts, have MDG 5 targets based on the local MMR.

Participant Handout 2.2: The Four Delays Contributing to Maternal Mortality

The 4 Delays Contributing to Maternal Mortality

The importance of the community's role in emergency obstetric care can not be underestimated. Programmers, providers, and communities need to understand, appreciate, and commit to avoiding the 4 delays that prevent women from accessing the care they need to prevent maternal mortality. The role of different providers at different levels of health services to work with the community to avoid those delays must be defined and carried out.

The 4 delays are:

1. Delay in recognizing that there is a problem: When an emergency occurs, it may take the woman, her family, or a traditional birth attendant (TBA) some time to recognize that there is a problem and/or its severity. Most people who are not clinically trained do not know how to recognize the signs of obstetric complications. A certain amount of bleeding is common during labor and delivery, but it is difficult for untrained people to differentiate between a normal amount of bleeding and PPH.
2. Delay in the decision to seek care: Once the problem is recognized, there may be further delay in seeking care. Making the decision to seek obstetric care is a complex process and requires many individuals (e.g., a woman, her husband, and key relatives) in decision-making. Women's status and level of education, the distance to a health facility, cost, perceived quality of care, and the perceived benefit of care all play major roles in reaching this decision. A family that is unprepared wastes valuable time deciding what to do, who to call for help, where to go, who should accompany the woman, and organizing transportation.
3. Delay in reaching the facility that can provide life-saving treatment: Time is often lost going to health practitioners or facilities that are unable to manage the emergency. This delay depends on the type and conditions of the road and weather, the seasons, and the availability and location of health care facilities. Other factors include distance to an appropriate facility, access to transportation, and ability to pay for transportation and/or care.
4. Delay at the facility, once reached, in providing the quality emergency treatment the woman requires: Poorly equipped health facilities, shortages of essential drugs and supplies, scarce human resources, and limited technical capacity of health personnel contribute to a delay in the provision of emergency obstetric treatment. Families are often unsure of where to go once they arrive at the facility. The family may not agree to the treatment the medical staff recommend, may not agree to donate blood, or may be unable to pay for the medical supplies needed.

Blood shortages play a critical role in the 4th delay. Working with communities, we must increase awareness of the critical need for emergency blood supply and ease cultural barriers that deter willingness to donate. Creating a base of community members willing to donate at least to family members and, ideally, toward a sufficient supply of blood for all who need it, is an important aspect of addressing the 4th delay.

Women die from maternal causes as a direct result of the low social, cultural, and economic status of women as well as of inadequacies in existing health systems. Delays play a big role in maternal mortality. All these sociocultural and systemic factors pose very great challenges that must be dealt with if we are to overcome the problem of maternal death.

Participant Handout 2.3: The Five Most Common Causes of Maternal Death

Cause of Maternal Mortality	Accounts for What Percent of Deaths
1.	
2.	
3.	
4.	
5.	

Participant Handout 2.4: Etiology of Maternal Death

Severe bleeding is the largest single cause of maternal death, causing approximately 25% of maternal deaths globally. PPH occurs in approximately 10.5% of live births. Studies reveal that causes of maternal death vary dramatically from country to country, depending on the age of women giving birth and access to care. In all studies however, hemorrhage is among the top causes, if not the greatest cause, of maternal mortality. Any attempt to reduce maternal mortality must address the major causes.

Additionally, systemic barriers to adequate blood supply also factor heavily in factor maternal death. One review concluded that more than 25% of deaths from PPH in Sub-Saharan Africa can be attributed to lack of access to blood supply due to inability of the patient/family to pay for blood, lack of donors, unwillingness of relatives to donate blood, or inadequate blood storage or transport. Globally, less than 40% of the world's blood supply is donated in developing countries, which account for more than 80% of the world's population. Bates et al. conducted a literature review finding that lack of blood supply was reported as a significant factor in almost half of studies of mortality from PPH.

Participant Handout 2.5: The Pathfinder International Model for Clinical and Community Action to Address Postpartum Hemorrhage

The Pathfinder model to address high levels of maternal mortality in developing countries due to PPH integrates essential clinical interventions with equally crucial government-level advocacy and community engagement. The 6 elements of the Pathfinder model include:

1. Advocacy with government officials to promote enabling policies;
2. Prevention of PPH through the routine application of AMTSL;
3. Identification of hemorrhage through accurate estimation of blood loss;
4. Management of PPH through:
 - N Identification of the cause of hemorrhage,
 - N Fluid replacement to prevent shock,
 - N Use of uterotonics as appropriate,
 - N Application of the NASG when shock occurs for resuscitation and stabilization for transfer, and
 - N Blood replacement and surgery;
5. Community mobilization for raising awareness of the danger of PPH, recognition of excessive blood loss and community action; and
6. Organization of emergency transportation systems in the community.

Pathfinder's *Model for Clinical and Community Action to Address PPH* combines multiple approaches for preventing, recognizing, and managing PPH to prevent long-term morbidity and death: AMTSL, accurate estimation of blood loss, and management of shock.

1. Literature indicates that AMTSL, using standard uterotonics, can prevent PPH by as much as 40% - 50%. Even though oxytocin is the first choice uterotonic and ergometrine the second choice, misoprostol is more stable in heat than injectable uterotonics. Thus, integrating misoprostol in AMTSL where other uterotonics are not available or viable increases the number of women who can benefit from AMTSL.
2. Simple technologies for more accurate visual estimation of blood loss, such as the blood collection drape, collecting blood from the delivery table into a calibrated jug or pail, using cholera beds for measuring blood loss, and a standard absorptive cloth (adapting the Kanga Method) have been devised for early and more accurate estimation of blood loss. Using these measures means dangerous blood loss is promptly identified, reducing life-threatening delays in treatment (including fluid replacement and uterotonic administration to prevent shock), referral, and/or transport of women who are bleeding to a higher-level facility for care.
3. For those women who do develop shock, treatment with rapid replacement of lost blood volume and the use of a simple first aid device—the NASG—has made it possible to revive women in shock and keep them alive and stable for up to 56 hours, which helps mitigate delays in access to care due to low transportation or service delivery resources.

Each of these approaches have been individually tried, tested, and proven. Through the Model for Clinical and Community Action to Address PPH, Pathfinder is introducing these innovations into the health system together as a continuum of care.

Participant Handout 2.6: The Pathfinder Model at Each Level

The Pathfinder Model at Each Level

1. At the home/community level: Avoid the delay in seeking care for obstetric emergencies by:

- N Sensitizing women and their families to the importance of giving birth with a skilled provider and developing birth preparedness and complication readiness plans;
- N Increasing community awareness, the ability to identify PPH, and understanding of the importance of donating blood;
- N Increasing timely decisions to seek care; and
- N Organizing communication and transportation systems with communities.

2. At the health facility level:

- N Incorporate 3 new technologies into existing protocols for prevention and treatment of PPH:
 1. Prevent PPH by adopting enhanced AMTSL.
 2. Accurately estimate blood loss to detect hemorrhage early, and take action, including fluid replacement to prevent shock and administration of uterotonics to manage PPH.
 3. Improve prevention of shock and management of PPH by using the NASG to stabilize women in shock until they can be treated comprehensively.
- N Use organized transport systems and community emergency funds for timely referral and transportation to higher-level facilities; and
- N Establish blood transfusion committees and blood donation and screening procedures to ensure effective and cost-effective management of blood supply.

3. At the policy level:

- N Advocate for and ensure incorporation of AMTSL and the new technologies into national policies, protocols, and PPH management guidelines;
- N Engage professional societies such as those for nurses, midwives, and obstetricians/gynecologists;
- N Institutionalize the new technologies in the pre-service curricula of midwifery, nursing, and medical schools and other training for SBAs;
- N Update practicing providers in the new technologies and skills; and
- N Advocate for sustainable blood supply policies, including provisions or financing schemes

for families who cannot pay for blood.

The model ensures that where ever a woman develops PPH—whether in the village, at a lower-level facility, or at a higher-level facility—she can receive the skilled, organized services she needs. It also means that every effort will be made at each stage for prevention and early detection of PPH, prevention of shock, and management of shock from PPH. Providing a woman the best preventative care and management possible at each stage reduces the chances her condition will deteriorate. The model also requires that all levels of care and facilities are coordinated for smooth flow upward, as needed, and that feedback is returned downward, for continuous improvement.

Development of comprehensive emergency obstetric services is already underway in many countries. Many countries are also improving emergency transportation systems, for obstetric and other health emergencies. The model will contribute to these efforts through sustained advocacy and support at the community, district, and state levels to establish community transportation and communication schemes for women in need of emergency care and to strengthen effective, comprehensive facility services to meet any obstetric emergency.

UNIT 3:
Preventing PPH Through the Active
Management of the Third Stage of
Labor (AMTSL)

Participant Handout 3.1: How Postpartum Hemorrhage Causes Death and Morbidity

The uterus is a hollow, pear-shaped, muscular organ located in the woman's pelvis. The urinary bladder is situated in front of the uterus and the rectum is situated behind it. The myometrium, (the layer outside of the endometrium), is the muscle layer of the uterus that expands during pregnancy to hold the growing fetus. The blood vessels in the uterus are intertwined with the muscle fibers of the myometrium.

Participant Handout 3.2: Causes of Continued Postpartum Bleeding

The causes of PPH can be classified into 4 categories, or “4 Ts:”

Tone

N Failure of the uterus to contract after the delivery of the baby and placenta (uterine atony)

Tissue

N Retained placenta and/or products of conception (POCs)

Trauma

N Ruptured uterus

N Lacerations or tears of the cervix, vagina, or perineum

Thrombin

N Bleeding disorders

Tone

Uterine atony is the most common cause of continued postpartum bleeding. It often progresses quickly and can be addressed rapidly and effectively.

Factors contributing to uterine atony:

1. Uterine fatigue due to prolonged labor or overuse of oxytocin for induction;
2. Precipitous labor—labor progressing very rapidly (less than 3 hours in duration);
3. Over distension of the uterus due to polyhydramnios/excess amniotic fluid, multiple gestation (twins, triplets), macrosomia/large fetus, as in gestational diabetes;
4. Retained placenta (when the placenta is not expelled within 30 minutes following the birth of the baby);
5. Retained placental fragments and/or clots (when pieces of the placenta are left in the uterus);
6. High parity/many children;
7. Chorioamnionitis/infection of the gestational sac and membranes;
8. Full bladder; or
9. Need to augment labor with oxytocin.

The contribution of uterine atony to PPH is so well known that there is a universal reflex action: firmly massaging the uterus to stimulate contractions. Once sure that the uterus has contracted effectively, the practitioner should search for other causes of persistent bleeding and manage any causes found, e.g., retained placental fragments or clots, genital tract trauma, and bleeding disorders.

Participant Handout 3.3: Preparing for PPH at Every Birth

Because two-thirds of women who develop PPH have no known risk factors, providers should assume that all women are potentially at risk of PPH. One of the reasons all women should be offered AMTSL is because risk factors predict so few PPH cases.

Reliance on risk factors to classify women at increased risk has not decreased morbidity and mortality associated with PPH. Moreover, relying on risk assessment can lead to unnecessary over-management of women classified as “high risk,” which can be detrimental both to women, (because of added anxiety and the cost of more frequent care and invasive procedures) and to health systems (because of the higher cost of high risk care).

Factors Predisposing Women to PPH due to Atony

Some conditions are known to increase the likelihood of PPH. Those conditions are:

- N Previous PPH
- N Multiple gestation
- N Preeclampsia
- N Obesity

But it is important to remember that most PPH cases occur in women with no identifiable risk.

70% of PPH is caused by uterine atony. Fortunately, we have the technology and strategies to prevent and treat this life-threatening condition. But although 70% of PPH is caused by uterine atony, recognition and management of the other 3 causes are necessary skills for providers. Since trauma (lacerations, uterine rupture, etc.) causes PPH twice as much as tissue (retained POC's), trauma should be investigated and managed first, and then tissue. Finally, if all else fails, clotting disorder should be investigated.

Tissue

Retained placenta, fragments or clots keep the uterus from contracting completely and bleeding continues. Tissue must be expelled or removed by use of forceps if tissue at cervical os, or manual removal.

Trauma

Lacerations of the perineum, vagina, cervix, and rupture of the uterus must be recognized rapidly, and either repaired or the woman transported urgently to a facility where the repair can be done (providing pressure to the laceration as possible during transport). Providers should always do a careful examination for tears, but especially if there is bleeding even though the uterus is well contracted.

Thrombin

Only 1% of women will bleed right after birth from clotting disorders, but women who have bled a lot may develop clotting problems called DIC (disseminated intravascular coagulopathy) which must be treated urgently at a higher-level facility.

Participant Handout 3.4: Preventing PPH

Established methods to prevent and manage PPH include:

- N Early detection and management of anemia;
- N Developing birth preparedness/complication readiness plans;
- N Preventing prolonged labor by monitoring labor using the partogram, if available;
- N Avoiding harmful traditional practices to speed up labor (e.g. pushing on the uterus to expel the baby);
- N Preventing dehydration;
- N Encouraging the woman to pass urine frequently to avoid having a full bladder;
- N Reducing cervical, vaginal, and perineal trauma by avoiding routine use of forceps and restricting use of episiotomy;
- N Avoid pushing when the cervix is not completely dilated;
- N Early detection and rapid treatment of hemorrhage; and
- N AMTSL.

1. Anemia: For severely anemic women, a blood loss of 200-250 ml can be fatal, and anemia can pre-dispose women to PPH. Treatment of anemia with iron and nutrition supplementation during pregnancy may help women survive PPH. Providers should address major causes of anemia such as malaria and hookworm.
2. All women must be encouraged to develop a birth preparedness and complication readiness plan, and, if possible, to deliver with an SBA who can provide PPH prevention and care (examples: choose a safe place of birth, a skilled provider, and have a transport access plan). Complication readiness includes a realistic plan for a life-threatening complication (examples: have transport ready, have payment for transport ready, keep a designated decision maker at hand, identify blood donors who would be available to donate blood immediately, etc.). The family and community should be aware of the major danger signs of complications, 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 lifesaving interventions, including application of the NASG.
3. Prolonged labor can be the result of a baby that is too large or in the wrong position to fit through the birth canal. If active labor lasts for more than 12 hours, the woman should be moved to a facility that can provide a C-section if needed.
4. Harmful traditional practices such as providing herbal remedies to increase contractions, unskilled practitioners giving oxytocin by intramuscular injection, or using fundal pressure to assist in the delivery of the baby can increase the likelihood of PPH.
5. Dehydration may slow contractions and prolong labor.
6. The use of instruments (such as forceps) to assist the birth is associated with increased risk of cervical and perineal trauma.
7. Delivering in a position of the mother's choosing will help avoid trauma (e.g., not flat on her

back).

8. Maternal pushing should be avoided until the cervix is completely dilated to avoid lacerations of the cervix.
9. Early detection and management of excessive bleeding reduces the likelihood of PPH.
10. AMTSL consists of interventions designed to:
 - N** Shorten the third stage of labor and reduce blood loss by facilitating delivery of the placenta, leading to effective uterine contractions, and
 - N** Prevent PPH by avoiding uterine atony.

Literature indicates that the best predictor of PPH is a third stage of labor that lasts 18 minutes or more. This is why early delivery of the placenta is important.

Participant Handout 3.5: The Main Components of Active Management of the Third Stage of Labor (AMTSL)

Review of available evidence shows that practicing AMTSL is proven to reduce the incidence of PPH, the quantity of blood loss, and the use of blood transfusion. Remember: 40-50% of PPH can be prevented using AMTSL.

The three main components of AMTSL are:

1. Administration of a uterotonic agent within one minute after the baby is born after ruling out the presence of another baby (oxytocin is the uterotonic of choice),
2. Controlled cord traction (CCT) with counter-traction to the uterus during a uterine contraction, and
3. Uterine massage immediately after delivery of the placenta to help the uterus contract as well as to assess uterine contraction.

Participant Handout 3.6: Administering the Uterotonic

1. Prepare the uterotonic during the second stage of labor and have it ready at the bedside.
2. Deliver the baby.
3. Gently palpate the abdomen to rule out presence of additional babies. At this point, do not massage the uterus.
4. Tell the woman that she will feel strong cramping when the uterotonic is delivered.
5. Within 1 minute of delivery, give oxytocin 10 IU IM. If not available, and no elevation of blood pressure (BP) or heart disease, give ergometrine, Methergine, or Syntrometrine. Give misoprostol if an injectable is not possible.
6. After delivery, immediately dry the infant and assess the baby's breathing. Then place the reactive infant, prone, on the mother's abdomen. Remove the cloth used to dry the baby and keep the infant covered with a dry cloth or towel to prevent heat loss.
7. Put the baby to the breast if this is the mother's choice for infant feeding and the baby and mother are ready.

Participant Handout 3.7: Controlled Cord Traction

1. Wait for cord pulsations to cease or approximately 2-3 minutes after birth of the baby, whichever comes first.
2. Clamp and cut the cord following strict hygienic techniques: Clamp the cord 4 cm from the baby, place second clamp right next to it, and cut between the clamps with sterile razor or scissors.
3. Re-clamp the cord close to the mother's perineum and hold the cord in one hand.
4. Place the other hand just above the woman's pubic bone to stabilize the uterus by applying counter pressure (upward and backward) during controlled cord traction.
5. Keep slight tension on the cord and await a strong uterine contraction (usually within 2-3 minutes after delivery).
6. With the first strong uterine contraction, encourage the mother to push. Gently pull downward on/apply controlled traction to the cord to deliver the placenta. Do not pull too hard (to avoid tearing/snapping the cord, uterine prolapse, and/or inversion of the uterus).
7. Continue to apply counter-pressure to the uterus. If the placenta does not descend during 30-40 seconds of controlled cord traction (and there is no hemorrhage and the uterus is not filling with blood), do not continue to pull on the cord, instead:
N Immediately massage the fundus of the uterus until the uterus is contracted. Gently hold the cord and wait until the uterus is strongly contracted. Then, with the next contraction, repeat controlled cord traction with counter pressure.
8. As the placenta delivers, hold the placenta in two hands and gently turn it in one direction, causing the membranes to twist on themselves until they slowly deliver.
9. Make sure mother's bladder is empty.
10. After cutting the cord, place the infant directly on the mother's chest, prone, with the newborn's skin touching the mother's skin.
11. If at anytime the woman begins to bleed profusely, the placenta must be delivered rapidly. It may be necessary, in an emergency only, to manually remove the placenta.

Participant Handout 3.8: Uterine Massage

1. Once the placenta is delivered, immediately massage the fundus of the uterus until it contracts. This should be done firmly, with enough strength to make the uterus contract and clots to be expelled, but not so strongly that it causes extreme pain or damage, e.g. prolapsed uterus.
2. Examine the placenta carefully to be sure none of it is missing. If a portion of the maternal surface is missing or there are torn membranes with open vessels, suspect retained placenta fragments and take appropriate action.
3. If the membranes are not complete, 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 visible.
4. Palpate for a contracted uterus every 15 minutes and repeat uterine massage as needed during the first 2 hours. Teach the woman how to check to see if her own uterus is contracted and to massage it herself until it contracts, especially if she feels herself starting to bleed.
5. Gently separate the labia and inspect the lower vagina and perineum for lacerations that may need to be repaired.
6. Ensure that the uterus does not become relaxed (soft) after you stop uterine massage by continuing to check in with the woman.

Throughout the procedure, the provider continues to provide support and reassurance to the woman. Remember to tell her that she will feel strong cramping when the uterotonics are given.

Participant Handout 3.9: Uterotonics

Uterotonic drugs are medicines that cause the uterus to contract. Three commonly used uterotonics for preventing and managing PPH are, in order of preference:

1. Oxytocin: the synthetic form (Pitocin/Syntocinon)
2. Ergot-based compounds: methylergonovine maleate (Methergine), ergometrine, and Syntometrine.
3. Prostaglandins: misoprostol (Cytotec) and carboprost tromethamine.

The WHO recommends oxytocin as the most effective uterotonic, and that a dose of 10 IU IM for prevention be offered to all women immediately after delivery. If oxytocin is not available, then ergometrine, Methergine, or Syntrometrine should be offered to women without hypertension or heart disease. Misoprostol is a good alternative when the others are not available or appropriate.

Storage of uterotonics

The stability of a uterotonic is defined as how well it remains potent, when stored over a period of time. Ergometrine and Syntometrine are sensitive to heat and light and oxytocin is sensitive to heat. Following the storage guidelines given by the manufacturer is essential to keeping the uterotonic effective.

Participant Handout 3.10: Case Studies

Case 1: Mrs. B. is a nurse-midwife in a clinic. Mrs. S. has come to deliver her baby at the clinic. Mrs. S has not come for any antenatal check-ups, nor does she have any of her medical records with her. What uterotonic should the nurse-midwife choose for Mrs. S. and why?

Answer: Oxytocin, if available and properly stored; ergometrine if normal BP and no heart disease; and misoprostol if there is no acceptable storage for the others (and it is available).

Case 2: Mrs. L. is delivering in the clinic in a town with a peak summer temperatures of between 40 and 45 degrees Celsius. The electric supply in town is erratic and there is only one refrigerator for vaccines. The nurse-midwife has stocks of Methergine, oxytocin, and misoprostol available in the clinic. What should she give to mothers delivering in the clinic during the hottest months?

Answer: Misoprostol, because the others would not be stable in that heat. (Pitocin is possible with only 14% loss of potency over one year if stored at 30 degrees or less.)

Case 3: Mrs. H has come to the clinic for her delivery. The clinic has no oxytocin available and the nurse-midwife notes from her antenatal record that she has high blood pressure. What uterotonic should she give?

Answer: Misoprostol, because ergometrine is contraindicated.

Participant Handout 3.11: The Use of Misoprostol in PPH Prevention

Some government guidelines and protocols for SBAs specify that skilled attendants may independently provide prophylactic misoprostol to women immediately after delivery. Since misoprostol is still not as commonly known or used, this training will familiarize health care providers participating. The table below shows the recommended doses of misoprostol tablets for prevention of PPH.

Route of administration and dosage of misoprostol for prevention of PPH

While misoprostol can be given rectally, sublingually, and orally for prevention of PPH, the recommended route is orally.

Route of administration	Dosage
Oral	600 mcg
Sublingual	600 mcg
Rectal	800 – 1000 mcg

How does misoprostol make the uterus contract?

Misoprostol is an analogue of prostaglandin E1 that causes powerful contractions of the uterus. When the uterus is fatigued, misoprostol (or any uterotonic) helps it to contract by producing the same physiological changes as when the uterus contracts naturally. It has been approved for use in the prevention and treatment of PPH in several countries and can be used to prevent PPH during the third stage of labor when intramuscular or IV oxytocin or Methergine are unavailable or are contraindicated. Misoprostol does not require refrigeration and can be taken orally for the prevention of PPH.

What are the side effects of misoprostol and is it safe?

Several studies have proven that misoprostol is safe and effective to prevent and treat excessive postpartum bleeding. Women can take misoprostol even if they are also taking other medications. It is also safe and without side effects for the newborn, so the woman who was administered misoprostol can feed and care for her baby immediately.

The side effects in the woman are transient and usually go away after 2 to 4 hours. Side effects include:

- N Shivering (most common, should pass within first 24 hours);
- N Fever (transient rise in body temperature), if fever continues more than 24 hours, suspect infection;
- N Headache;
- N Nausea, vomiting, and diarrhea may occur but are rare (lasting 2-6 hours);
- N Abdominal pain from uterine cramping (lasts until the uterus is well contracted); and
- N Seizures and palpitations may occur, but only when an overdose has been administered.

Participant Handout 3.12: Steps for Using Misoprostol to Prevent PPH

1. Ensure 600µg of misoprostol is on hand in the delivery room when the second stage of labor (pushing stage) begins.
2. Deliver the newborn. Immediately dry the infant and assess the baby's breathing. Then place the newborn infant, prone, on the mother's abdomen. Remove the cloth used to dry the baby and keep the infant covered with a dry cloth or towel to prevent heat loss.
3. Palpate the uterus to confirm there is not another baby in the uterus.
4. Administer 600µg misoprostol orally if there is no nausea or vomiting. If the woman might vomit the tablets up, place them under her tongue (also 600µg), or rectally (800-1000µg).
5. Clamp and cut the umbilical cord (after the cord stops pulsating or approximately 2-3 minutes after birth of the baby, whichever comes first).
6. After cutting the cord, place the infant directly on the mother's chest, prone, with the newborn's skin touching the mother's skin.

Caution:

Misoprostol is a very powerful stimulator of uterine contractions and can have serious and even fatal effects on the fetus and the mother if incorrectly used to induce labor or for purposes other than preventing or treating PPH.

Participant Handout 3.13: AMTSL

AMTSL reduces the incidence of PPH due to uterine atony by 40-50% and should be offered to all women.

Every birth attendant must have the knowledge, skills, and clinical judgment to perform AMTSL and must have access to the supplies and equipment necessary.

Where all 3 components of AMTSL cannot be performed, the uterotonic should be given prophylactically and the uterus massaged after delivery of the placenta. If the birth attendant has not been trained to apply CCT or a uterotonic drug was not given, WHO advises not to perform controlled cord traction.

The uterotonic of choice is oxytocin, followed by ergometrine or Methergine (not to be given if the woman has heart disease or hypertension). Misoprostol is the choice when an injectable uterotonic cannot be safely provided.

Early cord clamping should be done only if:

- N The baby is premature (less than 36 weeks),
- N The newborn is asphyxiated and immediate resuscitation is necessary,
- N The mother is known to be HIV positive or is RH negative, or
- N The mother starts to bleed profusely and the placenta must be delivered immediately.

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

Participant Handout 3.14: Competency-Based Training Skills Assessment Checklist for Active Management of the Third Stage of Labor (AMTSL)

Date of Assessment _____ Dates of Training _____

Place of Assessment: Clinic _____ Classroom _____

Name of Clinic Site _____

Name of the Service Provider _____

Name of the Assessor _____

This assessment tool contains the detailed steps that a service provider should accomplish when performing AMTSL. The checklist may be used during training to monitor the progress of the trainee as s/he acquires the new skills and during the clinical phase of training to determine whether the trainee has reached a level of competence in performing the skills. The checklist may also be used by the trainer or supervisor when following up or monitoring the trainee. The trainee should always receive a copy of the assessment checklist so that s/he may know what is expected of her/him.

Instructions for the Assessor:

Always explain to the client what you are doing before beginning the assessment. Ask for the client's permission to observe.

Begin the assessment when the trainee greets the client.

Only observe. Do not interfere unless the trainee misses a critical step or compromises the safety of the client.

Rate the performance of each task/activity observed using the following rating scale:

1. **Needs Improvement:** Step not performed correctly and/or out of sequence (if required) or is omitted.
2. **Competently Performed:** Step performed correctly in proper sequence (if required) but lacks precision, and/or the trainer/coach/supervisor needed to assist or remind the participant in a minor way.
3. **Proficiently Performed:** Step performed correctly in proper sequence (if required) and precisely without hesitation or need for any assistance.
4. **Not Observed:** Step not performed by participant during observation by trainer/observer. Continue assessing the trainee throughout the time s/he is with the client, using the rating scale.

Fill in the form using the rating numbers. Write specific comments when the task is not performed according to standards.

Use the same form for one trainee for at least 3 observations.

When you have completed the observation, review the results with the trainee. Do this in private, away from the client or other trainees.

Competency-Based Checklist for Active Management of the Third Stage of Labor (AMTSL)

TASK/ACTIVITY	CASES			COMMENTS
	1	2	3	
Preparation for Birth				
Checks that all needed equipment and instruments are ready, and in working order				
Makes sure that all surfaces the woman and baby will come in contact with are clean and dry				
Prepares uterotonic as soon as the cervix is completely dilated				
Asks the woman to empty her bladder when second stage begins				
Birth				
Does not encourage the woman to push until she has the urge to do so				
Assists the woman to assume the position of her choice (squatting, semi-sitting) and allows her to change position according to what is comfortable for her				
Provides emotional support				
Wears protective clothing (gown, mask, gloves)				
Washes hands with soap and dries them on a clean towel, or air dries them				
Wears sterile or high-level disinfected (HLD) gloves				
Delivers baby according to Standards of Practice and places on mother's abdomen				
Immediate Newborn Care				
Thoroughly dries the baby while assessing the baby's breathing				
If the baby is not crying or breathing well within 30 seconds of delivery, calls for help and begins resuscitation				
If the baby breaths well, places the baby in skin-to-skin contact on the mother's abdomen and covers the baby, including the head, with a clean dry cloth				
Puts baby to breast if mother plans to breastfeed				
Administration of a Uterotonic Drug				
Within one minute of the delivery of the baby, palpates the abdomen to rule out the presence of an additional baby(s) and gives uterotonic: Oxytocin 10 IU IM first choice Ergometrine 2 mg or Syntometrine 1 ML IM if no heart disease or elevated BP Misoprostol 600 mcg if other uterotonics are contradicted or unavailable				
Counsels on the possible side effects of these drugs				
Controlled Cord Traction				
Clamps the cord close to the perineum (once pulsation stops in a healthy newborn) and holds the cord in one hand.				

Competency-Based Checklist for Active Management of the Third Stage of Labor (AMTSL), continued

Places a second clamp on the cord and cuts the cord between the two				
Stabilizes the uterus using counter-pressure by pushing uterus up and backwards from just above the symphysis (pubic bone) while gently pulling downward on the cord.				
Keeps slight tension on the cord and awaits a strong uterine contraction (2-3 minutes).				
With the strong uterine contraction, encourages the mother to push while gently pulling downward on the cord to deliver the placenta.				
If the placenta does not descend during 30-40 seconds of controlled cord traction, stops traction				
Gently holds the cord and waits until the uterus is well contracted again;				
With the next contraction, repeats controlled cord traction with counter-pressure.				
As the placenta delivers, holds the placenta in two hands and gently turns it until the membranes are twisted. Slowly pulls to complete the delivery.				
If the membranes tear, gently examines the upper vagina and cervix wearing sterile/disinfected gloves and uses a sponge forceps to remove any pieces of membrane that are present.				
Inspects the placenta to be sure none of it is missing.				
If a portion of the maternal surface is missing or there are torn membranes with vessels, takes appropriate action to locate any pieces of membrane that might be present				
Uterine Massage				
Immediately massages the fundus of the uterus until the uterus is contracted.				
Palpates for a contracted uterus every 15 minutes and repeats uterine massage as needed during the first 2 hours.				
Ensures that the uterus does not become relaxed (soft) after stopping uterine massage.				
Keeps bladder empty				
Instructs the woman on how to massage her uterus				
Immediate Postpartum Care				
Inspects and repairs lacerations or tears (if necessary)				
Repairs episiotomy if one was performed				
Estimates blood loss				
Removes soiled bedding and makes the woman comfortable				
In all of the above actions, explains the procedures and actions to the woman and her family.				
Continues to provide support and reassurance throughout.				

Competency-Based Checklist for Active Management of the Third Stage of Labor (AMTSL), continued

Infection Prevention			
Before removing gloves, disposes of gauze swabs and other waste material in a leak-proof container or plastic bag			
Disposes of needles and sharps in a sharps disposal container			
Cleans apron with decontamination solution			
Places instruments in 0.5% chlorine solution			
Decontaminates and disposes of gloves			
Washes hands thoroughly with soap and water and dries them			
Counseling the Woman on Self Care			
Encourages the woman to eat, drink and rest			
Asks the woman's companion to watch her and call for help if bleeding or pain increases, if the mother feels dizzy, or has a severe headache, visual disturbance, or epigastric discomfort or pain			
Reminds the woman how the uterus should feel and how she can massage it herself			
Encourages the mother to empty her bladder and ensures that she has passed urine			
Counsels the woman on hygiene			

UNIT 4:
Early Detection of PPH

Participant Handout 4.1: How Hemorrhage Causes Morbidity and Death

The urgency of the woman's condition begins as soon as bleeding starts

Morbidity from PPH includes potential exposure to infected blood supply if transfusion is needed, anemia, and loss of reproductive capacity if a hysterectomy is needed to control PPH

Immediate response and action are crucial for survival. Those who live in rural, remote, and hard to reach areas are at much higher risk.

Even after practicing AMTSL to prevent PPH, providers must be alert to and recognize excessive postpartum bleeding. AMTSL prevents only 40-50% of PPH. The remaining cases will still need to be diagnosed as early as possible and managed in a timely way.

Reasons for high mortality from PPH

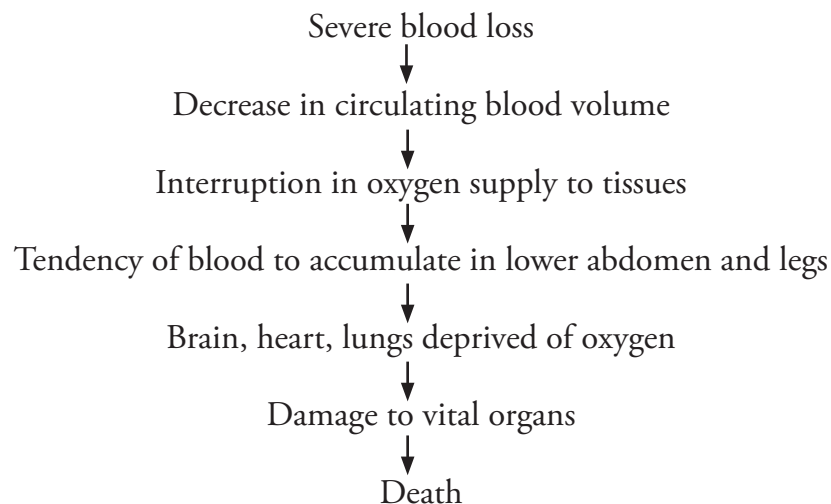
- N Failure to recognize excessive blood loss and estimate amount of blood loss
- N Failure to provide timely treatment for the cause of PPH
- N Failure to provide early and adequate fluid replacement and treatment for shock

Remember, PPH can kill within 2 hours if not managed aggressively and correctly.

The principle reason for high mortality associated with obstetric hemorrhage is simple: delayed recognition of excessive bleeding and failure to provide early and adequate treatment and fluid replacement. Unless lost fluid volume is restored as soon as possible and normal tissue perfusion and oxygenation are maintained, shock and death are not far off.

How hemorrhage causes shock, morbidity, and death

Understanding how hemorrhage causes shock, morbidity, and death is necessary to thinking about how to manage shock effectively.



Decreases in circulating blood volume interrupt oxygen supply to tissues, resulting in damage to the vital organs: heart, lungs, kidneys, and brain. When the brain is deprived of oxygen, a process of rapid deterioration sets in, leading quickly to circulatory collapse and organ failure, which could include cardiac arrest and death.

Shock is a highly unstable condition with a high risk of death. Immediate treatment is needed to save the patient's life. Shock is a reflection of inadequate tissue perfusion. Inadequate tissue perfusion means imminent cell death.

Successful outcomes depend on early recognition of shock, restoration of fluid volume, and control of hemorrhage.

Participant Handout 4.2: Improved Estimation of Blood Loss

How can you estimate lost blood volume and PPH so that timely and adequate intervention can be provided? What are some methods of estimating blood loss to detect PPH?

Methods of estimating blood loss

- N Visual estimation
- N Use of the blood collection drape
- N Use of the “Kanga Method” as in East Africa, or adaptation with local materials in each country
- N Collection of blood in a kidney tray or in a calibrated container placed under a cholera bed
- N *Any reliable method that can be devised - a reliable method is needed!*

Visual estimation can be inaccurate, unless providers are trained systematically to make accurate visual estimations. Published studies show that common visual estimation underestimates PPH by 30% -50% (Chua, *et al.*). This inaccuracy increases as blood loss increases (Duthie, *et al.*). Such underestimation delays diagnosis and timely action. However, much can be done to improve visual estimation of blood through competency-based training on reliable estimation of blood loss. It is also useful to have periodic drills where a trainer arranges several examples of blood loss at a facility, simulating real experiences, and has participants estimate and discuss the amounts. This improves and maintains providers’ ability to estimate accurately. The “Kanga Method” of estimating blood loss proved very effective in Tanzania. Standard kangas, which are large pieces of cloth of similar size, weight, and fabric that women wear wrapped around themselves, can be used by providers in lower-level facilities to estimate blood loss accurately. Studies have shown that when 2 kangas are saturated with blood, PPH can be accurately diagnosed for rapid, effective intervention. A cotton pad with a thin plastic lining is in use in Bangladesh, and similar testing of standard cloths has also been conducted in Bangladesh.

Using a cholera bed to estimate blood loss is also effective. To do so, the woman’s buttocks would be placed over the hole in the bed, rather than placing her legs in stirrups at the end of the bed, and the baby delivered onto the bed, rather than off the bed. A calibrated container should be placed under the hole in the bed so the attendant can monitor the amount of blood collected in the container. It is preferable for the woman not to lie flat—she may deliver in any other position she prefers (squatting, hands and knees, or lying on her side). **All blood on the bed must be swept into the hole using only a gloved hand.** Water must not be poured over the perineum or onto the bed until the postpartum blood loss has been measured: pouring water would artificially increase the volume of liquid in the calibrated container, leading to inaccurate measurement.

Any reliable method that can be devised is acceptable. Other local, standard methods of measuring blood loss can be tested with simulated blood to find an affordable, accessible method of estimating blood loss.

Participant Handout 4.3: Formulas for Simulated Blood

A liquid of comparable consistency to blood, useful in blood loss estimation exercises, can easily be made by combining either:

- N 475 ml corn syrup,
- N 237 ml water,
- N 110 grams maize flour,
- N 50 ml red food coloring, and
- N 10 drops blue food coloring,

or:

- N 237 ml corn syrup,
- N 15 ml water,
- N 30 ml red food coloring, and
- N 5 ml yellow food coloring.

Participant Handout 4.4: Competency-Based Training Skills Assessment Checklist for Estimating Blood Loss and Using the Blood Collection Drape

Date of Assessment _____ Dates of Training _____

Place of Assessment: Clinic _____ Classroom _____

Name of Clinic Site _____

Name of the Service Provider _____

Name of the Assessor _____

This assessment tool contains the detailed steps in infection prevention that a service provider should accomplish when using the blood collection drape. The checklist may be used during training to monitor the progress of the trainee as s/he acquires the new skills and during the clinical phase of training to determine whether the trainee has reached a level of competence in performing the skills. The checklist may also be used by the trainer or supervisor when following up or monitoring the trainee. The trainee should always receive a copy of the assessment checklist so that s/he may know what is expected of her/him.

Instructions for the Assessor:

Always explain to the client what you are doing before beginning the assessment. Ask for the client's permission to observe.

Begin the assessment when the trainee greets the client.

Only observe. Do not interfere unless the trainee misses a critical step or compromises the safety of the client.

Rate the performance of each task/activity observed using the following rating scale:

1. **Needs Improvement:** Step not performed correctly and/or out of sequence (if required) or is omitted.
2. **Competently Performed:** Step performed correctly in proper sequence (if required) but lacks precision, and/or the trainer/coach/supervisor needed to assist or remind the participant in a minor way.
3. **Proficiently Performed:** Step performed correctly in proper sequence (if required) and precisely without hesitation or need for any assistance.
4. **Not Observed:** Step not performed by participant during observation by trainer/observer. Continue assessing the trainee throughout the time s/he is with the client, using the rating scale.

Fill in the form using the rating numbers. Write specific comments when the task is not performed according to standards.

Use the same form for one trainee for at least 3 observations.

When you have completed the observation, review the results with the trainee. Do this in private, away from the client or other trainees.

Competency-Based Checklist for Checklist for Use of the Blood Drape

TASK/ACTIVITY	CASES			COMMENTS
	1	2	3	
Sterile Procedure				
Uses gloved hand to open the blood drape				
Puts gloved hands into corners of drape				
Placement				
Slides drape under woman's buttocks immediately following the delivery of the baby				
Ties strings around woman's abdomen and hips				
Opens drape by grasping wire and pulling outward				
Makes sure all blood is flowing into drape				
Checks amount of blood loss by holding the funnel part of the drape at eye level				
Removal				
Uses gloved hand to sweep any pooled blood into drape				
Closes wire at top of drape and rolls down top to prevent leakage				
Checks amount of blood loss by holding drape at eye level				
Absorbent Pads				
Clinic Level:				
Once woman is being prepared for transport, places absorbent pad to collect further blood lost.				
Gives woman a spare pad in a plastic bag in case pad becomes saturated during transport				
Hospital:				
Takes all used pads and places them in plastic bag and weighs them. Calculates blood loss accurately				
Sets aside any unused pads for return to clinic sites.				
After weighing of used pads, records weight in record book and disposes of pads in accordance with hospital policy				
Takes appropriate action based on estimated blood loss				
Using a Standardized Mat or Cloth for Estimating Blood loss				
Places mat or cloth under woman's buttocks immediately following delivery				
Monitors cloth for saturation and calculates blood loss accurately				
Takes appropriate action based on estimated blood loss				

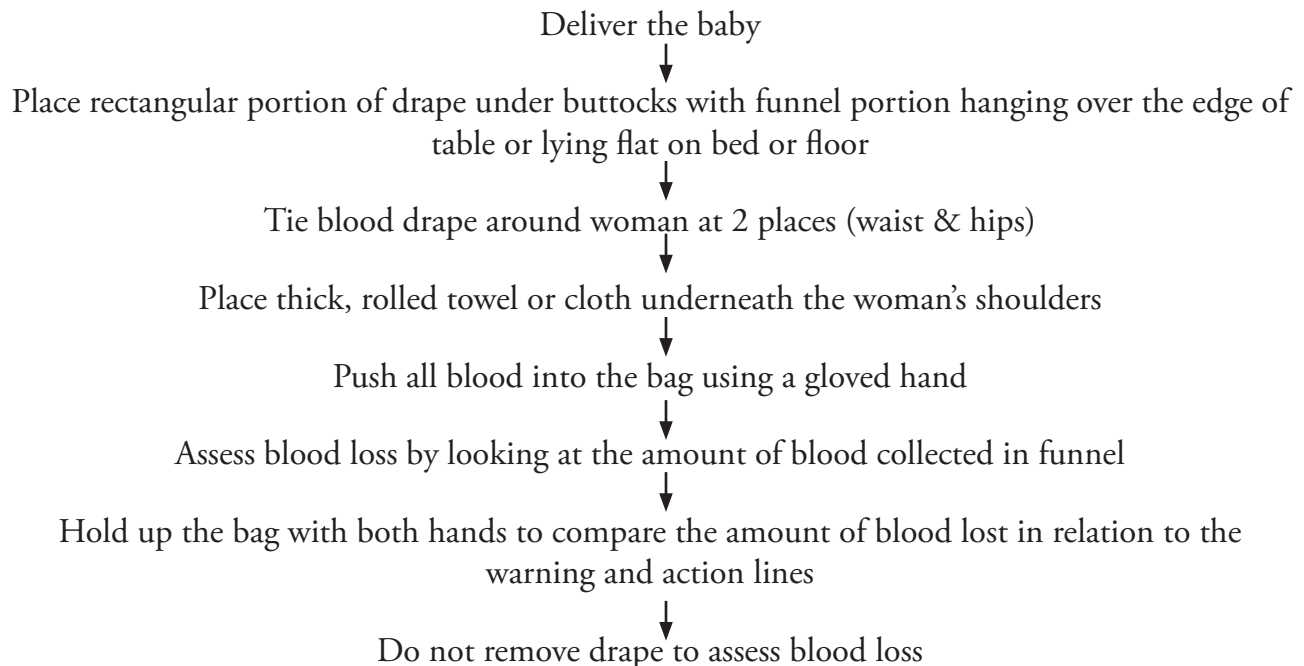
Participant Handout 4.5: The Blood Collection Drape and its Use

The plastic blood collection drape is a simple tool that can be used to assess blood loss. As soon as excessive blood loss is identified, corrective measures can be taken, which will improve patient outcomes. Skilled providers can provide all measures at hand to stop bleeding, begin fluid replacement and, when necessary, transfer patients to a higher-level facility, where more extensive care can be given. Hospitals can begin emergency treatment immediately when excessive blood loss is recognized. However, the blood collection drape is only a tool to measure blood loss. The provider must continuously assess the woman clinically for signs of shock after delivery.

The blood collection drape is a funnel-shaped plastic bag used to measure blood loss after delivery. The upper rectangular portion is placed under the woman's buttocks. The funnel shaped/triangular portion hangs from the end of the delivery table, or is placed flat on the table or floor (depending on the surface on which the woman is delivering). A stiff wire holds the pouch open to collect all blood. The funnel is calibrated with two lines, a yellow alert line at the 350 ml mark, which means preparation for transport must begin, and a red action line at the 500 ml mark, which means that the woman should be transferred immediately to a health facility capable of treating PPH.

The blood collection drape is made of plastic and may be hard to dispose of safely. Some countries, like India, have anti-plastics campaigns and may bar this use of plastic.

Using the Blood Collection Drape



How to Use the Drape

Once the baby is delivered and the amniotic fluid has passed, both gloved hands are used to slip the blue plastic under the woman's buttocks. This will ensure that only blood and no other body fluids are collected in the drape. The drape should be tied around the woman at both the waist and the hips. Tying the drape properly is important because it ensures that the blood is collected within the calibrated funnel. If the woman is positioned at the end of the table, the pouch may hang over the edge of the table. If the woman is lying elsewhere on the bed/table or on the floor, the pouch may lie flat on the bed/table/floor. Once the drape is tied, place a thick rolled towel or cloth under the woman's shoulder blades (scapulae) and head to lift her torso. This inclination will help the blood to flow downward into the funnel and avoid the pooling of blood under her back. In any case, the birth attendant should periodically use a gloved hand to manually push blood into the funnel if it is collecting elsewhere.

To assess the volume of blood in the funnel while the drape is still under the woman, grasp opposite edges of the top portion of the funnel between the fingers and thumb of each hand, lifting the funnel to a vertical position. With the funnel vertical, the level of the blood collected can be compared to the yellow and red lines. There is no need to remove the drape from under the woman when measuring blood loss this way.

Participant Handout 4.6: Cleaning and Storing the Drape

Cleaning and Storing the Drape

Infection prevention is critically important and is often practiced incorrectly. Proper infection prevention, or universal precautions, ensures that patients, providers, and staff are protected.

There are 3 stages in processing the blood collection drape for reuse: decontamination, cleaning, and storage. If the drape is not to be reused, it must still be decontaminated prior to disposal.

1. *Decontamination* is the first step. Decontamination makes everything safe to handle, killing 80-85% of all microbes and viruses. It requires 10 minutes of immersion in 0.05% bleach solution. Note: Over-processing (soaking too long--more than 10 minutes) can damage the drape; under-processing may be ineffective and is unsafe.
2. *If the drape is to be reused:* Next, wash it thoroughly with detergent and water, making sure to remove all blood from the narrowest (lower) part of the funnel. Rinse thoroughly with clean water and air dry in the sun before the next step. Storage is the final important step.
3. *Storage:* Because the drape is not going into the body of the woman, it does not need to be sterile and sterilization would damage the material. Thus, if the drape is to be reused, it should be decontaminated, cleaned, sun dried, folded, and stored until reuse.

To Fold and Store the Drape

N Lay the drape flat on a table.

N Fold the triangular portion of the drape over within itself (so the point touches the center of the top of the funnel) and then over the edge of the rectangular section.

N The opposite sides of the rectangle are folded together, encasing the triangular portion of the drape.

N This is then folded along its breadth, finally looking like a square.

N Once folded, only the blue rectangular portion is visible. This method of folding will occupy the least amount of space.

N The drape should be stored in a clean, dry, and closed place.

N Remember: overexposure, and exposure over time, to bleach and other chemicals used to disinfect may deteriorate the markings and the plastic.

Even if the drape is not to be reused, it must be decontaminated before it is disposed of in accordance with established guidelines.

Participant Handout 4.7: Observing and Monitoring the Woman for Signs of Shock

Prevention

All women should be examined carefully for tears in the vagina, cervix, or perineum as significant blood loss can occur from some tears. If there are tears, they should be repaired, or if the provider cannot repair them, pressure should be applied with sterile or clean material as the woman is transferred quickly to where the repair can be done. Ruptured uterus should be suspected if other causes cannot be found.

As soon as the placenta is delivered, examine it for torn membranes or missing pieces. If it appears that membranes are torn, or pieces are missing, gently examine the cervix and remove any visible tissue with a sponge forceps. If the missing tissue is not visible, it is likely that it is retained in the uterus and could cause excessive bleeding. Observe the woman to see if the uterus contracts normally.

The woman should be observed and monitored for 2 hours after delivery to assess volume of postpartum blood loss as well as for vital signs and other symptoms of shock. Use whatever method you find most effective to monitor the amount of postpartum blood loss. Every 15 minutes, palpate the uterine fundus to feel whether it is contracting or remains flabby, and monitor vital signs. Teach the mother and accompanying family members to massage the uterus as well, especially if bleeding begins again.

Throughout the two-hour immediate postpartum period, provide all measures to help the uterus to contract and stop any bleeding:

- N Keep the bladder empty;
- N Remind the woman how to check and massage her own uterus and to call you if the uterus stays soft or she thinks she is bleeding too much;
- N Check the amount of vaginal bleeding every 15 minutes and respond immediately if excessive;
- N Check the woman's BP and pulse every 15 minutes and respond immediately if abnormal;
- N Every 15 minutes, check that the uterus is well contracted and massage if not;
- N Put the baby to the breast; and
- N Perform bimanual compression, either internal or external.

Regardless of the level of the facility where the baby is delivered, these measures should be taken (by the trained birth attendant or health provider).

Monitoring to detect shock: How do you know if the woman is in shock?

Because women respond differently to the loss of similar levels of blood, based on their size and level of anemia (i.e., prehemorrhage blood volume and oxygen carrying capacity), some women will exhibit signs of shock even with blood loss less than 1000 cc, or severe PPH.

Signs of the early stages of shock are increasing tachycardia, tachypnea, lowering of blood pressure, pallor, and sweating.

Signs of shock include:

- N Rapid heart rate/tachycardia (the **first** sign);
- N Weak pulse;
- N Rapid breathing/tachypnea;
- N Fall in urine output (less than 30 ml/hour is serious);
- N Cold, pale, sweaty, bluish skin;
- N Alteration in consciousness; and
- N Falling blood pressure/hypotension (**late** sign).

Immediate Management

Therefore, while all efforts to manage PPH are ongoing, it is critical to be vigilant in monitoring, observing, and recording vital signs and symptoms so that the onset of shock is detected as soon as possible. When a woman becomes restless and confused, shock is advancing rapidly and immediate, aggressive treatment is needed. If any of these signs are present, treat the woman for shock regardless of how much blood she has lost.

Early recognition of blood loss and timely action is critically important in preventing morbidity and death from PPH, as it can be lethal within as few as 2 hours. In periphery or where higher-level care is less accessible, close monitoring and early diagnosis are even more critical. In regions and populations where chronic anemia and/or anemia during pregnancy is prevalent, the recognition of lesser amounts of blood loss is clinically important. In rural areas with unskilled or minimally-trained birth attendants, where transportation to referral facilities takes much time, we need simple tools that will facilitate early diagnosis so that we can act to avert mortality and morbidity from PPH

UNIT 5:
Treating PPH and Uterine Atony

Participant Handout 5.1: Action for PPH

Uterine atony is the most common cause of PPH, but retained tissue, trauma and bleeding disorders are other causes that need investigating, and, if found, need intervention.

After performing the steps of AMTSL, if you observe excessive bleeding and the uterus is contracted and the examinations for retained tissue or trauma are negative, a bedside clotting test can be performed to rule out coagulopathy as a possible cause for PPH. Less than 1% of PPH is from previously existing coagulopathy, but uterine rupture or abruption, preeclampsia/eclampsia, or any severe bleeding can lead to disseminated intravascular coagulopathy (DIC), a life-threatening emergency, which can be detected with this simple test. Treating DIC requires resources only found in comprehensive emergency obstetric care facilities and immediate transfer is required.

Bedside Clotting Test

1. Draw 2ml of venous blood and put it into a small, dry, clean, plain or red-top glass test tube (approximately 10 mm x 75 mm).
2. Hold the tube in your closed fist to keep it warm (+37°C).
3. After 4 minutes, tip the tube slowly to see if a clot is forming. Then tip it again every minute until the blood clots and the tube can be turned upside down.
4. Failure of a clot to form after 7 minutes, or a soft clot that breaks down easily, suggests coagulopathy.

Participant Handout 5.2: Steps to Take if Blood Loss Exceeds 350ml

In addition to continuing to keep the bladder empty, massaging the uterus every 15 minutes, and putting the baby to the breast, the practitioner should:

1. Administer a second dose of uterotonic to help the uterus to contract. Any uterotonic can be used as per dosage below.

N Oxytocin can be given, 10-20 IU IM initially. Oxytocin will begin to act within 2-3 minutes if given IM.

Or

N Ergometrine/Methergine can be given as an IM injection, 0.2-0.4 mg, provided the woman does not have preeclampsia, eclampsia, high blood pressure, or heart disease. It will act within 2-5 minutes of administration and could cause nausea and vomiting. The ergometrine requires stringent handling and storage conditions.

Or

N Misoprostol, which can be used where refrigeration and ideal storage conditions are not available, can be given orally, sublingually, or rectally, as follows:

Misoprostol for treatment of PPH

Route of Administration	Dosage
Oral	600 mcg
Sublingual	600 mcg
Rectal	800 – 1000 mcg

N Misoprostol is effective 9-12 minutes after administration and could cause shivering, nausea, and elevated temperature. It should not be given for at least 2 hours after an earlier dose. If the earlier dose caused shivering or nausea, a second dose should not be given earlier than 8 hours after the first dose.

Recent studies show that although misoprostol is not quite as effective in treatment of PPH as other uterotonics, it is a good alternative when the potency of oxytocin can't be guaranteed because of lack of refrigeration or it has passed its expiration date. Guidelines for misoprostol may change in the near future.

2. Initial steps to treat PPH: Start an IV drip (using a 16-18 bore needle so that the same needle can be used if a blood transfusion is required) with 10-20 IU oxytocin in 500 ml crystalloid fluids (Ringer's Lactate, Normal Saline, or Hartmann's Solution). Run at 40 drops per minute

or 150 ml/hour. (Remember that there are different drips per ml in different countries, so calculate the drop per minute in order to infuse 150/ml/hour.) Subsequent IVs of crystalloid can be given with 5-10 IU in 500 ml (10-20 IU in 1000 ml), run at 150 ml/hour. Oxytocin will begin to act immediately if given intravenously. If high doses of oxytocin are given with large volumes of fluid, oxytocin could have an anti-diuretic effect, causing fluid intoxication/water toxicity. This is a rare side effect however, especially in younger women of reproductive age.

3. If retained tissue is suspected and the SBA is trained in this procedure, explore the uterus for retained placenta and remove. If this is not successful and bleeding continues, request surgical assistance. If this facility cannot offer surgical intervention, transfer immediately to a higher facility.
4. If the uterus is contracted but bleeding is excessive, trauma is likely. Omit uterotonic treatment, but provide fluid replacement. If the facility can provide surgical intervention, repair the trauma. If the facility cannot offer surgical intervention, apply pressure to the wound and transfer immediately to a higher facility.
5. If the bedside clotting test is positive, the woman requires emergency treatment for clotting disorders either in the facility she is in if the capacity to treat exists,, or a facility she must be transferred to urgently to save her life.

If bleeding exceeds 500 ml:

Secure a second IV line with a 16-18 bore needle before transfer, so that if the woman's condition deteriorates during transfer, it will not be difficult to start a second IV. Transfer immediately to a facility that can provide higher-level care. It is safest to refer the woman to a facility that can provide surgical intervention as well.

Participant Handout 5.3: Case Studies

Case 1: Mrs. P. came to the primary health care unit at 16:00 hrs. A traditional birth attendant (TBA) delivered Mrs. P.'s healthy baby girl at home at 04:00 hrs. Mrs. P.'s family had learned about danger signs to look for during delivery from the community health worker. Mrs. P.'s family was concerned because she seemed to be bleeding excessively. They decided to bring her to the clinic. When she arrived, the nurse estimated that she had lost at least 350 ml of blood. Mrs. P.'s pulse was 95 and her blood pressure was 105/60. The facility had no equipment or supplies for resuscitation or treatment of PPH. The nurse tried to massage the uterus but it would not become firm. She tried bimanual compression, but this was also not effective. The nurse felt there was nothing more that she could do and decided to transfer Mrs. P. to a facility that could offer more emergency care.

1. Did she make the right decision? Is there anything else she could have done?
2. Was the nurse right about the amount of blood Mrs. P. lost? Do you have any way of determining how much blood Mrs. P. lost?
3. How would the nurse know whether Mrs. P. was in shock?
4. What precautions should the nurse take while transporting a woman to a higher facility for PPH to be managed?
5. Please state what you would do to achieve the principles of safe transfer.

The patient has to be transferred:

- At the right time,
- By the right people,
- To the right place, and
- With the right care throughout.

Case 2: Mrs. H. delivered her baby in a small private hospital, attended by a nurse-midwife. The nurse-midwife gave oxytocin immediately after the baby was born. The baby girl was healthy and the nurse-midwife suggested that Mrs. H. breastfeed her baby immediately. The midwife used controlled cord traction to deliver the placenta and immediately began to gently massage the uterus. Within an hour after the delivery, Mrs. H. began to bleed very heavily. The nurse midwife tried to collect as much of the blood as possible into a kidney dish. Within a short time, the kidney dish was full. The nurse-midwife started an IV drip with 10-20 IU oxytocin in 500 ml crystalloid fluids before transferring Mrs. H. to a higher-level facility.

1. Was this the right decision?
2. How much blood would you estimate that Mrs. H. lost?
3. How would the nurse-midwife know whether Mrs. H. was in shock?
4. What should she do next?
5. What precautions should she take while transporting Mrs. H. to a higher facility for PPH to be managed?
6. Please state what you would do to achieve the principles of safe transfer.

The patient has to be transferred:

- At the right time,
- By the right people,
- To the right place, and
- With the right care throughout.

Case Study 3: Mrs. B. delivered a healthy baby boy in a small district hospital with no surgical facilities. She was attended by a student nurse-midwife, who was supervised by a nurse-midwife on staff. The student nurse-midwife gave oxytocin immediately after the baby was born. The baby boy was healthy and the student nurse-midwife suggested that Mrs. B. breastfeed her baby immediately. The student nurse-midwife used controlled cord traction to deliver the placenta and immediately began to gently massage the uterus. Within an hour after the delivery, Mrs. B. began to bleed very heavily. The student nurse-midwife tried to collect as much of the blood as possible with a sanitary pad. Very quickly, the sanitary pad was completely saturated. She tried to scrape blood into a kidney dish. Within a short time, the kidney dish was full. The nurse-midwife started an IV drip with 10-20 IU oxytocin in 500 ml crystalloid fluids.

1. How much blood would you estimate that Mrs. B. lost?
2. How would the student nurse-midwife know whether Mrs. B. was in shock?
3. Was there anything else that could have been done at the district hospital?
4. What should the nurse-midwife do next?
5. What precautions should she take while transporting Mrs. B. to a higher facility for PPH to be managed?
6. Please state what you would do to achieve the principles of safe transfer.

The patient has to be transferred:

- At the right time,
- By the right people,
- To the right place, and
- With the right care throughout.

Participant Handout 5.4: Observing and Monitoring the Woman to Detect PPH

The woman should be observed and monitored for 2 hours after delivery to assess volume of postpartum blood loss, uterine firmness/tone, vital signs, and additional symptoms.

Throughout the two-hour immediate postpartum period, the birth attendant should provide all measures at hand to help reduce postpartum blood loss. Measures should include uterine massage, putting the baby to the breast, and keeping the bladder empty.

Decision making and action once excessive blood loss is detected depend on where the woman is delivering and what capacity the facility has for providing fluid replacement and oxygen and managing causes of PPH, particularly uterine atony. Broadly speaking, action would need to be as follows on the next page.

Participant Handout 5.5: Action to be Taken at Each Facility Level if Excessive Blood Loss Occurs

Extent of blood loss	Response, based on resources available at place of delivery		
	Where fluid replacement/ PPH management not available	Where only fluid replacement/PPH management available	Where surgical interventions are available
>350 ml after delivery	<p>Continuously provide all measures at hand to stop bleeding: additional uterotonics, put baby to breast, uterine massage, and bimanual compression.</p> <p>Reassess for other causes of bleeding.</p> <p>Continue to assess symptoms and vital signs to detect shock.</p> <p>Preparations to transfer the woman to a higher facility if retained placental tissue, trauma, or clotting problem if bleeding continues without obvious cause.</p>	<p>All in first column plus: Start an IV drip with 10-20 IU oxytocin at 40 drops/minute or 150mL/hour (depending on infusion set).</p> <p>Give appropriate uterotonic based on past history.</p> <p>Prepare to transfer the woman to a higher-level facility if retained placental fragments, trauma, clotting disorder, or continued bleeding.</p>	<p>All in first two columns plus: re-examine for cause of bleeding (atony, retained placenta, trauma, etc.)</p>
>500 ml in first 2 hours after delivery	<p>Refer and immediately transport the woman to a facility that can treat her for PPH.</p> <p>Provide details of treatment given to referral facility.</p>	<p>Start above treatment, plus a second line for fluid replacement with a large bore needle, to be used later if signs of shock develop.</p> <p>Refer and immediately transport the woman to a facility that can treat her for PPH.</p> <p>Provide details of treatment given to referral facility.</p>	<p>All in first 2 columns plus: Provide all needed interventions, which might include fluid and blood replacement, surgery, prevention and treatment of shock, etc.</p> <p>Take appropriate action in labor room or theatre</p>

Participant Handout 5.6: Transporting a Woman who is Bleeding

- N Prepare for transfer when blood loss exceeds > 350 ml in 1st hour
- N Transport if blood loss > 500 ml within 2 hours of delivery
- N Elevate legs to improve blood supply to vital organs
- N Keep the woman warm
- N Send a skilled provider with the woman to ensure an open airway, to deliver first aid if the woman goes into shock, and to explain the care provided and the NASG to the woman and her family.
- N Continue uterine massage during transport
- N Provide bimanual uterine compression (external if possible and internal if necessary)
- N Ensure the referral facility knows what uterotonics the woman has been given and when

Principles of Safe and Effective Transfer

To achieve safe and effective transfer, the patient has to be transferred:

- N At the right time,
- N By the right people,
- N To the right place, and
- N With the right care throughout.

At the right time: Calculate, based on accurate estimation of blood loss and careful observation for signs of shock, the time needed to prepare for transport and to traverse the distance to the referral site.

By the right people: All groups and individuals involved, including SBAs, ambulance/transport drivers, and the patients' families must be prepared to play the roles necessary to provide timely and safe transport.

To the right place: All individuals involved must know in advance which referral facility has the capacity to care for a woman with PPH, in shock, in an NASG, etc., so that time is not wasted traveling to an inappropriate facility, from which the woman will need to be transferred again. The referral site should be informed of the patient's situation as far in advance as possible, so that the referral staff are fully prepared to provide emergency treatment when the woman arrives. An up-to-date record of the patient's history, condition, and treatment should be provided to the receiving facility and providers.

With the right care throughout: When transferred, the patient should always be accompanied by a skilled provider and by family members who can donate blood if required and provide emotional support during transfer. Actions for the skilled provider include: ABCs (open airway, breathing, circulation), oxygen if possible, IVs for fluid replacement, placing a catheter to monitor urine output, keeping the patient warm and in Trendelenberg position, monitoring vital signs continuously, and explaining the NASG and care provided to the woman and her family.

Participant Handout 5.7: Reducing the Incidence of Shock

With the use of AMTSL to prevent PPH, early and accurate detection of PPH with the blood drape or other methods of accurate estimation, and rapid referral and transportation, the incidence of shock from PPH should be much reduced. However, about 1% to 3% of women will still suffer intractable PPH from uterine atony. Multiple blood transfusions are often needed to resuscitate these women and regaining hemostasis may require blood transfusion and/or surgical intervention.

Because women respond differently to the loss of similar amounts of blood, based on their size and level of anemia (i.e., pre-hemorrhage blood volume and oxygen carrying capacity), there is no uniform volume of blood loss at which a woman will exhibit signs of shock. Therefore, vigilant observation of signs of shock while all prevention efforts are ongoing is critical.

Shock is a highly unstable condition with a high risk of death. Immediate treatment is needed to save the patient's life

Participant Handout 5.8: Management of Hypovolemic Shock

A single individual cannot effectively manage this emergency situation. Help must be urgently requested prior to starting any treatment.

Follow A, B, and C (airway, breathing, and circulation)

Airway and Breathing need to be established and maintained before anything else can be done.

Remember: Hypoxia kills faster than hypovolemia.

If a woman is not responding when spoken to, her airway may be blocked. An individual with the appropriate skills and training must see that the airway is open.

Once the airway is assured:

- N Provide O₂ by mask at 6-10 liters/minute
- N No fluids are to be given by mouth
- N Keep the patient warm
- N Elevate her legs or place her in Trendelenberg position.

Circulating blood volume: If the uterus is not contracting and the woman shows signs of shock, IV fluid replacement is required immediately to correct blood loss.

For effective fluid replacement:

- N Ensure adequate fluid replacement
- N Deliver fluid as quickly as possible for the first 500ml, and slowed for subsequent IV fluids, providing boluses when needed to stabilize vital signs (see below).

Start 2 IV lines with short, large-gauge cannula (16-18). The volume that can be infused through a cannula is proportional to its diameter and is inversely proportional to its length. Use only crystalloid fluids—Ringer's Lactate, Normal Saline, or Hartmann's Solution.

IV Line #1:

Begin a **PLAIN FLUID IV** line, using crystalloid fluid, and infuse rapidly so that the patient receives 2000 ml in the first hour as follows:

- N 500 ml in the first 10 minutes
- N The next 500 ml in 10 minutes
- N The next 500 ml in 20 minutes
- N The next 500 ml in 20 minutes
- N Subsequent PLAIN IVs should run @ 150 ml/hour with boluses of 250ml as necessary to maintain the systolic BP at ≥ 80 mm/Hg

IV Line # 2:

This is the **UTEROTONIC IV** line. This IV should also be crystalloid fluid with uterotonic added. Continue until the patient is stable. Give no more than 100 IU oxytocin in 24 hours, as follows:

- N** 500 ml fluid with oxytocin 10 – 20 IU at 60 drops per minute (depending on the drops per ml for the IV set-ups in a particular country).
- N** 500 ml with oxytocin 20 IU at 30 drops per minute until the patient is stable.

These rates will ensure that fluid intoxication is avoided.

- N** Do not give more than 5000 ml total of both IV lines in the first 6 hours and 8000 ml of fluid in the first 24 hours.
- N** Keep the woman warm throughout: blood loss causes hypothermia.
- N** Evaluate the patient for blood transfusion CBC, platelets, type and cross match, and clotting (use bedside clotting test if possible).

Remember that oxytocin, which has an antidiuretic effect at high doses and with large volumes of fluid, can cause fluid intoxication, so the uterotonic IV must run much more slowly than the plain IV.

Fluid intoxication, especially in a young woman of reproductive age, is very rare unless she has severe heart disease or other uncommon conditions. If a maximum of 5,000 ml of plain IV fluids is given during the first 8 hours and 8,000 ml total in 24 hours, pulmonary edema and other adverse effects are extremely unlikely. However, only the plain IV should be used for boluses or to push fluids.

Signs of fluid intoxication are headache, vomiting, drowsiness, and convulsions.

The danger to the patient of infusing too little fluid and under-correcting for hypovolemia far exceeds the danger of fluid intoxication.

If the uterus is contracted, follow the directions for fluid replacement but omit the use of uterotonics, find the source of bleeding (laceration, ruptured uterus, retained products of conception), and address it medically or surgically.

Participant Handout 5.9: Treatment of PPH: An Emergency Situation Simulation Exercise

Simulation exercises model a common workplace scenario and allow Px to practice problem solving. Simulations are not role plays in a scenario, but rather as close to life as possible depiction, in real time, of clinical management situations. Simulation exercises are often used for emergency preparedness training. An emergency is simulated and staff at all levels—everyone from nurses, to nurse midwives, to doctors—can practice procedures together, to ensure that roles and procedures are defined, they are understood, compatible with each other, and they are realistic for the individual facility. Simulations are a great way to ensure all roles will be performed in a real emergency.

There are two primary reasons for conducting a simulation exercise:

1. *To verify the effectiveness of emergency plans and components thereof:* Where plans are developed for events not previously experienced, clinic and hospital managers and those responsible for caring for patients must be sure that the plans developed will work—the effectiveness of the planned activities and procedures needs to be verified. Events like eclampsia and PPH are not routine events in many settings, but providers and facilities must still plan for appropriate emergency responses. Where simulation exercises reveal a need for improvement, those areas can be addressed and the exercises can be repeated, if needed, to build confidence among the necessary staff. Occasionally, procedures may need to be modified. In that case, a new simulation should be conducted to verify the effectiveness of the modifications.
2. *To provide experience and practice to those who may be involved in a responding to an emergency:* Simulation exercises are a valuable way of putting emergency plans into practice prior to an actual need. Simulations allow staff identified in emergency plans to perform their functions in a lower-stress environment than an actual emergency. This gives staff the opportunity to explore their roles and what is expected from them. Within the exercise format, trainers, service providers, and managers have the opportunity to identify and correct knowledge gaps and functional inconsistencies. This may lead to additional, targeted training or improvements in the planning process after the exercise.

Below are three scenarios for the group work. Each group will be assigned one scenario.

Scenario for Group 1:

Situation: A 28 year-old grand-multipara delivered a healthy baby boy weighing 3,000 gm at 12:30 at a sub-centre. The placenta delivered at 13:10. It is now 13:30. She has been bleeding heavily since delivery of the placenta. As the nurse-midwife works to stabilize her for transfer, she recognizes beginning signs of shock.

Roles: the patient, her mother-in-law, and a community midwife based at the sub-center.

Scenario for Group 2:

Situation: A 24 year-old woman, gravita-2, para-2, was admitted at 01:00 hrs to a primary health center after 2 hours of labor. On admission she was having strong contractions 2 minutes apart, and delivered a 3500 gm baby girl precipitously at 01:20 hrs. She delivered the placenta 10 minutes later. Her BP at 01:45 hrs was 90/70 and pulse was 130. She has been bleeding heavily and showing signs of shock. She is accompanied by her mother-in-law.

Roles: the patient, her mother-in-law, one medical officer, one community midwife, a ward aid, and an ambulance driver located at a 24/7 primary health center.

Scenario for Group 3:

Situation: A primipara at a tertiary hospital delivered a male baby weighing 3500 gm at 02:30 hrs. The second stage of labor was 2 hours and she was exhausted. The placenta delivered at 03:15 hrs.

During monitoring, the student nurse found that the woman was bleeding heavily. The student nurse informed the nurse-midwife, who found the patient was showing signs of shock. The patient's husband is waiting in the corridor.

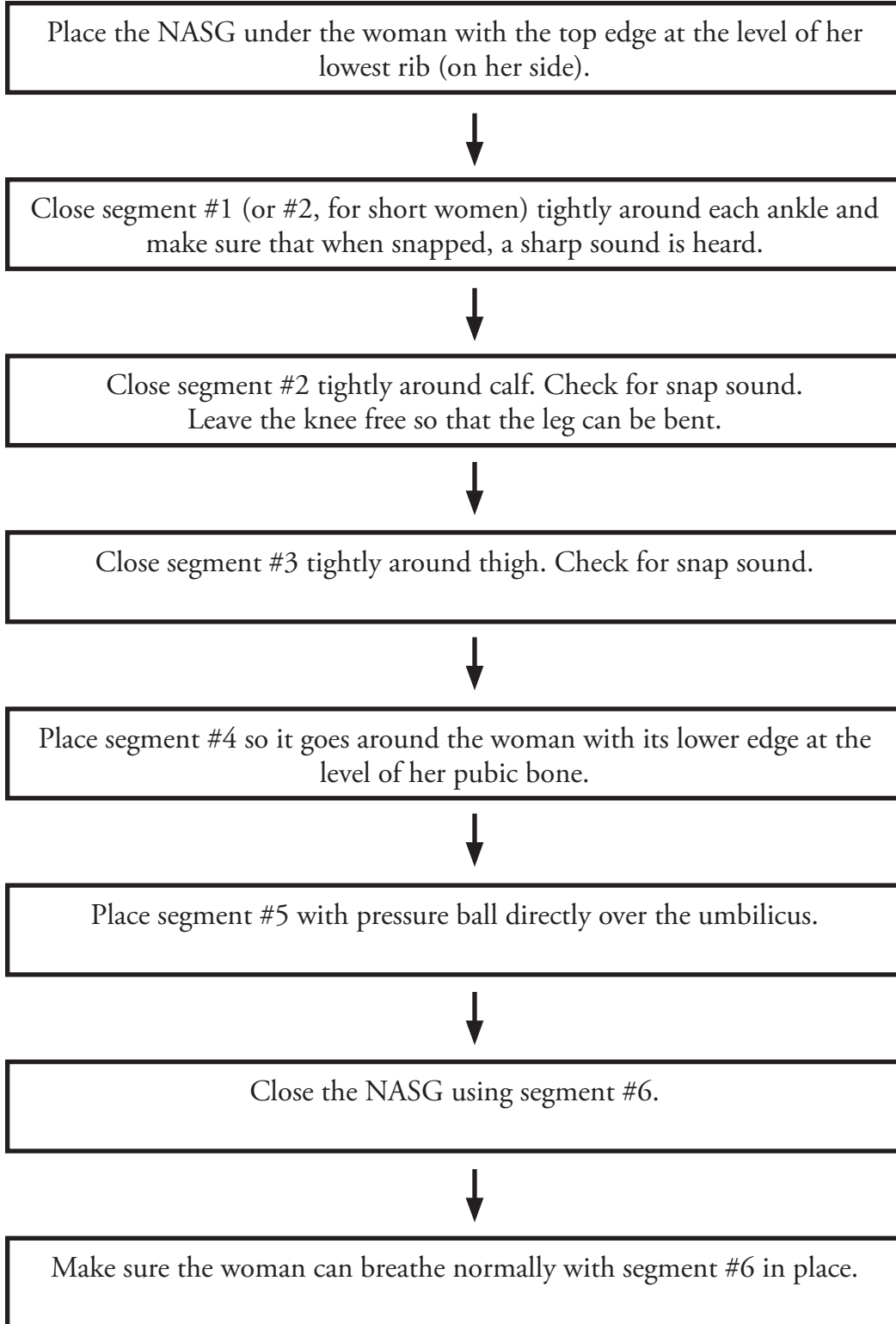
Roles: the patient, her husband, a resident, and a nurse-midwife.

Additional Groups

An additional scenario may be developed for a community health center or district hospital so all participants have a role to play.

Unit 6:
The Non-Pneumatic
Anti-Shock Garment

Participant Handout 6.1: Flowchart for Applying the NASG



Participant Handout 6.2: Competency-Based Skills Assessment Checklist for Application and Removal of the NASG

Date of Assessment _____ Dates of Training _____

Place of Assessment: Clinic _____ Classroom _____

Name of Clinic Site _____

Name of the Service Provider _____

Name of the Assessor _____

This assessment tool contains the detailed steps that a service provider should accomplish when performing NASG application or removal. The checklist may be used during training to monitor the progress of the trainee as s/he acquires the new skills and during the clinical phase of training to determine whether the trainee has reached a level of competence in performing the skills. The checklist may also be used by the trainer or supervisor when following up or monitoring the trainee. The trainee should always receive a copy of the assessment checklist so that s/he may know what is expected of her/him.

Instructions for the Assessor:

Always explain to the client what you are doing before beginning the assessment. Ask for the client's permission to observe.

Begin the assessment when the trainee greets the client.

Only observe. Do not interfere unless the trainee misses a critical step or compromises the safety of the client.

Rate the performance of each task/activity observed using the following rating scale:

1. **Needs Improvement:** Step not performed correctly and/or out of sequence (if required) or is omitted.
2. **Competently Performed:** Step performed correctly in proper sequence (if required) but lacks precision, and/or the trainer/coach/supervisor needed to assist or remind the participant in a minor way.
3. **Proficiently Performed:** Step performed correctly in proper sequence (if required) and precisely without hesitation or need for any assistance.
4. **Not Observed:** Step not performed by participant during observation by trainer/observer. Continue assessing the trainee throughout the time s/he is with the client, using the rating scale.

Fill in the form using the rating numbers. Write specific comments when the task is not performed according to standards.

Use the same form for one trainee for at least 3 observations.

When you have completed the observation, review the results with the trainee. Do this in private, away from the client or other trainees.

Competency-Based Skills Assessment Checklist for Application and Removal of the NASG

TASK/ACTIVITY	CASES			COMMENTS
	1	2	3	
Applying the NASG				
Places the NASG under the woman; the top of the NASG is at the level of her lowest rib (on her side).				
Starts at the ankles with segment #1				
Folds back segment #1 onto segment #2 for shorter patients				
Wraps tightly enough so that garment makes a snapping sound				
Checks snapping sound with each segment				
Wraps segment #2 & #3 , with room for bending joints				
Only one person applies segment #4 and #5 as tightly as possible				
Wraps segment #4, the pelvic segment, all the way around the woman with the lower edge at the level of the pubic bone.				
Gets up close to the patient and really stretches for larger abdomens				
Places segment #5 with the pressure ball directly over her umbilicus				
Then, closes the NASG using segment #6.				
Asks patient when she is conscious if she is comfortable and breathing easily				
Asks patient when she is conscious for informed consent				
Monitors pulse and BP every 15 minutes until stable				
If the source of bleeding appears to be uterine atony, administers uterotonic drugs and massages the uterus.				
Transporting with the NASG				
Starts oxygen and transports the patient with 2 IVs in place. One with Ringers and or Normal Saline and the other with oxytocin				
Calls ahead to alert referral center that transport is coming				
Works with one other person to lift patient onto a stretcher				
Places patient slightly on side in vehicle				
Monitors Pulse and BP every 15 minutes until arrives at referral center				
Removal of the NASG				
Px is aware that the NASG should only be removed at a facility where definitive therapy is possible (i.e., surgical and/or other necessary capacity)				
Px can explain criteria for removal: bleeding is < 50 ml per hour, , systolic blood pressure >90 mm/Hg, hemoglobin is >27 or HCT is 20%				

Competency-Based Skills Assessment Checklist for Application and Removal of the NASG, continued

Begins at ankle with number one, waits 15 minutes, rechecks BP and pulse				
If pulse and BP remain stable, repeats with each segment				
If the BP falls by 20 mmHg OR the pulse increases by 20 beats/min after a segment is removed, recloses all segments, rapidly increases IV fluid rate and looks for source of bleeding				
Completes removal once BP and pulse are stable, starting again at segment #1				
Cleaning the NASG				
Disinfects with 0.05% bleach solution for no longer than 10 minutes				
Wearing heavy utility gloves, washes in detergent by hand, removing tissue or other material by scrubbing with a brush				
While still wearing utility gloves, squeezes out excess water and hangs the NASG in the sun to dry				
Folding the NASG				
Starts with segment #1, fold Velcro inside of the segment so it doesn't stick				
Folds segment #2 and #3 the same way				
Folds the leg segments together				
Folds segment #4 across the leg seams (tuck the Velcro in so it doesn't stick)				
Folds segment #5 across the leg segments				
Wrap segment # 6 tightly around #5				
Store in clear plastic where it is visible and easily accessible				

Participant Handout 6.3: Photograph of the NASG



Participant Handout 6.4: The Non-Pneumatic Anti-Shock Garment (NASG)

A key component of managing hypovolemic shock is ensuring that the available blood in the body is directed mostly to the upper body so that the vital organs (heart, lungs, kidneys, and brain) continue to receive oxygen and the woman is protected from vital organ damage and death. One way to achieve this is to place the woman in Trendelenberg position, where the head is lower than the feet and hips. A more effective way of ensuring this is to apply the NASG.

- N The NASG is a lightweight (1.5 kg) compression suit made of neoprene with 6 segments that close around the legs at the ankle, calf, thigh, pelvis, and abdomen.
- N Velcro fastenings help keep the garment on tightly.
- N The abdominal segment (#5) incorporates a small foam ball that applies pressure to the uterus to decrease bleeding.
- N Markings on each section show how to apply it on a woman.
- N When applied tightly by one person, the garment supplies enough circumferential pressure from the ankles to the diaphragm to reverse hypovolemic shock by shunting blood from the capacitance vessels of the abdomen and lower extremities to the vital core organs- heart, lungs, kidneys, and brain.
- N It is washable and reusable (at least 30 times). It has received a United States Food and Drug Administration 510K medical device regulation number, K904267/A, Regulatory Class II, January 17, 1991. It can be exported outside the US.
- N The NASG can be easily packed into a bag for storage.

Applying the garment to an unconscious woman will require 2 people to position the garment beneath her. The final segment, however, should still be closed using only the strength of one person. A woman in shock may be unconscious and will require one-on-one nursing care to ensure a patent airway, prevent aspiration, etc.

Discomfort with the NASG

If the woman experiences difficulty breathing or is uncomfortable, the abdominal panel must be adjusted. If she is hot, try a fan, cool breeze, and/or cold compresses. If the NASG feels itchy to her, and she is stable, a provider may remove a single leg panel briefly, apply lotion, and quickly reapply the panel.

Application of the NASG for Any Level of Facility or Provider

- N General application
- N Application for shorter women
- N Application if the woman is unconscious

Steps of Application

General Application

Step 1

N To apply the NASG, place it under the woman; the top of the NASG should be at the level of her lowest rib.

N Starting at the ankles, close segment #1 tightly around each ankle.

N Make sure it is tight enough so that you can snap it and hear a sharp sound!

Step 2

N Next, close segment #2 on each leg as tightly as possible.

N Try to leave the woman's knee free in the space between segments so that she can bend her leg. She may be in the NASG for a long time.

Step 3

N Apply segments #3, the thigh segments, in the same way as segments #1 and #2.

N Remember: close segments tightly enough so that you can snap it and hear a sharp sound!

Step 4

N Segment #4, the pelvic segment, goes all the way around the woman at the level of the pubic bone.

Step 5

N Place segment #5 with the pressure ball directly over her umbilicus.

N Then close the NASG using segment #6.

If there are two people present they can rapidly apply the three leg segments together, each working on one leg, starting at the ankle. However, only one person using as much strength as possible should close the pelvic and abdominal segments. If two people close the pelvic and abdominal segments they can apply too much pressure and compromise the patient's breathing. Do not close the segment so tightly that it restricts the woman's breathing. One person can sufficiently manage the whole application if necessary.

When Finished

N Make sure the patient can breathe normally with the NASG segment #6 in place.

N If the source of bleeding appears to be uterine atony, administer uterotonic drugs and massage the uterus. The NASG stretches, allowing room for your hand to fit between the woman's abdomen and the NASG.

Application for Short Women (if the very small garment is not available)

If a woman is shorter than those for whom the NASGs available are designed, a simple adjustment can be made so that the larger garment will still fit. To apply the NASG to a short woman:

Step 1

N If the woman is short, fold segment #1 to the inside of segment #2

N Begin segment #2 at her ankles.

Steps 2-4

N Apply segment #3 to the thighs, as usual. Continue with the rest of the segments as with all women.

Application if the Woman is Unconscious

You will need 2 people!

Applying the garment to an unconscious woman will require 2 people to position the garment beneath her. The final segment, however, should still be closed using only the strength of one person.

Step 1:

N Open the NASG on a flat surface and only open segments #4, #5, #6, keeping segments #1, #2, and #3, closed (but not fastened with the Velcro).

Step 2:

N Fold segments #4 and #6 (the sides that do NOT contain the ball) once towards the yellow midline dots (in toward the black side of the NASG). This will prevent the Velcro from sticking to other parts of the NASG and to the patient or bed linen.

Step 3

N Turn segments #4 and #6 once more toward the yellow midline so that the folded edge lies along the yellow midline.

Step 4

N Take the folded segments #4 and #6 and turn them over towards the colored (maroon or blue) outside of the NASG placed approximately where the yellow midline is on the outside. This will divide the upper portion of the NASG in half along the dotted line.

Step 5

N Turn the woman on her side with her back facing you and place the folded NASG on the bed with the dotted line along the woman's spine and the top edge of the NASG at the level of her lowest rib.

N Push the folded/rolled sections #4 and #6 under her body.

Step 6

- N** Roll her towards you, turning her to her other side, over the rolled portions of the NASG. She is now facing you.
- N** The second person pulls the folded segments #4 and #6 out from under the woman.

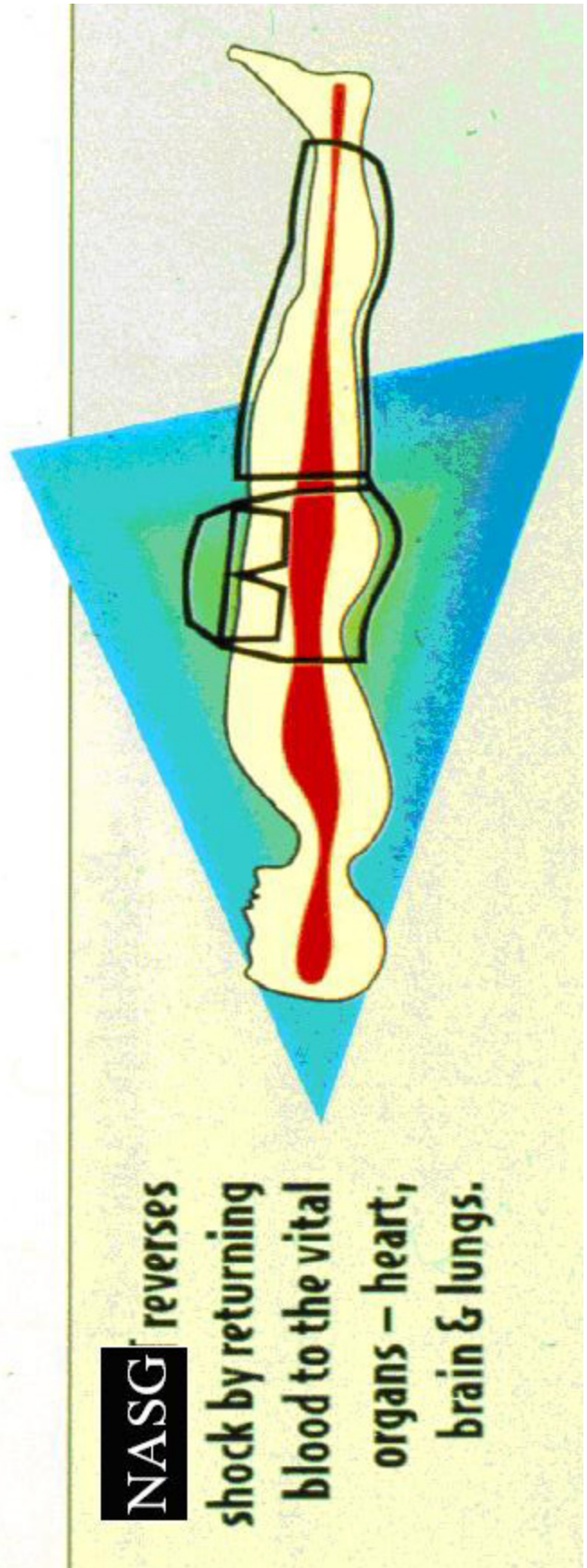
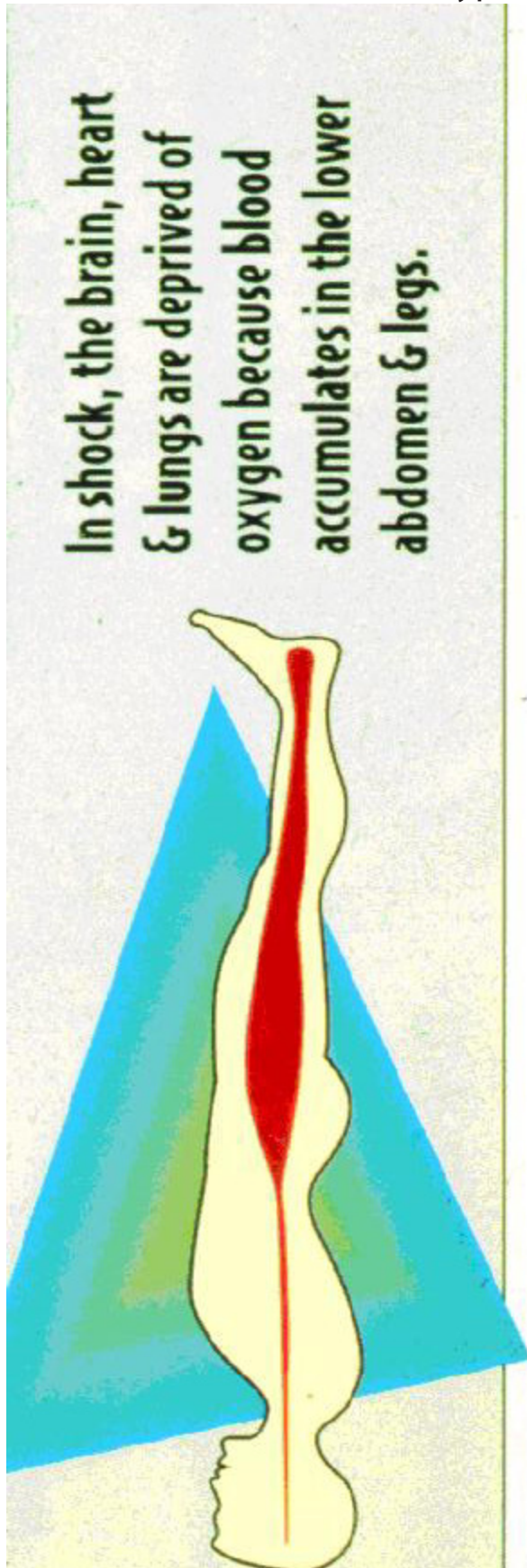
Step 7

- N** Turn the woman on her back. She is now lying in the middle of the NASG, with the yellow dots along her spine, with the top edge of the NASG at the level of her lowest rib on the side. Check positioning by placing, but not closing, the #5 segment with the ball over her navel.

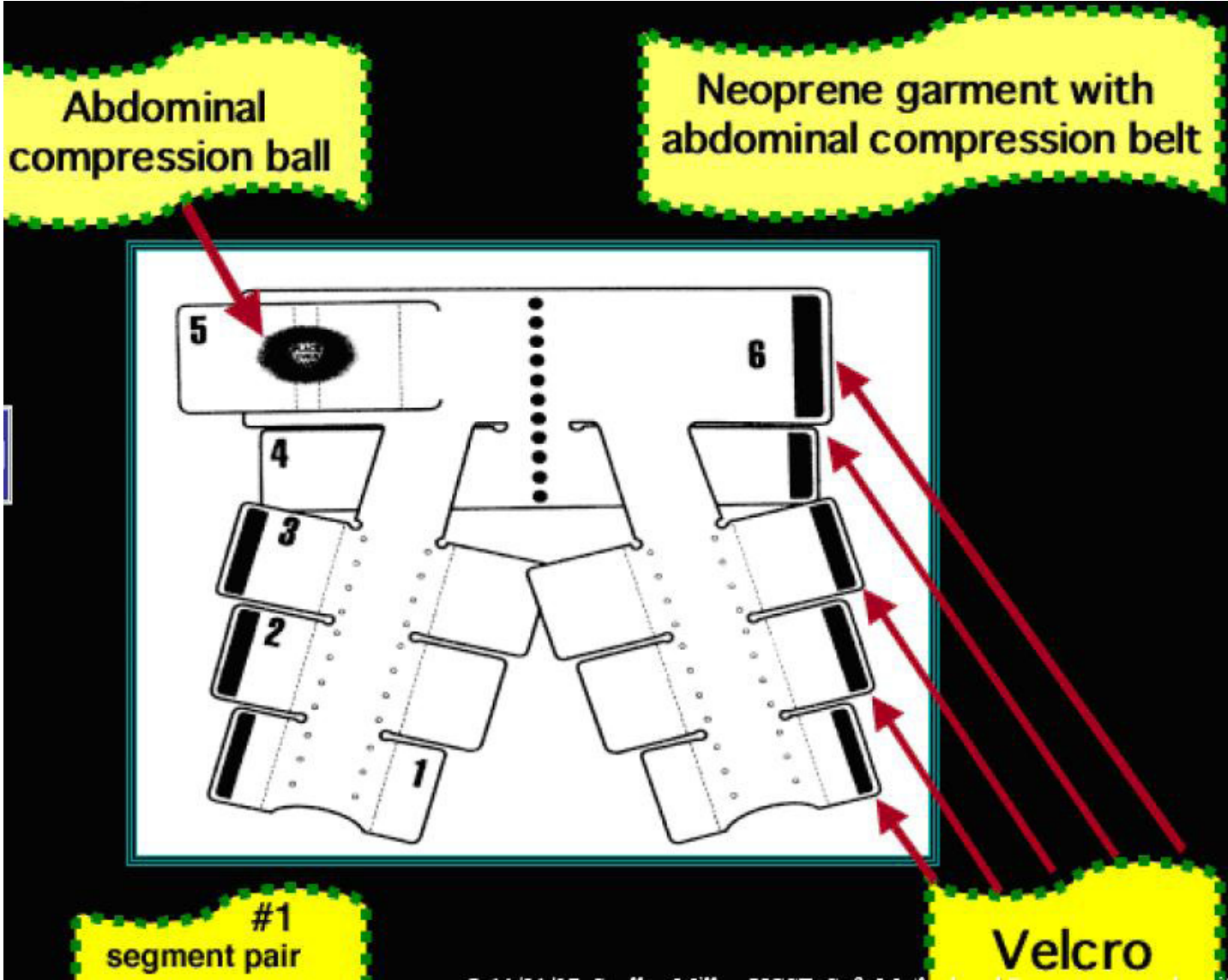
Step 8

- N** Starting at the ankles, close segments #1 tightly around each ankle. Remember: Make sure it is tight enough so that you can place a finger under the segment and snap the leg segments to hear a sharp sound!

Participant Handout 6.5: How the NASG Protects a Woman in Hypovolemic Shock



Participant Handout 6.6: The Components of the NASG



Participant Handout 6.7: Removal of the NASG

The NASG should only be removed:

- N Under medical supervision,
- N When the woman is stable, and
- N According to the time line outlined below.

Rapid removal of the NASG or removal of the segments in the wrong order can result in death.

Step 1

Begin removing the NASG only when the woman's condition has been stable for two hours:

- N Bleeding has decreased to <50 ml/hour,
- N Hemoglobin level is >7 or the hematocrit 20% (unless the woman's usual hemoglobin is less than 7% and hematocrit is less than 20%),
- N Pulse <100 and systolic BP 90 mm/Hg or greater, and
- N The woman is conscious and aware.

Step 2

- N Wait 15 minutes for redistribution of blood to occur between removing each segment.
- N Always wear gloves when handling a soiled garment.
- N Removal of the NASG begins with the lowest segment (typically #1, #2 if the woman is short and segment #2 is at her ankles) and proceeds upwards.
- N 15 minutes after removing the first segment and before proceeding to the next step, take her pulse and blood pressure to verify that she is ready for removal of the next segment.

Step 3

- N If pulse and blood pressure stable 15 minutes later, remove the next section.

Steps 4 and 5

- N After 15 minutes, take pulse and blood pressure. If stable, remove the next segment.
- N Continue following this procedure—remove a segment, wait 15 minutes, take pulse and blood pressure—until all parts of the NASG are removed.

CAUTION: Rule of 20

If the blood pressure falls by 20 mmHg OR the pulse increases by 20 beats/min after a segment is removed:

- a) Rapidly replace ALL segments, and consider the need for more saline or blood transfusions.
- b) If there is recurrent bleeding, replace all segments of the NASG and determine the source of bleeding.

Participant Handout 6.8: Avoiding Adverse Events When Using the NASG

- N Only one person should apply the pelvic and abdominal sections of the NASG (even if the woman is unconscious and two people were required to begin apply the NASG).
- N Monitor urine output.
- N Ensure airway protection and aspiration prevention as required.
- N Ensure one-on-one nursing care throughout.
- N Ensure presence of a relative/support person with the unconscious patient, ready to explain the purpose of the garment when patient returns to consciousness and call for help. Surprised, confused, or frightened patients may attempt to remove the garment prematurely, resulting in death.
- N Never open the abdominal panel first.

Participant Handout 6.9: Performing Vaginal Procedures with the NASG On

Pelvic exams with the NASG On:

The design of the NASG permits complete perineal access. Thus, the source of most obstetric hemorrhages can be located and treated while the garment maintains the woman's vital signs.

The following vaginal procedures can be performed on a woman in an NASG:

- N Repair of episiotomy or vaginal and cervical lacerations,
- N Manual removal of the placenta,
- N Bimanual compression (external or internal),
- N Dilatation and curettage (D&C),
- N Dilatation and evacuation (D&E), and
- N Manual vacuum aspiration (MVA).

Abdominal Surgery with the NASG On

Surgery to obtain hemostasis can also be performed with the NASG in place. The abdominal and pelvic panels must be opened, but only immediately before the first incision. Such procedures may include:

- | | |
|--------------------------------|---|
| N Cesarean section, | N Laparotomy, |
| N Repair of ruptured uterus, | N Laparoscopy, |
| N Hysterectomy, | N Removal of placenta accreta, |
| N Salpingectomy/salpingostomy, | N Repair of broad ligament hematoma, and |
| N Ligation of arteries, | N B-Lynch or other uterine compression sutures. |

Prepare the operating theatre for surgery, have all members of the surgical team scrubbed, gowned, gloved, in place, and ready to operate immediately prior to surgery. The woman should be catheterized; the anesthesiologist must be prepared to administer IV fluids to manage a drop in blood pressure.

Step 1

- N Remove ONLY segments #4, #5, and #6. With the abdominal portion removed, much of the benefit of the NASG is lost, and the patient may go back into shock.

Step 2

- N Place the patient in steep Trendelenberg position.
- N Operate as quickly as possible.

Step 3

- N Replace segments #4, #5, and #6 as soon as the vaginal procedure is complete.

Participant Handout 6.10 Recommended Dilutions of Sodium Hypochlorite (Bleach) for Decontaminating the NASG

Exposure to too strong a bleach solution will cause the NASG to deteriorate. Because the NASG does not go inside the body, it can be decontaminated in a bleach solution that one-tenth as strong as that used in conventional instrument processing (the NASG should be soaked in a 0.05% bleach solution; standard instrument processing uses a 0.5% bleach solution).

Dilution is necessary when using a pre-made bleach solution because bleach sold commercially is more concentrated than 0.05%. Because the concentration of commercially-sold bleach varies by brand and country, the amount of bleach needed to achieve a 0.05% solution will also vary. The following chart shows how to mix 0.05% solution from pre-made solutions.

Brand of Bleach (Country)	Percent Available Chlorine	Bleach Needed to Achieve 500 Ppm = 0.05% = 0.5 g/l Concentration for NASG, for Every:	
		1 Liter of Water	50 Liters of Water
Valu Check'd	3%	0.17 ml	8.33 ml
JIK (Africa)	3.50%	0.14 ml	7.14 ml
Household Bleach, Clorox (USA, Canada, Peru), Eau de Javel (France, Viet Nam, 15o chlorum*), ACE (Turkey), Jif (Haiti), Red & White (Haiti), Odex (Jordan)	5%	0.10 ml	5.00 ml
Blanqueador, cloro (Mexico)	6%	0.08 ml	4.17 ml
Lavandina (Bolivia)	8%	0.06 ml	3.13 ml
Chloros (UK), Leja (Peru)	10%	0.05 ml	2.50 ml
Extrait de Javel (France) (48o chlorum*), Chloros (UK)	15%	0.03 ml	1.67 ml

In general, a bleach solution for soaking the NASG can be made by using one-tenth as much bleach **or** ten times as much water as is normally used for instrument processing.

In some countries, the concentration of sodium hypochlorite is expressed in chlorometric degrees (° chlorum); 1° chlorum is approximately equivalent to 0.3% available chlorine.

Adapted from: Tietjen, L., Cronin, W., McIntosh, N., *Infection Prevention for Family Planning Service Programs*, JHPIEGO, Baltimore, MD, 1992.

Participant Handout 6.11: Washing and Drying the NASG

Wear heavy rubber utility gloves.

Prepare a 0.05% bleach solution in a plastic container large enough to completely submerge the NASG.

Decontaminate the NASG by submerging it in the container for 10 minutes. You may need to put a brick, stone, or other heavy object on the NASG to keep it under water. Do not handle during this time.

Do not leave the NASG in the solution more than 10 minutes. It will damage the garment.

Remove tissue or other material by scrubbing with a brush (while wearing heavy utility gloves).

Wash the garment with detergent and cool water, by hand or in a washing machine. Do not machine dry.

It is best to wash the NASG alone, as other items, such as threads and lint, will adhere to the Velcro.

If being hand washed, squeeze to expel excess water before drying.

Hang the NASG to dry, outside in the sunshine if possible, rotating sides for equal exposure to the sun. Keep away from plant material such as grasses, burrs, sticks and other material that could cling to the fabric and Velcro.

Participant Handout 6.12: Folding and Storing the NASG

Folding the NASG

Folding the NASG correctly is key to being able to unfold it quickly to apply on the next patient who is in shock. If not folded correctly, unfolding the NASG becomes very awkward and time-wasting because the Velcro will be difficult to undo when the NASG is needed in an emergency.

If the NASG is folded correctly, the Velcro closures will not stick as much when you unfold it, and you'll save precious time putting it on the next patient.

Step 1

N Start with segment #1: fold the Velcro in so that it doesn't stick to the outside (maroon or blue side), but is resting on the inside of the segment (black side).

N If you fold it correctly, the "#1" printed on the first segment will not be visible.

Step 2

N Fold segments #2 and #3 in the same way.

Step 3

N Fold the leg segments together like a map or fan.

Step 4

N Fold the leg segments, like a map, up into the abdominal segment.

Step 5

N Fold segment #4 up across the leg segments.

N When folding segment #4, be sure to tuck the Velcro located at the ends of the segment around to the inside. It is important to prevent the Velcro from sticking to the outside of segment #6.

Step 6

N Fold segment #5 across the leg segments.

N Wrap segment #6 tightly around segment #5 and place in carry bag.

N The NASG is now ready to be stored and, more importantly, ready to be applied **quickly** to the next patient.

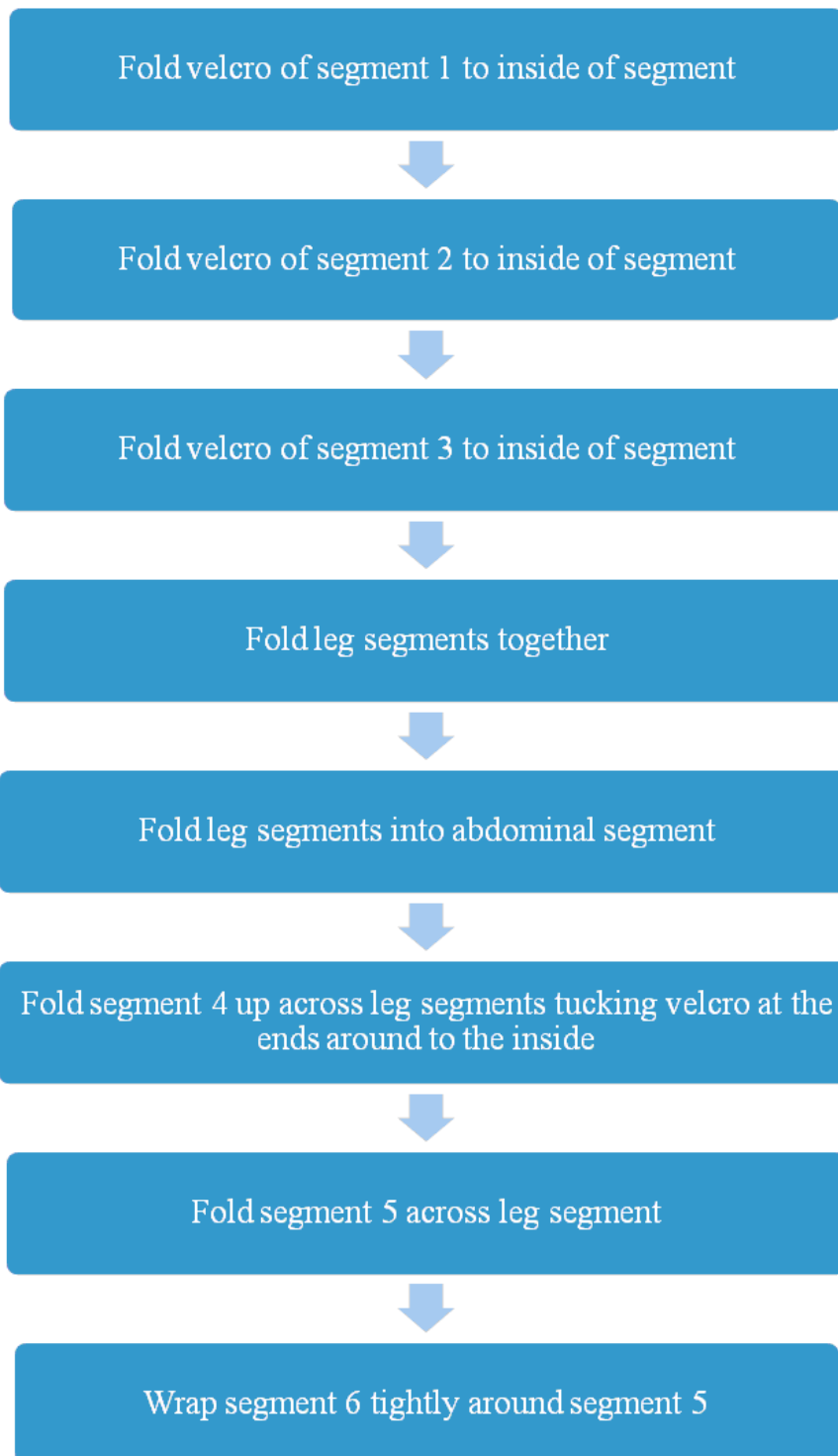
Storing the NASG

N The NASG should be stored where it is visible and easily accessible.

N Put the folded NASG into a clear plastic bag so that it is visible, but will not get wet or dusty.

N If there is more than one NASG in a facility, each NASG storage location should clearly indicate the others. For example, other NASG locations should be written on a sign posted on the wall above the storage shelf, or on the NASG storage bag if the bag is to be left in the storage location. This way, if, in an emergency, someone goes to retrieve an NASG from its usual place and does not find it there, they will know where to look for another one.

Participant Handout 6.13: Folding the NASG Flowchart



Participant Handout 6.14: Returning NASGs to Lower-Level Facilities for Future Use

All facilities must have a clear plan in place for getting NASGs back to their original facility, or back to a central distribution point from which NASGs are returned to the facilities designated to use them.

NASGs will leave lower-level facilities on women being transported to higher-level facilities. How will these referring facilities have garments to use the next time they need them? And how will the garments be cleaned properly for safe use with minimal damage to them?

A clear plan must be made in each facility, cluster of facilities, district, etc., to get NASGs cleaned appropriately and returned to the locations where they are needed. This plan could be made between each pair of referring and receiving facilities, or all garments could go to a central place for cleaning and redistribution to the facilities that are supposed to have them.

Local solutions are needed because if a garment is not available when a woman goes into shock, then a critical piece of the continuum of care is not available.

Participant Handout 6.15: Frequently Asked Questions about the NASG

1. Q: How does the NASG work?

A: The NASG provides mild pressure, pushing blood from the lower extremities into central circulation, making sure there is sufficient blood getting to the vital organs, including the brain. Additionally, the foam ball over the abdomen applies pressure to the blood vessels of the uterus, decreasing blood flow.

2. Q: What are the indications for using the NASG?

A: The NASG could be used to manage any condition where there is severe bleeding below the diaphragm. Our studies have documented use with all forms of obstetric hemorrhage, as long as the fetus is not viable in utero.

3. Q: What are the contraindications for NASG use?

A: In treating PPH with the NASG, there are no absolute contraindications. For trauma patients, the NASG is contraindicated for patients with severe congestive heart failure or preexisting mitral stenosis. In trauma victims with injury to the chest or head, redistribution of blood to the injured area with NASG placement raises the possibility of associated increased hemorrhage.

We have no data on uterine blood flow and negative fetal effects of the NASG—it could be assumed that placing the abdominal portion of the NASG would diminish uterine blood flow and could be detrimental to fetal oxygenation.

4. Q: Does the NASG cause any discomfort?

A: Particularly in a warm environment, patients may complain of being hot. Fans or air conditioning should be provided if possible. After many hours, some women experience itching. This can be relieved by removing one leg segment at a time and massaging with lotion. Do not open the abdominal segment!

5. Q: The NASG is made out of a non-breathable fabric. Won't this make the patient too hot, sweaty, and possibly dehydrated?

A: Women in shock are generally too cold, so the NASG initially will cause no problem. If the NASG is on for a long time, see 4 above. Additional fluids may be necessary when it is hot and a woman is in the NASG for a long time.

6. Q: Can the patient breathe normally with the NASG in place?

A: The patient should not experience difficulty breathing and if general anesthesia is needed, ventilation should not be compromised. Should the patient experience dyspnea (difficulty breathing), the NASG should be removed and cardio-respiratory evaluation carried out, if possible. Mitral stenosis should be suspected and ruled out before replacing the NASG.

7. Q: Patients who are unconscious from shock regain consciousness with the application of the garment and may become frightened when they find themselves in this garment. How do you address that?

A: The proper care of a critically ill, unconscious patient is one-to-one nursing care. However, the reality of some low-resource settings is that there will not be one-to-one nursing care available. If this is the case, it is crucial that a support person (family member, traditional birth attendant, or other accompanying person) continuously be involved in the patient's care and at her side. The support person must be instructed to reassure the patient that the NASG is something which has saved her life, and to also call for assistance from a nurse or doctor when needed.

8. Q: How long can/should the NASG be used on a given patient?

A: There is no particular time limit. The patient should be stable and comfortable in the NASG for hours or days until the bleeding has been arrested (spontaneously or through surgery), the volume restored, and the blood replaced as needed.

9. Q: What is the longest time an NASG has been worn?

A: To date, the longest the NASG has been on a woman has been 58 hours. However, the faster the source of bleeding is discovered and treated, and the woman's blood volume replaced, the better her chance of recovery.

10. Q: When should the NASG be removed?

A: The source of bleeding should have been identified and hemostasis attained. Then, remove the NASG stepwise when the clinical impression is that the blood volume has been restored with saline and blood as needed.

If equipment is available for measuring Hgb and Hct, a hemoglobin (Hgb) level of about 7g/dl and hematocrit (Hct/pcv) of about 20% should be achieved before removing the NASG.

Note: In places where the mean pregnancy and non-pregnancy Hgb is < 7 (in India 70% of pregnant women have a Hgb of < 7), it may be unrealistic to wait for an Hgb of 7 to remove the garment.

Remember: The NASG should never be removed unless under medical supervision!

11. Q: Why not remove the top of the NASG first?

A: The largest portion of capacitance vessels are in the abdominal cavity, rather than the legs. Removal of the abdominal segment first will cause rapid redistribution of blood and the patient may return to a state of shock.

12. Q: How will you know if the NASG has been removed prematurely?

A: If the woman is still hypovolemic, her BP will decrease and pulse will increase when a segment of the NASG is removed. If this happens, replace the segment immediately.

13. Q: Can surgery be performed with the NASG in place?

A: Vaginal surgery and procedures, such as repair of lacerations or D&C can and should be done without complete removal of the NASG. The upper segments (4 and 5) of the NASG must be opened for laparotomy.

14. Q: Does the NASG have to be placed and removed by a doctor?

A: After a basic training session, anyone who is able to recognize PPH or hypovolemic shock from any source of obstetric hemorrhage can place the NASG. However, the decision to remove the NASG is one based on clinical and laboratory assessment and in most settings would be a physician-initiated decision with physician supervision during the process. Actual physical removal of the NASG can also be done by a skilled health care provider. It is a stepwise process which requires training to assess the stability of vital signs as each segment is removed at 15-minute intervals. Removal also requires the ability to reverse shock by administering additional fluids or blood transfusions. When a physician is not available, well-trained midwives or clinical officers who have been trained on NASG removal can remove it. But, the important thing to remember is that emergency care must always be available when the NASG is removed.

15. Q: How can one ensure the garment is free of HIV and the hepatitis virus?

A: There is no need to treat the NASG any differently than any other fabric item that gets body fluids on it, except that the % solution needs to be lower or the fabric will wear out too quickly.

The NASG is wrapped on the outside of the body; it does not go inside the body. The NASG must be decontaminated with 0.05% bleach solution, washed, and dried in the sun. These are Universal Precautions/Infection Prevention Steps. To create a 0.05% bleach solution, add 50mL bleach to 4950mL water (or 2 oz. bleach to 1 gallon water).

16. Q: Why are we introducing the NASG when it seems it is still in the research phase?

A: There are different levels of evidence that satisfy different requirements. Globally, the WHO determines what devices, medicines, and procedures can be introduced into public health systems. WHO holds the very highest standards, the “gold standard” based on randomized control clinical trials (RCT). The NASG has not been tested in an RCT, however, an RCT, conducted by the University of California, San Francisco, the World Health Organization, the University of Zimbabwe, and the University Teaching Hospital, Lusaka, Zambia and funded by the National Institute of Health (US) and the Bill and Melinda Gates Foundation, is underway in Zambia and Zimbabwe. The results will not be known until 2012 or 2013. In the meantime, based on the promising results of the NASG pilot trials in Egypt and Nigeria, the MacArthur Foundation, working closely with the Nigerian Ministry of Health, decided that there was enough evidence for them to feel comfortable introducing the NASG into wide spread use.

Unit 7: Data Collection and Record Keeping

Participant Handout 7.1: A Primary-Level Logbook

Primary-Level Facility Patient Logbook

Month: _____ Year: 20____ Name of Facility: _____ City: _____ State: _____

Regn. # & Date of admission	Admission type	Arrived in shock	Pregnancy outcomes	Misoprostol	Other uterotonic	Controlled Cord Traction	Uterine Massage	Hemorrhage
1	2	3	4	5	6	7	8	9



Participant 7.2: Guidance and Definitions for Filling out Facility Logbooks

Every patient coming to this facility for the following should be recorded in the logbook

1. Childbirth delivery
2. With complications after childbirth (up to 42 days postpartum)
3. With complications after having a non-live birth outcome (miscarriage, stillbirth or unsafe abortion [performed elsewhere]) up to 42 days postpartum

The following information corresponds to the column number in the logbook.

1. Registration number and date of admission: Number assigned to the patient by the facility. Use whatever number has been assigned to the patient according to the facility's recording system; add date of admission.

Codes are assigned to columns 2 through 18. Use the corresponding codes to enter information in the logbook

2. Admission Type

D - if direct admission (i.e., woman came on her own)

R-I-F - if referred in by a private or public facility/private skilled provider/community health worker due to PPH, PPHS, PAH, ECL, or OOH

R-I-C - if referred in by community (chief, TBA, other) due to PPH, PPHS, PAH, ECL, or OOH

3. Arrived in Shock

SHK - if patient was already in hypovolemic shock secondary to hemorrhage when she was admitted to this institution either from home or from another facility

N - if patient was not admitted with shock

4. Pregnancy Outcome

LB - if live born baby

MC - if the outcome was a miscarriage

SB - if the outcome was a still birth

UA - if it was an unsafe abortion performed elsewhere

5. Misoprostol

MISO - if administration of misoprostol at the time of delivery of baby and up to 5 minutes after the delivery

N - if no misoprostol was given

6. Other Uterotonic

OXY - if administration of oxytocin at the time of delivery of baby and up to 5 minutes after the delivery of baby

MET - if administration of Methergine at the time of delivery of baby and up to 5 minutes after the delivery of baby

N - if no uterotonic was given

7. Controlled Cord Traction

CT - if controlled cord traction was performed

N - if controlled cord traction was not performed

8. Uterine Massage

UM - if uterine massage was performed

N - if uterine massage was not performed

9. Hemorrhage

N - if no PPH or if blood loss is <500 mL

PPH-A - if blood loss after delivery is >350-499 mL

PPH - if blood loss after delivery is >500-999 mL

PPHS - severe PPH if blood loss after delivery is >1000 mL

PAH - postabortion with hemorrhage (determined by clinical sign)

OOH - if other obstetric hemorrhage (e.g., placenta previa, ectopic etc.)

10. Crystalloid of 1500mL in First Hour

IVC - if Ringers Lactate, Hartmann's Solution, or Normal Saline is used

N - if no IV Crystalloid is used

11. Hypovolemic Shock (developed after admission)

HYP-SHK - if clinical signs of decompensation of circulatory system due to excessive blood loss. Blood loss may be revealed (as in PPH from uterine atony) or partially concealed (as in abruption or ruptured uterus). Vital signs change so that the pulse is > 110 BPM, systolic blood pressure < 90 mm Hg, the patient may become diaphoretic, confused, agitated or unconscious

N - if no signs of hypovolemic shock

12. NASG (Non-Pneumatic Anti-shock Garment)

NASG - if received NASG before transfer

N - if did not receive NASG before transfer

13. Operations/Procedures

C-Sec - if had C-section

HYST - if surgical removal of the uterus to stop intractable obstetrical hemorrhage

MRP - if placenta was manually removed to manage hemorrhage in the third stage of labor

LAP - if intractable PPH was managed by open abdominal surgery to ligate uterine/internal iliac arteries or to repair a possible uterine rupture

ECT - laparotomy for ectopic pregnancy

N - if no procedure was performed

14. Blood Transfusion

BL-TRNFS - if received a blood transfusion and number of transfusions given (e.g., 1, 2, or 3)

N - if no blood transfusion was received

15. ECL (Preeclampsia/Eclampsia)

ECL-NT - if preeclampsia (or eclampsia) and not treated at the facility

ECL-T - if preeclampsia (or eclampsia) and treated at the facility

ECL-T-R - if preeclampsia (or eclampsia) and treated at the facility and referred to higher level

N – if no preeclampsia (or eclampsia)

16. Refer-Out

Ref-O - if referred out to other hospital for PPH, PPHS, PAH, ECL or OOH

N - if no referral

17. Death: deaths that only occur at facility

Died - if the woman died

N - if the woman survived

18. Obstetrical Cause of Death-if died, write obstetrical cause of death as one of the following categories

PPH - if bleeding after delivery is > 500 mL

PAH - if post abortion hemorrhage

ECL - if eclampsia

ECT - if ectopic

OOH - if other obstetric hemorrhage (e.g. placenta previa or any other anomaly of placenta implantation)

Other - if other causes BPM, systolic blood pressure < 90 mm Hg, the patient may become diaphoretic, confused, agitated or unconscious

N - if no signs of hypovolemic shock

Participant Handout 7.3: Primary Level Case Studies

Case 1: Mrs. X is a 21 year-old, G3, P2, in her last month of pregnancy. She came to the facility for delivery at 08:00 hrs. She is 6 cm on arrival, her BP is 106/70, P 72, R normal. She makes rapid progress to fully dilated at 08:30 hrs. She pushes two times and delivers a baby boy. 10 IU oxytocin is given IM in the right thigh. The baby is put to breast and after pulsation stops, the cord is clamped and cut, Placenta is delivered by controlled cord traction. Uterus is massaged and firm. Blood loss 150 ml. Patient and baby discharged in good condition.

Case 2: Mrs. Y is a 38 year-old G4, P3 at term with a very large baby. She came to the facility for delivery at 19:00 hrs. She was 6 cm on arrival, BP 106/70, P 72, R normal. She made very slow progress to fully dilated at 00:00 hrs. She had a longer than expected second stage of 30 minutes and delivered a large baby girl in the posterior position. 10 IU oxytocin was given IM in the right thigh, the baby was put to breast and, after pulsation stopped, the cord was clamped and cut. Controlled cord traction was applied with fist contraction, but the placenta did not deliver. Next contraction awaited. Placenta was delivered by controlled cord traction with the next contraction, and arrived with a large gush of blood. Uterine massage was given for boggy uterus. Uterus stayed firm if massaged, but went soft as soon as massage stops. Blood loss appears to be around 400 ml. 10 IU oxytocin in IV drip (250 ml Ringer's Lactate) and 0.2 mg IM Methergine was given. Fundus stayed firm. Total blood loss 600 ml, Pulse 86, BP 100/70. Baby and mother discharged in good condition.

Participant Handout 7.5: Secondary Level Case Studies

Case 1: Mrs. A. M.

Mrs. A. M. is a 40 year-old G15 P12+2 with only 5 children living who was admitted to K. General Hospital at 14:50 hrs. on Tuesday, August 5, 2008 with a 2-day history of labor pains and 12-hour history of vaginal bleeding. On admission, her vital signs were Pallor+++, fast shallow breathing (pulse rate of 132/minute, fast and thready), BP of 80/?? On examination: The abdomen was tender and fetal parts were easily palpable. An ultrasound was done in the labor room and revealed intra-uterine fetal death with fluid collecting in the peritoneum. A diagnosis of shock secondary due to ruptured uterus was made.

Her PCV was 18%. 5 pints of blood were requested. The patient was given 1 liter of normal saline within the first hour and 1 liter 4 hourly. Antibiotics were also given and a urinary catheter was inserted. Other routine shock management was given.

The NASG was applied at about 16:00 hrs. There was a delay in applying the NASG because the nurse midwife in charge of the labor room locked the newly-supplied NASG in her office and she was absent when the patient was admitted. However, after the staff on-call telephoned her, she immediately came to the hospital and provided the NASG.

The 5 pints of blood requested were not available. At 20:00 hrs. (4 hours of the NASG being on), the relatives were only able to get one pint of blood. Mrs. A.M. was taken to the operating theatre where she had a successful repair of the uterus with bilateral tubal ligation. In addition, 1.8 liters of blood was seen intraperitoneum during the surgery.

Her vital signs remained stable and removal of the NASG commenced one hour post-surgery. Her vital signs the next morning (August 6 2008) were: pulse rate, 84/minute; BP, 110/80mmhg. A second pint of blood was located and given. The patient recovered and was discharged.

Note: The challenge with this case was the late application of the NASG (1 hour 20 minutes post-admission) because the nurse midwife in charge locked the NASG in her office and went out. It is important to have the NASG in a central place that is accessible to all on-call.

The NASG was very effective in keeping the patient in a stable condition while waiting for the relatives to get the requested pints of blood.

Case Study 2: Mrs. H. A.

Mrs. H.A. is a 35 year-old G11 P10 who was admitted to K General Hospital at 09:55 hrs. on Wednesday, August 6 2008, with a two-hour history of abdominal pains, dizziness, and a fainting attack a few hours before admission. The patient was carried into the hospital because she could not walk on her own.

On admission, her vital signs were:

- Pallor+++,
- Fast shallow breathing (Pulse rate of 132/minute, fast and thready), and
- Blood pressure of 110/60.

Fundal height was term, abdomen was hard and tender. Fetal parts were non-palpable. Abdominal ultrasound showed abruptio placenta at 37 weeks gestation with intra uterine fetal death. A diagnosis of abruptio placenta with fetal death was made. She was placed on intravenous fluids, a urinary catheter was inserted and the NASG was applied at about 10:30 hrs. The NASG was applied, but was old, weak, and worn-out. It was supplied in May 2007 and had lost most of its elasticity. The worn-out NASG was replaced with one of the new ones supplied to the hospital.

Subsequently, one of the midwives from a primary facility who was being trained applied the new NASG. During this application, the patient had recovered considerably as she was conscious, answered all questions posed by the attending physician and was able to lift herself off the bed for the new NASG to be applied. The patient was examined per vaginam by the attending physician. He performed artificial rupture of membrane which revealed red colored liquor. The patient is to get 5 pints of blood and PCV test was ordered to be done. She is stable and is expected to have spontaneous vaginal delivery.

Day 2 (August 7 2008)

Had spontaneous vaginal delivery of fresh still birth at 04:00 hrs. with much retro-placental clots. NASG was removed at about 06:00 hrs. due to the fact that the NASG was completely soaked in blood after the spontaneous vaginal delivery and the patient consistently asked the midwives on duty to remove the NASG. The patient was in the NASG about 19 hours. Her vital signs were BP: 120/60mmhg, pulse rate: 118/minute. Urine output was satisfactory and the urinary catheter was removed. Urgent PCV was requested by the attending physician because the patient was still clinically pale and the relatives were unable to provide any blood. However, the patient was sitting up and eating and later transferred to the postnatal ward and was monitored very closely by the medical team on-call.

Participant Handout 7.7: Tertiary Level Case Studies

Case Study 1: Mrs. S. was a G5 P4, 28 year-old woman who planned a home birth with a TBA, but because of mild preeclampsia she came to deliver at the secondary hospital. On admission her BP was 70/40, P130. On abdominal exam her uterus was soft with fetal parts felt right under the skin. The diagnosis was ruptured uterus. The team immediately started two IVs, normal saline, with large bore catheters and put Mrs. S. in the NASG. She was transferred to the Medical College for surgery and blood transfusions, sending a nurse with her with a referral form. The nurse would take her vital signs and monitor for shock. They call ahead to the college to alert them to the need for blood.

Case Study 2: Mrs. R. was a 28 year-old, G5 P4, who arrived at the medical college with extreme right sided pain. Her LMP was more than two months ago. While she was spotting only a little, her pulse was 120 and her BP 90/40. She was shaking and confused. A ruptured ectopic pregnancy and shock were diagnosed. The NASG was applied. Two IVs were started and blood was drawn and sent for type and cross match to prepare blood for transfusion. Mrs. R. was prepared for surgery, which took approximately 40 minutes, and she received two pints of blood. After receiving blood and saline Mrs. R's BP was 100/60, P100. The surgeons and anesthesiologist were completely scrubbed and ready. The circulating nurse opened the NASG segments #5 and #6 and the surgeons performed a laparotomy. When the NASG segments were opened, Mrs. R.'s BP fell to 80/30 and her pulse increased. The anesthesiologist increased the normal saline. The surgeons suctioned 2000 ml of blood from the abdominal cavity and repaired the tube. They closed the skin and then replaced the two NASG panels. Mrs. R's pulse was 100 and her BP 80/60. Gradually her pulse fell and her BP rose. Two hours after she left the recovery room, her pulse was 80 and her BP 98/70. She asked to have the NASG removed, which was done.

Participant Handout 7.8: Record Keeping and Data Collection

It is important to record basic information on clients who seek health services from providers and/or facilities.

At the provider and facility level, such data are necessary for diagnosis of the disease, determining the severity of the condition of a patient, and determining progression of the illness. The providers use these data for determining treatment regimens and/or making referral decisions. Also, effective monitoring and supervision for continuous quality improvement cannot be done without reliable patient data.

At the regional and national level, patient information is the basis for health care planning, projection of infrastructure and supply needs, resource allocation, and an epidemiological database of morbidity and mortality. Without minimal epidemiological surveillance, no effective planning can happen to enhance the effectiveness and efficiency of the health care system, to assess whether interventions are effective, and to improve public health.

At the intervention or project level, data can inform if, and to what extent, a single intervention or group of interventions were successful.

Numbers make sense when they are based on quality data. Therefore, we need to have good clinical record keeping in order to produce good quality data. The basic quality issues related to data are completeness of information in terms of:

N Content, N Timeliness, and
N Coverage, N Accuracy.

The reliability of data therefore depends on the completeness and accuracy of information collected.

Let's take an example: Logbooks are commonly used at facilities to note what happened to clients, what procedures were performed, and basic information about the client. Therefore, each and every client should be recorded in the logbook (for completeness of coverage) and every item in the logbook should be filled in for a client (for completeness of content). The record keeping for every client and every item should be as accurate as possible.

Data and record keeping need to be kept simple because the primary responsibility of providers is to give care. However, data is also very important in being able to document the success of an intervention, which will influence if it is allowed to continue after the project is over. Providers and managers on all levels of the health system can use the data for problem solving and quality improvement. Likewise, the data will inform decision makers if the intervention is not successful and this information can be used to improve the intervention.

Summary: Data and record keeping must be kept simple because the primary responsibility of providers is to give care. However, data is also very important to document the success of an intervention.

UNIT 8: Community Mobilization

Participant Handout 8.1: Prevention of PPH in the Community

During antenatal care, providers should work with each woman to develop a birth and complication readiness plan. If possible, birth planning should also involve the decision makers in the woman's family (husband, father, mother-in-law, etc.). This should ensure that the woman and her family are aware of warning signs and have already identified actions to take and resources to tap if warning signs present during pregnancy or birth. Birth and complication readiness plans address the first three delays: in recognizing the problem, in deciding to seek care, and in reaching the facility. Community transport schemes should be collaboratively developed by health authorities and facilities within each neighborhood or village so that every family can access those schemes quickly when emergencies arise.

Entry points for birth planning

Providers at different levels and in different roles have varying points of entry to facilitate birth and complication readiness planning with pregnant women:

Community-Level Providers: Community health workers, community midwives, and other skilled birth attendants working at the community level, providing antenatal care and attending homebirths.

Facility-Level Providers: During routine antenatal care visits, facility-level providers should incorporate birth and complication readiness planning into antenatal care

All health facility staff: All staff, whether clinical, janitorial, or transport staff, can be oriented to the four delays to urge their family and community members to establish birth and complication readiness plans.

Participant Handout 8.2: Counseling on Recognizing Labor, Warning Signs, and Emergency Readiness at the Community Level

At every level, providers should counsel women (and the decision makers in their families, if possible) on recognizing labor, warning signs, and being prepared for obstetric emergencies, all of which address the first three delays.

Ensuring a woman understands the danger signs

A critical component of birth and complication readiness planning is ensuring that the woman understands what danger signs to look for and that the danger signs could signify a serious complication. This addresses the first delay.

Warning signs of obstetric complications

Providers should counsel each woman to travel immediately to a health facility if she experiences any of the symptoms listed on the following page.

Signs of onset of labor

Providers should counsel each woman to go to a facility or contact her SBA if she notices any of the following three signs that signify the onset of labor:

- N Bloody, sticky vaginal discharge;
- N Painful contractions five to 20 minutes apart (or closer), depending on how far she is from the facility if that is her choice of birth place; or
- N Water breaks.

Risk factors, when known

Several major risk factors increase the likelihood the woman will experience obstructed labor or other complications. The woman should be especially encouraged to deliver in a facility if it is known that:

The woman:

- N Is carrying twins,
- N Is very young,
- N Was malnourished as a child,
- N Has a deformed pelvis,
- N Is diabetic,
- N Had a previous delivery that was very difficult,
- N Has a history of PPH,

Or the baby:

- N Is in a breech or transverse position,
- N Is very large, or
- N Its head is still up high and can be felt above the public bone (not in the pelvis).

Danger signs in the newborn

Women should also be informed of key danger signs for the baby before, during, or after birth, including:

- N Fever
- N Diarrhea/loose stools
- N Continuous crying
- N Cough/breathing problems
- N Irritability
- N Lethargy
- N Inability to feed
- N Vomiting
- N Abdominal distension/pain
- N Pus/pustules

Scenarios for role play

Non-provider roles can include:

- N A 14-year-old primipara
- N A 32-year-old grand-multipara carrying twins
- N A 24-year-old diabetic woman
- N A 28 year old woman who had severe bleeding with her first birth

If there is an odd number of Px, a third person can participate in a group, playing the woman's husband, mother-in-law, or other family member/support person.

Participant Handout 8.3: Danger Signs in Plain Language

Danger Sign in Plain Language	Could Indicate
At Any Time	
<ul style="list-style-type: none"> • Bag of waters breaks and labor does not begin within 24 hours 	(Preterm) premature rupture of membranes
<ul style="list-style-type: none"> • Baby stops moving for 24 hours 	Fetal death
<ul style="list-style-type: none"> • Strong abdominal pains 	Infection, miscarriage, or tubal pregnancy
<ul style="list-style-type: none"> • Vaginal bleeding at any time: <ul style="list-style-type: none"> ○ In an amount similar to monthly bleeding ○ With pain 	Placental abruption, ectopic pregnancy, miscarriage,
<ul style="list-style-type: none"> • Vaginal bleeding without pain, in the second half of pregnancy 	Placenta previa
<ul style="list-style-type: none"> • Moderate or severe fever (above 38°C) • Bad-smelling vaginal discharge 	Infection
<ul style="list-style-type: none"> • Chills • Cold sweats • Fast breathing • Feeling dizzy, faint, weak, or confused • Pale skin • Fast but weak pulse 	Shock
<ul style="list-style-type: none"> • Strong headaches • Blurry vision or double vision • Pain in the upper abdomen, similar to feelings of indigestion, that starts suddenly and stays • Hands, feet, etc. react too much when tapped firmly with the first 2 fingers (overactive reflexes) • Face and hands are swollen, especially when the woman first gets up in the morning • Sudden weight gain • Fainting • Fits/convulsions 	Preeclampsia
During Labor	
<ul style="list-style-type: none"> • Pain in or above the uterus between contractions 	Infection
<ul style="list-style-type: none"> • Contractions stop • Baby feels loose in the belly 	Uterine rupture
<ul style="list-style-type: none"> • Loss of consciousness 	Shock and/or eclampsia
<ul style="list-style-type: none"> • Strong contractions lasting longer than 12 hours (24 hours if first pregnancy) 	Obstructed labor
Table continues on following page	

Danger Sign in Plain Language	Could Indicate
During Labor, continued	
<ul style="list-style-type: none"> • Baby comes feet, bottom, hands, or face first (before head) 	Dangerous fetal position
<ul style="list-style-type: none"> • Cord comes out before the baby 	Prolapsed cord
<ul style="list-style-type: none"> • Uterus is firm between contractions, or firm at all times • Abdomen is sore or tender • Baby moves less or doesn't move at all • Baby's heartbeat is too fast, too slow, or undetectable 	Detached placenta
During Labor or After Delivery	
<ul style="list-style-type: none"> • More bleeding than normal: <ul style="list-style-type: none"> ○ A "gush" or burst of blood during the second stage of labor ○ Steady bleeding before the placenta has come ○ Bleeding without pain between contractions ○ More blood is lost than would fit in a typical cup (provider should explain that it is very hard to estimate blood loss accurately, and the woman should go to a facility if there is any worry that she has lost this much blood) 	Detached placenta, PPH, or placenta previa
<ul style="list-style-type: none"> • Placenta does not come out 	Retained placenta
<ul style="list-style-type: none"> • Uterus feels soft, will not firm up with massage, after delivery 	PPH and/or retained placenta
<ul style="list-style-type: none"> • Fits or convulsions • Eyes roll uncontrollably • Hands and/or face twitch • Skin starts to look blue around mouth • Breathing has a loud, bubbly sound 	Eclampsia

Participant Handout 8.4: Developing a Birth and Complication Readiness Plan

Advantages of delivering at a facility

Because most women who develop PPH have no risk factors, delivering at a facility means that the woman is already at a place where she can access higher-level care if needed, including skilled providers, drugs, and equipment. This addresses the first three delays and ensures that skilled providers are involved, to help identify problems that arise.

In addition to PPH, many other complications of delivery requiring higher-level care can develop unexpectedly. Delivering in a facility is especially important for young women and for women living with HIV, because both are more likely to develop complications and, even in normal deliveries, the facility can provide antiretroviral drugs for the women living with HIV for prevention of mother-to-child transmission of HIV.

Barriers to Facility Delivery

Women may be unable to deliver in a facility because of distance, cost, provider attitudes, household decision-making, or other reasons.

Some barriers can be addressed by facilities through:

- N Implementation of ambulance transportation schemes, or
- N Provider training that emphasizes treating women with respect, improving the quality of facility-level services.

Other barriers may require involvement of other groups, such as the MOH providing incentives for facility births, or mobilization at the community level to generate funds for transport and/or facility expenses.

Discussion points for birth and complication readiness planning

When discussing birth and complication readiness plans with a woman and her family decision makers, the following key messages should be included:

- N Importance of being prepared if an emergency occurs;
- N Advantages of delivering at a facility;
- N Importance of skilled attendance in facility or at home;
- N Key preparations beforehand, depending on place of delivery:
 - N For delivery at a facility: when to go, what to bring, money for transport and/or facility costs, and identifying willing blood donors; or
 - N For delivery at home: an SBA, clean birth space, new blade and cord ties, plan to immediately breastfeed, and an emphasis on emergency transport plan.

Importance of skilled attendance

Whether a woman delivers in a facility or at home, skilled birth attendance is critical. A skilled birth attendant is trained in recognizing signs of complications, including estimation of blood lost, can provide lifesaving interventions, and can make the decision to seek higher-level care if needed. SBAs do not employ harmful traditional practices, which are sometimes used by unskilled attendants and result in serious complications.

Key preparations for delivery in a facility

In advance, the woman and decision makers need to identify the following:

- N Who will make the decision to go to the facility if the decision maker is not present?
- N How will the woman travel to the facility?
- N Is there a cost for transportation to the facility? If so, how will transportation be paid for?
- N How much does delivering at the facility cost? How will that be paid for?
- N How soon can the woman and her family start saving for these expenses?
- N Who will travel to the facility with the woman?
- N Who is identified as a willing donor of blood if the woman needs it?
- N While the woman is away, who will look after her other children (if she has any) and her home?

When to go and what to bring: When a woman should go to the facility depends on how far she lives from the facility.

A woman who lives within easy reach of the facility should go once labor is well established (contractions regular, five minutes apart).

If a woman lives far from the facility, she should begin her journey (via previously organized transport) at the first signs of labor. If she has the resources and support to do so, she should travel to the community where the facility is located two to three weeks prior to her due date. If she has family or friends who live near the facility and are able to help her, she should stay with them until she is ready to go to the facility. If the facility has a maternal waiting home that the woman is eligible to use, and she has the resources to do so, staying at the waiting home is also recommended.

When a woman travels to the facility, she and her support person(s) should bring:

- N Her birth planning card and/or maternal record;
- N Large clean cloths, which will be used for washing, drying, and wrapping the baby and (a second set) as sanitary pads after birth;
- N Clothes for both adults and the baby; and
- N Food and water for the woman and her support person.

Preparations for delivery at home

In advance, the woman and decision makers need to identify the following:

- N Who will make the decision to go to a facility if the usual decision maker is not present?
- N Who will stay with the woman during labor?
- N Who will be nearby for at least 48 hours after she gives birth?
- N Who will help care for the woman's other children (if she has any) and her home while she is in labor and recovering?

The provider should also reiterate to the woman (and decision makers, if possible):

- N An SBA should be called at the first sign of labor; and
- N If the woman needs help, she should be linked beforehand to existing community resources for help, such as community emergency transport, willing blood donors, a community fund to cover costs, etc.

Some programs provide women with home-based maternal records—simple, pictorial cards that women can use to record information about pregnancy, labor, delivery, and complications. Home-based maternal records help the woman and family determine that complications are developing and facilitate sharing this critical information with a provider.

If a home-based maternal record is used, the provider should explain the sections of the card, information collected, and any signs or symbols to the woman as well as to any decision makers with her. The provider should take time to verify that the woman and her companions understand the card, especially if they cannot read. If the provider is working with the woman alone, the woman should be instructed to explain the card to her family members. If the woman is seen for multiple antenatal visits, the provider should review the home-based maternal record each time, to reinforce the importance of the record and its accurate use.

Preparations for delivery at home

If a woman plans to deliver at home, she should identify where she will give birth. This should be a clean, warm room with a clean surface covered by clean cloths.

In advance of labor, the woman and her family should also gather the following materials:

- N Clean cloths of varying sizes to be used for: the woman's bed, drying and wrapping the baby, cleaning the baby's eyes, for washing and drying the birth attendant's hands, and to use as sanitary pads after the birth;
- N If there is a cloth or mat of standard sized used in the community to help estimate blood loss (an adaptation of the kanga method), such a cloth should be acquired if possible;
- N Blankets for mother and baby;
- N Clean buckets with clean water;
- N A means of heating the clean water;
- N Soap;
- N Three large bowls: two to be used for washing and one to hold the placenta; and
- N Plastic for wrapping the placenta.

Participant Handout 8.5: Birth Planning Card

Birth Planning Card

If I need blood, the following people will donate for me:

Name : _____
 Address: _____

Name : _____
 Address: _____

The person who will escort me is: _____
 Address: _____

If this person is not at home, I will be escorted by: _____
 Address _____


Husband/Father signature: _____

If you have any of these problems, get help as fast as possible:

<p>During Pregnancy</p> <ul style="list-style-type: none"> • Vaginal bleeding • Fever • Strong abdominal pains • Fainting, fits or convulsions • Severe headache • Swelling of the legs, hands and face • Fetus stops moving for 24 hours • Bad-smelling vaginal discharge • Bag of waters breaks and labor does not begin within 24 hours 	<p>During Birth</p> <ul style="list-style-type: none"> • Labor longer than 12 hours (24 hours if first pregnancy) • Cord comes out before the baby • Baby comes feet, hand or bottom first (before head) • Placenta does not come out • Fits/convulsions • Heavy bleeding
--	--

After Birth

- Heavy bleeding
- Fever
- Bad-smelling discharge



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Birth Planning Card

Name : _____
 Address: _____
 Location: _____
 Village: _____


Head of Household: _____

I plan to deliver at: _____
 Facility (name): _____
 Home _____
 For delivery at home I will be assisted by (name): _____
She has agreed to stay with me for 2 hours after my delivery

In Case of Emergency I will go to: _____
 Facility: _____

Transport vehicle: _____ Cost: _____

I have saved _____ (money) for my transport



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continues on other side

Participant Handout 8.6: Scenarios for Birth and Complication Readiness Planning Role Plays

Group 1 (2 Px): You are a woman pregnant with her first child and a provider counseling her on birth and complication readiness planning. The woman lives far from a facility and plans to give birth at home. The provider should discuss with her the advantages of giving birth at a facility, the advantages of using a skilled attendant for a home birth, and steps needed to take in either situation. The woman should leave the counseling session with a birth preparedness and complication readiness plan (including transport), written or pictorial, and a plan to tell her husband, mother-in-law, and/or other decision makers of her plans and what she needs.

Group 2 (2 Px): You are a pregnant woman and a provider helping her plan. The woman lives a medium distance from the facility and this is her first pregnancy. The woman should leave the counseling session with a birth preparedness and complication readiness plan (including transport), written or pictorial, and a plan to tell her husband, mother-in-law, and/or other decision makers of her plans and what she needs.

Group 3 (3 Px): You are a woman, her husband, and a provider who live in a community with a large hospital. The woman is pregnant with her second child and she had a lot of bleeding at her first birth, but is healthy now. The woman and her husband favor delivery at home because of costs. The provider should discuss with her the advantages of giving birth at a facility, the advantages of using a skilled attendant for a home birth, and steps needed to take in either situation. The woman and her husband should leave the counseling session with a birth preparedness and complication readiness plan (including transport), written or pictorial, and plans to tell any other decision makers of her plans and what she needs.

Group 4 (3 Px): You are a pregnant woman, her husband, and a provider. The woman is pregnant with her first child and plans to give birth at home. Her husband's aunt is a traditional birth attendant and the family plans for her to help with the birth. The woman and her husband should leave the counseling session with a birth preparedness and complication readiness plan and a plan to tell her mother-in-law, husband's aunt, and/or other decision makers of her plans and what she needs.

Group 5 (2 Px): You are a pregnant woman and a provider. This is the woman's sixth pregnancy and she plans to give birth at home. She gave birth to two of her children alone and is not concerned about having anyone around to help her. The provider should discuss with her the advantages of giving birth at facility, the advantages of using a skilled attendant for a home birth, and steps needed to take in either situation. The woman should leave the counseling session with a birth preparedness and complication readiness plan.

Participant Handout 8.7: Post-Test

There are a total of 50 correct answers. Each correct answer is worth 2 points.

1. List at least 4 causes of uterine atony.

2. List the 4 elements of the *Pathfinder International Model for Clinical and Community Action to Address Postpartum Hemorrhage*.

Multiple Choice Questions: Circle all the correct answers

3. Which of the following is a type of obstetric hemorrhage:
- a. Antepartum hemorrhage
 - b. Postpartum hemorrhage
 - c. A ruptured ectopic pregnancy
 - d. Retained placenta
 - e. All of the above
4. When a woman presents in hypovolemic shock, how much fluid should you infuse in the first 20 minutes?
- a. 250 mL
 - b. 500mL
 - c. 1000mL
 - d. 1500mL
5. Please mark all the steps in active management of third stage labor:
- a. Administration of a uterotonic within 1 minute of delivery of the baby
 - b. Controlled cord traction to deliver the placenta
 - c. Delivery of the baby
 - d. Uterine massage following delivery of placenta to ensure that the uterus is contracted
 - e. None of the above

6. What is the oral and sublingual dose of misoprostol administered to prevent postpartum hemorrhage?
 - a. 200 µg
 - b. 400 µg
 - c. 600 µg
 - d. 800 µg
7. When is the blood drape placed underneath the woman's buttocks and tied around her waist and hips?
 - a. Before delivery of the baby
 - b. After the delivery of the placenta
 - c. Immediately after the delivery of the baby
8. What does the red line on the blood drape indicate to the provider?
 - a. To get prepared to transfer the woman to a higher-level facility
 - b. To immediately transfer the woman to a higher-level facility
 - c. To start observing the bleeding every 20 minutes
 - d. None of the above
9. How can you ensure that the NASG is free of the HIV virus?
 - a. Put it out in the sun to dry
 - b. Decontaminate the garment with a 0.05% chlorine solution
 - c. Wash the garment with soap and water or in a washing machine
 - d. All of the above
10. How is misoprostol commonly administered to prevent PPH?
 - a. Injectable
 - b. Oral tablets
 - c. Vaginally
11. The 4 delays include:
 - a. Delay in recognizing that there is a problem
 - b. Delay in the decision to seek care
 - c. Delay in reaching a facility that can provide life-saving treatment
 - d. Delay at the facility, once reached, in providing the quality emergency treatment the woman requires.
 - e. All of the above

True/False Questions: Circle either T (true) or F (false)

12. T F A blood collection drape is a tool for measuring blood loss that can be used on all women who deliver.
13. T F Obstetric hemorrhage is one of the leading causes of maternal mortality.
14. T F Postpartum hemorrhage can be caused by genital tract or perineal lacerations.
15. T F Two-thirds of postpartum hemorrhage cases occur in women with no identifiable risk factors.
16. T F When collecting data for research it is important to get the patient's permission to use their information.
17. T F The most common side effect of misoprostol is shivering.
18. T F The NASG is an inflatable device that shunts blood to the brain, heart, and lungs and stabilizes hypovolemic patients.
19. T F The NASG is made of neoprene and Velcro.
20. T F The NASG shunts blood from the veins of the abdomen and lower extremities to the vital core organs (heart, lungs, kidneys, and brain).
21. T F If the woman experiences difficulty breathing with the NASG, the provider may adjust the abdominal panel.
22. T F Because the NASG is so effective, only 500 mL of crystalloid fluids should be given in the first hour.
23. T F Only one person, using as much strength as possible, should apply the pelvic and abdominal sections of the NASG.
24. T F When removing the NASG, start at the abdominal segment.
25. T F When applying the NASG, start at the abdominal segment.
26. T F The NASG can be disinfected and washed 30 times.
27. T F 40-50% of PPH can be prevented using AMTSL.
28. T F Misoprostol needs to be refrigerated.
29. T F Misoprostol works by helping the uterus contract, squeezing the blood vessels closed.
30. T F All women must be encouraged to develop a birth preparedness and complication-readiness plan, and to deliver (if possible) with a skilled provider.

Matching: Write the correct letter next to the matching definition

31. ____ is defined by how well it maintains active ingredient potency and other measures like pH when stored over time.	A. Blood Drape
32. ____ A two handed delivery of the placenta, involving gentle downward cord traction with one hand and upwards and backwards uterine counter-pressure with the other, performed only on a contracted uterus.	B. Uterotonic
33. ____ A funnel shaped plastic sheeting to catch blood with markings at 350 ml and 500 ml that is placed under the woman after delivery of the baby to enable the attendant to assess blood loss.	C. Hypovolemic Shock
34. ____ Surgical removal of the uterus to stop intractable obstetric hemorrhage.	D. Uterotonic stability
35. ____ A drug that stimulates uterine contractions.	E. Non-pneumatic Anti-Shock Garment (NASG)
36. ____ Excessive bleeding immediately after delivery, within the first 24 hours.	F. Crystalloid Intravenous (IV) Fluids
37. ____ Vaginal bleeding after delivery that exceeds 500 ml, or that is less than 500 ml and causes symptoms of shock.	G. Controlled Cord Traction
38. ____ Clinical signs of decompensation of the circulatory system, due to excessive blood loss.	H. Postpartum Hemorrhage (PPH)
39. ____ A garment that can be placed around the legs, pelvis, and abdomen of a woman who is in hypovolemic shock, compressing the blood vessels in her lower extremities and the uterus, that will stabilize her (shunt blood to her vital organs) until she can be treated at an appropriate higher-level facility.	I. Emergency (Caesarean) Hysterectomy
40. ____ Ringers Lactate, Hartmann's Solution, Normal Saline used for fluid replacement for PPH.	J. Primary Postpartum Hemorrhage
41. ____ Includes 3 components: a) Administration of a uterotonic within 5 minutes after the birth of a newborn, b) delivery of the placenta by controlled cord traction (after the cord has stopped pulsing), c) followed by uterine massage.	K. Active Management of the Third Stage of Labor (AMTSL)

Participant Handout 8.8: Course Evaluation

A. Overall evaluation

(How do you evaluate the overall quality of this training? Please mark in one appropriate box.)

Excellent

Very good

Good

Fairly good

Not good

B. Specific aspects

Please evaluate each of the training's factors by circling one appropriate number, according to the following rates

- 5: very good; very essential
- 4: good; necessary
- 3: fairly good; appropriate
- 2: not very good; not very necessary
- 1: weak; absolutely unnecessary

Please explain why you gave that rate in the last column

Factor	Rate					Comments
1. (Subjects covered in the training)	5	4	3	2	1	
2. Trainer's presentation and skill	5	4	3	2	1	
3. Materials used by trainers	5	4	3	2	1	
4. Materials provided to participants	5	4	3	2	1	
5. Preparation, planning and organization of the training	5	4	3	2	1	
6. Methods used in the training (group work, role plays, etc.)	5	4	3	2	1	

7. To what extent were objective clearly stated?

Completely unclear 1 2 3 4 5 6 7 8 9 10 Completely clear

8. To what extent was knowledge of participants utilized?

Completely unclear 1 2 3 4 5 6 7 8 9 10 Completely clear

9. To what extent was decision making shared by participants?

Dominated by one person 1 2 3 4 5 6 7 8 9 10 Completely shared

10. To what extent did participants have a chance to express their opinions?

Not at all 1 2 3 4 5 6 7 8 9 10 a very great extent

11. To what extent was the training participatory?

Not at all 1 2 3 4 5 6 7 8 9 10 a very great extent

II. Time for the training is (please mark on one appropriate box)

Too long

Long

Adequate

Short

Too short

C. Feedback for subsequent training.

If this training is held again, you would:

1. Maintain the following:

2. Improve the following:

3. Stop/eliminate the following:

D. Other comments and recommendations:

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