Active Management of the Third Stage of Labor

Data obtained from National Health Network Hospitals in Guatemala

July to August 2006

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Prevention of Postpartum Hemorrhage Initiative

ASOCIACION de GINECOLOGIA y OBSTETRICIA GUATEMALA

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The report was prepared by Dr. Walter O. Linares Pacheco, member of the Association of Gynecologists and Obstetricians of Guatemala (AGOG) and its coordinator within the Research Committee of the Central American Federation of Associations of Obstetricians and Gynecologists (COMIN-FECASOG), in collaboration with USAID's Prevention of Postpartum Hemorrhage Initiative (POPPHI). The Guatemalan research team included: AGOG associates, with Dr. Walter O. Linares Pacheco as country study coordinator, with the support of the members of the Association of Gynecologists and Obstetricians of Guatemala (MAGOG): Drs. Roxana Ochoa González, Vicente Aguirre Garay, Marco Antonio Barrientos Rivas, Vinicio Del Valle, Héctor Romeo Menéndez, Julio Rojas Sánchez, Francisco Luna Mejía, Sergio Marroquín Castillo, and Elsa Marina Hernández.

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About POPPHI

The Prevention of Postpartum Hemorrhage Initiative (POPPHI) is a USAID-funded, five-year project focusing on the reduction of postpartum hemorrhage, the single most important cause of maternal deaths worldwide. The POPPHI project is led by PATH and includes four partners: RTI International,

EngenderHealth, the International Federation of Gynecology and Obstetrics (FIGO), and the International Confederation of Midwives (ICM).

Commitment to Health: The Central American Federation of Associations and Societies of Obstetricians and Gynecologists

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Acronyms

AGOG	Association of Gynecologists and Obstetricians of Guatemala
AMTSL	Active management of the third stage of labor
COMIN-FECASOG	Central American Federation of Associations and Societies of Obstetricians and Gynecologists
FIGO	International Federation of Gynecology and Obstetrics
ICM	International Confederation of Midwives
IM	Intramuscular injection
IV	Intravenous injection
JHSPH	Johns Hopkins Bloomberg School of Public Health
MAGOG	Member of the Association of Gynecologists and Obstetricians of Guatemala
MSPAS	Ministry of Public Health and Social Work
POPPHI	Prevention of Postpartum Hemorrhage Initiative
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Postpartum hemorrhage is of the world's leading causes of maternal mortality. Active management of the third stage of labor (AMTSL) is a feasible and inexpensive intervention that can help save thousands of women's lives. AMTSL involves three basic procedures: the use of a uterotonic agent (preferably oxytocin) within one minute following the delivery of the baby, delivery of the placenta with controlled cord traction, and massage of the uterus after delivery of the placenta, with palpation of the uterus to assess the need for continued massage for the two-hour period following delivery of the placenta. Based on conclusive evidence from clinical trials, the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO) issued a joint statement in 2003 stating that every woman should be offered AMTSL as a means of reducing the incidence of postpartum hemorrhage.[1] The World Health Organization (WHO) Making Pregnancy Safer Technical Update on Prevention of Postpartum Haemorrhage by AMTSL recommends that "AMTSL should be practiced by all skilled attendants at every birth to prevent postpartum haemorrhage."[2]

Currently, very little is known about the actual practice of AMTSL. The aim of this study is to provide ministries of health and their international partners with the descriptive information necessary to assess AMTSL practices and identify major barriers to its use. Specifically, the study asks:

1. In what proportion of deliveries is AMTSL used nationally?
2. What practices are in place that do not conform with the FIGO/ICM definition of AMTSL?
3. What are the facility- and policy-level barriers and facilitators to the use of AMTSL?

To answer these questions, a convenience sample of facility-based deliveries from 15 hospitals with 1,000 or more deliveries annually across six of the eight regions in Guatemala was observed; clinical care guidelines, the Essential Drug List, and medical and midwifery school curricula were reviewed; the central pharmaceutical storage site, as well as pharmacies in health facilities selected for the study, were visited; and interviews were conducted with hospital directors and pharmacists.

The study showed that 87 percent of the deliveries received a uterotonic drug during the third or fourth stages of labor. The third stage of labor begins with the birth of the baby and ends with the delivery of the placenta. The fourth stage of labor is the first postpartum hour, which begins after the delivery of the placenta. Oxytocin, the drug of choice for AMTSL, was the only uterotonic drug used. Two AMTSL definitions were used in the study. The first definition strictly reflects the FIGO/ICM recommendations, including the administration of the uterotonic drug within one minute of delivery of the baby; the second definition is slightly more flexible, extending the timing of the uterotonic drug to within three minutes of delivery of the baby. The results of the study show that 7 percent of deliveries met the strict definition of correct AMTSL use and 12 percent met the more relaxed definition of AMTSL use. This means that between 88 and 93 percent of the women delivering in national public health network facilities did not receive adequate prevention of postpartum hemorrhage.

Several practices led to the low use of AMTSL. These include no use of a uterotonic at all during the third stage of labor, the incorrect timing of the administration of oxytocin, inappropriate

application of traction to the cord; low use of massage immediately following delivery of the placenta and even lower use of massage followed by palpation to assess the need for continued massage over the next two hours. The study also documented several potentially harmful practices, such as uterine massage following delivery of the baby, application of fundal pressure following delivery of the baby, and application of traction to the cord without manual support to the uterus and/or without prior administration of a uterotonic. At least one of these practices was observed in 88 percent of deliveries.

The policy and logistical environment to support AMTSL use in Guatemala is mixed. The most recent clinical guidelines for obstetric care (Medical care guidelines for pregnancy, labor, puerperium, and obstetrics emergencies or *Guías de atención del embarazo, parto, puerperio y emergencias obstétrica*) promote and define AMTSL according to the FIGO/ICM definition. However, it appears that this document has not been widely disseminated, as outdated guidelines which do not mention AMTSL were available in a third of facilities in the study. Oxytocin, ergometrine, and misoprostol are included on the Essential Drug List, though ergometrine and misoprostol are cited only for the management and not prevention of postpartum hemorrhage. AMTSL is not included in the current curricula for medical doctors or nurses, though these curricula are under revision and will include a detailed description of AMTSL in the near future. Only about half of the facilities visited had provided in-service training including AMTSL during the previous 12 months.

At the facility level, the logistics regarding the procurement and storage of uterotonic drugs in health facilities is satisfactory for the most part, though there are specific problems that need to be addressed. For example, there is substantial variation in the recommended storage temperature for oxytocin, including some which recommend storage at room temperature. Not surprisingly, there is also variation in storage conditions at the facility pharmacies, with 13 percent of facilities storing oxytocin at room temperature. The supply of uterotonic drugs requires continuous monitoring but is adequate in most facilities. Only one of 15 health facilities visited reported a stockout of oxytocin and ergometrine during the three months prior to the study, and all facilities had one year or less of available stock of all three uterotonic drugs.

Recommendations

The main recommendations selected from this study are summarized below:

National Policy

1. Standardize and disseminate the use of MSPAS National and Official Guidelines in national public health network hospitals and its promotion at private and autonomous levels.
2. Update the *Guías de atención del embarazo, parto, puerperio, y emergencies obstetricas* to include AMTSL as defined by international organizations such FIGO/ICM and WHO.
3. Implement AMTSL as a preventive measure for postpartum hemorrhage within pre-service curricula for medical, paramedical, and empirical personnel who participate in assisting public, private, or home deliveries.

4. Support and promote the joint work of the MSPAS, AGOG, international agencies, and other organizations to disseminate and implement the *Guías de atención del embarazo, parto, puerperio, y emergencies obstetricas* from the MSPAS in all national public health network institutions.
5. Adequately promote and disseminate the international standards for the proper storage of uterotonic drugs.
6. Promote the procurement of oxytocin as the first choice drug for the national health system and in sufficient quantities for all births. This will reduce national hospital consumption expenses.

Health Providers/Practices

1. Develop and evaluate, as soon as possible, a hands-on, competency-based AMTSL in-service training for medical, paramedical, or empirical personnel who participate in deliveries at national public health institutions.
2. Identifying barriers, including motivation, that impede use of AMTSL and address these barriers.
3. Prioritize the regions with particularly low use of AMTSL in national planning.
4. Prioritize the training of health providers with no or very little knowledge about AMTSL.
5. Standardize and enforce the *Guías de atención del embarazo, parto, puerperio, y emergencies obstetricas* and especially AMTSL at the national level.
6. Provide training of pharmacy or warehouse personnel of the different facilities on the care needed for the storage of uterotonic drugs.

Logistics and Supplies

1. Provide the institutions with adequate supplies and equipment needed for the proper storage of uterotonic drugs.
2. Provide the needed supplies for using AMTSL at national public health network institutions.
3. Reevaluate and update the procedures for the procurement and distribution of uterotonic drugs, particularly oxytocin, in order to ensure that all hospitals have an adequate supply of oxytocin for its use in AMTSL for every patient who has a vaginal delivery.
4. Uterotonic drugs should be available to every parturient woman, as necessary.

Monitoring and Evaluation

1. Implement a classifying system for the facilities to routinely monitor the use of AMTSL and to develop instruments to document its use, such as quality indicators.
2. An AMTSL documentation section should be included in the birth registry system and recorded in the medical file or records.

3. Train supervisors in AMTSL, and include items to monitor proper use of AMTSL on the supervision checklists.
4. Medical audits should include an evaluation of AMTSL use.

This study clearly shows very low use of AMTSL at the national level. As AMTSL has been proven effective in reducing postpartum hemorrhage, it must be classified as a primary preventive measure and must be urgently implemented in order to substantially reduce maternal mortality in Guatemala.

1. Background

Maternal mortality has become a key public health issue in Latin American and Caribbean (LAC) countries. This new focus on maternal mortality was conceived to increase attention and resources for this important topic. The goal of this strategy is to implement activities that will reduce maternal mortality by 75 percent by 2015, consistent with the Millennium Development Goals.

The maternal mortality ratio (MMR) for LAC is 190/100,000 live births; for Central America the ratio is 123/100,000. Almost all of these maternal deaths could be avoided if complications are diagnosed early and treated appropriately. Furthermore, in most countries one sees large discrepancies in maternal mortality by socioeconomic status, with the rural, poor, and isolated areas having higher ratios.

It is also important to recognize that for every case of maternal death, there are many more cases of severe maternal morbidity. Many women suffer the consequences of complications during childbirth at a later time. Consequently, proper maternal care brings rewards not only for the survival of the mother, but also for her long-term well-being.

According to data from the ENSMI 2002 in Guatemala, 41 percent of births took place in hospitals. Of those, 28.8 percent were in Ministry of Health facilities; 7 percent in Social Security facilities, and 6.3 percent in private hospitals. Births outside a facility accounted for 57.9 percent of all births. We do not know how accessible good quality antenatal and childbirth services are to women, particularly women who are poor, uneducated, or live in rural areas.

According to the Baseline Study of Maternal Mortality (2000) in Guatemala, the national MMR for the previous five years was 153/100,000 live births. Indirect causes account for 9.5 percent of these deaths; direct causes account for 90.5 percent. Postpartum hemorrhage is the leading cause of death (53.3 percent), followed by infection (14.4 percent), hypertensive disease of pregnancy (12.1 percent), and abortion (9.5 percent).

Among the deaths caused by hemorrhage, retained placenta was the most frequent cause (39.5 percent), followed by uterine atony (26.8 percent), non-specific uterine hemorrhage (16.4 percent), and ruptured uterus (8.3 percent).

Active Management of the Third Stage of Labor

Active management of the third stage of labor (AMTSL) is a feasible and inexpensive intervention that can help save thousands of women's lives from postpartum hemorrhage. AMTSL involves three main components:

- The use of a uterotonic agent within one minute following the birth of the baby.
- Delivery of the placenta with controlled cord traction.
- Massage of the uterus after delivery of the placenta.

This definition is supported by the International Federation of Gynecology and Obstetrics (FIGO), the International Confederation of Midwives (ICM)[1] and the World Health Organization

(WHO).[2] This definition differs from the original research protocol in the Bristol[3] and Hinchingbrooke[4] trials because the original protocols include immediate cord clamping and did not include massage of the uterus. The most current recommendation identified in the FIGO/ICM Joint Statement and *Managing Complications in Pregnancy and Childbirth*, [5] produced by the WHO, do not include immediate cord clamping.

Clinical trials in developed countries have shown that the use of AMTSL significantly reduces postpartum hemorrhage, in contrast to physiologic management of the third stage of labor where oxytocic drugs are not used and the placenta separates spontaneously and is delivered by gravity and maternal effort. When compared to AMTSL, the use of physiologic management has a higher rate of postpartum hemorrhage and severe postpartum hemorrhage, need for blood transfusion, and need for therapeutic oxytocics, and a shorter duration of the third stage of labor. A Cochrane review of these trials concludes by recommending AMTSL for all women delivering in a hospital and anticipating the vaginal birth of a single infant.[6]

Endorsement and use of AMTSL

Based on this body of evidence, ICM and FIGO issued a joint statement in November 2003 stating that every woman should be offered AMTSL "as a means of reducing the incidence of postpartum hemorrhage due to uterine atony."[1] The inclusion of AMTSL in the WHO evidence-based manual *Managing Complications in Pregnancy and Childbirth* also attests to the international acceptance of this practice as the standard of care.[5]

Evidence regarding adoption of this practice, however, is limited. Evaluations of donor-funded projects incorporating AMTSL tend to be limited to reporting on the numbers of providers trained and the percent achieving competence following training. Apart from anecdotal information, a 2003 article by the Global Network for Perinatal and Reproductive Health[7] offers a limited glimpse into the adoption of this practice. Their results, based on an evaluation of 15 university-based referral obstetric centers in developed and developing countries, show substantial variation between and within hospitals. Overall, only 25 percent of observed deliveries included AMTSL. Only one (in Dublin, Ireland) consistently used all three components of the practice. Variation in the prophylactic use of oxytocic drugs ranged from 0 to 100 percent; the practice of controlled cord traction ranged from 13 to 100 percent; and the number of women who received additional doses of oxytocin during the third stage of labor ranged from 5 to 100 percent. There is insufficient evidence for drawing conclusions about the effectiveness of this practice in its altered states. These results do suggest, however, that the use of AMTSL is quite low and, where it is practiced, the definition varies within and between countries.

Since 1997, the Safe Motherhood Initiative has stated that maternal mortality is an issue of health infrastructure. AMTSL is a highly measurable, evidence-based, life-saving aspect of this health infrastructure. Given that postpartum hemorrhage is a leading cause of maternal death in many countries with high maternal mortality, there is an important and urgent need for information from these countries on current practices regarding AMTSL.

About this study

As a complement to work undertaken by the Global Network for Perinatal and Reproductive Health, these surveys have been carried out to advance understanding of current AMTSL practices in East Africa (Ethiopia and Tanzania), sub-Saharan Africa (Benin), Asia (Indonesia) and Central America (El Salvador, Guatemala, Honduras, and Nicaragua). Surveys are underway in Uganda and Ghana. This report focuses on Guatemala. The ten country AMTSL surveys focus on policy, provider-related factors, and supplies and logistics. When viewed together, these components provide important insights on routine use of AMTSL (Figure 1.1).

Policy

At the national level, a number of influences determine the priority given to AMTSL. For example, given that AMTSL has been a standard of care in the United Kingdom (UK) for many years, some researchers have hypothesized that AMTSL is more common in former UK colonies and among providers who have trained in the UK. Likewise, effective leaders from national or international agencies may have been able to influence national policies, the inclusion of drugs in the essential drug list and country formulary, and health provider education regarding AMTSL. In turn, such training may influence facility-based policies and behavioral expectations.

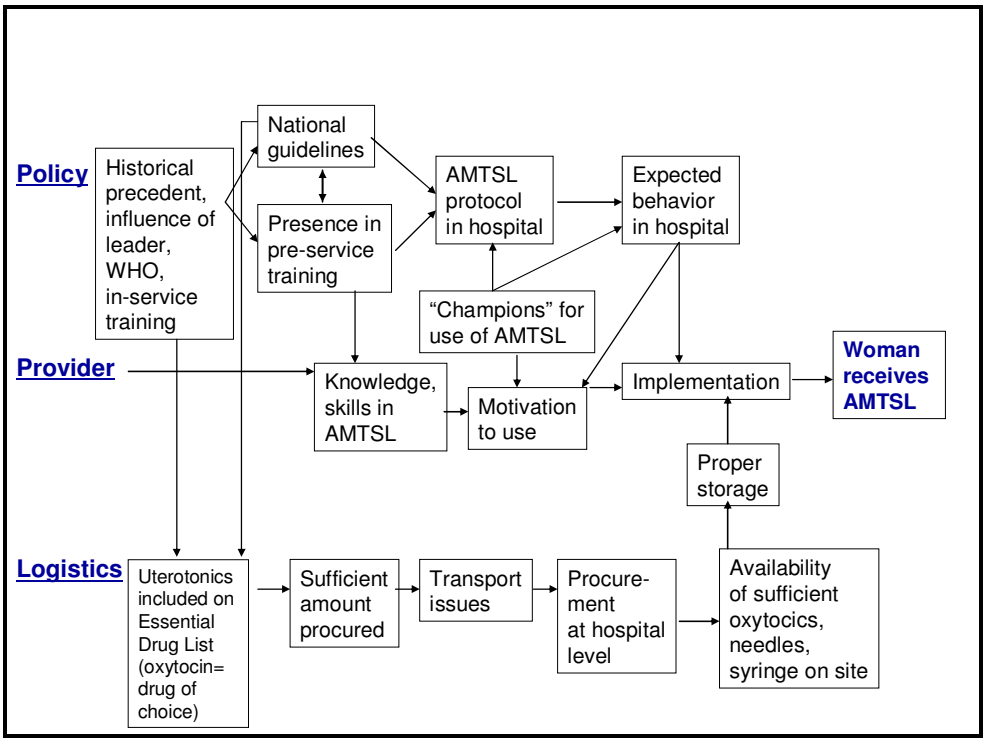
Provider-related factors

The knowledge and skills required to perform AMTSL are essential for routine use of the practice. Provider motivation, which is influenced by facility-based behavioral expectations, also is key.

Supplies and logistics

The sufficient availability of high-quality uterotonic drugs, needles, and syringes at national and local levels is essential for routine use of AMTSL. Effective use of AMTSL also requires appropriate conditions during transport and storage to ensure the use of chemically-active drugs and safe, sterile needles and syringes.

Figure 1.1. Determinants of the routine use of AMTSL.



The aim of this study is to provide ministries of health (MOHs) and their international partners with the descriptive information necessary to assess AMTSL practices and identify major barriers to its use. The findings will inform interventions that improve adoption and implementation of AMTSL.

The study's specific research questions are as follows:

1. For what proportion of deliveries is AMTSL used at a national level? Which components of AMTSL (e.g., prophylactic use of oxytocic agents, controlled cord traction, and fundal massage) are practiced, and how consistently are they practiced?
2. Is AMTSL formally promoted in the Standard Treatment Guidelines (STGs) in each country at national and/or facility levels? If so, since when? How is AMTSL defined in the standards?
3. How is the need for AMTSL drugs quantified at national and facility levels?
4. Which uterotonic drug (e.g., oxytocin, ergometrine, or a prostaglandin) is used? How is it stored?
5. At the facility level, is enough oxytocin available to allow for routine use of AMTSL?
6. What are the major barriers to correct use of AMTSL, as defined by WHO and FIGO/ICM in their Joint Statement on prevention of postpartum hemorrhage?

2. Methods

This study is part of a multiple country study to assess use of AMTSL among facility-based deliveries. The development of the study was a participatory process, which involved an initial expert meeting in Washington, DC in May 2005 to elicit feedback on the draft protocol, a planning workshop in Nairobi, Kenya in July 2005 for the first two country studies, and planning workshops in Panama and El Salvador in January and February 2006 with representatives of the Central American Federation of the Associations and Societies of Gynecologists and Obstetricians (COMIN-FECASOG) to further refine the protocol and questionnaires before the beginning of data collection in El Salvador, Honduras, Nicaragua, and Guatemala.

In the case of Guatemala, prior to data collection, the study protocol was submitted to and approved by the Ministry of Public Health and Social Work (MSPAS) of Guatemala, as there is no national-level ethical review panel. The MSPAS did not consider review by local ethics committees to be necessary. Following this approval, the protocol was submitted to the Committee for Human Research at the Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland, USA. The Johns Hopkins Committee for Human Research judged the protocol to be exempt from review for human subjects research because no personal identifiers were collected and because the procedures observed were all standards of care. They specified that informed consent must be obtained at admission to the health facility and not in the labor and delivery room. PATH deferred to Johns Hopkins Bloomberg School of Public Health for review. In this study, informed consent consisted of describing the study and requesting participation from women at admission to the health facility.

Questionnaire development

The processes and outcomes identified in the conceptual framework for the study (Figure 1.1) determined the content and number of questionnaires required for the study. In all, three questionnaires were developed:

- **National-level questionnaire.** This questionnaire was designed to capture the policy environment for AMTSL. It includes questions regarding the content of the essential drug list, standard treatment guidelines, pre-service training curricula, procurement practices for uterotonic drugs, and storage conditions for uterotonic drugs at the central pharmaceutical storage site. Completing this questionnaire required document review, interviews with MOH staff and other policymakers, and a visit to the pharmaceutical storage site. The study's country coordinator conducted the national-level data collection.
- **Facility-level questionnaire.** This questionnaire was designed to capture the policy environment at the individual facility level. It includes questions on the availability of an essential drug list and clinical guidelines in the facility, provision of in-service training (including AMTSL), the cost of uterotonic drugs to the facility and to patients, access to the facility pharmacy, procurement practices for uterotonic drugs, and supply and storage conditions at the facility. Completing this questionnaire required interviews with hospital administrators and the pharmacist and a visit to the facility pharmacy. One of the two

members of the data-collection team completed this questionnaire during his/her visit to selected facilities.

- **Observation-of-deliveries questionnaire.** This questionnaire was designed to document provider practices during the third stage of labor and the first 30 minutes of the fourth stage of labor for all vaginal deliveries. It was based on the questionnaire used in the study by Festin et al.[7] The questionnaire documents the availability of uterotonic drugs and other supplies in the labor and delivery unit as well as storage conditions for uterotonic drugs. Members of the data collection team completed the questionnaire based on their observation of deliveries during their visit to selected facilities.

Training for data collectors

A group of ten data collectors were trained to observe deliveries in selected health facilities. The team was made up of medical doctors specializing in gynecology and obstetrics and one epidemiologist. The training lasted three days in July 2006 and involved lectures, a visual CD-ROM presentation on AMTSL, demonstrations and practice using an anatomical model, and field practice that provided an opportunity to pretest the questionnaires and supervise the observers.

Sample Design

A sample of approximately 200 facility-based deliveries was required to meet the aim of the study described in the methodology section. Sample size calculations assumed a prevalence of 30 percent, a 90 percent response rate, and a design effect of two. Due to budgetary and logistical concerns, the sample was restricted to public facilities with at least 1,000 deliveries annually in order to avoid visits to institutions with few or no observed deliveries. There are 39 maternity wards in the national public health system in Guatemala, distributed across eight regions, of which nine have fewer than three deliveries per day. The hospitals in two regions were excluded (Peten and Huehuetenango) due to difficult access and/or the high costs associated with observing the deliveries there. A convenience sample of 15 hospitals with a minimum average of three or more deliveries per day was selected for this study. The sample includes hospitals in six of eight regions and 11 of 22 departments. Although the sample is not, strictly speaking, a nationally-representative sample of public facility-based deliveries, it provides a reasonable representation of the hospitals and deliveries in Guatemala.

A team of two data collectors visited each selected health facility for two days. Each data collector observed all deliveries over an eight-hour period on the first and second day, thus ensuring observation for 16 hours per day for two days.

A total of 172 deliveries were observed in the 15 selected national public hospitals. Observers collected information regarding the existence and availability of the pharmaceutical supplies during the afternoon of the first day and the morning of the second day.

To ensure that the sample of deliveries was as representative as possible, weights were calculated for use during analysis. When the number of deliveries observed in a facility over the two-day

period is not proportional to the reported annual number of deliveries in that facility, weights will correct for this over- or under-representation. The weighted number of observed deliveries is also 172. All of the tables in this report show weighted values for n.

Field Work

The study coordinator sent a memorandum through the National Program of Reproductive Health to each medical director of the health facilities selected for the study to inform them about the study and the arrival of the data collection teams. Permission to participate in the study was granted by the director of each hospital. Five teams of two observers carried out the field work from July 25 to August 18, 2006. One team member was present in the delivery room during the first day for eight hours to observe all deliveries, while the other team member conducted the pharmacy visits and interviews. After eight hours, the second team member observed deliveries for the following period of eight hours.

Data entry and analysis

The study team adapted the data entry programs developed for the global survey to the finalized Guatemalan questionnaire. EpiInfo (version 3.3.2) was used for data entry and cleaning. The data were double entered, and a preliminary data-cleaning process was carried out immediately following fieldwork. The final cleaning process was carried out during a data analysis workshop held in Baltimore, MD in December 2006. Data analysis was conducted using STATA 9.1.

3. Findings regarding national and facility-level policies and logistics

The National Policy Environment

This chapter summarizes information describing the policy environment and logistical support for AMTSL at the national and facility levels.

National Standard Treatment Guidelines

The Second edition of the medical care guidelines for pregnancy: labor, puerperium, and obstetric emergencies *(Guías de atención del embarazo, parto, puerperio y emergencias obstétricas)* issued by the MSPAS of Guatemala in the year 2005 was reviewed for this study. This document was revised and distributed by the MSPAS of Guatemala through the National Program of Reproductive Health in collaboration with the Association of Gynecology and Obstetrics of Guatemala, Pan American Health Organization, United Nations Fund for Population Activities, the Quality Assurance Project, and other cooperating international agencies. These national guidelines specifically promote AMTSL and provide recommendations for the management of postpartum hemorrhage. There are no national policies that restrict the practice of AMTSL. Chapter one of the national guidelines provides recommendations for AMTSL that comply with the FIGO/ICM definition. The recommendations in these guidelines provide for two notable exceptions to the FIGO/ICM definition of AMTSL: 1) if the patient has an existing peripheral IV line, it is acceptable to administer five international units of oxytocin via IV, as opposed to ten international units. This practice is not recommended by FIGO/ICM, since there are no available data to support this practice; 2) The national guidelines do not provide a recommendation for a secondary drug to be used if oxytocin is not available.

The National Guidelines describe recommended practices in the general management of postpartum hemorrhage including: evaluation, laboratory tests, use of solutions and transfusions, and use of uterotonics in the case of diagnosis, which include:

- 20 units of oxytocin in saline solution or Hartman 1000 cc IV set to 20 drops per minute.

If hemorrhage persists, administer:

- 0.20 mg ergometrine IM every 15 minutes for up to 3 doses or;
- 800 mcg (4 tabs of 200 mcg) of misoprostol (Cytotec) intrarectally.

Essential Drug List

Only oxytocin is registered as a uterotonic drug in Guatemala. It is also included on the Essential Drug List of the MSPAS. There is no record of combination drugs (such as Syntometrine) or of any prostaglandin in the uterotonic drug section. See Table 3.1. Ergometrine and misoprostol are registered in the country and included in the Essential Drug List but are listed as a drugs used for the management of postpartum hemorrhage. The uses, indications, and contraindications of the abovementioned drugs are all described in the Essential Drug List.

Table 3.1. Uterotonic Drugs on the Ministry of Health's Essential Drug List

	Oxytocin	Ergometrine	Misoprostol
Uterotonic Drugs listed in the Essential Drug List	Yes	Yes	Yes

Availability and storage of uterotonic drugs

There is no central level location for drug storage in Guatemala. Individual facilities procure their own drugs. Although FIGO/ICM specifies that oxytocin and ergometrine be stored in temperatures between 2° and 8°C, the Guatemalan national guidelines do not specify storage conditions for these drugs.

Pre-Service Training in AMTSL

The current curricula in public universities for doctors and paramedic personnel do not include a detailed description of AMTSL. The two educational institutions responsible for training at the national level, the University of San Carlos of Guatemala and the National School for Nursing, will soon revise their curricula to include a detailed description of AMTSL.

The Facility-level Policy Environment

For each health facility selected in the sample, the data collectors interviewed the director of the health facility or other responsible staff and the pharmacist and visited the pharmacy to document the availability and storage conditions of uterotonic drugs. The results of these visits are summarized below.

Availability of clinical guidelines specific to AMTSL

Table 3.2 shows the availability of clinical guidelines at the facility level and the components of AMTSL specifically cited in the guidelines. Approximately 87 percent of health facilities surveyed had clinical guidelines available. Clinical guidelines were not available in one regional provincial hospital and one health center.

The guidelines included specific mention of all three components of AMTSL and mentioned oxytocin as the drug of choice in two-thirds of health facilities in the study. It is important to note that this study found only one of the Central Referral Hospitals to have guidelines that included AMTSL. In 60 percent of health facilities, controlled cord traction was mentioned or defined in the available guidelines, and in 60 percent, uterine massage of the fundus following delivery of the placenta was specified. Only one-third of the health facilities in this study utilized the current edition of the National Guidelines. The other health facilities used the previous edition of the National Guidelines or their own guidelines or protocols.

Table 3.2. Percent of health facilities with available protocols, clinical guidelines or obstetric care standards that include AMTSL

Type of Health Facility	Protocols, Clinical Guidelines, or Obstetric Care Standards are available (%)	Protocols, Obstetric Care Guidelines include AMTSL (%)	Oxytocin mentioned as the drug of choice for AMTSL (%)	Controlled cord traction is mentioned or defined (%)	Uterine massage of the fundus is mentioned and specified (%)	n of health facilities
Central Referral Hospitals	100.0	50.0	50.0	50.0	50.0	2
Regional Provincial Hospitals	88.9	66.7	66.7	66.7	66.7	9
District Hospital	100.0	100.0	100.0	100.0	100.0	1
Health Centers	66.7	66.7	66.7	33.3	33.3	3
Total	86.7	66.7	66.7	60.0	60.0	15

Accessibility of the Pharmacy and Pharmaceuticals at the Facility-level

Table 3.3 describes the accessibility of the pharmacies at the facility level. Eighty percent of health facilities in the study had their own pharmacy. The pharmacies provide the necessary supplies for AMTSL (uterotonic drugs, syringes, and needles) to the labor and delivery wards. Only one (7 percent) of the 15 health facilities observed required women to purchase the abovementioned supplies and uterotonic drugs.

Table 3.3. Percent of health facilities in which families are required to purchase supplies and percent distribution of the distances to the nearest pharmacy

	% of health facilities N=15
Families must purchase syringes	6.7
Families must purchase uterotonic drugs	6.7
Distance to the nearest pharmacy:	
On-site	80.0
< 4 km	6.7
4-5 km	6.7
> 5km	6.7

As shown in Table 3.4, oxytocin (5 IU/ML) and ergometrine (0.2 MG/ML) were each available in 93 percent of health facility pharmacies, while misoprostol (200 µg) was found in about half (47 percent) of the pharmacies. The one facility that did not procure oxytocin did procure ergometrine. The one facility that did not procure ergometrine did procure oxytocin. During the observation period, at least one uterotonic drug was found in all of the health facilities visited.

Approximately one quarter (28 percent) of facilities had less than one month's stock of oxytocin on hand at the time of the visit. Thirteen percent of facilities had less than one month's stock of ergometrine and misoprostol. However, only one facility (7 percent) reported a stockout of oxytocin and ergometrine during the three-month period prior to the study (data not shown). Misoprostol was reported to be procured in 47 percent of all health facilities, though only 40 percent of facilities had it in stock at time of study visit.

The average purchase price for the facility of uterotonic drugs was: oxytocin G$0.97 (US$0.13 x 2 ampoules = $0.26); and ergometrine G$1.11 (US$0.14). Misoprostol was not free to any of these facilities and cost an average of G$24.17 (US$3.14), ranging from G$11.67 to G$36.40 (US$1.51 to 4.73) per tablet.

Nearly three-quarters of the health facilities (74 percent) reported that their supply of oxytocin and ergometrine was determined based on consumption, and 7 percent reported simply receiving a fixed quantity. Only one facility reported stockout problems in which they were out of misoprostol for 90 days, though no reason for stockout was provided.

Table 3.4. Percent of facilities with uterotonic drugs available, average price and percent distribution of stock of uterotonic drugs at the facility level

	% of all health facilities n=15		
	Oxytocin	**Ergometrine**	**Misoprostol**
% of facilities that procure:	93.3	93.3	46.7
% of facilities with drug on-site at time of visit:	93.3	93.3	40.0
Average price in Guatemalan currency per ampoule/tablet for the facility (range)	0.97 (0-1.39)	1.11 (0-1.84)	24.2 (11.67-36.40)
In US$ (range)	0.13 (0.13-0.18)	0.14 (0-0.24)	3.14 (1.51-4.73)
Months of stock on-hand:			
< 1 month	26.7	13.3	13.3
1-3 months	26.7	26.7	20.0
4-6 months	33.2	6.7	6.7
7-9 months	6.7	33.3	0.0
10-12 months	0.0	13.3	6.7
Does not procure drug	6.7	6.7	53.3
How is the quantity of drug determined for procurement:			
Based on consumption patterns	73.3	73.3	46.7
Fixed quantity ordering form	6.7	6.7	0.0
Inconsistent data	13.3	13.3	0.0
Does not procure drug	6.7	6.7	53.3

Storage Conditions for Uterotonic Drugs at the Facility-level

There was substantial variation in the manufacturers' recommendations regarding storage of oxytocin. In only 13 percent of the facilities visited, it was recommended that oxytocin be stored between 2 and 8°C, whereas the manufacturers' recommended storage temperatures between 15 and 25° C in 47 percent of facilities, and in 13 percent of facilities the manufacturers' recommendation was to store oxytocin at room temperature. In one-third of the facilities visited, it was recommended that oxytocin be stored away from direct light, and there was no indication regarding light conditions for over half of the facilities (53 percent). There is less variation in the recommendations for ergometrine; in two-thirds of the facilities visited, manufacturers agreed that ergometrine must be stored between 2 and 8°C. In approximately half of facilities visited (47 percent), the manufacturer recommendation was that ergometrine be stored away from direct light. In 40 percent of the facilities, the recommended light conditions for ergometrine were not stated. See Table 3.5.

Actual storage conditions for oxytocin and ergometrine varied. Over one-quarter of the facilities (27 percent) stored oxytocin between 2 and 8°C. Forty percent stored oxytocin between 15 and 25°C. Two-thirds of facilities stored ergometrine between 2 and 8°C, per manufacturer recommendations, and 20 percent stored it between 15 and 25°C. Thirteen percent of facilities stored oxytocin at room temperature, though none of the facilities visited stored ergometrine at room temperature. Regarding actual lighting conditions in which these drugs were stored, oxytocin and ergometrine were stored with no direct exposure to sunlight in all facilities where those drugs were available (93 percent).

Storage temperatures recommended by the manufacturer were between 15 and 25°C for almost all facilities that procure misoprostol. Few manufacturers provided recommendations on lighting for misoprostol, and the drug was kept away from direct light in all establishments with the drug on hand at time of visit.

Table 3.5. Percent of facilities that procure uterotonic drugs, average price of these drugs, and percent distribution of storage conditions for uterotonic drugs at the facility level

	% of all health facilities (n=15)		
	Oxytocin	**Ergometrine**	**Misoprostol**
% of facilities that procure:	93.3	93.3	46.7
Drug is free for the facility:	13.3	13.3	0.0
Storage temperature recommended by the manufacturer:			
2 - 8° C	13.3	66.7	0.0
<15° C	13.3	0.0	0.0
15 - 25° C	46.7	26.6	40.0
Room temperature	13.3	0.0	6.7
Missing data	6.7	0.0	0.0
Does not procure drug	6.7	6.7	53.3
Actual storage temperature:			
2 - 8° C	26.6	66.7	0.0
<15° C	13.3	6.7	0.0
15 - 25° C	40.0	20.0	26.6
Room temperature	13.3	0.0	13.3
Missing data	0.0	0.0	6.7
Does not procure drug	6.7	6.7	53.3
Storage lighting conditions recommended by the manufacturer:			
Not stated	53.3	40.0	26.6
Store away from the light	33.3	46.6	13.3
Could not locate recommendations	6.7	6.7	6.7
Does not procure drug	6.7	6.7	53.3
Actual light conditions for storage of the drug:			
Kept in dark	46.7	73.3	20.0
In daylight, away from direct sun	46.7	0.0	26.6

Other (refrigerator)	0.0	13.3	0.0
Missing data	0.0	6.7	0.0
Does not procure drug	6.7	6.7	53.3

In-Service Training at the Facility-level

In the year preceding the study, in-service training programs that included AMTSL were conducted in approximately half of the health facilities visited. Sixty percent of the facilities reported providing in-service training programs for nurses, and 53 percent of the facilities reported providing in-service training for medical doctors. See Table 3.6.

Table 3.6. Percent of facilities which offered in-service training programs on AMTSL during the previous 12 months to doctors and nurses

In-service Training on AMTSL	% of facilities N=15
For nurses	60.0
For doctors	53.3

4. Findings regarding the management of the third and fourth stages of labor

The principle objectives of this study were to measure the use of AMTSL according to FIGO/ICM criteria and to measure current practices regarding the management of the third and fourth stages of labor outside of this definition. This section describes the management of the third and fourth stages of labor by focusing on 1) the overall use of uterotonic drugs; 2) the timing, mode of administration, and dose of these drugs; 3) practices in use of the individual components of AMTSL; 4) the correct use of AMTSL; and 5) potentially-harmful practices.

Study sample

The study team observed a total of 172 deliveries in 15 health facilities. Table 4.1 describes the characteristics of the facilities and women associated with these deliveries.

Over half of the observed deliveries took place in regional or provincial hospitals (59 percent), with an additional 16 and 18 percent in the central referral hospital or health centers, respectively. Only 7 percent of observed deliveries occurred in district hospitals.

All regions of the country are represented. One-third of the observations took place in Region 1, 13 to 18 percent of observations each occurred in Regions 3 through 6, and 7 percent of observations occurred in Region 2. The large majority of observations took place in high-volume facilities; with 92 percent in facilities with 3,000 or more deliveries annually. Six different cadres of providers were observed. All cadres of health professionals are fairly well represented with between 19 and 24 percent of deliveries. Nurses and traditional birth attendants are an exception with, only six percent of deliveries attended by nurses and eight percent by traditional birth attendants (TBAs). Four-fifths of the observed deliveries received no uterotonic drugs prior to the third stage of labor (82 percent). Induction was very rare (one percent) and 17 percent of observed deliveries were augmented.

Both oxytocin and ergometrine were used to manage the third and fourth stages of labor. The majority of observed deliveries received oxytocin only (61 percent); 21 percent received ergometrine only, and five percent of the observed deliveries received both. Thirteen percent of the observed deliveries received no uterotonic during the third or fourth stages of labor. The percent of observed deliveries that occurred in facilities which had offered in-service training on AMTSL to doctors and nurses was 47 percent and 58, respectively.

Table 4.1. Percent distribution of observed deliveries by characteristics of the health facility and the woman

Characteristics of the facility	%	n	Characteristics of the woman	%	n
Type of facility			**Woman's age (years)**		
Central referral hospital	16.2	28	<20	23.8	41
Regional/provincial hospital	58.7	101	20-34	70.3	121
District hospital	7.1	12	35+	5.9	10
Health center	18.0	31			
Deliveries per year			**Parity**		
<3000	7.4	13	0	35.5	61
3000-3999	50.7	87	1-3	50.8	87
4000+	41.9	72	> 4	13.7	24
Region			**Received uterotonic drug prior to 3rd stage of labor for:**		
1	34.1	59			
2	7.0	12			
3	13.6	23	Induction	1.4	2
4	12.7	22	Augmentation	17.0	29
5	14.2	24	Spontaneous, no drugs before 3rd stage of labor	81.6	140
6	18.4	32			
Provider qualification			**Drug received during 3rd / 4th stage of labor:**		
Obstetrician	19.2	33			
Other physician	18.7	32	Oxytocin Only		
Nurse	6.1	11	Ergometrine Only	61.2	105
Traditional Birth Attendant	7.8	13	Oxytocin & Ergometrine	20.8	36
Auxiliary nurse	24.1	41	No uterotonic	4.7	8
Medical Student	24.1	41		13.3	23
Percent of deliveries observed in facilities that had offered AMTSL training to doctors in the preceding 12 months					
Yes	47.2	81			
No	52.8	91			
In-service training offered to nurses in preceding 12 months					
Yes	58.3	100			
No	41.7	72			
TOTAL	**100.0**	**172**	**TOTAL**	**100.0**	**172**

Components of AMTSL

This section of the report describes the use of the various components of AMTSL among observed deliveries. It also describes the practice of AMTSL as defined by FIGO/ICM, which includes all of the following components:

1. Administration of 10 IU of oxytocin (the drug of choice) via intramuscular (IM) injection within one minute of the delivery of the baby. Where oxytocin is not available, 0.2 mg of ergometrine administered via IM injection is recommended
2. Controlled cord traction (gentle traction of the cord with manual support to the uterus).
3. Immediate uterine massage following delivery of the placenta and palpation of the uterus to assess the need for continued massage every 15 minutes for two hours following delivery. For logistical ease, we have defined correct uterine massage as immediate massage following delivery of the placenta, followed by palpation of the uterus every 15 minutes for the first 30 minutes after delivery of the placenta.

We also present results using a less restrictive definition of AMTSL. This second definition of AMTSL is exactly the same as the first definition above, only the timing of the administration of the uterotonic drug is extended to within three minutes of the delivery of the baby.

Table 4.2 below describes the characteristics of the health facility and the women by use of one or more uterotonic drugs during the third and fourth stage of labor. These data suggest that observed deliveries in regional hospitals were more likely to use ergometrine than other facility types. Nearly one third of observed deliveries in these facilities used ergometrine only, compared to 12 percent at the Central Referral Hospital and none in the other types of facilities. Health centers were the most likely not to use any uterotonic during the third and fourth stages of labor (25 percent). There is very little variation in uterotonic use by characteristic of the woman. However, firm conclusions cannot be drawn from these results given the limited sample of deliveries observed; none of these results are statistically significant.

Table 4.2. Percent distribution of deliveries by use of uterotonic drugs during the 3rd and 4th stages of labor by characteristics of the facility and the woman

	Use of oxytocin only (%)	Use of ergometrine only (%)	Use of oxytocin & ergometrine only (%)	No Use of uterotonic drugs (%)	Total (%)	n of de-liveries	p value
Total	61.2	20.8	4.7	13.3	100.0	172	-
Characteristics of the facility							
Type of facility							
Central referral hospital	59.6	12.5	21.8	6.1	100.0	28	
Regional/provincial hospital	52.6	32.0	2.1	13.3	100.0	101	0.4200
District hospital	100.0	0.0	0.0	0.0	100.0	12	
Health center	75.1	0.0	0.0	24.9	100.0	31	
Deliveries per year							
<3000	24.7	40.5	16.2	18.6	100.0	13	
3000-3999	63.4	27.7	0.0	8.9	100.0	87	0.4092
4000+	64.9	9.0	8.4	17.7	100.0	72	
Provider qualification							
Obstetrician	73.7	15.7	5.8	4.8	100.0	33	
Other doctor	24.1	57.2	6.0	12.7	100.0	32	
Nurse	78.0	5.2	0.0	16.8	100.0	11	0.1316
TBA	51.9	8.3	0.0	39.8	100.0	13	
Auxiliary nurse	84.7	14.5	0.0	0.8	100.0	41	
Medical student	55.0	11.2	10.4	23.4	100.0	41	
Characteristics of the woman							
Woman's age (years)							
<20	74.3	10.5	4.3	10.9	100.0	41	
20-34	56.4	24.6	4.6	14.4	100.0	121	0.4464
35+	65.2	8.7	16.2	9.9	100.0	10	
Parity							
0	66.0	22.7	4.3	7.0	100.0	61	
1-3	58.4	21.4	3.4	16.8	100.0	87	0.5519
> 4	59.1	13.9	10.8	16.2	100.0	24	

Correct use of uterotonic drugs for AMTSL

The first component of AMTSL is the correct use of uterotonic drugs. Four criteria must be met for the correct use of a uterotonic drug. These are:

1. Correct mode of administration: the uterotonic drug should be administered IM injection. If the woman has been induced or augmented, administration via IM injection, intravenous drip, or intravenous push are also considered correct.
2. Correct dose: 10 IU of oxytocin or 0.2mg of ergometrine.
3. Correct stage of labor: uterotonic is to be administered following the delivery of the baby.
4. Correct timing: uterotonic is to be administered within one minute following the delivery of the baby (or three minutes for the less restrictive definition used for this study).

Table 4.3 presents the percentages of observed deliveries in which uterotonics were correctly used. A uterotonic was correctly administered by IM injection (or other means: IV, IV push, etc.) for women who were induced or augmented) in 83 percent of observed deliveries. In nearly three-quarters of observed deliveries (73 percent), the correct dose of the uterotonic was given. Results suggest that the timing of the administration of a uterotonic is problematic in Guatemala. Only 61 percent of observed deliveries received the uterotonic following delivery of the baby. In addition, only 21 percent of deliveries received the uterotonic within one minute of delivery of the baby, increasing to 43 percent within three minutes. Consequently, although 87 percent of deliveries received a uterotonic during the third or fourth stage of labor, in only 21 percent of deliveries was the uterotonic correctly administered for the purposes of AMTSL (with administration within one minute of delivery of the baby), increasing to 36 percent when the uterotonic was administered within three minutes of the delivery of the baby.

Table 4.3. Percent of deliveries with correct use of a uterotonic drug for AMTSL purposes and 95 percent confidence intervals

Use of a uterotonic drug during the 3rd or 4th stages of labor	% of all deliveries (95% confidence intervals) N=172
Administration of any uterotonic during the 3rd or 4th stage of labor	86.7 (62.5-96.3)
Correct mode of administration	82.7 (61.5-93.5)
Correct dose given	73.0 (49.5-88.2)
Given during the correct stage of labor for AMTSL	60.6 (37.2-80.1)
Correct timing (given ≤1 minute following delivery of the fetus)	21.3 (8.7-43.6)
Relaxed timing requirement: (given ≤ 3 minutes of delivery of the fetus)	43.4 (23.7-65.5)
Overall correct use of a uterotonic:	
(with timing ≤ 1 minute)	20.1 (7.9,42.6)
(with timing ≤ 3 minutes)	36.0 (17.6,59.7)

Table 4.4 provides additional detail on the timing and mode of administration of uterotonic drugs. Among deliveries in which the women received oxytocin only (n=105), approximately 90 percent were administered this drug following delivery of the baby, as recommended for AMTSL in the FIGO/ICM definition. However, among deliveries in which the women received ergometrine only (n=36), nearly all (94 percent) received the drug following delivery of the placenta. Among the deliveries having received only one uterotonic drug (oxytocin or ergometrine), the mode of administration does not appear to be a problem. Ninety-three percent of deliveries with oxytocin and 100 percent of deliveries with ergometrine received the drug via intramuscular injection.

Table 4.4. Percent distribution of the timing and mode of administration of uterotonic drugs

	% among cases receiving oxytocin only	n of deliveries	% among cases receiving ergometrine only	n of deliveries
Timing of administration				
During delivery of the baby	2.7	3	0.0	0
After delivery of the baby	89.4	94	5.8	2
During delivery of the placenta	3.2	3	0.0	0
After delivery of the placenta	4.7	5	94.2	34
TOTAL	100	105	100	36
Mode of administration				
Intramuscular	92.6	97	100.0	36
Intravenous push/injection	3.2	3	0.0	0
Intravenous drip	4.2	4	0.0	0
TOTAL	100	105	100	36

Controlled Cord Traction and Uterine Massage

Controlled cord traction was practiced in 34 percent of deliveries. Uterine massage immediately following delivery of the placenta was practiced in 88 percent of deliveries. However, immediate uterine massage, plus palpation of the uterus at least twice during the first 30 minutes after delivery of the placenta was recorded in only one-third of observed deliveries (32 percent), suggesting limited surveillance of women in the early postpartum period. See Table 4.5.

Table 4.5. Percent of deliveries with controlled cord traction and uterine massage following delivery of the placenta

Additional components of AMTSL	% of all deliveries (95% confidence intervals) N=172
Controlled cord traction	34.1 (18.1-54.8)
Immediate uterine massage following delivery of placenta	88.3 (79.1-93.8)
Immediate uterine massage following delivery of placenta PLUS palpation every 15 minutes	31.6 (15.9-53.0)

Use of AMTSL

Overall, only seven percent of public facility-based vaginal deliveries in Guatemala benefit from AMTSL (95 percent confidence intervals: 1.4 to 30.0 percent) using Definition 1, the strict FIGO/ICM definition with administration of a uterotonic within one minute of delivery of the baby; and 12 percent (95 percent confidence intervals: 2.1-45.4 percent) using Definition 2, with administration of a uterotonic within three minutes. See Table 4.6.

Table 4.6. Percent of observed deliveries with AMTSL use and 95% confidence intervals

AMTSL Use	% of observed deliveries with AMTSL N=172
Definition 1 (Correct uterotonic use, given at ≤ 1 minute, controlled cord traction, and immediate massage, plus palpation)	7.1 (1.4-30.0)
Definition 2 (Correct uterotonic use, given at ≤ 3 minute, controlled cord traction, and immediate massage, plus palpation)	11.7 (2.1-45.4)

Given the low use of the various components of AMTSL, Table 4.7 presents the percent of observed deliveries with controlled cord traction, deliveries with immediate uterine massage, immediate uterine massage, plus uterine palpation, and overall use of AMTSL by characteristics of the facility and provider. Our small sample size prevents firm conclusions from being drawn for many of the differentials shown here. However, these data do suggest AMTSL use is concentrated among older, high parity women, suggesting that such use may be reserved for women considered high risk. Physicians and medical students appear to practice somewhat more

consistently the various components of AMTSL than other cadres. It should be noted that there was no correct use of AMTSL at district hospitals and health centers.

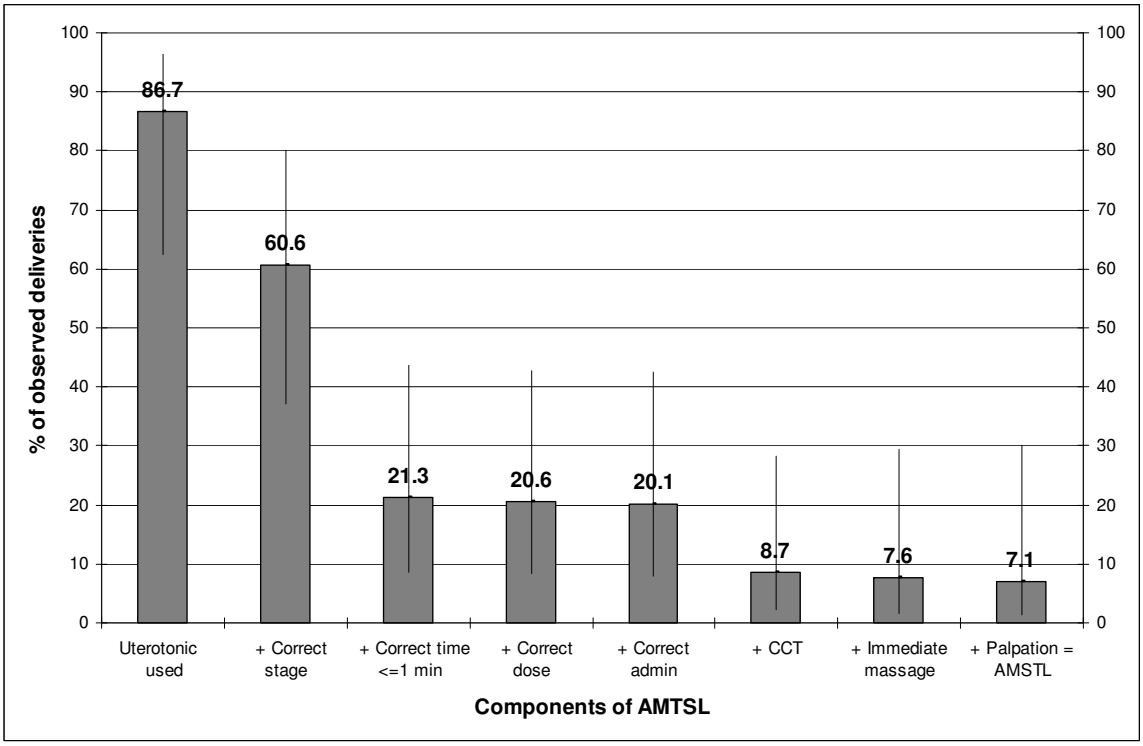
Table 4.7. Percent of observed deliveries by controlled cord traction, uterine massage, and palpation and correct use of AMTSL by characteristics of the facility and the woman

	Controlled cord traction (%)	Massage Only (%)	Massage and Palpation (%)	AMTSL use by Definition 1 (%)	AMTSL use by Definition 2 (%)	n of deliveries
Total	34.1	56.8	31.6	7.1	11.7	172
Type of facility						
Central referral hospital	50.8	45.2	37.0	6.1	9.2	28
Regional/provincial hospital	35.6	55.1	33.5	10.5	17.4	101
District hospital	12.5	75.0	0.00	0.00	0.00	12
Health center	22.5	65.2	32.8	0.00	0.00	31
p-value	**0.3555**	**0.3609**	**0.7015**	**0.7809**	**0.7187**	
Deliveries per year						
<3000	44.7	61.6	27.8	8.1	13.0	13
3000-3999	23.8	66.5	21.3	0.0	0.0	87
4000+	44.6	44.1	44.7	15.6	25.6	72
p-value	**0.2781**	**0.3028**	**0.2954**	**0.1752**	**0.1820**	
Provider qualification						
Obstetrician	43.6	40.6	52.8	4.8	15.4	33
Other doctor	47.4	56.2	23.4	13.1	13.1	32
Nurse	0.0	73.8	15.8	0.0	0.0	11
TBA	13.0	87.2	8.4	0.0	0.0	13
Auxiliary nurse	15.0	75.5	14.6	0.0	0.8	41
Medical Student	50.8	37.0	49.5	15.6	25.3	41
p-value	**0.1014**	**0.0790**	**0.0973**	**0.5098**	**0.3626**	
Woman's age (years)						
<20	24.9	51.8	33.0	5.9	9.8	41
20-34	38.0	59.9	30.7	6.1	11.3	121
35+	24.3	38.9	36.0	24.3	24.3	10
p-value	**0.3611**	**0.2878**	**0.8475**	**0.0057**	**0.0913**	
Parity						
0	36.2	50.5	32.1	6.5	12.8	61
1-3	33.4	65.6	28.7	4.8	7.6	87
> 4	31.0	40.3	40.7	17.2	23.9	24
p-value	**0.9014**	**0.0718**	**0.5152**	**0.0044**	**0.0091**	

As a means of identifying where efforts are most needed to improve compliance with the FIGO/ICM definition of AMTSL, Figure 4.1 shows the percentage of deliveries during which a uterotonic was given during the third or fourth stages of labor in the left-most column (87 percent). Each column to the right shows the percentage of deliveries having received a

uterotonic, plus one additional component of AMTSL. This figure clearly shows that administration of a uterotonic at an inappropriate stage of labor, administration of the uterotonic at greater than one minute following delivery of the baby, and lack of both controlled cord traction and immediate massage and palpation following delivery of the placenta are the components responsible for the low use of AMTSL in Guatemala facilities. In short, nearly all components are insufficiently practiced.

Figure 4.1. Percent of deliveries with use of a uterotonic drug during the third or fourth stages of labor, plus additional components of AMTSL



NOTE: AMTSL use is based on Definition 1 (use of uterotonic within one minute of delivery of the baby). CCT stands for controlled cord traction.

Patterns of cord clamping

Immediate cord clamping is not an element of the FIGO/ICM definition of AMTSL. WHO has recently recommended delayed cord clamping for the benefit of the newborn. Debate on the best timing for cord clamping for maximum benefit of mother and baby persists. Table 4.8 shows that cord clamping in less than one minute of delivery is the norm in Guatemalan health facilities, with 90 percent of observed deliveries having the cord clamped in less than one minute of delivery of the baby.

Table 4.8. Percent distribution of the duration between delivery of the baby and cord clamping

Time elapsed between delivery of the baby and cord clamping	% of observed deliveries	n of deliveries
< 1 minute	90.0	155
1 minute	0.0	0
2 minutes	9.4	16
3 minutes	0.3	1
4+ minutes	0.3	1
TOTAL	100.0	172

Duration of the third stage of labor

Table 4.9 shows the average duration of the third stage of labor among deliveries with and without correct use of AMTSL (including using a uterotonic within one minute of delivery of the baby). Among deliveries with AMTSL use, the average duration of the third stage of labor was 4.3 minutes (95 percent confidence intervals: 3.95, 4.69). Among those without AMTSL, the average duration was significantly longer at 7.3 minutes (95 percent confidence intervals: 5.67, 8.92).

Table 4.9. Average duration of the third stage of labor by use and non-use of AMTSL and 95 percent confidence intervals

AMTSL Use	Average duration of the third stage of labor (minutes)	95% confidence intervals	n of deliveries
Correct AMTSL use (within one minute of delivery of the baby)	4.3	(3.95-4.69)	12
No use of AMTSL use (within one minute of delivery of the baby)	7.3	(5.67-8.92)	159

Potentially-harmful practices

In addition to documenting AMTSL use, data from this study also identified four practices considered potentially harmful. These practices include uterine massage following delivery of the baby, application of fundal pressure while awaiting the placenta, application of cord traction without manual support of the uterus, and application of cord traction without previous

administration of a uterotonic. All of these practices may increase the risk of postpartum hemorrhage or cause problems such as uterine inversion.

As shown in Table 4.10, these practices are very common in Guatemalan facilities. Nearly 90 percent of observed deliveries had at least one potentially-harmful practice. In two-thirds of the deliveries, uterine massage following delivery of the baby was observed, and in well over half of the deliveries fundal pressure was applied to the fundus while awaiting delivery of the placenta (62 percent). In 56 percent of deliveries, cord traction without manual support to the uterus was observed. In one in eight deliveries, providers applied traction to the cord without having previously administered a uterotonic drug. Very little variation was seen in these practices across characteristics of the facility and the woman. The only notable differences were that there were fewer observations of deliveries with potentially-harmful practices at the Central Referral Hospital than elsewhere, and that district hospitals show higher use of all potentially-harmful practices except cord traction without a uterotonic than other types of facilities. However, neither of these relationships are statistically significant.

Table 4.10. Percent of deliveries with potentially-harmful practices by characteristics of the facility

	Any harmful practice (%)	Massage after delivery of baby (%)	Fundal pressure while awaiting the placenta (%)	Cord traction, no support to uterus (%)	Cord traction no uterotonic (%)	n of deliveries
Total	87.8	66.2	61.6	55.5	12.0	172
Characteristics of the facility						
Type of facility						
Central referral hospital	66.7	35.6	32.6	37.0	6.1	28
Regional/provincial hospital	90.1	70.0	61.7	51.7	12.3	101
District hospital	100.0	75.0	100.0	87.5	0.0	12
Health center	94.4	77.5	72.0	71.8	21.1	31
p-value	**0.2051**	**0.1706**	**0.4328**	**0.1496**	**0.7562**	
Deliveries per year						
<3000	83.8	65.8	44.7	55.3	18.7	13
3000-3999	92.5	70.4	71.3	63.0	7.5	87
4000+	82.8	61.0	52.8	46.4	16.3	72
p-value	**0.2566**	**0.6543**	**0.3818**	**0.4318**	**0.5685**	
Provider qualification						
Obstetrician	90.2	76.7	69.9	54.6	3.0	33
Other physician	82.7	54.6	54.1	31.9	9.6	32
Nurse	100.0	89.4	89.4	94.8	16.8	11
TBA	95.6	65.4	44.2	78.1	35.4	13
Auxiliary nurse	94.6	74.1	77.3	71.8	0.8	41
Medical student	77.4	53.1	43.5	40.8	23.4	41
p-value	**0.2259**	**0.3368**	**0.3539**	**0.0892**	**0.1184**	

5. Conclusions and recommendations

This study documented practices during the third and fourth stages of labor in a representative sample of public health facilities from six of the eight regions of Guatemala. The results demonstrated that some type of uterotonic drug was used in 87 percent of deliveries. Oxytocin was the drug most frequently used; 61 percent of women received oxytocin as the only uterotonic drug during the third or fourth stages of labor. Ergometrine alone was used in 21 percent of deliveries, and both uterotonic drugs were administered in five percent of deliveries. In 13 percent of deliveries, no uterotonic drugs were administered.

Two AMTSL definitions were used in the study. The first definition strictly reflects the FIGO/ICM recommendations, including with administration of the uterotonic drug within one minute of delivery of the baby; the second definition is slightly more flexible, extending the timing of the uterotonic drug to within three minutes of delivery of the baby. Seven percent of the observed deliveries comply with the strict definition, and 12 percent comply with the more relaxed definition of AMTSL use. This means that between 88 and 93 percent of the women delivering vaginally in national public health network facilities did not receive adequate prevention of postpartum hemorrhage.

This low use of AMTSL is due to several practices, all of which need to be addressed. First of all, 13 percent of women with vaginal deliveries did not receive a uterotonic at all during the third or fourth stages of labor. Only 60 percent of deliveries received a uterotonic following delivery of the baby, the correct stage of administration for AMTSL purposes. Among women receiving ergometrine (21 percent of deliveries), nearly all received the drug following delivery of the placenta, versus following delivery of the baby. Only 21 percent of women with vaginal deliveries received the uterotonic within one minute of delivery of the baby. In addition, controlled cord traction and uterine massage following delivery of the placenta, with palpation to assess the need for continued massage, was performed in only about one-third of deliveries.

In addition to measuring the use of AMTSL, this study also documented four potentially-harmful practices. These are: the application of fundal pressure while awaiting the placenta, uterine massage following delivery of the baby, application of cord traction without previous administration of a uterotonic, and application of cord traction without manual support of the uterus. At least one of these practices was observed in 88 percent of observed deliveries. In over half of the deliveries, cord traction was applied without manual support to the uterus, and in 62 percent of deliveries the provider used fundal pressure while awaiting the delivery of the placenta. Two-thirds of the women received uterine massage following delivery of the baby, and 12 percent had traction applied to the cord without prior administration of a uterotonic drug.

The national policy environment on AMTSL in Guatemala is mixed. Favorable conditions include the recently published Medical Care Guidelines for Pregnancy: Labor, Puerperium, and Obstetric Emergencies (*Guías de atención del embarazo, parto, puerperio y emergencias obstétricas)* in which the AMTSL procedure and the management and treatment of postpartum hemorrhage are thoroughly described as an expected norm. Oxytocin is listed as a uterotonic drug on the Essential Drug List. Ergometrine and misoprostol are also on this list, though they

are cited only for the treatment of postpartum hemorrhage. And, although the current curricula for doctors and nurses do not include a detailed description of AMTSL, the University of San Carlos of Guatemala and the National School for Nursing have plans to include AMTSL in the upcoming revision of their curricula.

At the facility level, 87 percent of facilities had a copy of clinical guidelines available at the time of visit, though only two-thirds of the facilities had guidelines which include and promote the use of AMTSL. Given that the MSPAS has recently published the Medical Care Guidelines for Pregnancy: Labor, Puerperium, and Obstetric Emergencies (*Guías de atención del embarazo, parto, puerperio y emergencias obstétricas)*, it is essential that this document be widely disseminated and used. Furthermore, in-service training programs that included AMTSL and were offered during the 12 months prior to the study were reported in only about half of the facilities in the sample. The in-service training should be standardized and include hands-on, competency-based training.

Regarding logistics and storage of uterotonic drugs at the facility level, there were few problems with the stock of oxytocin and ergometrine, though misoprostol is likely to be available only about half of the time. The storage conditions for these drugs varied substantially, which is likely a reflection of the varying manufacturer recommendations, another issue that needs to be addressed. In general, oxytocin and ergometrine were kept refrigerated, though 40 percent of facilities kept oxytocin and 20 percent of facilities kept ergometrine at 15 to 25° C. Thirteen percent of facilities stored oxytocin at room temperature routinely (versus the acceptable time period of three months at room temperature).

Recommendations

The following recommendations are made based on the results of this study regarding the use of AMTSL in public hospitals in Guatemala.

National Policy

1. Standardize and disseminate the use of MSPAS National and Official Guidelines in national public health network hospitals and its promotion at private and autonomous levels.
2. Update the *Guías de atención del embarazo, parto, puerperio, y emergencies obstetricas* to include AMTSL as defined by international organizations such FIGO/ ICM and WHO.
3. Implement AMTSL as a preventive measure for postpartum hemorrhage within pre-service curricula for medical, paramedical, or empirical personnel who participate in assisting public institutional, private, or domiciliary deliveries.
4. Support and promote the joint work of the MSPAS, AGOG, international cooperation agencies, and other organizations for the dissemination and implementation of the *Guías de atención del embarazo, parto, puerperio, y emergencies obstetricas* from the MSPAS in all national public health network institutions.
5. Adequately promote and disseminate the international standards for the proper storage of uterotonic drugs.

6. Promote the procurement of oxytocin as the first-choice drug for the national health system and in sufficient quantities for all births. This will reduce national hospital consumption expenses.

Health Providers/Practices

7. Develop and evaluate, as soon as possible, a hands-on, competency-based AMTSL in-service training for medical, paramedical, or empirical personnel who participate, one way or another, in deliveries at national public health institutions.
8. Identify barriers, including motivation, that impede use of AMTSL, and address these barriers.
9. Prioritize the regions with particular low use of AMTSL in national planning.
10. Prioritize the training of health providers with no or very little knowledge about AMTSL.
11. Standardize and enforce the *Guías de atención del embarazo, parto, puerperio, y emergencies obstetricas* and especially AMTSL at the national level.
12. Provide training of pharmacy or warehouse personnel of the different facilities on the care needed for the storage of uterotonic drugs.

Logistics and Supplies

13. Provide the institutions with adequate supplies and equipment needed for the proper storage of uterotonic drugs.
14. Provide the needed supplies for using AMTSL at national public health network institutions.
15. Reevaluate and update the procedures for the procurement and distribution of uterotonic drugs, particularly oxytocin, in order to ensure that all hospitals have an adequate supply of oxytocin for its use in AMTSL for every patient who has a vaginal delivery.
16. Uterotonic drugs should be available to every parturient woman if they can save these women's lives.

Monitoring and Evaluation

17. Implement a classifying system for the facilities to routinely monitor the use of AMTSL and to develop instruments to document its use, such as quality indicators.
18. Include an AMTSL documentation section in the birth registry system, and record in the medical file or records.
19. Train supervisors in AMTSL, and include items to monitor proper use of AMTSL on the supervision checklists.
20. Include an evaluation of AMTSL use in medical audits.

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