

# **Study of the Active Management of the Third Stage of Labor in Health Facilities: Results of a National Survey conducted in Benin, 2006**

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Rational Pharmaceutical Management Plus Program

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**MANAGEMENT SCIENCES for HEALTH**

*RPM Plus | Rational Pharmaceutical  
Management Plus*



**POPPHI**

Prevention of Postpartum  
Hemorrhage Initiative

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### **About POPPHI**

The Prevention of Postpartum Hemorrhage Initiative is a three-year project awarded on July 29, 2004, to a partnership composed of the Partnership for Appropriate Technology in Health, RTI International, EngenderHealth, the International Confederation of Midwives, and the International Federation of Gynecology and Obstetrics.

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### **Notice**

This report concerns missions that took place from October 30 to November 18, 2006, in Benin, conducted by Dr. Sourou Gbangbade, Consultant for Management Sciences for Health and RPM Plus.

The opinions and interpretations expressed in this report are those of its author and do not necessarily reflect the points of view of the countries or MSH.

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## ACRONYMS AND ABBREVIATIONS

AMTSL	active management of the third stage of labor
CAME	Centrale d’Achat des Médicaments Essentiels (Central Procurement Agency for Essential Medicines)
CCT	controlled cord traction
CES	<i>certificat d’études spéciales</i> (certificate of special studies)
CHD	<i>centre hospitalier départemental</i> (departmental hospital center)
CSA	<i>centre de santé d’arrondissement</i> (arrondissement health center)
CSC	<i>centre de santé de commune</i> (commune health center)
CUGO	University Clinic of Gynecology and Obstetrics
DSF	Direction de la Santé Familiale (directorate of family health)
EmOC	Emergency Obstetric Care
FEFO	first expired, first out
FIGO	International Federation of Gynecology and Obstetrics
HOMEL	Hôpital de la Mère et de l’Enfant Lagune (Lagune women’s and children’s hospital)
ICM	International Confederation of Midwives
IM	intramuscular
INSAE	National Institute of Statistics and Economic Analysis
IU	International Unit
MoH	Ministry of Health
MSH	Management Sciences for Health
NEML	National Essential Medicines List
PISAF	Integrated Family Health Project
POPPHI	Prevention of Postpartum Hemorrhage Initiative
PPH	postpartum hemorrhage
PPPH	prevention of postpartum hemorrhage
PSI	Population Services International
PSS	Projet Socio-sanitaire Suisse (Swiss Socio-health Project)
RGPH	Recensement Général de la Population et de l’Habitat (General Population and Housing Census)
RPM Plus	Rational Pharmaceutical Management Plus Program
SGOBT	Société de Gynéco-Obstétrique du Bénin et du Togo (Gynecology and Obstetrics Society of Benin and Togo)
UNFPA	United Nations Population Fund
UNICEF	United Nations Children’s Fund
URC/QAP	University Research Corporation/Quality Assurance Project
USAID	U.S. Agency for International Development
USD	U.S. dollar
WHO	World Health Organization
XOF	Communauté Financière Africaine franc
ZH	zone hospital



## EXECUTIVE SUMMARY

This study of the active management of the third stage of labor (AMTSL) in Benin was conducted from October to November 2006. It was primarily intended to give the Ministries of Health (MoH) and their development partners the information necessary to assess the practice of AMTSL and identify the barriers to its use. It is a transverse and descriptive study aimed at achieving the preceding objectives through the collection of data in 26 health facilities located throughout the country. This study has provided answers to various research questions.

With regard to the national policy environment, the study found the following—

- AMTSL is officially recommended and promoted by the MoH through various policy and national strategy documents and also through family health protocols published since 2003. The definition of AMTSL adopted by Benin is from all perspectives comparable to that of the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO). Oxytocin is the principal uterotonic chosen by Benin for AMTSL.
- Instruction on AMTSL is not yet included in the training programs for midwives, nurses, and physicians in the public training schools.
- Since 2003, several series of trainings in physician, midwife, and nursing programs have been under way in both the public and private sectors of the health system through the MoH.

With regard to the policy environment in health facilities, the study found the following—

- A medicine supply list including oxytocin and ergometrine is available in 100 percent of the health facilities.
- Conversely, the document “Family Health Services Protocols,” which specifies the clinical guidelines for AMTSL, is available in only 46 percent of the health facilities.

As for pharmaceutical management and logistics—

- Although medicine sales points are open 24/7 in all the health facilities surveyed, the medicines and supplies necessary for AMTSL must be purchased by the families prior to use.
- Oxytocin was kept at temperatures between 2 and 8°C in the majority of health facilities surveyed. It was available in most (92 percent) of the health facilities surveyed but sold to women at a relatively high price.

- In most health facilities, medicine orders are based on the previous months' consumption. To properly quantify the requirements with this method, good information on consumption is necessary, and it is often missing or incomplete. Also, if AMTSL is a new practice in a health facility, consumption will be greater than in the previous months. Consequently, this quantification method exposes health facilities to frequent stock-outs.

In terms of the practice of AMTSL in health facilities, the study found the following—

- Although 82.3 percent of women had delivered in health facilities where providers were trained in AMTSL, only 17.6 percent of the women in the sample benefited from the correct practice of AMTSL.
- Oxytocin was properly administered to 61.3 percent of women, controlled cord traction was carried out correctly in 65.3 percent of the women, and correct uterine massage and palpation were performed on only 34.6 percent of women.
- The principal obstacles to the proper practice of AMTSL were controlled cord traction and massage (drop from 65.3 percent to 34.6 percent).
- The lowest rate of correct performance of AMTSL was recorded by health centers, zone hospitals, and *centres hospitaliers départementaux* (departmental hospital centers; CHD).
- The situation is alarming in the Mono-Couffo and Ouémé-Plateau departments, which recorded no instances of the correct practice of AMTSL.
- The 2002 pilot sites show better performance than the other sites.

This study also observed rather exaggerated usage of the technique of managing labor with oxytocin in health facilities. Finally, some harmful practices were noted. These included in particular fundal pressure to help deliver the placenta, uterine massage while awaiting delivery of the placenta, and cord traction without counterpressure.

On July 18, 2007, the Direction de la Santé Familiale (Directorate of Family Health; DSF) and the U.S. Agency for International Development (USAID) invited key decision makers—representatives of USAID, the MoH, training schools, the United Nations Population Fund (UNFPA), the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), the Integrated Family Health Project (PISAF), Population Services International (PSI), Projet Socio-sanitaire Suisse (Swiss Socio-health Project; PSS), UNIDEA Foundation, University Research Corporation/Quality Assurance Project (URC/QAP), Association des Sages Femmes du Bénin (Beninese Association of Midwives), and the Beninese branch of the Société de Gynéco-Obstétrique du Bénin et du Togo (Gynecology and Obstetrics Society of Benin and Togo; SGOTB)—to participate in a postpartum hemorrhage (PPH) prevention day. The goal of this day was to inform the participants of the state of AMTSL practice in health facilities in Benin and to spark reflection on effective strategies for reinforcing AMTSL to contribute to reducing maternal mortality. Several recommendations were adopted to increase AMTSL coverage and improve its practice in health facilities.

## INTRODUCTION

### Prevention of Postpartum Hemorrhage and the Issue of Maternal Mortality

According to WHO estimates, globally, 529,000 women die each year from complications of pregnancy, delivery, and consequences of childbirth [1, 2]. Nearly half of these deaths occur in Sub-Saharan Africa, a region that accounts for only 13.5 percent of the world's population and where 23.5 percent of all births take place [2]. With an estimated ratio of 1,000 maternal deaths per 100,000 live births, the African region has the highest maternal mortality in the world. Although regional variations exist, the ratio of some countries is over 500 maternal deaths per 100,000 live births, while others have a ratio exceeding 1,000 maternal deaths per 100,000 live births, in particular in countries in Sub-Saharan Africa [2].

In the world, approximately 80 percent of maternal deaths result directly from complications of pregnancy, delivery, or consequences of childbirth. Hemorrhage, in particular postpartum hemorrhage, is the most frequent cause of maternal deaths. Immediate PPH is defined as blood loss exceeding the amount considered physiological (<500 milliliters) occurring during the 24 hours following delivery [3]. It is responsible for nearly 25 percent of all maternal deaths. Hemorrhage, in particular PPH, is unpredictable, sudden, and more dangerous in anemic women. Without immediate and appropriate care, it can lead to death. According to estimates, each year, about 14 million cases of pregnancy-related hemorrhage occur, of which at least 128,000 result in death.

In the context of high mortality and limited resources, which applies to most countries in Sub-Saharan Africa, the introduction of low-cost, fact-based practices able to prevent PPH will significantly improve the survival of mothers and newborns. Active management of the third stage of labor is one of the low-cost and effective interventions to prevent PPH. Clinical trials conducted in developed countries have shown that contrary to physiological management of the third stage of labor—in which oxytocics were not used and the placenta was expelled by gravity and maternal effort—AMTSL significantly reduces the occurrence of PPH. Compared to AMTSL, physiological management is associated with a high rate of PPH and severe PPH, an increased need for blood transfusions, an increased need for the administration of therapeutic uterotonics, and an extended third stage of labor. Cochrane's systematic review of these trials recommended AMTSL for all women giving birth in a hospital [4].

AMTSL consists of a range of interventions whose goal is to facilitate the expulsion of the placenta by increasing uterine contractions and to prevent PPH by preventing uterine atonia. Its usual components are—

- Administration of a uterotonic
- Controlled cord traction
- Uterine massage following expulsion of the placenta

This definition of AMTSL has been adopted by FIGO, ICM, and WHO. Nevertheless, this definition adopted by FIGO, ICM, and WHO differs somewhat from the one used in the original

protocol of the Hinchingsbrooke [4] and Bristol [5] clinical trials. In fact, the original protocol of these two clinical trials entailed immediate clamping of the cord but did not include uterine massage. Similarly, the joint ICM/FIGO statement [6] and the document entitled *Managing Complications in Pregnancy and Childbirth* published by the WHO in 2002 also do not mention immediate clamping of the cord [7].

In view of the scientific proof of the effectiveness of this practice, ICM and FIGO recommended, through their joint statement of November 2003, that AMTSL be offered to all women “as a way to reduce the incidence of postpartum hemorrhage due to uterine atonia” [6]. The inclusion of AMTSL in the WHO manual *Managing Complications in Pregnancy and Childbirth* [7] also evidences the international recognition of this practice as an acceptable standard of care.

Despite the effectiveness of AMTSL, evidence of its use remains rare. The assessment of certain projects promoting this practice tends most often to be limited to only the numbers of trained providers and the percentage of providers having achieved an acceptable level of performance after training. Beyond anecdotal information, the use of this practice is somewhat better described in the research report published by the Global Network for Perinatal and Reproductive Health [8]. In fact, the data from the study of 15 reference university obstetrics facilities in developed and developing countries indicate a clear variation in the use of the practice of AMTSL both within a single hospital facility and between hospital facilities. For both groups, only 25 percent of the deliveries observed included the practice of AMTSL. This study also revealed that the three components of the technique were applied consistently in only one hospital (Dublin). In addition, major variations were noted in the use of its different components. For example, prophylactic use of oxytocin varied from 0 percent to 100 percent, the practice of controlled cord traction varied from 13 percent to 100 percent, and finally, the number of women who received extra doses of oxytocin during the third stage of labor varied from 5 percent to 100 percent. These results suggest that the correct use of AMTSL is still limited. Similarly, in places where it is practiced, the definition varies not only within a single country, but also between countries [9].

## **Maternal Mortality in Benin**

### ***The Republic of Benin***

Benin is a country located in West Africa and extends from the Atlantic Ocean to the Niger River over a length of 700 kilometers (km). Its area is 114,763 square km, and it is bordered in the north by the Republic of Niger and Burkina Faso, to the west by Togo, to the east by the Federal Republic of Nigeria, and to the south by the Atlantic Ocean with a coastline 120 km long. [10] (figure 1.)



Figure 1. Map of Benin

In administrative terms, Benin has had 12 departments since January 15, 1999. The country also has 77 communes, 566 arrondissements, and 3,557 villages and city districts.

The third general population and housing census conducted from February 15 to March 1, 2002, by the National Institute of Statistics and Economic Analysis (INSAE) counted 6,752,569 inhabitants [11] with an average annual growth rate of 3 percent. Women represent 51.5 percent of the population. Women of childbearing age account for 22 percent of the total population. The principal health indicators are—

- birthrate: 41.2 per 1,000 inhabitants
- synthetic fertility index: 5.5 children per woman
- contraceptive prevalence: 18.6 for 100
- general mortality rate: 12.3 per 1,000 inhabitants
- maternal mortality ratio: 498 per 1,000 live births
- neonatal mortality rate: 38 per 1,000 live births
- infant mortality rate: 89 per 1,000 live births
- infanto-juvenile mortality rate: 160 per 1,000 live births
- life expectancy at birth: 59 years

From the economic perspective, Benin is classified among the least-developed countries [12]. Agriculture is the basis of the Beninese economy. The gross domestic product per inhabitant was 273,641 Communauté Financière Africaine francs (XOF), or 390 U.S. dollars (USD), in 2001 [13].

The health system in Benin comprises two large sectors: the public sector and the private, faith-based, and liberal sector. The public sector is well structured, whereas the private sector has little organization and the Ministry of Health has difficulty controlling it.

The public sector health care system has a pyramidal structure and includes three levels—

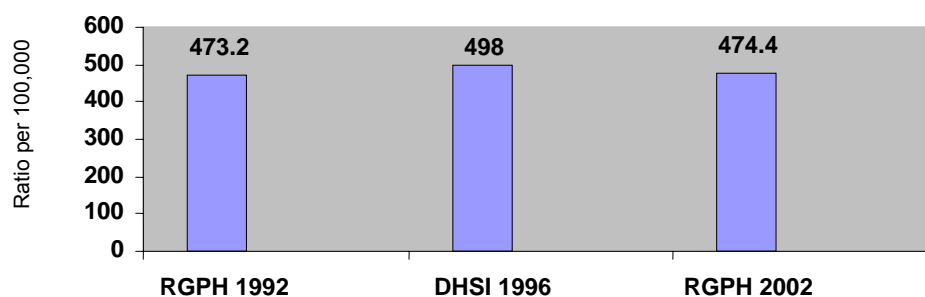
- Central or national level, represented by the Ministry of Health with its administrative and technical directorates and national-level reference health facilities.
- Intermediate or departmental level, represented by six departmental offices of health and departmental-level health facilities.
- Peripheral or operational level, represented by 34 health zones; a health zone generally contains one to three communes. It includes a zone hospital (ZH), commune health centers (*centre de santé de commune*; CSC), and arrondissement health centers (*centre de santé d'arrondissement*; CSA). It should be noted that only 13 of the existing 34 health zones are truly operational.

The number of health facilities in the 1998 census in Benin was 1,250, of which 619 were public and 631 private [13]. According to the 2001 demographic health survey, 76 percent of deliveries took place in a health facility (public or private). This same source shows that 64.8 percent of the deliveries occurred in the public sector, 11.2 percent in the private sector, and 22.7 percent at home [14].

The health sector's financial resources come from three sources: the government (national budget), development partners (bilateral and international aid), and communities (community funding).

### ***Maternal Mortality***

Until 1992, the actual maternal mortality level was not well known in Benin. In fact, the only estimates available until that time came from hospital sources, which hardly convey the reality within the population. It was only in 1992, through the second general population and housing census, that the first estimate of maternal mortality based on data from the population was published [15]. Two other estimates of the mortality ratio were published in 1996 [16] and 2002 [11]. These estimates made possible assessing the effect on maternal mortality of the various policies and strategies implemented in the health field since 1992. In fact, since 1992, three policy documents and health sector development strategies have been implemented, covering the periods 1993–1996, 1997–2001, and 2002–2006 [17, 18, 19, 20]. As figure 2 shows, the maternal mortality ratio leveled at approximately 473 per 100,000 live births from 1992 to 2002 [21].



Note: RGPH = recensement général de la population et de l'habitat (general population and housing census); DHSI = Demographic and Health Survey I.

**Figure 2. Change in the maternal mortality ratio in Benin (1992–2002)**

While maternal mortality marks time, infant mortality has dropped considerably from 94 per 1,000 live births in 1996 to 89 per 1,000 live births in 2001 [6]. This difference is probably evidence that these two problems obviously did not receive the same attention during the 1992–2002 period.

Similarly, the national assessment of emergency obstetric care (EmOC) needs conducted in May 2003 [22], and which concerned all of the 48 health facilities able to provide comprehensive emergency obstetric care, and of a random sample of 234 of the 581 health facilities able to provide basic emergency obstetric care showed that—

- Benin has few health facilities that truly provide EmOC.
- The deficiency is especially worrying for health facilities providing basic EmOC: 1.4 instead of 4 per 500,000 inhabitants.
- All EmOC usage indicators are below the minimum level acceptable: 12.6 percent instead of 15 percent for the proportion of births occurring in EmOC facilities; 22.9 percent compared with 100 percent for emergency obstetric care needs met; and 2.6 percent instead of a minimum of 5 percent for the number of cesareans relative to the total number of births among the population.
- The obstetric fatality rate indicating the quality the EmOC provided is 3.5 percent instead of below 1 percent.

These various facts demonstrate the seriousness of maternal mortality in Benin.

### **Implementation of AMTSL in Benin**

Thanks to the financial support of USAID, Benin was one of the West African countries involved in the initiative to reduce maternal mortality related to postpartum hemorrhage through

the technique of AMTSL. USAID began the initiative for prevention of postpartum hemorrhage (PPPH) through AMTSL in 2002 with the technical assistance of Prime II (IntraHealth, American College of Nurses and Midwives, EngenderHealth, and Abt Associates), which has been in full swing in Benin since 2003 through a series of trainings for health care providers in both the public and private sectors. One remarkable fact that merits highlighting is that the AMTSL training activities have intensified even after its sponsor Prime II ended activities in Benin in 2006, thanks to a dynamic takeover by the Ministry of Health through the DSF.

Implementation of the PPPH initiative by promoting AMTSL has gone through three major phases in Benin—

- Pilot phase
- Extension phase to 14 new health facilities in Cotonou
- Scaling-up to national level

### *Pilot Phase*

In 2002, the series of discussions between the MoH through its DSF and Prime II led to launching the pilot project for the PPPH initiative in Benin. A national training of trainers in AMTSL was carried out and seven pilot sites were selected. The pilot sites were the maternity ward of l’Hôpital de la Mère et de l’Enfant Lagune (Lagune women’s and children’s hospital; HOMEL), University Clinic of Gynecology and Obstetrics (CUGO), Akassato CSA, Bohicon CSC, Zou DHC, Borgou DHC, and Pébié CSA. It should be noted that six of the seven sites were in the sample of this study.

From March to April 2003, a baseline survey was carried out at these pilot sites to collect information on the current performance of the health care providers, the feasibility and acceptability of preventing postpartum hemorrhage through AMTSL, and the baseline data for monitoring and evaluating the initiative. Effective implementation of the initiative began in May 2003 in the seven pilot sites after the health care providers were trained.

In January 2004, after six months of implementation, this pilot phase was evaluated. The results regarding acceptability of AMTSL among both providers and women were encouraging.

### *Extension Phase to 14 New Health Facilities in Cotonou*

In 2004, reinforced by the results at the pilot sites, the initiative was extended to 14 new health facilities in the city of Cotonou.

### *National Scaling-Up Phase*

From 2004 to 2007, under the leadership of the DSF, many trainings on AMTSL were organized for health care providers in Benin with various sources of funding, including the national budget, USAID (Project ACQUIRE, PROSAF, PSI), UNICEF, UNFPA, and PSS.

From 2003 to March 2007, a total of 838 providers, including 581 midwives (69.2 percent), were trained on AMTSL in Benin. It should be noted that 62 percent (21 of 34) of the health zones are already covered by the PPPH/AMTSL initiative. Although at the beginning of the initiative, emphasis was placed on the public sector, coverage of private health facilities increased more and more, thanks in particular to the support of PSI and the Association des Sages femmes du Bénin with the support of the Prevention of Postpartum Hemorrhage Initiative (POPPHI).

The following parties are currently working on PPPH in Benin: the MoH, UNFPA, PSI, PSS, UNICEF, USAID, Association des Sages-femmes du Bénin, and the Beninese branch of SGOBT. This group of players will be reinforced henceforth by a USAID project and new programs, namely: the PISAF, covering as a priority the departments of Zou and Collines, and the Quality Assurance Project, covering the Aplahoué-Dogbo-Djakotomey health zone.

### **Justification of the Study**

Since 1997, the Safe Motherhood and Family Planning Initiative has declared that maternal mortality is health system problem. AMTSL is one aspect of this system. It is a measurable, fact-based intervention, able to save mothers' lives. Considering the fact that PPH is the leading cause of maternal death in most countries, it is crucial to have information on the current AMTSL practices with a view to enabling countries to design and implement efficient and effective strategies for its promotion at locations where deliveries take place. It is in this framework that POPPHI, funded by USAID, set about conducting this survey, complementing the work of the Global Network for Perinatal and Reproductive Health, to increase our knowledge of the current status of the practice of AMTSL.

This study was conducted in several countries: African countries (Benin, Ghana, Ethiopia, Tanzania, and Uganda), Latin American countries (El Salvador, Guatemala, Honduras, and Nicaragua), and one Asian country (Indonesia). In Benin, it was funded by the Rational Pharmaceutical Management Plus Program (RPM Plus) of Management Sciences for Health (MSH). Additionally, RPM Plus conducted a national review from November 2005 to February 2006 of pharmaceutical management policies and AMTSL guidelines in Benin, Burkina Faso, Cameroon, Côte d'Ivoire, and Mali. The conclusions of this study in Benin supplement the data already available, in particular in the area of pharmaceutical logistics.

This study is intended to give the Ministries of Health and their development partners the information necessary to assess the practice of AMTSL and identify barriers to its use. It will also allow tools and methods to be developed that can help the health care community document its current practice of AMTSL.



## METHODOLOGY

This study is intended to assess the use of the AMTSL technique in deliveries at health facilities in several countries including Benin. The other countries are Ethiopia, Ghana, Tanzania, Uganda, El Salvador, Guatemala, Honduras, Nicaragua, and Indonesia. The research protocol was established using a participatory approach in several phases. In May 2005, an initial meeting of experts was held in Washington, D.C., to collect changes to the first rough draft of the protocol, followed in July 2005 by a planning seminar-workshop in Nairobi, Kenya, and finally, a planning workshop in El Salvador in February 2006 to refine the research protocol and tools before the effective start of data collection in El Salvador, Guatemala, Honduras, and Nicaragua.

Prior to the collection of data, the research protocol, collection tools, and informed consent forms were reviewed and approved by the sectoral scientific committee of the Cotonou (Benin) Faculté des Sciences de la Santé (school of health sciences) and by the Minister of Health in Benin. Following this approval phase in Benin, the protocol was submitted to the ethics committee of Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland. This committee deemed that the protocol merited an exemption from review for research on human subjects because no personal identification was collected during the survey. In addition, all the procedures observed comply with health care standards. The committee specified, nevertheless, that the informed consent must be obtained not in the labor and delivery room, but rather upon arrival at the health facility.

### Study Objectives

As mentioned at the beginning of this report, this study is intended to give the Ministries of Health and their development partners the information necessary to assess the practice of AMTSL and identify the barriers to its use. It will also allow tools and methods to be developed that can help the health care community document its current practice of AMTSL.

The specific research questions of this study are as follows—

1. In what portion of deliveries is AMTSL practiced on the national level? What are the components of AMTSL used (prophylactic use of oxytocics, controlled cord traction, uterine massage), and are they used consistently?
2. Is AMTSL officially recommended in the treatment standards and protocols of each country on the national and/or health facility level? Since when? How is AMTSL defined according to the rules and standards?
3. How are the medicine requirements for AMTSL quantified on the national and health-facility levels?
4. What type of medicine is used (oxytocin, ergometrine, prostaglandins)? How is it stored?

5. Is a sufficient quantity of oxytocin available at health facilities for regular use for AMTSL?
6. What are the principal obstacles impeding the correct practice of AMTSL?

### **Type of Study**

This is a transverse and descriptive study intended to achieve the objectives defined above through the collection of data in 26 health facilities throughout the entire country. The data collection strategy includes the following four techniques—

- Direct observation of the deliveries occurring in the health facilities
- Interviews with key contacts
- Review of documents related to the training and practice of deliveries
- Examination of the availability and storage conditions of the medicines used for AMTSL

### **Health Facility Sampling**

A national-level representative sample of about 200 deliveries taking place in health facilities was necessary to achieve the objectives of this study. The size of the sample was calculated based on a prevalence of 30 percent, a response rate of 90 percent, and a clustering effect of two. For logistical and financial reasons, to avoid fruitless stays in health facilities where no births occurred, the sample was restricted to health facilities with at least 90 deliveries a month. In Benin, the 26 health facilities fulfilling this criterion were initially selected with representation of 11 of the 12 existing departments. Out of concern for having all 12 existing departments represented, however, one of the 26 health facilities was randomly pulled and replaced by a health facility with the largest volume of deliveries per day on average in the department not represented in the initial sample. Health statistics for 2004 served as the basis for the sampling.

At the end of the survey, 250 eligible deliveries were observed in the 26 health facilities throughout the 12 departments of the country.

During the analysis, the number of deliveries was weighted to ensure national representativeness of the sample. When the number of deliveries observed in a health facility during the three-day observation period was not proportional to the annual number of deliveries in this health facility, the weighting will correct the under- or overrepresentation. In this report, all the tables present weighted values of *n*.

## **Data Collection**

### ***Data Collection Tools***

Two data collection tools were used in Benin: a health facility questionnaire and a delivery observation guide. These tools were adapted based on the ones developed and used in Ethiopia and Tanzania. These tools were revised in Arlington, Virginia, in April 2006. After revision, they were translated from English into French.

#### ***Health Facility Questionnaire***

This questionnaire was designed to collect information on the policy environment of each health facility. The principal data targeted were the existence of a medicine supply list, the existence of clinical protocols including AMTSL, on-the-job training, the accessibility of the medicines and supplies necessary for AMTSL, and the management and logistics of uterotonics and supplies. Completion of this questionnaire required an interview with the health facility managers, an interview with the pharmacy managers, and a visit to the health facility pharmacy. This information was collected by the data collection agents assigned to each health facility according to their specific organization.

#### ***Delivery Observation Guide***

This guide was designed to document the providers' practices during the third stage of labor and the first 30 minutes of the fourth stage of labor. It was based on the one used by Festin et al. [8] in their study. In addition to the providers' practices, this questionnaire documents the availability of uterotonics and supplies as well as their storage in the health facility. This questionnaire was completed by data collection agents following direct observation of the deliveries during their stay in the health facilities. Deliveries eligible for observation were all the vaginal deliveries.

### ***Selection and Training of Data Collection Agents***

A selection committee selected 10 midwives experienced in and familiar with the AMTSL technique from 25 midwives preselected by the DSF. The principal criteria for choosing the agents were good mastery of the AMTSL technique, physical stamina, and availability during the study period (administrative leave). The number of agents to be selected was determined using an average duration of three weeks to collect the data in the 26 health facilities selected.

After their selection, the research coordinator contacted these 10 data collection agents by telephone to ensure their actual availability for the study.

The appointed agents went through a three-day training session October 19–21, 2006, in the conference room of the National AIDS Prevention Program at the Ministry of Health in Cotonou. The technical preparation and presentation of the training was ensured by the research coordinator, who was assisted by two resource people from the DSF. During the training, the

data collection agents were oriented on the goal, objectives, and purpose of the study through presentations, role-playing, simulations, practice on dummies, and discussions.

Both data collection tools (observation guide and health facility questionnaire) were systematically analyzed question-by-question and supported by appropriate clarifications. A pretest on the research was given to—

- Familiarize the agents with the collection tools
- Assess the clarity of the tools and utility of each of the items of the tools
- Measure the average time to complete each tool
- Assess the providers' reactions
- Test the organization model of the teams in the field

The pretest allowed the agents to familiarize themselves with the collection tools, reinforce their understanding of their content, and anticipate the conditions under which the real collection of the data will take place.

During the training, the data collection agents received technical assistance from an agent of the Centrale d'Achat des Médicaments Essentiels (Central Procurement Agency for Essential Medicines; CAME), who helped clarify the problems related to the variety of oxytocics found in the health facilities during the pretest and their storage conditions (light, temperature, and so on).

During the training, the USAID Office in Benin provided active support through a visit by a member of the office.

### ***Organization, Execution, and Supervision of the Data Collection***

The 10 data collection agents appointed were divided into five teams of two agents. In addition, the 26 health facilities selected were grouped into six operational strata: one stratum common to all data collection agents and five specific strata. (See Appendix A.)

Before beginning the survey, all field materials were prepared and provided to each of the teams. Additionally, the logistics were also arranged, and each team was given a vehicle in good condition and driver. A field guide was also developed and provided to each agent.

Each team of collection agents was to cover five to six health facilities during the survey. The duration of the stay in each health facility was three days, and the delivery observation period was eight hours per day and per agent.

For prompt resolution of any major data collection issues that might arise, it was planned in the initial data collection phase for all five teams to begin the survey with the common operational stratum of health facilities in Littoral department.

The data were collected from October 30 to November 18, 2006. Data collection was generally carried out as follows—

- An initial collection phase went from October 30 to November 1, during which all the teams were concentrated in Littoral department and divided in teams of two agents in five health facilities.
- A collaboration session took place in which the operational issues encountered during this initial collection phase were discussed. It was held on November 2 at the Ministry of Health before sending the teams to their respective departments.
- A second data collection phase went from November 2 to 18, during the course of which each team worked in the facilities assigned to it.
- A session for pooling information and review of the completed forms was held on November 20 at the Ministry of Health in the presence of all the agents and supervisors.

The study was supervised by the national coordinator of the study and resource people from the DSF. During this supervision, quality control was carried out regularly on the data collected for their completeness and reliability, and corrections were made as needed.

### **Processing and Analysis of the Data**

The data were entered using Epi Info 6 software and analyzed by STATA 9 software according to an analysis plan developed to achieve the objectives of the study. The various steps of the data processing are summarized as follows—

- Checking questionnaires
- Numbering questionnaires
- Coding questionnaires
- Double entry of data
- Data cleaning
- Analysis

Checking questionnaires consisted of checking the completeness of the questionnaires by health facility and verifying the consistency and plausibility of the responses gathered. It was carried out by the team of supervisors at the collection sites throughout the development of the survey. The errors noted were corrected as needed by the collection teams.

The questionnaires were numbered according to a strategy determined by the national coordinator of the study, preventing any duplication of numbers. The collection teams coded some non-precoded items of the questionnaires as necessary.

The data were entered according to the double-entry approach using Epi Info 6 software from an entry form created for this study. The data entered were cleaned using Epi Info 6 then STATA 9 software. The data analysis was basically descriptive and carried out with STATA 9.

The data underwent four levels of quality control—

- Prior to the collection of the data, by careful selection of the collection agents, their training, and pretesting of the tools
- During the collection, by the supervisors
- Prior to entering the data and when numbering and coding the completed forms
- After entering the data and during analysis of the data

## **POLICY ENVIRONMENT**

### **National Policy Environment**

#### ***Standard Treatment Guidelines***

In Benin, the document entitled “Protocoles des services de santé familiale, Volet Femme” (Family Health Services Protocol, Female Component), published by the DSF of the Ministry of Health with the financial support of USAID and technical assistance of IntraHealth, is the national reference document for reproductive health. The first version of this document was published in November 2002; however, it is the December 23, 2003, version that frequently mentions AMTSL. This may be explained by the fact that AMTSL was introduced in Benin only in 2003.

#### ***National Essential Medicines List***

The National Essential Medicines List (NEML) (January 2003) describes 10 IU/ml and 5 IU/ml oxytocin and 0.2 mg ergometrine tablets, injectables: 0.2mg/ml and 0.5mg/ml, in the oxytocics section. The NEML is revised every two years. The most recent version of the National Essential Medicines Formulary (1993) available does not describe the use of oxytocics for PPH and AMTSL [25].

#### ***Initial Training and On-the-Job Training in AMTSL***

At this time, AMTSL education is not included in midwife, nurse, or physician training programs in the public training schools. However, AMTSL was introduced in Benin in 2003, and the Ministry of Health is carrying out several series of trainings in physician, midwife, and nursing programs in both the public and private sectors of the health system.

### **Policy Environment in Health Facilities**

Public and private health facilities, regardless of their level in a country’s health system (peripheral, intermediate, or national), have a predominant role to play in the implementation of the initiative to prevent postpartum hemorrhage through the AMTSL technique. In fact, the community–health facility interface is the special place where the vital prognosis of women and newborns, with or without complications, is played out. Health facilities are the link in the health system that determine by virtue of their performance level the survival and welfare of mothers and newborns. Health facilities’ performance in AMTSL depends, among other things, on the policies in place, human and material resources available, management and logistics of uterotonic medicines, and women’s access to the services.

We present in this section the policy environment noted in the health facilities surveyed, specifically their characteristics, the existence of a medicine supply list, the availability of

clinical protocols, the accessibility of the medicines necessary to AMTSL, and the management and logistics of uterotronics.

### ***Characteristics of the Health Facilities***

The type of health facility, its administrative sector, geographic context, administrative context (department<sup>1</sup> and health zone), volume of deliveries, size of the delivery staff, and training in AMTSL are the characteristics that can influence performance in AMTSL. These different characteristics are analyzed here so they can later be linked to the practice of AMTSL in Benin.

Table 1 presents the health facilities in the sample distributed (in percentages) according to the following variables: type of health facility, administrative sector, geographic context, administrative context, volume of deliveries, size of the delivery staff, and training in AMTSL.

This table shows that half (50 percent) of the health facilities are represented by health centers, followed by ZHs (30 percent), CHDs (11.5 percent), and national facilities (7.7 percent). This distribution of health facilities in the sample is similar to that observed on the national level. The CSCs, CSAs, and private nonhospital facilities contained in the sample have been grouped here by health center.

This table also shows that the vast majority of health facilities are public and located in urban areas. The Atlantique-Littoral department is heavily represented in the sample, a result of the location of many health facilities with a high volume of deliveries in Cotonou. In addition, of the 34 health zones that Benin comprises, 14, or 41 percent, are represented in the sample. In Benin, the health zone is the most decentralized operational entity of the health system. A little over half (57.7 percent) perform between 1,000 and 2,000 deliveries per year, and a very small proportion (7.7 percent) have more than 20 providers performing deliveries.

With regard to AMTSL, this table indicates that the vast majority (80.8 percent) of the health facilities surveyed were trained in AMTSL between 2003 and 2006.

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<sup>1</sup> The departments are presented here according to the former subdivision, which is still in effect.

**Table 1. Distribution of Health Facilities Surveyed by Some Key Characteristics**

<b>Characteristics</b>	<b>Number</b>	<b>Percent</b>
<b>Type of health facility</b>		
National Reference Hospital	2	7.7
CHD	3	11.5
Zone Hospital	8	30.8
Health Center	13	50.0
Total	26	100.0
<b>Sector</b>		
Private	3	11.6
Public	23	88.4
Total	26	100.0
<b>Geographic context</b>		
Rural	2	7.7
Urban	24	92.3
Total	26	100.0
<b>Department</b>		
Borgou-Alibori	2	7.7
Atacora-Donga	2	7.7
Mono-Couffo	2	7.7
Zou-Collines	4	15.4
Ouémé-Plateau	5	19.2
Atlantique-Littoral	11	42.3
Total	26	100.0
<b>Health-system level</b>		
Health zone	21	80.8
Departmental health facility	3	11.5
National health facility	2	7.7
Total	26	100.0
<b>Deliveries per year</b>		
<1,000	4	15.4
1,000-1,999	15	57.7
2,000 and over	7	26.9
Total	26	100.0
<b>Total number of agents performing deliveries in this facility (Q105)</b>		
<10	11	42.3
10–19	13	50.0
20 and over	2	7.7
Total	26	100.0
<b>Training in AMTSL</b>		
No	21	19.2
Yes	5	80.8
Total	26	100.0

### **Existence of a Medicine Supply List**

The injection of a uterotonic medicine immediately after the delivery of a baby is one of the most important interventions used to prevent PPH. This leads to the necessity of ensuring that uterotonic medicines are included not only on the country's national essential medicines list, but also and especially on the medicine supply list of the health facilities.

As table 2 indicates, all the health facilities surveyed have a medicine supply list, all of which mention oxytocin and ergometrine. In contrast, misoprostol is mentioned in only a little less than half (42 percent) of the health facilities, and syntometrine is not mentioned in any health facilities.

**Table 2. Percentage of Health Facilities with a Medicine Supply List and Uterotonics Mentioned on the List**

<b>Supply List and Mention of Uterotonics</b>	<b>Number of Health Facilities (N = 26)</b>	<b>Percent</b>
<b>Availability of medicine supply list</b> List available	26	100
<b>Mention of uterotonics on the list</b>		
Oxytocin: Yes	26	100
Ergometrine: Yes	26	100
Syntometrine: Yes	0	0
Misoprostol: Yes	11	42.3

### **Existence of Clinical Protocols**

One of the questions this study seeks to answer is whether AMTSL is officially recommended in the care protocols on the health facility level. As table 3 shows, family health services protocols exist in a little over half (53.9 percent) of the health facilities surveyed. However, the service protocols in only 46 percent of the health facilities mention AMTSL specifically. With regard to the three components of AMTSL—

- The use of oxytocin, ergometrine, syntometrine, and misoprostol, as well as their administration, is mentioned in all the health facilities whose family health services protocols mentioned AMTSL.
- Oxytocin was mentioned in all the health facilities as a first-line uterotonic. It is administered via intramuscular (IM) route and at the dose of 10 International Units (IU).
- Controlled cord traction and uterine massage are also mentioned in all health facilities whose family health services protocols mentioned AMTSL.

The only restriction to AMTSL on the provider level is the lack of training in the technique.

The protocol document found in the health facilities surveyed is the document entitled “Protocoles des services de santé familiale, Volet Femme” published by the DSF of the Ministry of Health with the financial support of USAID and technical assistance of IntraHealth. AMTSL is mentioned only in the December 23, 2003, version. The November 2002 version does not mention it. This is easily explained by the fact that AMTSL was introduced in Benin only in 2003.

Table 4 examines the availability of health services protocols according to the characteristics of the health facilities. From analysis of this table, a marginally significant difference ( $p < 0.05$ ) emerges between the public sector and the private sector with regard to the availability of health services protocols: the situation appears more worrisome in the private sector health facilities.

**Table 3. Health Facilities Distributed According to the Availability Clinical Protocols and the Mention of Certain Components**

Availability of Protocols and Mention of Certain Components	Number of Health Facilities	Percent
<b>Existence of protocols or clinical standards for labor</b>		
Yes	14	53.9
No	12	46.1
Total	26	100.0
<b>Specific mention of the active management of the third stage of labor</b>		
Yes	12	46.2
No	2	7.6
Not applicable (health facility does not have protocols)	12	46.2
Total	26	100.0
<b>Specific mention of the use of oxytocin?</b>		
Yes	12	46.2
No	0	0
Not applicable (health facility does not have protocols + health facility whose protocols do not mention AMTSL)	14	53.8
Total	26	100.0
<b>Specific mention of the use of ergometrine</b>		
Yes	12	46.2
No	0	0
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>Specific mention of the use of syntometrine</b>		
Yes	12	46.2
No	0	0
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>Specific mention of the use of misoprostol</b>		
Yes	12	46.2
No	0	0
Not applicable (same as above)	14	53.8
Total	26	100.0

	<b>Number of Health Facilities</b>	<b>Percent</b>
<b>Availability of Protocols and Mention of Certain Components</b>		
<b>Specific mention of controlled cord traction</b>		
Yes	12	46.2
No	0	0
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>Specific mention of uterine massage</b>		
Yes	12	46.2
No	0	0
Not applicable (same as above)	14	53.8
Total Not applicable	26	100.0
<b>Mention of the administration of a uterotonic</b>		
Yes	12	46.2
No	0	0
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>First-line uterotonic</b>		
<b>First line</b>		
Oxytocin	12	46.2
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>Administration route</b>		
IM	12	46.2
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>Dose</b>		
10 IU	12	46.2
Not applicable (same as above)	14	53.8
Total	26	100.0
<b>Provider restriction</b>		
Provider not trained	12	46.2
Not applicable (same as above)	14	53.8
Total	26	100.0

**Table 4. Percentage of Health Facilities According to Protocol Availability and Characteristics**

<b>Characteristics</b>	<b>Percentage “Yes”</b>	<b>Health Facility Staff</b>	<b>Total Number of Health Facilities</b>	<b>P</b>
<b>Type of facility</b>				
National reference hospital	50.0	1	2	0.409
CHD	66.7	2	3	
Zone hospital	75.0	6	8	
Health center	38.4	5	13	
All	53.9	14	26	
<b>Department</b>				
Atacora-Donga	0.0	0	2	0.396
Atlantique-Littoral	45.5	5	11	
Borgou-Alibori	50.0	1	2	
Mono-Couffo	100.0	2	2	
Ouémé-Plateau	60	3	5	
Zou-Collines	75	3	4	
All	53.9	14	26	
<b>Health-system level</b>				
Health zone health facilities	52.4	11	21	0.892
Departmental health facilities	66.7	2	3	
National health facilities	50.0	1	2	
All	53.9	14	26	
<b>Sector (public or private)</b>				
Public	60.9	14	23	0.047
Private	0.0	0	3	
All	53.9	14	26	
<b>Geographic context</b>				
Urban	54.2	13	24	0.910
Rural	50.0	1	2	
All	53.9	14	26	
<b>AMTSL training</b>				
Yes	57.1	12	21	0.490
No	40.0	2	5	
All	53.9	14	26	
<b>Volume of deliveries</b>				
<1000	50.0	2	4	0.972
1,000–1,999	53.3	8	15	
2,000 and over	57.1	4	7	
All	53.9	14	26	

### ***Accessibility of Medicines and Supplies Necessary for AMTSL***

Parturients’ lack of access to the uterotonics and supplies necessary to AMTSL can be an obstacle to the proper practice of AMTSL. Table 5 shows the modes of access to uterotonics and supplies in the health facilities surveyed. This table shows that women or their families must buy the syringes and uterotonics in nearly all the health facilities surveyed. However, pharmacies or drugstores are open 24 hours a day, seven days a week in all of the 26 health facilities where women or their families can buy the products prescribed.

**Table 5. Percentage of Health Facilities Answering Yes for Modes of Access to Medicines and Supplies**

<b>Modes of Access to Medicines and Supplies</b>	<b>Number of Health Facilities</b>	<b>Percent</b>	<b>Total Number of Health Facilities</b>
Syringes purchased by families: Yes	25	96.2	26
Uterotonic medicines purchased by families: Yes	24	92.3	26
On-site pharmacy or drugstore in the health facility: Yes	26	100	26
Method for obtaining medicines and supplies when the health facility pharmacy or drugstore is closed: Open 24/7	26	100	26

## LOGISTICS MANAGEMENT FOR UTEROTONIC MEDICINES

In their joint statement, FIGO and ICM recommend that AMTSL be offered to all women “as a means of reducing the incidence of postpartum hemorrhage due to uterine atonia.” To implement this recommendation, however, high-quality uterotonic medicines need to be available on a permanent basis in the health facilities where deliveries take place, which leads to the issue of managing the logistics of uterotonic products in the country in general and in the health facilities in particular.

### Inventory Management at CAME<sup>2</sup>

Oxytocic medicines are supplied and procured through international open tendering for the requirements formulated for two years, in accordance with the National Essential Medicines List. The orders are then split, based on the needs and funds available. Misoprostol, whose use is restricted to gynecologists, was in stock at CAME although it did not appear on the essential medicines list and is not registered with the Direction de la Pharmacie et des Médicaments (Directorate of Pharmacies and Medicines; DPM).

In general, the inventory is managed on cards with computerized monitoring according to good inventory management practices (first expired, first out, or FEFO). Frequent stock-outs are caused at times by long delivery periods, but mostly because the statement of requirements does not take into account quantitative feedback from the peripheral health centers. No inventory of medicines specifically for PPPH has been defined, and oxytocics are still widely used by midwives to induce labor during deliveries.

CAME has a cold chamber that ensures temperatures between +2 and +8°C. At the time of the visit, the temperature displayed was 7°C, which is consistent with the vendor’s instructions on storage conditions. The products are arranged in the cold chamber on pallets with no grouping of oxytocic products; this system does not facilitate compliance with the FEFO rule and increases the risk of expired products. A system for recording the temperature of the cold chamber is necessary even if the staff monitors the temperatures displayed.

The distribution of uterotonics from CAME to the regional or district store is carried out through the “pull” system or based on requisitions and complies with the cold chain through the use of battery-powered coolers. Otherwise, the health facilities are responsible for determining the quantity of products necessary and for the delivery of the orders from the store to their facility.

Quality control consists of analyses identifying the active ingredient and determining the name on medicines upon receipt of the orders, but rarely following distribution at the health centers.

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<sup>2</sup> This section was taken from the report on the review of policies and procedures for using oxytocics prepared by RPM Plus in Benin [25].

## **Uterotonics Dosage, Form, and Recommended Dose for AMTSL**

Table 6 shows the facilities distributed by unit, dosage, and form of uterotonics. It also shows the dose recommended for AMTSL for the different uterotonics.

Some uterotonics are not sold in some health facilities: for example, oxytocin is sold in only 24 of 26, ergometrine in 17 of 26, and misoprostol in 6 of 26. Misoprostol, in fact, still does not appear on Benin's NEML [23]. In addition, since the introduction of AMTSL in Benin, ergometrine has been used less and less in Benin.

Table 6 shows that oxytocin is the most widespread uterotonic in the health facilities surveyed. The dosage of 10 IU/ml injectable ampoules was the form found most in the majority of health facilities surveyed. Oxytocin is also the uterotonic recommended for AMTSL in Benin. The recommended dose for AMTSL is 10 IU/ml IM. This dose of oxytocin is the same recommended by FIGO and ICM in their joint statement [6].

**Table 6. Health Facilities Distributed by Unit, Dosage, and Form of Uterotonics and According to the Dose Recommended for AMTSL**

Uterotonics	Number of Health Facilities	Percent
<b>Oxytocin</b>		
Unit and dosage		
5 IU/ml	3	11.5
10 IU/ml	21	80.8
20 IU/ml	0	0.0
Not sold	2	7.7
All	26	100.0
Form		
Ampoule	24	92.3
Other	0	0.0
Not applicable (not sold)	2	7.7
All	26	100.0
Dose recommended for AMTSL		
5 IU/ml	0	0.0
10 IU/ml	24	92.0
20 IU/ml	0	0.0
Not applicable (not sold)	2	7.7
All	26	100.0
<b>Ergometrine</b>		
Unit and dosage		
0.2 mg/ml	7	26.9
0.25mg/m	1	3.9
0.4mg/ml	0	0.0
0.5 mg/ml	9	34.6
Not sold	9	34.6
All	26	100.0
Form		
Ampoules	16	61.5
Tablets	1	3.9
Not applicable (not sold)	9	34.6
All	26	100.0
<b>Misoprostol</b>		
Unit and dosage		
100 µg	1	3.9
200 µg	5	19.2
600 µg	0	0.0
800 µg	0	0.0
1,000 µg	0	0.0
Not applicable (not sold)	20	76.9
All	26	100.0
Form		
Tablets	6	23.1
Other	0	0.0
Not applicable (not sold)	20	76.9
All	26	100.0

## Storage Conditions for Uterotonics in Health Facility Pharmacies

Table 7 shows the health facilities distributed according to the temperature and light storage conditions for uterotonics in the pharmacies. Analysis of this table shows that oxytocin is stored at temperatures between 2 and 8°C in the majority of health facilities surveyed. It is stored at room temperature in nearly a fifth of the health facilities. As for ergometrine, it is stored at temperatures between 2 and 8°C in a little over a third of the health facilities surveyed and at room temperature in nearly a fifth of the health facilities.

Ergometrine is used less and less in health facilities in Benin. It was not available in 42 percent of the health facilities surveyed. This makes evaluating the storage conditions with respect to lighting difficult. However, in the vast majority of health facilities with ergometrine (13 of 15 health facilities), ergometrine was stored in the dark.

The storage conditions for misoprostol were not analyzed because of its rarity in the health facilities surveyed.

**Table 7. Health Facilities Distributed According to Temperature and Light Storage Conditions for Uterotonics in the Pharmacies**

Storage Conditions	Uterotonics	
	Oxytocin (percent) <i>n</i> = 26	Ergometrine (percent) <i>n</i> = 26
Temperature conditions in the pharmacy		
2 °C–8 °C	61.5	38.5
<15 °C	0.0	0.0
5 °C–25 °C	11.6	3.8
Room temperature or in a cooler	19.2	19.2
None available (not sold)	7.7	38.5
Light conditions in the pharmacy		
In the dark	84.6	50.0
In daylight, out of direct sunlight	7.7	7.7
In the direct sun	0.0	0.0
Other (specify):	0.0	0.0
None available at the time of the visit (not sold)	7.7	42.3

## Storage Conditions for Uterotonics Recommended by the Manufacturer

Table 8 presents the storage conditions (temperature and light) recommended by the manufacturer for the uterotonic products in the pharmacies of the health facilities visited. Analysis of this table reveals noncompliance with the manufacturers' recommendations on the storage of uterotonics. For example, for oxytocin, the storage temperature recommended by the manufacturer is between 2 and 8 °C in 50 percent of the health facilities and between 15 and 25 °C in 27 percent. In 15 percent of the health facilities, the temperature storage conditions recommended by the manufacturer could not be ascertained because the boxes on which these instructions are generally printed were not seen by the observers during their visit. This same example of storage noncompliance is also noted for ergometrine.

With regard to the light conditions, to which ergometrine is sensitive [24], no guideline was given in 8 percent of the health facilities. In 12 percent of the health facilities, the light conditions of storage recommended by the manufacturer could not be assessed because the boxes on which these instructions are generally printed were not seen by the observers during their visit.

**Table 8. Health Facilities Distributed According to the Temperature and Light Conditions for Storage of Uterotonics Recommended by Manufacturers**

Storage Conditions	Uterotonics	
	Oxytocin (percent) <i>n</i> = 26	Ergometrine (percent) <i>n</i> = 26
Temperature conditions recommended by the manufacturer		
2–8 °C	50.0	50.0
<15 °C	0	0
15–25 °C	26.9	0
Box not seen during visit	15.4	15.4
Not applicable (not sold)	7.7	34.6
Light conditions recommended by the manufacturer		
Not indicated	15.4	7.7
Keep out of the light	76.9	46.2
Box not seen during visit	0.0	11.5
Not applicable (not sold)	7.7	34.6

***Compliance with Storage Conditions for Uterotonics Recommended by the Manufacturer***

The pharmacies' compliance with the temperature conditions recommended by the manufacturer for oxytocin could be assessed in only 20 health facilities carrying oxytocin and with a mention of the manufacturer's recommendations on the temperature conditions. The results obtained follow—

- In the 13 pharmacies where the manufacturer recommended an oxytocin storage temperature between 2 and 8 °C, 11 pharmacies, or 85 percent, complied with the manufacturer's instructions.
- In the 7 pharmacies where the manufacturer recommended an oxytocin storage temperature between 15 and 25 °C, 3 pharmacies, or 43 percent, complied with the manufacturer's instructions (see details in Appendix B).

The pharmacies' compliance with the temperature conditions recommended for ergometrine could be assessed only in the 13 health facilities carrying ergometrine and with a mention of the manufacturer's recommendations on the temperature conditions. The results obtained follow—

- In 12 pharmacies where the manufacturer recommended an ergometrine storage temperature between 2 and 8 °C, 12 pharmacies, or 100 percent, complied with the manufacturer's instructions (see details in Appendix B).
- In one health facility, there was no indication of the manufacturer's recommendations on light conditions.

### **Availability of Uterotonics in the Health Facilities and in the Delivery Room**

Data were collected on the availability of medicines at the time of the visit and the quantity available. As shown in table 9, oxytocin was available in the majority (92 percent) of the health facilities surveyed. Nearly half (46 percent) of the health facilities had 101 to 500 ampoules of oxytocin at the time of the visit. As for ergometrine, it was available in a little over half (54 percent) of the health facilities at the time of the visit.

**Table 9. Availability of Uterotonic Products**

	Uterotonic Medicines		
	Oxytocin (percent) <i>n</i> = 26	Ergometrine (percent) <i>n</i> = 26	Misoprostol (percent) <i>n</i> = 26
<b>Availability of Uterotonics</b>			
<b>Medicine available at the time of the visit</b>			
Yes	92.3	53.8	19.2
No	7.7	46.2	80.8
<b>Quantity of medicines available at the time of the visit</b>			
0	0.0	0.0	3.8
1–100	19.2	26.9	3.8
101–500	46.2	26.9	7.7
>500	29.9	0.0	3.8
Not applicable (not available)	7.7	46.2	80.9
<b>Total</b>	100.0	100.0	100.0

Table 10 shows that oxytocin was available in the delivery rooms of over three-quarters (77.6 percent) of the deliveries observed. However, oxytocin was only refrigerated in one-fifth (21.6 percent) of the deliveries.

The ampoules of oxytocin not refrigerated were placed out of the light in only 4 percent of the deliveries. Needles and syringes were available during 79 percent of the deliveries.

**Table 10. Distribution of Oxytocin and Supply Management Methods**

<b>Management Methods</b>	<b>Number of Deliveries (n = 250)</b>	<b>Percent</b>
<b>Oxytocin</b>		
Oxytocin available in the delivery room		
Yes	194	77.6
No	56	22.4
Stored in refrigeration		
Yes	54	21.6
No	140	56.0
Not available	56	22.4
Protected from light		
In the dark	9	3.6
In daylight, out of the direct sun	85	34.0
In the direct sun	0	0.0
Other	46	18.4
Not available	56	22.6
Not applicable	54	21.6
Number of oxytocin ampoules in the refrigerator		
<=2	35	14.0
3–20	14	5.6
21–84	5	2.0
Not applicable	196	78.4
<b>Syringe</b>		
Syringes available in the delivery room		
Yes	195	78.0
No	55	22.0
Number of syringes in the delivery room		
0	55	22.0
1–3	170	68.0
4–10	25	10.0
<b>Needle</b>		
Needles available in the delivery room		
Yes	197	78.8
No	53	21.2
Number of needles in delivery room		
0	54	21.6
1–3	168	67.2
4–10	28	11.2

### ***Uterotonics Consumption in Health Facilities***

The lack of reliable data on the total number of uterotonics ampoules consumed during the last three months in the majority of health facilities led us to decide not to include these data in this report. In fact, in the majority of health facilities, an inconsistency was noted between the consumption amounts recorded in the pharmacies and what was actually used in the delivery rooms, taking into account the providers' statements and volume of deliveries.

### **Purchase Price and Transfer Price of Uterotonics**

Table 11 shows that oxytocin, the uterotonic of choice for AMTSL in Benin, costs an average of XOF 50 (USD 0.10) (USD 1 = XOF 500) per ampoule. However, it is sold at a price four times higher (XOF 200, or USD 0.40) to women in the majority of the health facilities surveyed. This nearly 300 percent markup for a product essential to an intervention required to save the lives of women who are, for the most part, on a low socioeconomic level could be a barrier to providing AMTSL.

**Table 11. Purchase Price and Transfer Price of Uterotonics**

	Uterotonic Medicines		
	Oxytocin (percent) <i>n</i> = 26	Ergometrine (percent) <i>n</i> = 26	Misoprostol (percent) <i>n</i> = 26
<b>Prices of Uterotonic Products (XOF)</b>			
<b>Purchase price (per ampoule) for the facility</b>			
<=50	69.3	0.0	
51–100	11.5	23.1	
>100	11.5	30.8	11.5
Not applicable	7.7	46.1	88.5
Average	50	103	280
<b>Transfer price per ampoule to patients</b>			
<=200	69.2	34.6	
>200	19.3	15.4	19.2
Not applicable	11.5	50.0	80.8
Average	200	200	400
<b>Total</b>	100.0	100.0	100.0

### **Quantification of Uterotonics**

Quantification of the medicines to be ordered poses a problem in the health facilities surveyed. In fact, as table 12 shows, in most of the health facilities, the medicine order is based on the previous months' consumption. To properly calculate the requirement using this method, one must have good information on consumption. Also, if AMTSL is a new practice in a health facility, the actual consumption will be greater than in the previous months. Consequently, this method for quantifying medicine requirements exposes health facilities to the risk of stock-outs caused by the frequent variations observed in the monthly consumption.

**Table 12. Determining the Amount of Medicines to Be Ordered**

<b>Methods</b>	<b>Uterotonic Medicines</b>	
	<b>Oxytocin (percent) n = 26</b>	<b>Ergometrine (percent) n = 26</b>
Order based on previous months' consumption, process under the control of the health facilities	76.9	42.4
Medicines provided by the central level without any orders being placed by the health facilities	0.0	3.8
Order placed when the health facility has no more medicines	3.8	3.8
Amount predetermined by the central level; the health facilities decide when to place the order	0.0	0.0
Other	11.6	15.4
Not applicable	7.7	34.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

### ***Stock-outs and Reasons***

A stock-out of at least eight days was observed in 34.6 percent of the health facilities during the last three months (table 13). The main reason given for stock-outs by the health facilities was stock-outs at the primary provider, which is CAME.

**Table 13. Stock-outs in Uterotonic Products**

	<b>Uterotonic Medicines</b>	
	<b>Oxytocin (percent) n = 26</b>	<b>Ergometrine (percent) n = 26</b>
<b>Number of days of stock-out</b>		
0 days	57.7	42.3
At least 8 days	34.6	15.5
Not applicable	7.7	42.2
<b>Reasons for stock-out</b>		
Stock-out at the supplier	42.3	7.7
Not applicable	57.7	92.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>



## AMTSL PRACTICE IN HEALTH FACILITIES

The implementation of AMTSL has been under way in Benin since 2003, and approximately 838 providers (midwives, nurses, and physicians) have already been trained. Although it is true that training is necessary for the practice of AMTSL, it is no less true that the correct use alone of this practice guarantees prevention of expected postpartum hemorrhage—hence, it is important to ask the following questions—

- In what proportion of deliveries is AMTSL used on the national level?
- What components of AMTSL are used?
- Are they used consistently?

This section presents the results of the observation of deliveries in health facilities in Benin and focuses on the following points—

- Characteristics of the health facilities and women in the sample
- The practice of AMTSL
- Observation of the placenta expulsion period
- Potentially harmful practices

### Characteristics of the Health Facilities in the Sample

The type of health facility, administrative sector, geographic context, administrative context (Department and Health Zone), qualifications of the birth attendant, and training in AMTSL are characteristics that can influence the practice of AMTSL. These different characteristics are analyzed here so they can subsequently be linked to the practice of AMTSL in Benin.

Table 14 shows that over half (57.2 percent) of the deliveries took place in health centers (CSC, CSA, and private nonhospital facilities contained in the sample). This table also shows that the vast majority of deliveries took place in public health facilities and in urban areas. Over one-third (44.4 percent) of the deliveries occurred in Atlantique-Littoral department because it has many health facilities with high delivery volumes. Similarly, the vast majority (82.4) of the deliveries observed occurred in health facilities in health zones.

With regard to AMTSL, this table notes that the majority (82.4 percent) of the deliveries observed occurred in health facilities where the providers were trained in AMTSL, and the vast majority (94 percent) was handled by midwives.

**Table 14. Deliveries Distributed by Health Facility Characteristics**

<b>Characteristics</b>	<b>Number (n = 250)</b>	<b>Percent</b>
<b>Type of health facility</b>		
National reference hospital	13,0	5,2
CHD	31,0	12,4
Zone hospital	63,0	25,2
Health center	143,0	57,2
All	<b>250,0</b>	<b>100,0</b>
<b>Department where health facility is located</b>		
Atacora-Donga	11,0	4,4
Atlantique-Littoral	111,0	44,4
Borgou- Alibori	27,0	10,8
Mono-Couffo	21,0	8,4
Ouémé-Plateau	53,0	21,2
Zou-Collines	27,0	10,8
All	<b>250,0</b>	<b>100,0</b>
<b>Health-system level</b>		
Health zone health facility	206,0	82,4
Departmental health facility	31,0	12,4
National health facility	13,0	5,2
All	<b>250,0</b>	<b>100,0</b>
<b>Geographic context</b>		
Urban	238,0	95,2
Rural	12,0	4,8
All	<b>250,0</b>	<b>100,0</b>
<b>Sector (public or private)</b>		
Public	235,0	94,0
Private	15,0	6,0
All	<b>250,0</b>	<b>100,0</b>
<b>Birth attendant's qualifications</b>		
Obstetrician	1,0	0,4
<i>Certificat d'études spéciales</i> (CES; certificate of special studies), student nurse and graduate students	8,0	3,2
Midwife	235,0	94,0
Nurse	2,0	0,8
Other	4,0	1,6
All	<b>250,0</b>	<b>100,0</b>
<b>Did more than one person assist the woman during the delivery?</b>		
Yes	210,0	84,0
No	40,0	16,0
All	<b>250,0</b>	<b>100,0</b>
<b>In health facilities where the staff is trained in AMTSL</b>		
Yes	206,0	82,4
No	44,0	17,6
All	<b>250,0</b>	<b>100,0</b>

## Characteristics of the Women in the Sample

Table 15 shows the deliveries distributed by the women’s characteristics (age, gravidity, parity, day of delivery, and time of delivery). This table shows that the majority (84.8 percent) of the deliveries were in the ages 20 to 34 segment and that a little less than half (45.6 percent) of them are nulliparas or primiparas. A slight predominance of deliveries on Thursdays and between the hours of midnight and 8 a.m. is noted

**Table 15. Deliveries Distributed by Women’s Characteristics**

<b>Characteristics</b>	<b>Number of Health Facilities (n = 250)</b>	<b>Percent</b>
<b>Age</b>		
<20 years	19,0	7,6
20–34 years	212,0	84,8
35+ years	19,0	7,6
<b>Gravidity</b>		
Primigravida	51,0	20,4
Secundigravida	50,0	20,0
Tertigravida	53,0	21,2
Multigravida	96,0	38,4
<b>Parity</b>		
Nullipara	58,0	23,2
Primipara	56,0	22,4
Secundipara	50,0	20,0
Tertipara	24,0	9,6
Multipara	62,0	24,8
<b>Day of delivery</b>		
Sunday	14,0	5,6
Monday	23,0	9,2
Tuesday	38,0	15,2
Wednesday	40,0	16,0
Thursday	52,0	20,8
Friday	44,0	17,6
Saturday	39,0	15,6
<b>Time of delivery</b>		
Midnight–8 a.m.	108,0	43,2
8 a.m.–4 p.m.	66,0	26,4
4 pm–Midnight	76,0	30,4

## Use of Uterotonics in Delivery

The introduction of uterotonics into obstetrical practice not only has improved the environment of deliveries for the providers, but also has made possible a great reduction the number of cesarean deliveries, which are expensive, thus relieving many women of their physical and financial costs. However, abusive use of uterotonics or their inappropriate use can be catastrophic for women and even lead to maternal and fetal death. These reasons motivated the analysis of the use of uterotonics by providers during the various stages of labor in Benin to

deduce the trends. The use of uterotonics was specifically examined before the third stage of labor and during the third and fourth stages of labor.

### ***Use of Uterotonics before the Third Stage of Labor***

Table 16 shows that the vast majority of labors were spontaneous. However, a rather high proportion of 40.2 percent of women received the uterotonic prior to the third stage of labor. Analysis of the subsample of women who went into labor spontaneously reveals that over one-third (39.3 percent) of them received uterotonics prior to labor. This reporting of the increased use of oxytocin in women experiencing spontaneous labor suggests an exaggerated trend of providers to “augment” labor (in other words—use uterotonics to stimulate the uterus during labor with the goal of increasing the frequency, duration, and intensity of the contractions).

This table also shows that oxytocin is the uterotonic used most frequently to augment or induce labor in Benin.

**Table 16. Deliveries Distributed by the Use of Uterotonics before the Third Stage of Labor**

<b>Use of Uterotonic</b>	<b>Number (N = 250)</b>	<b>Percent</b>
<b>Modality of starting labor</b>		
Spontaneous	242,0	96,8
Induced	8,0	3,2
<b>Received a uterotonic before the third stage of labor</b>		
To induce labor	8,0	3,2
To augment the labor	95,0	38,0
No uterotonic before the third stage of labor	147,0	58,8
<b>Type of uterotonic used to induce or augment labor (n = 102.7)</b>		
Oxytocin	99,0	96,1
Other	4,0	3,9
<b>Labor augmented following spontaneous start (n = 242.1)</b>		
Yes		
No		

### ***Augmented Labor Following Spontaneous Start by Health Facility Characteristics***

Table 17 shows that relatively high proportions of deliveries were augmented in national reference hospitals and CHDs compared with the practice in zone hospitals and health centers. The highest proportions of augmented labors were recorded in Atlantique-Littoral and Borgou-Alibori departments. A comparison of health facilities of the health zones to those of the departmental and national hospitals shows a predominance of augmented labor in departmental

and national hospitals. The private sector has a greater tendency to augment labor compared to the public sector.

These different reports could suggest a too-easy tendency of providers in the private sector and providers in national and departmental hospitals toward augmenting labor.

**Table 17. Percentage of Augmented Deliveries Following Spontaneous Labor, by Health Facility Characteristics**

Characteristics	Percentage Augmented Deliveries	Staff	Total	P
<b>Type of facility</b>				0.0785
National reference hospital	83,3	10	12,0	
CHD	60,7	17,0	28,0	
Zone hospital	38,3	23,0	60,0	
Health center	31,7	45,0	142,0	
All	39,3	95,0	242,0	
<b>Department</b>				0.3006
Atacora-Donga	30,0	3,0	10,0	
Atlantique-Littoral	49,1	53,0	108,0	
Borgou-Alibori	40,0	10,0	25,0	
Mono-Couffo	4,8	1	21,0	
Ouémé-Plateau	34,6	18,0	52,0	
Zou-Collines	33,3	9,0	27,0	
All	39,3	95,0	242,0	
<b>Health-system level</b>				0.0021
Health zone health facility	33,7	68,0	202,0	
Departmental health facility	60,7	17,0	28,0	
National health facility	83,3	10,0	12,0	
All	39,3	95,0	242,0	
<b>Sector (public or private)</b>				0.1066
Public	37,1	85,0	229,0	
Private	76,9	10,0	13,0	
All	39,3	95,0	242,0	
<b>Geographic context</b>				0.7013
Urban	38,7	89,0	230,0	
Rural	50,0	6,0	12,0	
All	39,3	95,0	242,0	
<b>Birth attendant's qualification</b>				0.2549
Obstetrician	0,0	0,0	0,0	
CES, student nurse and graduate students	66,7	4,0	6,0	
Midwife	37,8	87,0	230,0	
Nurse	100,0	2,0	2,0	
Other	50,0	2,0	4,0	
All	39,3	95,0	242,0	

### **Augmented Labor by Characteristics of the Women**

Table 18 shows that primigravidas are more often subject to augmented labor than the rest of women. The time of delivery does not appear to have influenced the augmentation of labor in this sample.

**Table 18. Deliveries Distributed According to Augmentation of Labor Following Spontaneous Start, by Characteristics of the Women**

<b>Characteristics</b>	<b>Percentage Augmented Deliveries</b>	<b>Staff</b>	<b>Total</b>	<b>P</b>
<b>Age of the parturients</b>				0.2257
<20 years	64,7	11,0	17,0	
20–34 years	36,7	76,0	207,0	
35+ years	50,0	9,0	18,0	
All	39,3	95,0	242,0	
<b>Gravidity</b>				0.0199
Primigravida	66,0	31,0	47,0	
Secundigravida	38,8	19,0	49,0	
Tertigravida	28,8	15,0	52,0	
Multigravida	33,0	31,0	94,0	
All	39,3	95,0	242,0	
<b>Parity</b>				0.0285
Nullipara	64,1	34,0	53,0	
Primipara	41,8	23,0	55,0	
Secundipara	26,5	13,0	49,0	
Tertipara	13,0	3,0	23,0	
Multipara	37,1	23,0	62,0	
All	39,3	95,0	242,0	
<b>Time of delivery</b>				0.3330
Midnight–8 a.m.	36,3	37,0	102,0	
8 a.m.–4 p.m.	50,0	33,0	66,0	
4 p.m.–Midnight	33,8	25,0	74,0	
All	39,3	95,0	242,0	

### **Use of Uterotonics during the Third or Fourth Stage of Labor**

Table 19 presents the distribution of deliveries into percentages according to the use of uterotonics during the third or fourth stage of labor. Examination of this table reveals that the vast majority (96.0 percent) of women received a uterotonic during the third or fourth stage of labor. Analysis of the practice of using oxytocin shows that the majority of women received a 10 IU IM dose after the birth of the child. Nearly two-thirds of the women received oxytocin within one minute after the birth.

Ergometrine has been used less and less since the advent of AMTSL in Benin. As table 19 shows, a little over 3percent of the women in this sample received ergometrine in 0.2 and 0.4 mg IM doses after expulsion of the placenta.

**Table 19. Deliveries Distributed According to Use of Uterotonics during the Third or Fourth Stage of Labor**

<b>Use of Uterotonics</b>	<b>Number of Deliveries N = 250</b>	<b>Percent</b>
<b>Received a uterotonic during the third and fourth stage of labor</b>		
Yes	240,0	96,0
No	10,0	4,0
<b>Type of uterotonic received during the third or fourth stage of labor</b>		
Oxytocin only	237,0	94,8
Oxytocin + Ergometrine	2,0	0,8
Oxytocin + Misoprostol	1,0	0,4
Oxytocin + Ergometrine + Misoprostol	1,0	0,4
No uterotonic	9,0	3,6
<b>Oxytocin</b>		
<b>Received oxytocin</b>		
Yes	240,0	96,0
No	10,0	4,0
<b>Dose</b>		
5 IU	6,0	2,4
10 IU	229,0	91,6
20 IU	5,0	2,0
40 IU	1,0	0,4
None	9,0	3,6
<b>Administration route</b>		
IM	240,0	96,9
IVD/IV	0,0	0,0
Slow-drip IV + IM	1,0	0,4
Not applicable	9,0	3,6
<b>Administration period</b>		
During the birth of the baby	2,0	0,8
After the birth of the baby	222,0	88,8
During expulsion of the placenta	17,0	6,8
After expulsion of the placenta	9,0	3,6
<b>Birth-administration interval</b>		
<= 1 minute	160,0	64,0
1–3 minutes	50,0	20,0
4–93 minutes	31,0	12,4
No uterotonic	9,0	3,6
<b>Ergometrine</b>		
<b>Received ergometrine</b>		
Yes	3,0	1,2
No	247,0	98,8
<b>Dose</b>		
0.2 mg	2,0	0,8
0.4 mg	1,0	0,2
Not applicable	247,0	98,8
<b>Administration route</b>		
IM	3,0	1,2
Not applicable	247,0	98,8

	<b>Number of Deliveries N = 250</b>	<b>Percent</b>
<b>Use of Uterotonics</b>		
<b>Administration period</b>		
After expulsion of the placenta	3,0	1,2
Not applicable	247,0	98,8
<b>Misoprostol</b>		
<b>Received misoprostol</b>		
Yes	1,0	0,4
No	249,0	99,6
<b>Dose</b>		
100 mcg	1,0	0,4
Not applicable	249,0	99,6
<b>Administration route</b>		
Rectal	1,0	0,4
Not applicable	249,0	99,6
<b>Administration period</b>		
After expulsion of the placenta	1,0	0,4
Not applicable	249,0	99,6

Although misoprostol still does not appear on the Benin essential medicines list, its use is increasingly noted in some health facilities in Benin. In this sample, less than 0.5 percent of women received misoprostol at the dose of 100 mcg by rectal administration after expulsion of the placenta.

### ***Use of Uterotonics during the Third or Fourth Stage of Labor in Women Whose Labor Was Induced or Augmented***

It was also noted that a total of 7.9 percent of women whose labor was induced and 94.8 percent of women whose labor was augmented received uterotonics during the third or fourth stage of the labor. This practice may be detrimental to women by predisposing them to postpartum hemorrhage.

### **The Practice of AMTSL in the Health Facilities Surveyed**

As table 20 shows, the definition of AMTSL adopted by Benin is nearly identical to the one recommended by FIGO/ICM. At a meeting with officials from the Ministry of Health on February 14, 2007, they expressly recommended conducting an analysis of AMTSL coverage by strictly following the definition of AMTSL as adopted by Benin. Benin's definition includes the three components of AMTSL specified by FIGO/ICM and nine elements. However, because this study did not collect information on "Massage Continued by the Woman," this study makes do with the eight elements in common with the FIGO/ICM definition.

**Table 20. Comparison of the Benin and FIGO/ICM AMTSL Definitions**

Components	Benin's Definition	ICM/FIGO Definition for Oxytocin
1. Uterotonic	Type: Oxytocin	Type: Oxytocin
	Dose: 10 IU	Dose: 10 IU
	Administration route: IM	Administration route: IM
	Administration period: Within one minute following the birth of the child (Precautions: Palpate the uterus to rule out the possibility of another baby/babies before administering a uterotonic)	Administration period: Within one minute following the birth of the child (Precautions: Palpate the uterus to rule out the possibility of another baby/babies before administering a uterotonic)
2. Controlled cord traction	Controlled cord traction	Controlled cord traction
	With counterpressure above the pubic bone	With counterpressure above the pubic bone
3. Massage	Transabdominal uterine massage by birth attendant after expulsion of the placenta	Transabdominal uterine massage by birth attendant after expulsion of the placenta
	Massage continued by the woman	
	Check tone of uterus every 15 minutes for 2 hours	Check tone of uterus every 15 minutes for 2 hours

Table 21 shows the distribution into percentages of the practice of the different components and elements of AMTSL during the deliveries observed. This table shows that the correct use of uterotonics was recorded in only 61.2 percent of women. Correct controlled cord traction was recorded in 65.2 percent of the women who gave birth. However, the massage component (transabdominal uterine massage following expulsion of the placenta and checking uterine tone) registered the lowest performance. In fact, it was performed correctly in only 34.8 percent of women.

Finally, the actual coverage of AMTSL, that is, the proportion of deliveries during which AMTSL was practiced correctly on the national level, was 17.6 percent.

**Table 21. Distribution of the Practice of the Different Steps and Components of AMTSL**

<b>Components/Elements</b>	<b>Number of Health Facilities (n = 250)</b>	<b>Percent</b>
<b>Uterotonic</b>		
<b>Uterotonic</b>		
Correct choice of uterotonic (oxytocin)	240.4	96.2
Incorrect choice or nonadministration	9.6	3.8
<b>Administration route</b>		
Correct administration route	239.7	95.9
Incorrect route or nonadministration	10.3	4.1
<b>Dose</b>		
Correct dose	228.7	91.5
Incorrect dose or nonadministration	21.3	8.5
<b>Administration period</b>		
Correct administration period (after birth of the child)	221.5	88.6
During the delivery of the child or placenta	19.0	7.6
No administration	9.6	3.8
<b>Administration timing</b>		
Correct administration timing	158.0	63.2
Incorrect timing or nonadministration	92.0	36.8
<b>Use of uterotonic</b>		
Correct use	153.4	61.3
Incorrect use	96.6	38.7
<b>Controlled cord traction</b>		
<b>Controlled cord traction performed</b>		
Yes	186,0	74,4
No	64,0	25,6
<b>Counterpressure performed</b>		
Yes	163,0	65,2
No	87,0	34,8
<b>Controlled traction + counterpressure</b>		
Correct	163,0	65,2
Incorrect	87,0	34,8
<b>Massage and palpation</b>		
<b>Immediate uterine massage</b>		
Yes	204,0	81,6
No	46,0	18,4
<b>Palpation of the uterus</b>		
Yes	90,0	36,0
No	160,0	64,0
<b>Massage + check correct uterine tone</b>		
Yes	87,0	34,8
No	163,0	65,2
<b>AMTSL coverage</b>		
Correct AMTSL	44,0	17,6
Incorrect or no AMTSL	206,0	82,4

### ***Practice of AMTSL and Characteristics of the Health Facilities***

Table 22 shows that only 21.4 percent of the women who delivered in health facilities in which the providers were trained in AMTSL actually received this intervention. This assessment suggests that training alone is not enough to maintain the skills of the providers.

According to the type of health facility, health centers, zone hospitals, and CHDs recorded the weakest performance in the correct practice of AMTSL.

On the departmental level, Borgou-Alibori and Atacora-Donga departments recorded the best performance in the correct practice of AMTSL. Mono-Couffo and Ouémé-Plateau departments recorded the weakest performance in the correct practice of AMTSL. The private sector appears to outperform the public sector by far.

According to health-system levels, although a performance problem exists on all levels, the situation on the health zone level is worrisome.

AMTSL was performed correctly on only 17 percent of the women who delivered using midwives.

Comparison of the pilot sites to the other sites shows that AMTSL was performed correctly on a significantly higher proportion of women who delivered at the pilot sites.

**Table 22. Correct AMTSL According to the Characteristics of the Health Facilities**

<b>Characteristics</b>	<b>Percentage Correct AMTSL</b>	<b>Number of Deliveries</b>	<b>Total Deliveries</b>	<b>P</b>
<b>Trained in AMTSL</b>				0.2245
Yes	21,3	44,0	206,0	
No	0,0	0,0	44,0	
All	17,6	44,0	250,0	
<b>Type of facility</b>				0.0547
National reference hospital	38,5	5,0	13,0	
CHD	22,6	7,0	31,0	
Zone hospital	33,3	21,0	63,0	
Health center	8,4	12,0	143,0	
All	17,6	44,0	250,0	
<b>Department</b>				0.1738
Atacora-Donga	36,4	4,0	11,0	
Atlantique-Littoral	16,2	18,0	111,0	
Borgou-Alibori	48,1	13,0	27,0	
Mono-Couffo	0,0	0,0	21,0	
Ouémé-Plateau	0,0	0,0	53,0	
Zou-Collines	33,3	9,0	27,0	
All	17,6	44,0	250,0	
<b>Health-system level</b>				0.4701
Health zone health facility	16,0	33,0	206,0	
Departmental health facility	22,5	7,0	31,0	
National health facility	38,5	5,0	13,0	
All	17,6	44,0	250,0	
<b>Sector (public or private)</b>				0.0261
Public	15,7	37,0	235,0	
Private	46,7	7,0	15,0	
All	17,6	44,0	250,0	
<b>Birth attendant's qualification</b>				0.6732
Obstetrician	00,0	0,0	1,0	
CES, student nurses, graduate students	25,0	2,0	8,0	
Midwife	17,4	41,0	235,0	
Nurse	0,0	0,0	2,0	
Other	0,0	0,0	4,0	
All	17,6	44,0	250,0	
<b>Pilot sites vs. others</b>				0.0022
Pilot sites	44,6	21,0	47,0	
Other sites	11,8	24,0	203,0	
All	17,6	44,0	250,0	

### ***Analysis of the Components of AMTSL***

#### *Correct Use of Uterotonics and Characteristics of the Health Facilities*

Table 23 shows the percentage of correct use of uterotonics according to the characteristics of the health facilities. Examination of this table reveals that the best performance in correct

administration of uterotonics was recorded by the zone hospitals and national reference hospitals. Health centers and CHDs had the weakest performance. On the departmental level, Atacora-Donga and Mono-Couffo recorded the weakest performance in the correct practice of AMTSL. Here again, better performance is noted at the pilot sites compared to the other sites.

**Table 23. Percentage of Correct Use of Uterotonics by Health Facility Characteristics**

Characteristics	Percentage Correct Use	Number of Deliveries	Total Deliveries	P
<b>Type of facility</b>				0.0329
National reference hospital	84,6	11,0	13,0	
CHD	45,2	14,0	31,0	
Zone hospital	81,0	51,0	63,0	
Health center	54,5	78,0	143,0	
All	61,2	153,0	250,0	
<b>Department</b>				0.2856
Atacora-Donga	36,4	4,0	11,0	
Atlantique-Littoral	64,0	71,0	111,0	
Borgou-Alibori	70,3	19,0	27,0	
Mono-Couffo	52,4	11,0	21,0	
Ouémé-Plateau	56,6	30,0	53,0	
Zou-Collines	66,7	18,0	27,0	
All	61,2	153,0	250,0	
<b>Health-system level</b>				0.0903
Health zone health facility	62,1	128,0	206,0	
Departmental health facility	45,2	14,0	31,0	
National health facility	84,6	11,0	13,0	
All	61,2	153,0	250,0	
<b>Sector (public or private)</b>				0.4240
Public	60,8	143,0	235,0	
Private	73,3	11,0	15,0	
All	61,2	153,0	250,0	
<b>Pilot sites vs. other</b>				0.6279
Pilot sites	70,2	33,0	47,0	
Other sites	59,6	121,0	203,0	
All	61,2	153,0	250,0	

*Controlled Cord Traction and Characteristics of the Health Facilities*

Table 24 shows the percentage of correct controlled cord traction (CCT) according to the characteristics of the health facilities. Analysis of this table reveals that the best performance was recorded by zone hospitals and national reference hospitals. Health centers and CHDs had the weakest performance. On the departmental level, Borgou-Alibori and Zou-Collines recorded the best performance.

**Table 24. Percentage of Correct CCT by Health Facility Characteristics**

<b>Characteristics</b>	<b>Percentage Correct CCT</b>	<b>Number of Deliveries</b>	<b>Total Deliveries</b>	<b>P</b>
<b>Type of facility</b>				0.2768
National reference hospital	84,6	11,0	13,0	
CHD	64,5	20,0	31,0	
Zone hospital	77,8	49,0	63,0	
Health center	58,0	83,0	143,0	
All	65,2	163,0	250,0	
<b>Department</b>				0.1272
Atacora-Donga	54,5	6,0	11,0	
Atlantique-Littoral	76,6	85,0	111,0	
Borgou-Alibori	85,2	23,0	27,0	
Mono-Couffo	33,3	7,0	21,0	
Ouémé-Plateau	39,6	21,0	53,0	
Zou-Collines	81,8	22,0	27,0	
All	65,2	163,0	250,0	
<b>Health-system level</b>				0.4337
Health zone health facility	64,1	132,0	206,0	
Departmental health facility	64,5	20,0	31,0	
National health facility	84,6	11,0	13,0	
All	65,2	163,0	250,0	
<b>Sector (public or private)</b>				0.0212
Public	63,4	149,0	235,0	
Private	93,3	14,0	15,0	
All	65,2	163,0	250,0	
<b>Pilot sites vs. other</b>				0.2089
Pilot sites	76,6	36,0	47,0	
Other sites	62,6	127,0	203,0	
All	65,2	163,0	250,0	

*Correct Massage and Characteristics of the Health Facilities*

Table 25 shows the percentage of correct massage and palpation according to the characteristics of the health facilities. Analysis of this table reveals that the best massage performance was recorded by the national reference hospitals. Health centers and zone hospitals had weaker performance. On the departmental level, Mono-Couffo and Ouémé-Plateau recorded the weakest performance in correct massage. Analysis of the system level shows that the health zones recorded the weakest performance compared to the national level. Better performance is noted at the pilot sites compared to the other sites.

**Table 25. Percentage of Correct Massage by Health Facility Characteristics**

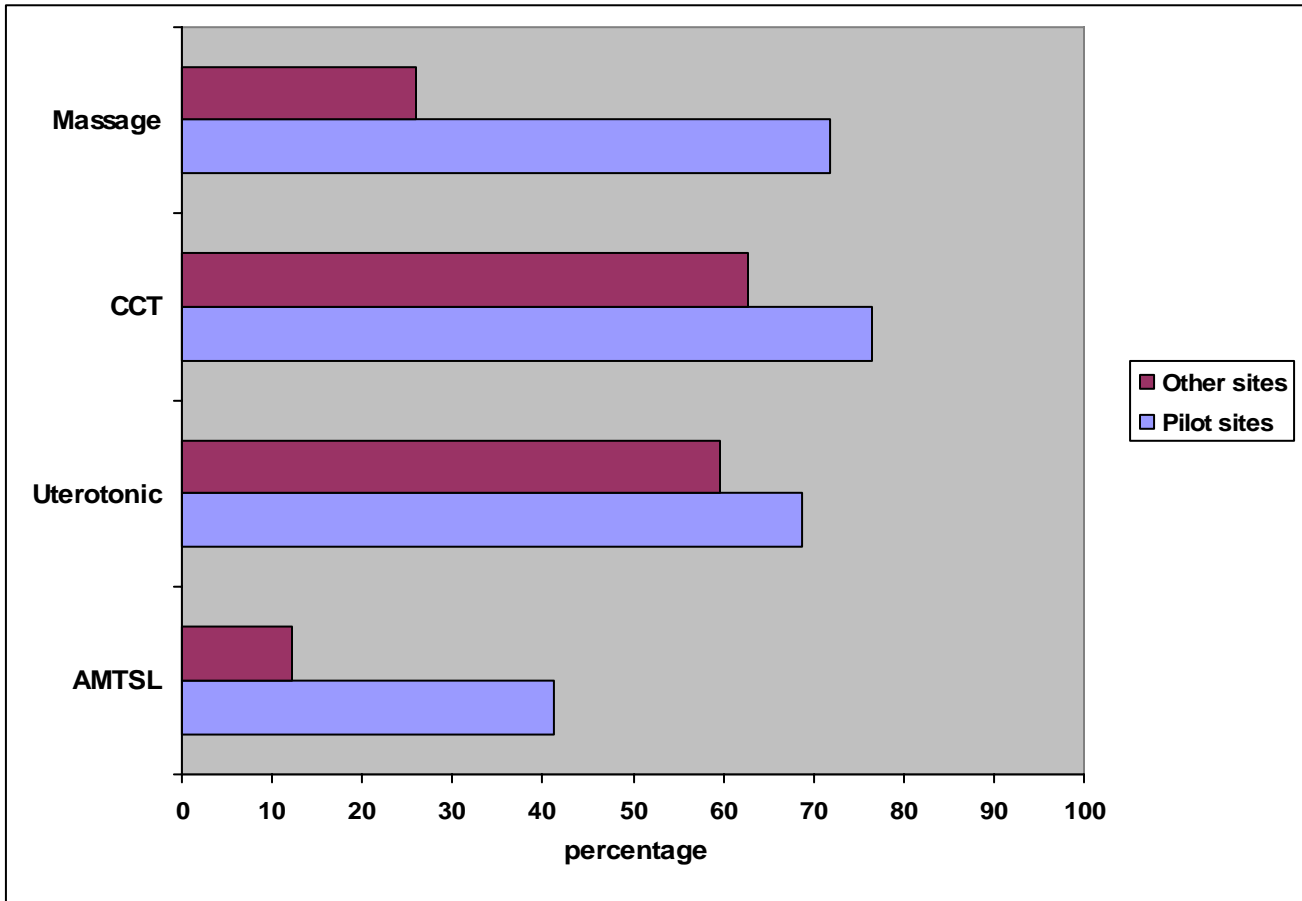
<b>Characteristics</b>	<b>Percentage Correct Massage</b>	<b>Number of Deliveries</b>	<b>Total Deliveries</b>	<b>P</b>
<b>Type of facility</b>				0.4081
National reference hospital	69,2	9,0	13,0	
CHD	45,2	14,0	31,0	
Zone hospital	42,9	27,0	63,0	
Health center	25,9	37,0	143,0	
All	34,8	87,0	250,0	
<b>Department</b>				0.0039
Atacora-Donga	63,6	7,0	11,0	
Atlantique-Littoral	39,6	44,0	111,0	
Borgou-Alibori	77,8	21,0	27,0	
Mono-Couffo	4,8	1,0	21,0	
Ouémé-Plateau	0,0	0,0	53,0	
Zou-Collines	48,1	13,0	27,0	
All	34,8	87,0	250,0	
<b>Health-system level</b>				0.4104
Health zone health facility	31,1	64,0	206,0	
Departmental health facility	45,2	14,0	31,0	
National health facility	69,2	9,0	13,0	
All	34,8	87,0	250,0	
<b>Sector (public or private)</b>				0.2434
Public	33,2	78,0	235,0	
Private	60,0	9,0	15,0	
All	34,8	87,0	250,0	
<b>Pilot sites vs. other</b>				0.0023
Pilot sites	72,3	34,0	47,0	
Other sites	26,1	53,0	203,0	
All	34,8	87,0	250,0	

***Performance of the Pilot Sites Compared to the Other Sites***

Table 26, illustrated by figure 3, shows the relatively better performance of the pilot sites compared to the other sites. One can cite among the possible factors explaining this situation the type of training received by the providers of the pilot sites during the pilot phase and the quality of the follow-up in the field after training.

**Table 26. Summary of the Performance of the Pilot Sites Compared to the Other Sites**

Sites	Percentage Correct AMTSL	Percentage Correct Use of Uterotonics	Percentage Correct CCT	Percentage Correct Massage
Pilot sites	44,6	70,2	76,6	72,3
Other sites	11,8	59,6	62,6	26,1
All	17,6	61,2%	65,2	34,8
<i>p</i>	0,002	0,628	0,209	0,002



**Figure 3. Performance comparison of pilot sites and other sites**

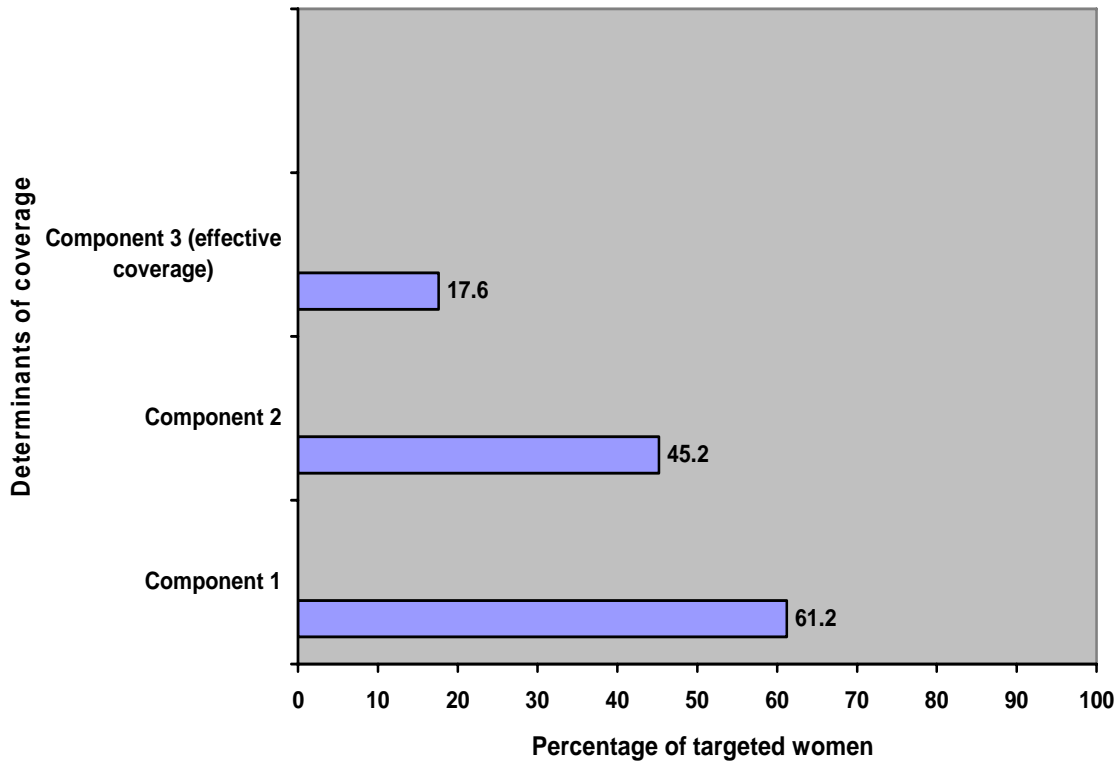
## Identification of the Bottlenecks in Terms of Components and Elements of AMTSL

Table 27 presents the results of the additive analysis of each of the three components of AMTSL and the eight elements of AMTSL. The additive analysis of the components is designed to detect flaws in the process of performing AMTSL. It successively examines the performance of component 1, the performance of component 1 + component 2, and finally, the performance of component 1 + component 2 + component 3.

This table illustrated by figure 4 shows that two bottlenecks occur in the practice of the components of AMTSL: a first between the first and second component of AMTSL (drop from 61.2percent to 45.2 percent), and a second between the second and third components of AMTSL (drop from 45.2 percent to 17.6 percent). This shows first the inadequate correct practice of controlled cord traction and counterpressure, and second the inadequate correct practice of transabdominal uterine massage by the birth attendant following expulsion of the placenta and correct monitoring of the uterine tone.

**Table 27. Identification of the Bottlenecks in Terms of AMTSL Components**

<b>Components</b>	<b>Number N = 250</b>	<b>Percent</b>
Component 1: Correct use of uterotonics	153,0	61,2
Component 2: Correct step 1 + correct traction and counterpressure	113,0	45,2
Component 3: Correct step 2 + correct massage and monitoring of uterine tone	44,0	17,6



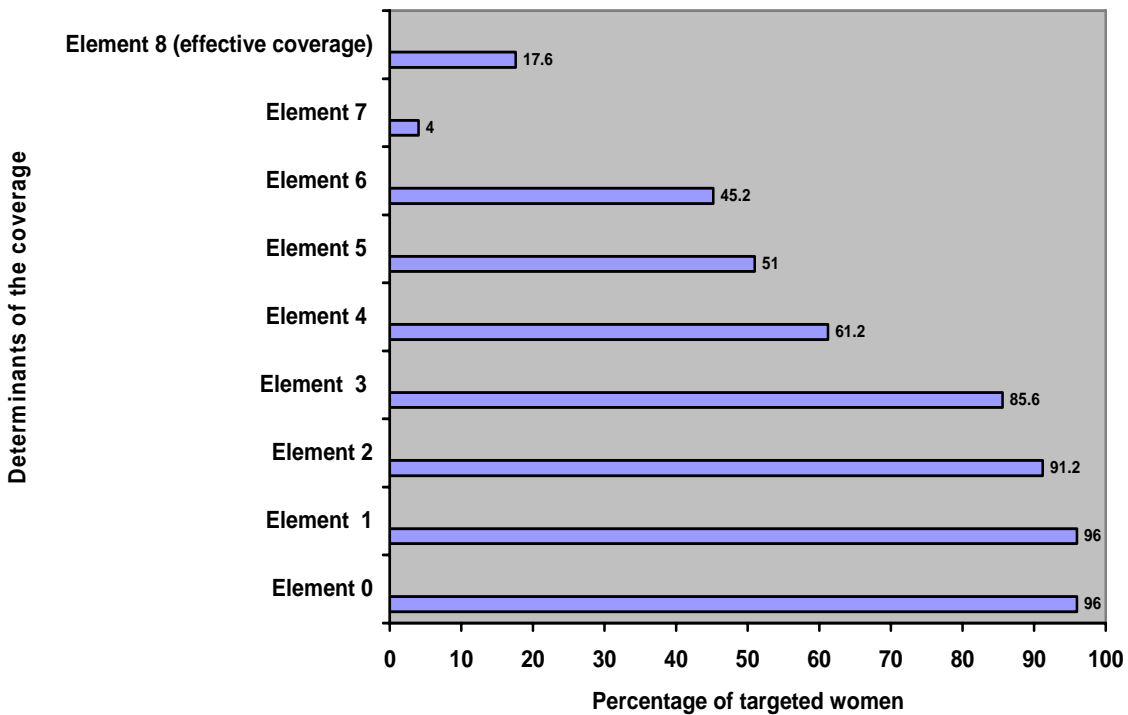
**Figure 4. AMTSL coverage diagram (components)**

Table 28 presents the results of the additive analysis of the eight elements of AMTSL. The analysis of the elements of AMTSL is an additive examination of the eight elements of AMTSL, that is, element 1, element 1 + element 2, element 1 + element 2 + element 3, and so on.

It is illustrated by figure 5, which shows three major bottlenecks in the practice of the elements of AMTSL: a first between the correct administration period for oxytocin and timing of administration of oxytocin, a second between correct cord traction and counterpressure, and finally a third between correct massage and monitoring uterine tone.

**Table 28. Identification of the Bottlenecks in Terms of Elements of AMTSL**

Elements	Number N = 250	Percent
Element 0: Choice of oxytocin	240,0	96,0
Element 1: Correct element 0 + Correct administration route	240,0	96,0
Element 2: Correct element 1 + Correct dose	228,0	91,2
Element 3: Correct element 2 + Correct administration period	214,0	85,6
Element 4: Correct element 3 + Correct administration timing	153,0	61,2
Element 5: Correct element 4 + Correct traction	128,0	51,2
Element 6: Correct element 5 + Correct counterpressure	113,0	45,2
Element 7: Correct element 6 + Correct massage	104,0	41,6
Element 8 (effective coverage): Correct component 7 + correct monitoring of uterine tone	44,0	17,6



**Figure 5. AMTSL coverage diagram (elements)**

## Observation of the Period for Expulsion of the Placenta

In the study sample, the average duration of the third stage of labor was 6.7 minutes in women who receive correct AMTSL compared with 10.9 minutes in women who did not receive correct AMTSL.

**Table 29. Average Duration of the Third Stage with Correct AMTSL and with Incorrect AMTSL (According to Benin's Definition)**

Use of AMTSL	Average Duration	95 Percent Confidence Interval	N	p
Correct AMTSL	6.7 minutes	4.3–9.1	44.0	0.0536
Incorrect AMTSL	10.9 minutes	7.9–14.0	206.0	

## Potentially Harmful Practices

Certain potentially harmful practices were observed in the study sample. Table 30 shows that in nearly a quarter of the deliveries, the health care providers exerted fundal pressure during the third stage of labor. Similarly, uterine massage was performed on about 10 percent of women before expulsion of the placenta. Finally, traction without counterpressure was carried out on 9 percent of the women.

**Table 30. Distribution of Potentially Harmful Practices Observed in the Health Facilities**

Practices	Number (n = 250)	Percent
<b>Fundal pressure</b>		
Yes	56,0	22,4
No	194,0	77,6
<b>Uterine massage while awaiting expulsion of the placenta</b>		
Yes	24,0	9,6
No	226,0	90,4
<b>Traction without counterpressure</b>		
Yes	23,0	9,2
No	227,0	90,8
<b>Controlled traction without uterotonics</b>		
Yes	0,0	0,0
No	250,0	100,0

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

This study of the active management of the third stage of labor in Benin has made it possible to answer the various basic questions raised in the “Methodology” section of this report. These conclusions focus on three categories related to preventing postpartum hemorrhage through the use of AMTSL: national policy environment, policy environment in the health facilities, and the practice of AMTSL in Benin.

#### ***National Policy Environment***

In Benin, AMTSL is officially recommended and promoted by the Ministry of Health through various national strategy and policy documents and also through the family health protocols published since 2003. The definition of AMTSL adopted by Benin is from all perspectives comparable to that of ICM/FIGO. Oxytocin is the principal uterotonic chosen by Benin for AMTSL. Benin’s NEML contains oxytocin and ergometrine, but not yet misoprostol.

At this time, AMTSL education is not included in the training programs for midwives, nurses, or physicians in public training schools. However, since 2003, the Ministry of Health has carried out several series of trainings in physician, midwife, and nursing programs in both the public and private sectors of the health system.

#### ***Policy Environment at the Health Facilities***

It was noted that a medicine supply list mentioning oxytocin and ergometrine was available in 100 percent of the health facilities. In contrast, the “family health services protocols” document indicating the clinical guidelines of AMTSL was available in only 46 percent of the health facilities, all of which were in the public sector. This document is not present in any private sector health facility. The medicines and supplies required for AMTSL must be purchased by the families prior to use.

#### ***Medicine Management and Logistics***

Oxytocin is stored at temperatures between 2 and 8 °C in the majority of the pharmacies of the health facilities surveyed. As for ergometrine, it is stored at temperatures between 2 and 8 °C in a little over one-third of the health facilities surveyed, and at room temperature in nearly one-fifth of the health facilities. Oxytocin is available in the majority (92 percent) of the health facilities surveyed. As for ergometrine, it was available in a little over half (54 percent) of the health facilities at the time of the visit.

The relatively high cost of oxytocin should be emphasized; the average purchase cost is XOF 50 (USD 0.10) (USD 1 = XOF 500) per ampoule, but it is sold at a price four times higher (XOF 200, or USD 0.40) to women in the majority of the health facilities surveyed. This nearly 300 percent markup for a product essential to an intervention that saves the lives of women who are for the most part on a low socioeconomic level could be a barrier to providing AMTSL.

Quantifying the medicines to be ordered poses an enormous problem in the health facilities surveyed. In fact, in the majority of health facilities, the medicine order is based on the preceding months' consumption. This method of quantifying the medicine requirements exposes health facilities to the risk of stock-outs. Stock-outs lasting a minimum of eight days were observed in 34.6 percent of the health facilities during the last three months. The primary reason for stock-outs given by the health facilities was stock-outs at the principal supplier, which is CAME.

### ***The Practice of AMTSL in Health Facilities***

Although 82.4 percent of women delivered in health facilities where the providers were trained in AMTSL, this study reveals that only 17.6 percent of the women in the sample received correct AMTSL.

With regard to the three components of AMTSL, oxytocin was administered correctly to 61.2 percent of the women, controlled cord traction was performed correctly on 65.2 percent of the women, and massage was performed correctly on only 34.8 percent of the women. From these figures, the main bottlenecks appear to be first between the use of oxytocin and controlled cord traction, and second between controlled cord traction and massage.

Although the situation is not good on the national level, the weakest performance in the correct practice of AMTSL was recorded by health centers, zone hospitals, and CHDs. The situation is alarming in Mono-Couffo and Ouémé-Plateau departments, which recorded no correct practice of AMTSL.

Comparison of the pilot sites to the other sites shows that a significantly higher proportion of women who delivered at the pilot sites received the correct practice of AMTSL. This study also reveals a somewhat exaggerated use of the technique of augmenting labor by providers in the health facilities.

Finally, some harmful practices were noted. Overall, this concerned fundal pressure to aid in expulsion of the placenta, uterine massage while awaiting expulsion of the placenta, and traction without counterpressure.

### **Recommendations**

On July 18, 2007, the DSF and USAID invited the key decision makers (representatives of USAID, the MoH, training schools, UNFPA, UNICEF, WHO, PISAF, PSI, PSS, UNIDEA, URC/QAP, Association des Sages Femmes du Benin, Beninese branch of the SGOBT) to participate in a postpartum hemorrhage prevention day. The goal of this day was to inform the participants of the status of the practice of AMTSL in health facilities in Benin and to spark reflection on effective strategies for reinforcing it in order to contribute to reducing maternal mortality.

After having learned the results of the study, the participants shared comments and made several recommendations to increase the coverage of AMTSL and improve its practice in the health

facilities. The DSF validated the recommendations of the postpartum hemorrhage prevention initiative day on July 25, 2007. These recommendations follow.

***Policy***

1. Decree that all women admitted to maternity wards and giving birth vaginally are entitled to AMTSL.
2. Inform patients about the AMTSL method throughout prenatal consultations.
3. Develop comprehensive care. Ensure immediate care for newborns and close monitoring for at least the first six hours following expulsion of the placenta.
4. Provide two midwives per health facility.
5. Find strategies to ensure the training of newly assigned staff in the health zones.
6. Promote AMTSL by organizing a network of stakeholders and development partners.
7. Expand the national oversight team to learned society and professional associations.
8. Ensure training supervision.
9. Promote audits and publish the results.
10. Involve the community in the efforts to reduce maternal mortality.
11. Correct dysfunction in the health system as soon as possible.
12. Promote financial innovations and medical insurance systems to reduce the socioeconomic obstacles to receiving health care during pregnancy, delivery, and the postpartum period.
13. Promote the continuous review of policies, standards, and procedures to consider scientific evidence on the prevention and treatment of PPH.
14. Ensure compliance with standards and procedures for inducing and augmenting labor in order to reduce abuse.
15. In the case of oxytocin stock-outs, expand the uterotonics to be used for AMTSL to include ergometrine.
16. Organize broad dissemination of the “Protocoles des services de santé familiale: Volet Femme” document, and give each public and private maternity ward at least one copy to be made available to the providers.
17. Include private facilities in the trainings and dissemination of standards and protocols.

18. Urgently improve the situation in the health zones by retraining providers in the departments with poor AMTSL coverage.
19. Promote operational research on PPPH.
20. Ensure the permanence of postproject activities.
21. Build on, document, and disseminate the results.

### ***Health Care Providers***

1. Schedule decentralized dissemination of the results of this study.
2. Hold discussions with providers to establish action plans to improve the practice of AMTSL.
3. Identify the barriers, including demotivation, that affect the correct practice of AMTSL and lift these barriers with the help of behavior change and other interventions.
4. Ensure that trainers have the skills required.
5. Ensure that the skills of each person trained are confirmed.
6. Make each provider feel responsible for the results obtained in preventing PPH in his or her health facility.
7. Make each provider trained feel like an operational research pioneer.
8. Promote self-evaluation and evaluation by peers.
9. Review the current approaches of provider training and post-training monitoring of providers by giving priority to the skills approach and relying on the lessons learned at the pilot sites.
10. Revise and standardize the AMTSL training procedures and curriculum in Benin (approach based on skills and strict compliance with the components of AMTSL).
11. Institutionalize approaches for continuously improving quality as well as reinforcing comprehensive support supervision to reinforce the practices during pregnancy and delivery, including AMTSL.
12. Draw providers' attention to the harmful practices identified in the study.
13. Institutionalize the practice of AMTSL by introducing its teaching in the basic training program for midwives, physicians, and state registered nurses and nurses.

### ***Medicines and Logistics***

1. Ensure the availability of the supplies, medicines, and equipment necessary.
2. Ensure the adequate quantitative estimate, storage, and use of uterotonics.
3. Improve CAME services vis-à-vis its clients and avoid stock-outs in uterotonic products.
4. Train managers of the health facility pharmacies on the techniques for quantifying medicine requirements.
5. Improve providers' information on the storage conditions for uterotonic products by establishing and disseminating posters and brochures containing clear and precise information.
6. Create one distribution store per health zone.

### ***Monitoring and Evaluation***

1. Develop pertinent national indicators for monitoring and evaluating the practice of AMTSL.
2. Establish a simple but valid approach to monitoring and evaluation.



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## APPENDIX A: OPERATIONAL GROUPING OF HEALTH FACILITIES

Operational Strata	Teams	Zone	Town	Health Facility
<b>Common stratum</b>	All 5 teams (at a rate of one team of two agents per health facility)	<b>(Littoral)</b>	Cotonou	1. Cotonou HOMEL 2. Cotonou II Maternity Ward (Missessin) 3. Menontin HC 4. Houenoussou HC (Cotonou VI) 5. Cotonou III Maternity Ward (Suru-Lere)
<b>Specific strata</b>				
<b>2</b>	<b>Team 1</b>	<b>Alibori-Borgou-Atacora-Donga</b>	Kandi	6. Kandi CSCU
			Parakou	7. Borgou CHD
			Djougou	8. Djougou CSC
			Tanguiéta	9. St. Jean de Dieu Hosp.
<b>3</b>	<b>Team 2</b>	<b>Atlantique</b>	Cotonou	10. CUGO 11. Bethesda 12. St. Jean HC
			Godomey	13. Godomey CCS
			Abomey-Calavi	14. Abomey-Calavi
<b>4</b>	<b>Team 3</b>	<b>Ouémé-Plateau</b>	Porto-Novo	15. Ouémé CHD
			Akpo-Missereté	16. Akpo-Missereté CSC
			Kétou	17. Kétou CSC
			Pobe	18. Pobe CSC
<b>5</b>	<b>Team 4</b>	<b>Zou-Collines</b>	Abomey	19. Zou CHD
			Bohicon	20. Bohicon CSC
			Cove	21. Cove ZH
			Savalou	22. Savalou ZH
<b>6</b>	<b>Team 5</b>	<b>Mono-Couffo</b>		
			Lokossa	23. Lokossa CSCU
			Aplahoué	24. Aplahoué ZH
			Akassato	25. Akassato CCS
			Adjarra	26. Adjarra CSC



## APPENDIX B: ADDITIONAL TABLES

### Distribution of Health Facilities According to Storage Temperature of Uterotonics Recommended by the Manufacturer and Storage Temperature at the Pharmacy

Temperature recommended by the manufacturer	Storage Temperature at the Health Facility Pharmacy			
	Oxytocin			
	2-8 degrees C	15-25 degrees C	Other	Total
2-8 degrees C	11 (84.6%)	0 (0%)	2 (15.4%)	13 (100%)
15-25 degrees C	1 (14.4%)	3 (42.8%)	3 (42.8%)	7 (100%)
Total	12 (60.0%)	3 (15%)	5 (25%)	20 (100%)
Temperature recommended by the manufacturer	Ergometrine			
	2-8 degrees C	15-25 degrees C	Other	Total
2-8 degrees C	8 (61.5%)	1 (7.7%)	3 (7.7%)	12 (100%)
15-25 degrees C	0 (0%)	0 (0%)	0 (0%)	0 (100%)
Total	8 (34.6%)	1 (3.8%)	3 (19.3%)	12 (100%)

### Distribution of Health Facilities According to the Light Conditions of Uterotonics Recommended by the Manufacturer and the Light Conditions of the Storage at the Pharmacy

Manufacturer	Pharmacy			
		Dark	In Daylight	Total
	Not indicated	1 (100 percent)	0 (0 percent)	1 (100 percent)
	Out of the light	12 (100 percent)	0 (0 percent)	12 (100 percent)
	Total	13 (100 percent)	0 (0 percent)	13 (100 percent)

