USAID | DELIVER PROJECT

South Sudan Reproductive Health Commodity Quantification, 2014–2016

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UNFPA
As an integral part of its reproductive health commodity security strategy, UNFPA strives to improve access and use of RH products in developing countries. To this end, UNFPA provides support and assistance in the procurement of RH products and to develop capacity at the country level to manage health systems for RH products. UNFPA applies effective approaches to deliver services in priority RH areas, including availability and access to high quality RH products.

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Abstract
In November 2013, the South Sudan Ministry of Health, with technical assistance from the USAID | DELIVER PROJECT, Task Order 4, and UNFPA South Sudan conducted the South Sudan Maternal Health and Family Planning Commodity Requirements and Financing Need 2014–2016. This report documents the results from that review.

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Contents

Acronyms

CES	Central Equatorial State
CHW	community health worker
COC	combined oral contraceptive
CPR	contraceptive prevalence rate
CYP	couple-years of protection
EC	emergency contraception
EMF	Emergency Medicine Fund
EML	essential medicine list
EMONC	Emergency Obstetrics and Newborn Care
FP	family planning
g	gram
HPF	Health Pooled Fund
IDPG	International Drug Pricing Index
IM	intramuscular
IMA WH	IMA World Health [a faith-based organization—is not spelled out]
IU	international unit
IUD	intrauterine device
JMCHIP	JHPIEGO/Maternal and Child Health Integrated Program
JSI	John Snow, Inc.
$MgSO_4$	magnesium sulfate
mL	milliliter
MOH	Ministry of Health
MMR	maternal mortality rate
MSI	Marie Stopes International
MWRA	married women of reproductive age
NGO	nongovernmental organization
NRHSP	National Reproductive Health Strategic Plan
PHCC	primary health care center

POP	progestin-only pill
PPH	post-partum hemorrhage
PSM	Procurement and Supply Chain Management
RH	reproductive health
RHCS	Reproductive Health Commodity Security
SHHS II	South Sudan Household Survey (2010)
TBA	traditional birth attendant
TWG	technical working group
µg	microgram
UNFPA	United Nations Population Fund
USAID	U.S. Agency for International Development
WES	Western Equatorial State
WRA	women of reproductive age

Acknowledgments

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We also acknowledge the contributions of the staff of the USAID | DELIVER PROJECT, namely Jayne Waweru, Shyam Lama, Marie Tien, Sean Murphy, and Abyu Faris.

Executive Summary

In 2010, the United Nations estimated the population of South Sudan to be 9,410,929. South Sudan, the newest country in the world, was founded in 2011 after years of war with Sudan. The fighting left the country with many barriers to developing and improving reproductive health—widespread poverty, multiple security challenges, very limited infrastructure, low rates of education, few well-trained health personnel, and food insecurity. As a result, South Sudan has some of the poorest reproductive health indicators in the world. The maternal mortality ratio (MMR) is 2,054 per 100,000 live births; and a contraceptive prevalence rate (CPR) for modern methods of only 1.5 percent.

Note: Since this quantification was completed, South Sudan's security situation has significantly worsened. Therefore, the availability of commodities has certainly suffered; more than likely, significantly fewer commodities will be consumed in 2014.

Faced with these challenges, the South Sudan government plans to increase the budget for health in 2014, increase skilled birth attendance, construct basic emergency obstetric care facilities, train more individuals, and establish midwifery training schools. These future efforts are largely intended to lower the maternal mortality. However, family planning also leads to lower maternal mortality, and it should be included as a priority.

As of November 2013, reproductive health (RH) commodities and interventions were mainly supported by donors working through many international and local nongovernmental organizations (NGOs). The United Nations Population Fund (UNFPA) Office of South Sudan and USAID have been procuring RH kits, contraceptives, condoms, and emergency obstetric equipment and supplies. To predict commodity availability, future procurements of contraceptives and maternal health commodities would need evidence-based guidance.

A reproductive health commodity security (RHCS) situation analysis was conducted in South Sudan in 2007; the findings prompted interventions that partially remedied the issue of commodity availability. Six years later, in November 2013, the Ministry of Health (MOH), in collaboration with UNFPA and the USAID|DELIVER PROJECT, conducted a review of the RHCS situation analysis and operational plan; the goal was to determine the current state of commodities logistics management and to suggest strategies that would strengthen the system. One strategy is to develop a national contraceptive and reproductive health commodity forecast that is informed by the current situation in the country.

USAID and UNFPA asked the USAID|DELIVER PROJECT for assistance in quantifying maternal and family planning commodities.

Process Used for the Quantification

1. The team met with the Director General (DG) for Reproductive Health, the DG for Primary Care, the Director of Pharmaceutical Services, and various other stakeholders to talk about and to establish their support for the quantification exercise.
2. The quantification team reviewed all the relevant documents and questioned anything that was unclear.
3. The agreed-upon assumptions were then used for the maternal health and family planning forecast and supply plan.
4. A validation workshop was conducted to present analysis of available data and information, frequency, duration of commodity usage, other assumptions and the forecast to all stakeholders. Stakeholders made additional inputs and modifications (see annex 1 for the participant list and annex 2 for the workshop schedule).

Limitations/Bias on the Quantification Caused by the Special Situation in South Sudan

The situation in South Sudan is unique in many ways. However, four elements make the quantification more difficult, less accurate, and less precise than would be found in other more developed countries.

1. Little to no data is available for the supply chain infrastructure. Some survey data is available, but it is only useful for a few methods. This means that different methodologies were use for various commodity forecasts. Contraceptive use is so low (1.5 percent for modern methods) that the numbers put into the system would be small and probably not enough to ensure liquidity within the substandard supply chain—i.e., to make sure that each facility has at least some of each commodity.
2. Transportation is an enormous problem in South Sudan; 60 percent of the countries roads are under water for up to six months of the year. This means that extra supplies are needed in the system.
3. No information is available for the supplies stock on hand outside the central warehouses. This is because there was no visibility to stock on hand at the state stores and service delivery stores.

All four findings result in a bias toward putting extra quantities into the system, which will risk future expirations. However, this is a risk when trying to avoid stock outs and ensure availability.

Product and Funding Requirements for 2014–2016

Some products have total availability from 2014–2016, while others—like Misoprostol—will need a full pipeline to ensure availability of products for clients that need them. The funding requirements for 2014, 2015, and 2016 are $342,474.95; $813,181.20; and $1,056,798.30, respectively. These funding requirements include UNFPA-planned donations for 2014 only. The funding requirements do not include supply chain cost, such as freight cost. Table 1 lists the products and funding requirements.

Table 1. Product and Funding Requirements for 2014–2016

Product	Unit Pack	Product Unit Cost ($)	2014 Product Requirements +6 months Buffer	2014 Total Commitments as of Nov. 2013	2014 Product Gap	2014 Gap to be Funded ($)	2015 Product Req.	2015 Funding Req. ($)	2016 Product Req.	2016 Funding Req. ($)
magnesium sulfate 10G/vial INJ	10g vial	0.36	5,210	21,236	0	-				
oxytocin 10IU/ml INJ (IV)	10IU/ml	0.20	122,222	155,000	0	-	67,210	13,442.0	115,629	23,125.8
Misoprostol 200µg/TAB (PO)	200ug	0.48	332,771	50,000	277,971	133,425.8	703,612	337,733.8	816,423	391,883.0
Copper T (IUD)	Piece	0.20	873	0	333	66.3	577	115.4	574	114.8
Depo-Provera 150mg inj.+syringes (Injectable)	vial	0.90	163,472	10,000	138,272	124,444.5	167,490	150,741.0	191,710	172,539.0
Jadelle (Implant)	Piece	9.00	2,554	25,000	0	-				
Implanon (Implant)	Piece	9.00	7,663	19,000	0	-	10,674	96,066.0	25,987	233,883.0
Microlut Pill (POP)	Cycle	0.30	63,856	5,660	26,456	7,936.8	49,717	14,915.1	62,961	18,888.3
Microgynon Pill (COC)	Cycle	0.27	191,568	25,000	165,068	44,568.5	185,434	50,067.2	183,216	49,468.3
Condom Male	Piece	0.03	6,677,956	5,432,000	1,186,406	32,033.0	5,003,359	150,100.8	5,514,790	165,443.7
Condom Female	Piece	0.57	5,071	56,000	0	-				
Levonorgestrel 0.75mg	2 Tabs	0.52	8,921	15,000	0	-	0	-	2,793	1,452.4
						$342,474.9		$813,181.2		$1,056,798.3

Key Recommendations

Change some planned procurement by UNFPA to make funds available for Misoprostol procurement: Oxytocin and magnesium sulfate are two products included in the draft UNFPA procurement plan. They are part of the expected deliveries from the Emergency Medicines Fund (EMF), which has already exceeded the 2014 forecasted needs.

Establish a technical working group (TWG) to monitor reproductive health commodity security: These working groups have been very active and successful in other countries. To simplify the arrangement of regular (quarterly) meetings, the TWG will be a sub-committee of the existing Reproductive Health Collaboration Forum.

Use this quantification an opportunity for USAID to participate in contraceptive donations. USAID may donate contraceptives, particularly Microgynon, Depo-Provera, and Jadelle and Implanon implants.

The Ministry of Health should provide a national authorization for the use of Misoprostol. The government of the South Sudan Ministry of Health should provide a written authorization for all stakeholders to use Misoprostol in the country. Presently, the South Sudan essential medicine list does not have Misoprostol. This authorization would allow for planned interventions and roll out of Misoprostol usage in the country.

Background

In 2010, the United Nations estimated the population of South Sudan to be 9,9410,929. South Sudan, a new country, was founded in 2011 after two civil wars and conflicts that spanned 50 years and left two million dead. However, the fighting left the country with many barriers to developing and improving reproductive health—widespread poverty, multiple security challenges, very limited infrastructure, low rates of education, few well-trained health personnel, and food insecurity. As a result, South Sudan has some of the poorest reproductive health indicators in the world. The maternal mortality ratio (MMR) is 2,054 per 100,000 live births, and a contraceptive prevalence rate (CPR) for modern methods of only 1.5 percent.

Faced with these challenges of poverty, deprivation, under-development, ill health, and the poor status of maternal, neonatal, and reproductive health, the government determined that reproductive health should be the main emphasis for developing and improving the health sector. In 2014, South Sudan government plans to increase the budget for health, increase skilled birth attendance, construct basic emergency obstetric care facilities, train more individuals, and establish midwifery training schools. These future efforts are largely intended to lower the maternal mortality. However, family planning also leads to lower maternal mortality, and it should be included as a priority.

As of November 2013, reproductive health (RH) commodities and interventions were mainly supported by donors working through many international and local nongovernmental organizations (NGOs). The United Nations Population Fund (UNFPA) Office of South Sudan and USAID have procured RH kits, contraceptives, condoms, and emergency obstetric equipment and supplies. To avoid unpredictable commodity availability, future procurement of contraceptives and maternal health commodities need evidence-based guidance.

A reproductive health commodity security (RHCS) situation analysis was conducted in South Sudan in 2007; the findings prompted interventions that partially remedied the issue of commodity availability. Six years later, in November 2013, the Ministry of Health (MOH), in collaboration with UNFPA and the USAID | DELIVER PROJECT, conducted a review of the RHCS situation analysis and operational plan; the goal was to reveal the current state of commodities logistics management and to suggest strategies that will further strengthen the system. One strategy is to develop a national contraceptive and reproductive health commodity forecast that is informed by the current situation in the country.

USAID and UNFPA asked the USAID | DELIVER PROJECT for assistance in quantifying maternal and family planning commodities.

Note: Since this quantification was completed, South Sudan's security situation has significantly worsened. Therefore, the availability of commodities has suffered; and. more than likely, significantly fewer commodities will be consumed in 2014.

Scope and Purpose of the Quantification

This activity includes a three-year forecast (2014–2016) for three maternal health commodities (oxytocin, magnesium sulphate, and misoprostol) and family planning commodities (oral contraceptives, injectables, implants, intrauterine devices [IUDs], emergency contraceptives, and

male and female condoms) for public health facilities in South Sudan. Considering the agreed-to patient targets, a three-year supply/procurement plan will be developed—which will be reviewed and updated periodically—to determine the commodity requirements, determine the cost requirements, and generate a funding gap, if needed.

This activity includes a three-year forecast (2014–2016) for three maternal health commodities (oxytocin, magnesium sulphate, and misoprostol) and family planning commodities (oral contraceptives, injectables, implants, intrauterine devices [IUDs], emergency contraceptives, and male and female condoms) for public health facilities in South Sudan. Considering the agreed-to patient targets, a three-year supply/procurement plan will be developed—which will be reviewed and updated periodically—to determine the commodity requirements, determine the cost requirements, and generate a funding gap, if needed.

Methodology

Commodities quantification is a process that includes estimating the quantities and the cost of products, as required, to meet demand and to fill the pipeline with adequate stock levels. For maternal health and family planning commodities, this includes forecasting for medicines and devices. The process considers the service delivery capacity, supply pipeline requirements, and resources available for procurement. Quantification includes five distinct steps: (1) forecasting demand; (2) estimating requirements; (3) calculating the costs for procuring the requirements, and, if needed; (4) adjusting the final quantities to procure based on the amount of funding available; as well as (5) developing supply plans for each of the commodities. See annex 4.

Various forecasting methods were considered for this exercise, including methodology based on —

- logistics data that primarily relies on past usage data—it has been found to be the most representative indicator of future usage
- service data, which comes from the number of service delivery sites, the number of patients accessing that site, the type of service rendered at supported facilities, and the number of patients accessing or expected to access the service provided
- demographic data, such as contraceptive prevalence rate for family planning commodities.

After carefully reviewing the available data, it was determined that logistics data was unavailable because the system does not routinely capture and report it. Because the desired logistics data was not available, the team agreed to use a combination of demographic data, service data, and patient targets.

In using these agreed-to methodologies, many additional steps are required to move from the number of patients generated from demographic data, service data, and patient targets to the quantity of products needed. These steps are based on significant assumptions and reported demographic data on the percentage of patients meeting specific group criteria, including percentage of deliveries in hospitals and homes, couple-years of protection (CYP), and percentage of distributed products for a demographic class.

For additional input and modification, the analysis of available data and information, frequency, duration of commodity usage, and other assumptions were presented at the Reproductive Health Quantification workshop. Excel and *Quantimed* tools were used for the forecast. Aggregated client load, treatment duration, and frequency of commodity usage were entered into *Quantimed* software; it was used to generate the forecast figures for maternal health commodities. The Excel tool was used to generate the family planning commodities forecast figures. The result of the quantification exercise is the final output for the exercise.

The supply planning process is a critical step to ensure that products are continuously available for the program. The supply plan provides information on the quantities of drugs and supplies expected, including costs and their shipment schedules. This ensures that the stock is managed within the desired inventory control levels. In planning procurement, the program considers the user requirement, the stock on hand, the suppliers' lead time, and the buffer stock needed to protect the program if there is an unusual increase in demand or delays in shipments.

For the commodities of interest, the maximum and minimum stock level at the central level was fixed at a conservative six months and three months of stock, respectively, prior to designing a logistics management system; the stock on hand at the facility is assumed to be zero. Unit commodity costs were taken from the International Drug Pricing Index (IDPG) and international pricing for UNFPA and USAID.

A Note on Quantifying for the Special Situation of South Sudan

The situation in South Sudan is unique in many ways. However, four elements made the quantification difficult, less accurate, and less precise than would be found in other more developed countries: First, little to no data is available for the supply chain infrastructure. Some survey data is available, but it is useful for only a few methods. This means that different methodologies were used for various commodity forecasts; some were based on informed assumptions that were not necessarily accurate.

Second, according to the South Sudan Household Survey, contraceptive use is very low. It is approximately 1.5 percent for modern methods; therefore, the numbers entered in the system would be small; more than likely, it would not be enough to ensure liquidity within the substandard supply chain—i.e., to ensure that each facility has at least some of each commodity.

Thirdly, transportation is an enormous problem in South Sudan; according to the office of the coordination humanitarian affairs, 60 percent of the countries roads are accessible for up to six months of the year. This means that extra supplies are needed in the system.

And finally, no information is available for the stock on hand supplies outside the central warehouses.

All four findings result in a bias toward putting extra quantities into the system, which runs the risk of future expirations. However, this is often difficult when trying to avoid stockouts and ensure availability.

The forecasted quantities of drugs and supplies for the forecast period (January 2014–December 2016) were then entered in the PipeLine software. To avoid overstocking or stockouts, quantities and shipment dates were proposed to ensure that the stocks were managed properly within the desired stock levels.

In proposing the shipment quantities and dates, PipeLine considers the central stock on hand, quantities of drugs on order, buffer stock, supplier lead time, and desired maximum and minimum inventory levels of the program—as explained above—for a designed system. One output from the PipeLine software is the supply plan that estimated product quantities and financial requirements for 2014, 2015, and 2016.

Various Quantification Methodologies Were Used for Different Commodities

The lack of data meant that different methodologies had to be used. For the three maternal health products, available data on deliveries were available from the United Nations and the Emergency Obstetric and Newborn Care (EMONC) publication. Pre-eclampsia morbidity was available from the EMONC report, and rollout of the use of misoprostol was a consensus decision from the workshop. For Microgynon and Depo-Provera, standard demographic calculations were done using

method-specific CPR extrapolations from the 2010 South Sudan Household Health Survey (SHHS II). Multi-year contraceptives (IUDS and implants) are not appropriate for demographic forecasts; therefore, the implant numbers were based on service plans from Marie Stopes International (MSI) and JHPIEGO. The IUD (not popular in South Sudan) was based on distribution figures. Male condoms were estimated with information from sexually active males and very limited information on use from the SHHS II. Female condoms and emergency contraception (EC) were based on distribution and an educated guess from workshop participants; they are not used very much in South Sudan, but everyone agreed that they should be part of the method mix in the country.

Table 2. Summary of Forecast Method

S/N	Product List	Forecast Method (data used)	Remark
1	Oxytocin	Service data: Births in facilities from EMONC report	
2	Misoprostol	Service data: Births outside facilities (total births from United Nations source minus births in facilities) and roll-out plan targets	Ambitious roll-out plans
3	Magnesium sulphate	Service data: Births in facility and morbidity data	
4	Injectable and pills	Demographic data (method-specific CPR)	CYP was used
5	Implants	History of insertions and plans from Marie Stopes International and JHPIEGO	CYP not useful
6	Male condom	Demographic data (sexually active male population and a consensus *guestimate* of condom use in the last sex act	
7	Female condom, IUD, and EC	Distribution and demographic data	

Assumptions

Assumptions that were used for the forecast are documented below. These are data and information obtained from both primary and secondary source documents as well as from stakeholders in South Sudan. Where not available, the team relied on stakeholders to guide. All assumptions were presented in a workshop for modification and final acceptance.

Table 3. Assumption for Oxytocin, Misoprostol, and Magnesium Sulphate

Oxytocin	
Treatment/dispensing protocol: The protocol of oxytocin in active management of the third stage of labor is 10 international units (IU)/milliliter (mL) in one day. This means one ampoule per delivery mother. Additional oxytocin may be required for managing postpartum hemorrhage (PPH)	**Patient load:** To be used for 100% of women that deliver in hospitals and primary health care center (PHCC)
Misoprostol	
Treatment/dispensing protocol: The dosage of misoprostol in the management of third stage of labor to prevent PPH is 600 micrograms (µg) in one day Additional 200 µg of misoprostol may be required to treat PPH	**Patient load**: Misoprostol is to be used by traditional birth attendants (TBA) and community health worker (CHW) for home deliveries The roll out of misoprostol use in South Sudan was agreed in the following pattern: To cover 50% of home births of the Western Equatorial State (WES) and the Central Equatorial State (CES) by 2014 To cover 100% of home births of WES and CES 2015–2016 To cover 10% of home births of other states by 2014 To cover 25% of home births of other states by 2015 To cover 50% of home births of other states by 2016 Misoprostol is also to be made available for 10% of deliveries at hospitals and PHCCs as a backup 5% of delivery mothers will need extra 200 µg for treatment of PPH
Magnesium Sulphate	
Treatment/dispensing protocol: Loading dose: Slow IV injection of 4 gram (g) (20 mL of 20% solution in saline) at a rate of 1 g/5 minutes over 5–20 minutes	**Patient load**: Percentage of deliveries with eclampsia that will need loading dose=4.8% according to South Sudan National Assessment for Emergency Obstetric and Newborn Care

Maintenance dose (intramuscular [IM]): 10 g of 50% solution; with 5 g of 50% solution every 4 hours for 24 hours, following last convulsion Maintenance dose (IV): 1 to 2 g/hour in 100 mL of maintenance solution	October 2013. Percentage that will need first maintenance dose=2% Percentage that will need second maintenance dose=0.5%

Oxytocin, a peptide and an injectable, is used for its strong uterotonic property. It requires cold chain storage of 2°C to 8°C; it is unstable in high temperatures. This limits its use in hospitals and primary health care centers (PHCC), which have skilled personnel and refrigerators to preserve the potency of the product. All women that deliver in hospitals and PHCC will be given oxytocin to prevent PPH.

Magnesium sulphate is an effective anticonvulsant for preventing and treating life threatening eclampsia. In South Sudan, magnesium sulphate can only be used in referral hospitals.

Misoprostol, a prostaglandin E1 analogue, is used during the third stage of labor to prevent PPH. It is given orally and rectally (if patient cannot take oral medication). It is easy to use and does not require special storage condition.

Table 4. Oxytocin and Magnesium Sulphate Client Load

	2012	2013	2014	2015	2016	Remarks/Comments
Hosp. and PHCC deliveries (oxytocin)	52,842	60,451	70,849	85,019	104,403	EMONC 2013 Report
Percentage increase in hospital and PHCC deliveries	11.60%	14.40%	17.20%	20.00%	22.80%	To increase hosp. and PHCC deliveries to 20% target by 2015. NRHSP 2011–2015 (factor of 2.8%)
4.8% of deliveries of hospitals (magnesium sulfate)			3,401	4,081	5,011	EMONC 2013 Report

The South Sudan National Assessment for Emergency Obstetric and Newborn Care (EMONC) from October 2013 recorded 52,842 hospital and PHCC deliveries; this is 11.6 percent of the total deliveries in South Sudan. According to the National Reproductive Health Strategic Plan (NRHSP) 2011–2015, the country wants to achieve 20 percent by 2015; an increment of 2.8 percent every year will achieve this target by 2015 and 22.8 percent target by 2016 (104,403).

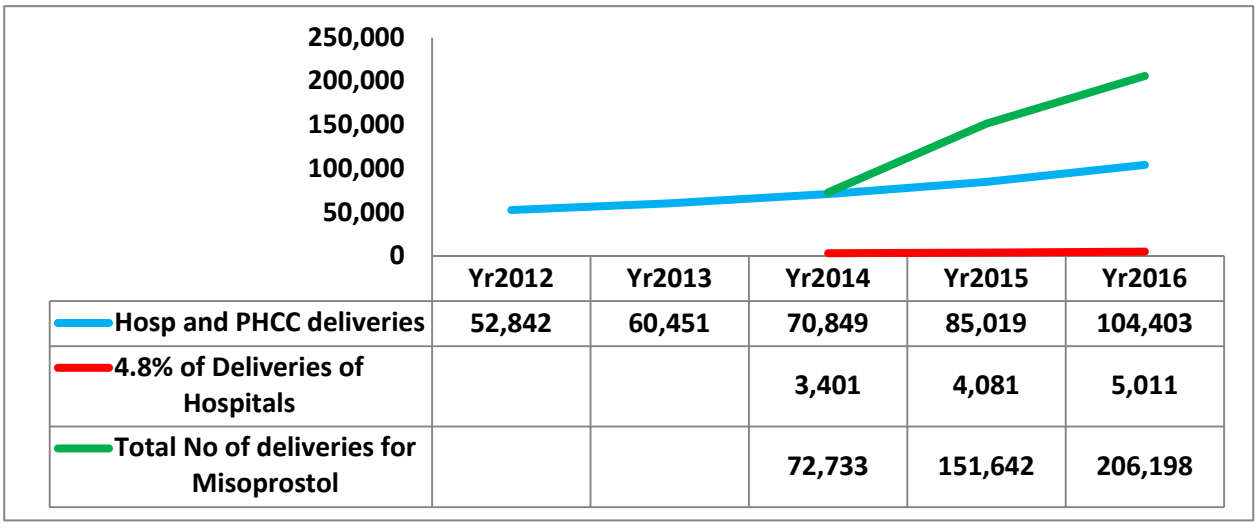
The recorded 4.8 percent deliveries with eclampsia in the EMONC assessment report by 2013 were also applied to 2014 to 2016. Misoprostol is to be made available to 50 percent of the home births of WES and CES in 2014. Misoprostol is also to be made available for 10 percent of home deliveries for other states in 2014, as well. This is because the JPHIEGO/Maternal and Child health Integrated Program (JMCHIP) in these states has already conducted a pilot and has shown success in using misoprostol in South Sudan. In 2015 and 2016, JMCHIP will cover 100 percent of home births, while other states will scale up to 25 percent and 50 percent in 2015 and 2016, respectively, according to the IMA World Health. See table 5.

Table 5. Misoprostol Client Load

	2012	2013	2014	2015	2016	Remarks/Comments
No. of expected birth	455,176	474,439	493,026	510,397	526,295	Crude birth rate (42/1,000) × total pop.
No. of births outside facilities	402,334	413,988	422,177	425,379	421,892	
A. WES + CES (JMSHIP)			44118 (50%)	88904 (all counties)	88,175 (all counties)	WES+CES pop. is 21% of total pop. 100% miso. scale up
B. 8 HPF STATES			10% (25,157)	25% (54,236)	50% (107,582)	Scale up pattern of 51% of total pop
C. Upper Nile + Jonglei (IMA/WB)			10% (11,863)	25% (29,883)	50% (59,276)	Scale up pattern of 28% of total pop
D. 10% hosp. and PHCC deliveries			7,085	8,502	10,440	As backup
Total Client Load for Misoprostol (A+B+C)			72,733	151,642	206,198	

The summary of client/patient load for all products that save mother's lives shows that misoprostol will complement oxytocin in reaching delivery mothers and, by implication, reducing mortality associated with PPH by covering more deliveries. Figure 1 shows a summary of the patient load figures. The red line indicates the 4.8 percent of deliveries in facilities that will present with pre-eclampsia; and will, therefore, need magnesium sulfate. The blue line shows the increasing number of deliveries that will take place in health facilities and should, therefore, receive prophylactic oxytocin. The green line represents the roll out of women receiving misoprostol outside health facilities.

Figure1. Summary of Patient Load from 2014–2016



	Yr2012	Yr2013	Yr2014	Yr2015	Yr2016
Hosp and PHCC deliveries	52,842	60,451	70,849	85,019	104,403
4.8% of Deliveries of Hospitals			3,401	4,081	5,011
Total No of deliveries for Misoprostol			72,733	151,642	206,198

Family Planning Commodities Assumptions

Table 6 shows assumptions for method-specific CPR, based on a gradual increase, starting with the 2010 SHHS II. It is noteworthy that the surveys show a decrease in modern contraceptive use from 1.73 percent of 2006 to 1.2 percent in 2010. And, there are some challenging figures in the 2010 report (male sterilization was assigned 0.01 percent, for example). The numbers in table 6, because they have been adjusted, may not reflect the exact figures in the two household surveys.

Anecdotal information suggested that injectables and implants have become very popular, creating a strong demand. This trend reflects experiences in other sub-Saharan countries, where significant growth was forecast for these two products.

Table 6. Assumptions for Injectables, Pills, and Implants

	2010	**2013**	**2014**	**2015**	**2016**	**Remark**
Women of reproductive age (WRA) (15–49 yrs.)	2,336,445	2,686,370	2,803,012	2,919,654	3,036,296	
Married women of reproductive age (MWRA) (15–49 yrs.)	1,892,520	2,175,960	2,270,440	2,364,920	2,459,400	81.00%

Method	**SHHS II 2010**	**2013**	**2014**	**2015**	**2016**	
Tubal ligation	0.1	0.1	0.1	0.1	0.1	
Injectables	0.4	0.8	**1.20%**	**1.60%**	**2.00%**	To use modern specific CPR method with CYP
Orals	0.3	0.4	**0.50%**	**0.60%**	**0.70%**	
Implant	0	0.1	**0.90%**	**1.50%**		CYP calculation not appropriate
Male condoms	0.4	0.4	0.4	0.4	0.4	
TOTAL Modern	1.2	1.8	2.5	3.6	4.7	
Traditional	2.8	2.8	2.8	2.8	2.8	
TOTAL CPR	4	4.6	5.3	6.4	7.5	

Method	**SHHS II 2010**	**2013**	**2014**	**2015**	**2016**	
Tubal ligation	0.1	0.1	0.1	0.1	0.1	
Injectables	0.4	0.8	**1.20%**	**1.60%**	**2.00%**	To use modern specific CPR method with CYP
Orals	0.3	0.4	**0.50%**	**0.60%**	**0.70%**	
Implant	0	0.1	**0.90%**	**1.50%**		CYP calculation not appropriate
Jadelle			1,703	5,321	9,223	25%

According to the SHHS II 2010, 81 percent of women of reproductive age (WRA) are married. Also, the specific CPR for injectables in 2010, according to the SHHS II, is 0.4 percent. This increased by 0.05 percent to 2013; thereafter, a 0.4 percent increment was applied, up to 2016. Also, orals (pills) and implants increased because of the expected acceptance of these products. However, the CYP factor that was applicable to injectables and orals does not apply to implants.

For orals, 25 percent was apportioned to Microlut (progestin-only pill [POP]) and 75 percent was apportioned to Microgynon (combined oral contraceptive [COC]). Also, 25 percent and 75 percent was apportioned to Jadelle and Implanon implants, respectively. See table 7.

Table 7. Assumptions for Male Condoms

		2010	2014	2015	2016
Population of male 15–59 yrs.		2,569,000	3,028,552	3,155,751	3,288,292
Population growth rate	4.2%				
Percentage (%) sexually active	49.0	1,258,810	1,483,990	1,546,318	1,611,263
Percentage (%) using condom in last sex act in 2014	2.5		37,100		
Percentage (%) using condom in last sex act in 2015	2.7			41,751	
Percentage (%) using condom in last sex act in 2016	3.0				48,338

Traditionally, in surveys like the SHHS II, respondents are asked about their family planning method. The answer to this question often gives a distorted picture of condom use, particularly because the use of condoms for disease prevention has increased. The interviewer would typically select the method for family planning that was highest in the list; if the respondents were using condoms with sterilization, IUDs, pills, and injectables, condom use would not be counted. Newer surveys have a section on HIV knowledge and prevention practices. For demographic forecasts, the best question to ask both the male and female is "Did you use a condom in your last sexual intercourse (or sex act)." The generality of the question covers all users, whether inside or outside marriage; the status of the partner—spouse, boy/girlfriend, commercial sex worker; it is easy to remember; and it self-adjusts for irregular use.

The 2010 SHHS II asked the question, "Did you use a condom in your last sex act?" However, the response was not reported out in the survey report. But, the report made this statement:

> In addition, only 4 percent have had sex with more than one partner twelve months preceding the survey, illustrating relatively low level of risky sexual behaviour in the population. Of those having sex with multiple partners, only 5 percent report condom use when having sex…

It is safe to presume that the vast majority of respondents who have had a single partner in the past year would use condoms at a lower rate than respondents who have multiple partners. Without better data, a consensus agreement is 2.5 percent, with gradual increases over the next two years.

Table 8. Assumptions for Female Condom, IUDs, and Emergency Contraceptives

Products	2013 Quantity Distributed	% Utilized	Quantity Utilized	% of Active Uses	2014	2015	2016
Female condom	32,400	10%	3,240	0.15%	3,381	3,521	3,662
IUD	2,790	20%	558	0.03%	582	606	631
Emergency contraceptives	11,400	50%	5,700	0.26%	5,947	6,195	6,442

Without visibility to stock on hand at the facility level, the percentage of female condoms, Copper-T, and levonorgestrel use were assumed to be 10 percent, 20 percent, and 50 percent, respectively; these resulted in 0.15 percent, 0.03 percent, and 0.26 percent active users from the total population of married women of reproductive age (MWRA). The same percentage of active users were applied for 2014 to 2016, with no current plan to promote the use of these products in South Sudan.

Quantification Results

Quantification is an output that combines forecasting and supply planning. While forecast generates the future average monthly consumption, the supply planning generates the product and funding requirements. The average monthly consumption and central level stock on hand reveals how long the central level stock will last.

Table 9. Forecast and Stock Status, 2014

Product	Unit Pack	2014 Product Consumption Forecast	Average Monthly Consumption	Central level Stock on Hand as at Nov. 2013	MOS without shipments	Jan. UNFPA 2014 Shipments	Jan. EMF 2014 Shipments	2014 Total Commitments as at Nov. 2013	MOS with shipments
magnesium sulfate 10G/vial INJ	10g vial	3,473	289	0	0.0	5,000	16236	21,236	73.4
oxytocin 10IU/ml INJ (IV)	10IU/ml	81,481	6,790	1,500	0.2	500	154500	155,000	23.0
Misoprostol 200µg/TAB (PO)	200ug	221,847	18,487	4,800	0.3	50,000	0	50,000	3.0
Copper T (IUD)	Piece	582	49	540	11.1	0	0	0	11.1
Depo-Provera 150mg inj.+syringes (Injectable)	vial	108,981	9,082	15,200	1.7	10,000	0	10,000	2.8
Jadelle (Implant)	Piece	1,703	142	50	0.4	25,000	0	25,000	176.5
Implanon (Implant)	Piece	5,108	426	0	0.0	19,000	0	19,000	44.6
Microlut Pill (POP)	Cycle	42,571	3,548	31,740	8.9	5,660	0	5,660	10.5
Microgyn	Cycl	127,712	10,643	1,500	0.1	25,000	0	25,000	2.5

on Pill (COC)	e								
Condom Male	Piece	4,451,971	370,998	59,550	0.2	5,432,000	0	5,432,000	14.8
Condom Female	Piece	3,381	282	0	0.0	56,000	0	56,000	198.8
Levonorgestrel 0.75mg	2 Tabs	5,947	496	350	0.7	15,000	0	15,000	31.0

The forecasted average monthly consumption of products in South Sudan for 2014 depends on the assumptions made for the client load that will access public health interventions within the available infrastructure and human resources. These clients/patients will have to use all the available stock in-country. Considering only the central stock on hand, and with no buffer in the system, Copper-T and Depo-Provera will last more than eight months; Microgynon will last for less than two months, while other products will stockout in less than a month. The quantification team did not have access to the facility stock on hand. Therefore, the stock on hand used for this quantification is only for the central level; which, by now, may have been exhausted by shipments to facilities and states.

Considering the expected shipments of all products from UNFPA and EMF in 2014, except for Copper-T, product availability is guaranteed for at least 10 months of supply for Microlut and, at most, 176 months; Jadelle implants, misoprostol, Depo-Provera, and Microgynon availability will be within three months of supply.

Introducing assumed central-level inventory control parameters of a maximum stock level of six months and a minimum stock level of three months, the total 2014 product requirements from supply planning was be determined. Subtracting the total 2014 expected shipments from UNFPA and the EMF from the total 2014 product requirements yield the product gaps in table 10.

Table 10. 2014 Product and Funding Requirements

Product	Unit Pack	2014 Product Consumption Forecast	2014 Product Requirements + 6 months Buffer	Central level Stock on Hand as at Nov. 2013	UNFPA Commitments	EMF Commitments	2014 Total Commitments as at Nov. 2013	2014 Product Gap	Product Unit Cost	2014 Gap to be Funded
magnesium sulfate 10G/vial INJ	10g vial	3,473	5,210	0	5,000	16,236	21,236	-16,027	$0.36	$0.00
oxytocin 10IU/ml INJ (IV)	10IU/ml	81,481	122,222	1,500	500	154,500	155,000	-34,279	$0.20	$0.00
Misoprostol 200µg/TAB (PO)	200 ug	221,847	332,771	4,800	50,000	0	50,000	277,971	$0.48	$133,425.84

Copper T (IUD)	Piece	582	873	540	0	0	0	333	$0.20	$66.34
Depo-Provera 150mg inj.+syringes (Injectable)	vial	108,981	163,472	15,200	10,000	0	10,000	138,272	$0.90	$124,444.50
Jadelle (Implant)	Piece	1,703	2,554	50	25,000	0	25,000	-22,496	$9.00	$0.00
Implanon (Implant)	Piece	5,108	7,663	0	19,000	0	19,000	-11,337	$9.00	$0.00
Microlut Pill (POP)	Cycle	42,571	63,856	31,740	5,660	0	5,660	26,456	$0.30	$7,936.84
Microgynon Pill (COC)	Cycle	127,712	191,568	1,500	25,000	0	25,000	165,068	$0.27	$44,568.46
Condom Male	Piece	4,451,971	6,677,956	59,550	5,432,000	0	5,432,000	1,186,406	$0.03	$32,032.97
Condom Female	Piece	3,381	5,071	0	56,000	0	56,000	-50,929	$0.57	$0.00
Levonorgestrel 0.75mg	2 Tabs	5,947	8,921	350	15,000	0	15,000	-6,429	$0.52	$0.00
								Total Funding Gap		$342,474.95

The negative product gaps indicate complete product availability for 2014; it also extends availability to 2015 and 2016, in varying amounts. To fill the national pipeline, the positive product gap in varying quantities yields the funding gap of $342,474.95 in 2014.

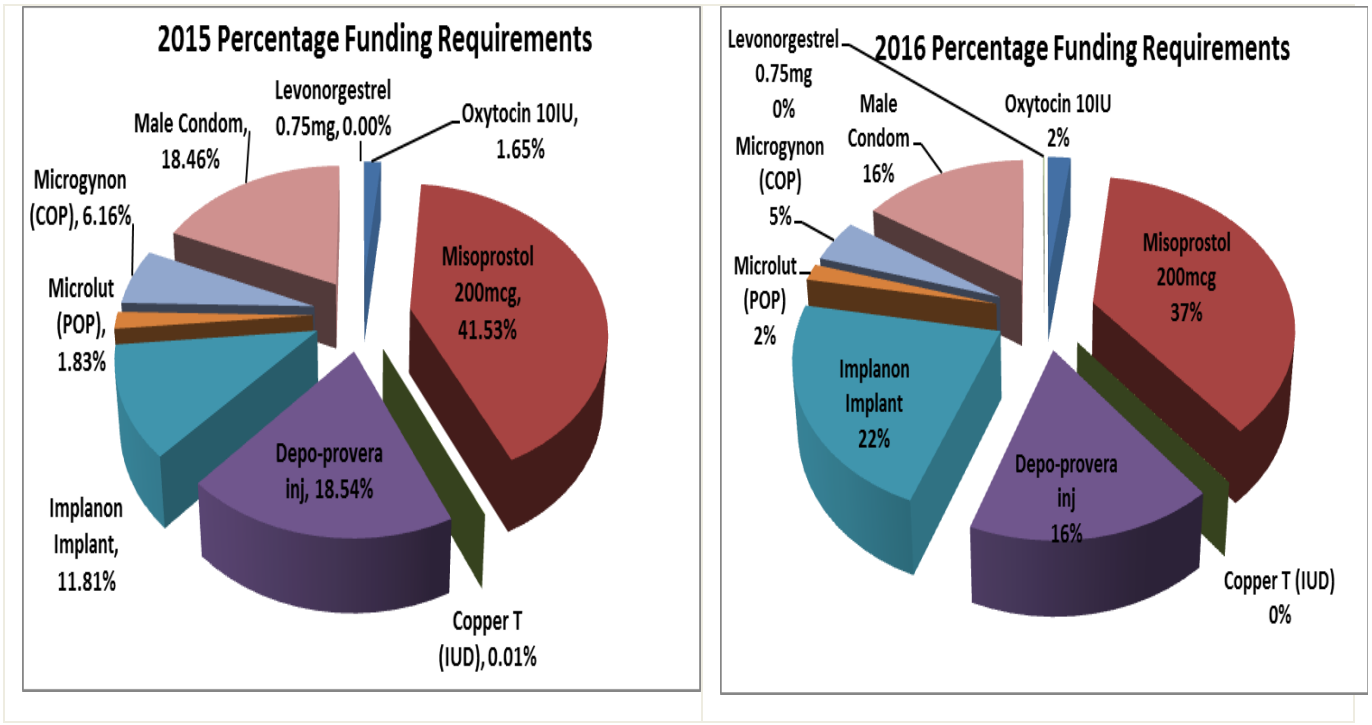
Table 11. Product and Funding Requirements, 2015 and 2016

Products	Unit Pack	unit cost	2015 Commodity Req.	2015 Funding Req.	2016 Commodity Req.	2016 Funding Req.
Oxytocin 10IU	10IU/ml	$0.20	67,210	$13,442	115,629	$23,126
Misoprostol 200µg	Cycle	$0.48	703,612	$337,734	816,423	$391,883
Copper T (IUD)	Piece	$0.20	577	$115	574	$115
Depo-provera inj	vial	$0.90	167,490	$150,741	191,710	$172,539
Implanon Implant	Piece	$9.00	10,674	$96,066	25,987	$233,883
Microlut (POP)	Cycle	$0.30	49,717	$14,915	62,961	$18,888
Microgynon (COP)	Cycle	$0.27	185,434	$50,067	183,216	$49,468
Male Condom	Piece	$0.03	5,003,359	$150,101	5,514,790	$165,444
Levonorgestrel 0.75mg	Tab	$0.52	0	$0	2,793	$1,452
			Total 2015 Funding Req.	**$813,181**	**Total 2016 Funding Req.**	**$1,056,798**

The quantities of products that will be available in 2014 extend to four products—magnesium sulfate, female condoms, Jadelle implant, and levonorgestrel—in 2015. In 2016, only three products will be available: magnesium sulfate, female condoms, and Jadelle implants.

In 2015, requirements for eight products, which will complement the products already in-country, will cost $813,181; the product requirements to also ensure availability in 2016 will cost $1,056,798. The percentage funding requirement for misoprostol, Depo-Provera, male condoms, and Implanon is highest for both 2015 and 2016.

Figure 2: Percentage Funding Requirements



Recommendations

To ensure this quantification translates into continuous family planning and maternal health commodities availability in the country, the authors make a number of recommendations. These recommendations are actions that will create the platform for improved implementation of logistics management tasks and activities.

1. **Change some planned procurement by UNFPA to release funds for misoprostol procurement:** Oxytocin and magnesium sulfate are two products included in the draft UNFPA procurement plan. These products also are part of the expected deliveries to be made by the EMF, which has already exceeded 2014 forecasted needs. Therefore, UNFPA should quickly suggest that the funds originally budgeted for these two products be used to purchase 50,000 tablets of misoprostol.

   Note: The original quantification exceeds this amount; it was based on an optimistic roll-out plan to train rural providers; it is unlikely that this will be done given the current and ongoing security issues in South Sudan. Therefore, the 50,000 proposed procurement by UNFPA should be sufficient to begin the delayed roll out.

2. **Establish a technical working group (TWG) to monitor reproductive health commodity security:** These working groups have been very active and successful in other countries. To simplify arrangements for the regular (quarterly) meetings, it was decided that the TWG would be a sub-committee of the existing Reproductive Health Collaboration Forum. There was some discussion about having this work done by the Pharmaceutical Committee of the Department of Pharmacy. However, because of the RH focus, it was decided that the TWG should be separate, but would share their minutes with the Department of Pharmacy. UNFPA would be the secretariat for this group, but the DG for Reproductive Health would chair the meetings. Some of the terms of reference for this group would be—

   - Develop and approve annual quantifications for reproductive health commodities.
   - Review supply status in-country, including consumption, stock on hand, and expected shipments.
   - Serve as a forum for discussing proposed purchases and donations of RH commodities.
   - Serve as a forum for discussing distribution problems and supply chain needs.
   - Eventually, similar committees could be set up at the state level, as well—in keeping with South Sudan's desire to decentralize management of the health system.

3. **This quantification should be an opportunity for USAID to participate in contraceptive donations.** USAID could, potentially, donate contraceptives, particularly Microgynon, Depo-Provera, and Jadelle and Implanon implants. USAID and UNFPA should coordinate this effort to prevent duplication. A good coordination would prevent excessive overstock from effort duplication to making of funds available for low stock commodities. The coordination can free-up funds that UNFPA could use to purchase misoprostol. With the activation of the RHSC

TWG, additional information will gradually become more readily available; quantification of needs should be reviewed quarterly and updated annually.

4. **The MOH should provide a national authorization for the use of misoprostol**: The government of the South Sudan MOH should provide a written authorization for all stakeholders to use misoprostol in the country; this would provide the required enabling environment for the intervention and roll out of misoprostol usage in the country. The formal written authorization, which is an immediate measure, should be followed by a long-term measure of updating and revising the essential medicine list (EML) of South Sudan. Another follow up for this enabling environment is training on the use of misoprostol by the various cadres of personnel involved in home deliveries.

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Annex 1. List of Participants

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13	Anthony Hudgins	DELIVER/JSI	Snr. Technical Advisor	
14	Michael Egharevba	DELIVER/JSI	Technical Advisor	

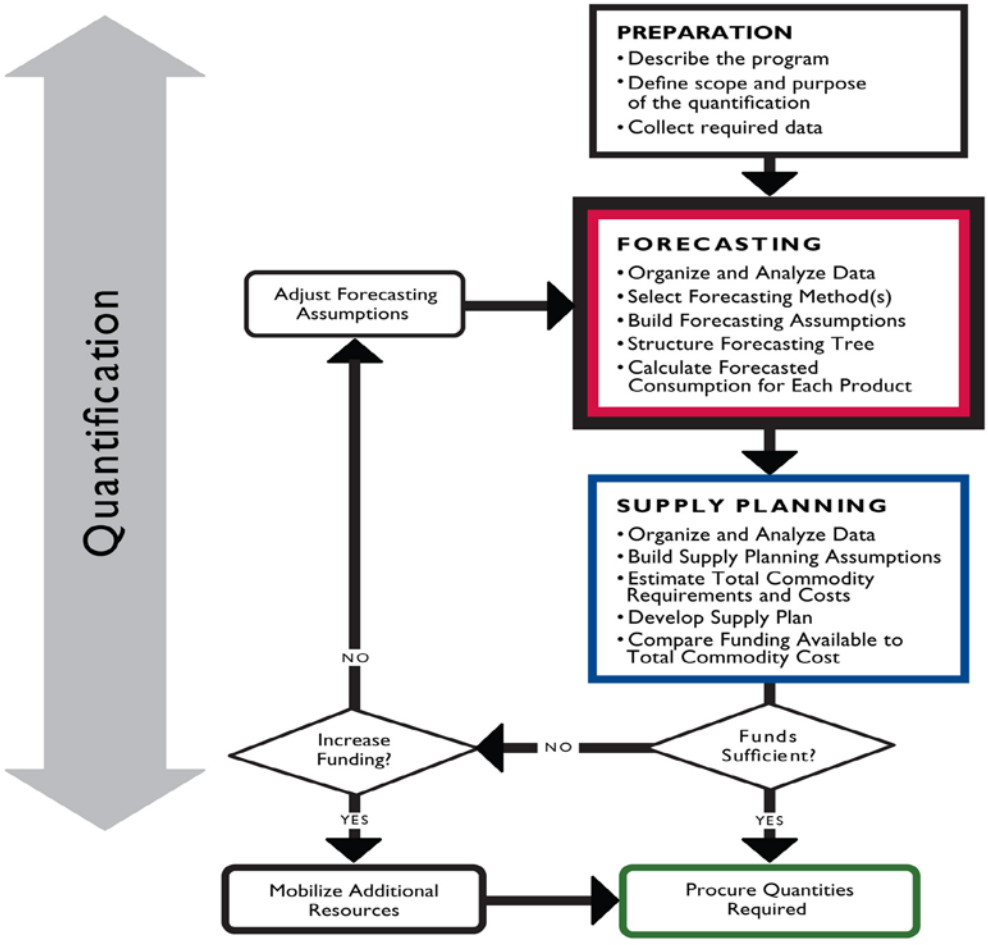
Annex 2. Reproductive Health Quantification Workshop in Juba, South Sudan—November 21, 2013

9:00–9:30	Welcome, and setting the stage	Dr. Dimiti Director General for Reproductive Health
9:30–9:45	Introductions, review of agenda	Tony Hudgins USAID | DELIVER PROJECT
9:45–10:45	Quantification for Oxytocin and Magnesium Sulfate	Michael Egharevba USAID | DELIVER PROJECT Plenary Discussion
10:45–11:00	Tea Break	
11:00–12:30	Quantification for broader introduction of Misoprostol	Michael Egharevba Plenary Discussion
12:30–1:30	Lunch	
1:30–2:45	Quantification for Contraceptives	Tony Hudgins Plenary Discussion
2:45–3:00	Tea Break	
3:00–3:30	Unfinished Business	Tony, Michael, and Plenary
3:30	Closing	Dr Dimiti

Annex 3. Issued/Distributed Stock and Central-Level Stock On Hand, 2013

S/N	Name of Commodities	Pack size	2013 Issued/Distributed stock				UNFPA	CMS	GPRHCS
			CMS/MDTF Kits	UNFPA Implementer	UNFPA States	UNFPA Kits	Stock on hand as of Nov. 2013		
1	Ocytocin 10IU	Ampoule	175,200		2,000	16,000	1,000		500
2	Misoprostol tabs	200µg		27,000	300	23,400	1,800		3,000
3	Magnesium sulfate Inj.	Vial	3,760			600			
4	Depo-Provera 150mg inj. +syringes	Vial		15,500	26,000	24,000	1,200		14,000
	Implanon/Implant	Piece							
5	Jadelle/Implant	Piece		4,550					50
6	Microlut/Implant	Cycle				4,800	240		31,500
7	Microgynon/COC	Cycle		3,000	15,500	30,000	1,500		
8	Copper T/IUD	Piece				2,790	540		
9	Condom Male	Piece		3,210,000	1,265,000	5,943,780	34,550		25,000
10	Condom Female	Piece				32,400			
11	Levonorgestrel/ EC	0.75mg				11,400	350		
12	Water for inj	10ml							
13	5ml Syringe	Piece							
14	2ml Syringe	Piece							

Annex 4. Quantification Process



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