Assessment of the Essential Medicines Kit-Based Supply System in Uganda

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We sincerely hope that this evaluation of the kit supply system can guide its revision and optimization, thereby increasing access to essential medicines and supplies.

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ACRONYMS, ABBREVIATIONS, AND BRAND NAMES

ACT	artemisinin-based combination therapy
AL	artemether-lumefantrine
AMC	average monthly consumption
Depo Provera	medroxyprogesterone injection
emergency contraceptive	levonorgestrel 750 µg tablets
EMHS	essential medicines and health supplies
EMLU	Essential Medicine List Uganda
FP	family planning
HC	health center
HMIS	health management information system
LOC	level of care
Microgynon	ethinylestradiol–levonorgestrel 0.03–0.15 mg tablets
MOH	Ministry of Health
MOS	months of stock
MSH	Management Sciences for Health
NMS	National Medical Stores
OPD	outpatient department
SURE	Securing Ugandans' Right to Essential Medicines
UGX	Uganda shillings
USAID	US Agency for International Development
USD	US dollars
VEN	vital, essential, and necessary items divided in groups based on health impact

EXECUTIVE SUMMARY

In December 2010, the Ministry of Health (MOH), together with the Securing Ugandans' Right to Essential Medicines (SURE) program, implemented an assessment of the kit-based supply system introduced nationwide in Uganda in June 2010.

In 1985, when Uganda was struggling to ensure availability of essential medicines and health supplies (EMHS), public health facilities were using a push or kit-based order system. In 2002, the kit system was abolished and a pull or order-based system replaced it to make better use of the limited resources available for EMHS. The introduction of the pull system was accompanied by capacity building in supply chain management at the facility level, which has been ongoing with support from Danida, USAID through DELIVER and SCMS, and other health care partners. However, medicines management remains weak; only 50% of the products in a SURE 2010 facility baseline survey had the correct stock balance on the stock card. Poor medicines management combined with insufficient EMHS funding have led to serious availability problems that threaten the provision of health care to the people of Uganda.

In an attempt to rectify the unsatisfactory supply situation and improve the availability of life-saving medicines, the MOH and the National Medical Stores (NMS) decided to reintroduce a kit supply system for lower-level health facilities, whose staff typically have the weakest medicines management skills.

We carried out this study in December 2010, following several kit distribution cycles, to assess the effects of the kit system on the availability of EMHS at level II and III health centers (HCs).

The appropriateness (composition and quantities) of the kit depends on several factors, such as patient load, disease patterns, and prescribing and dispensing practices. These factors can differ greatly from facility to facility and from district to district. As a result, composing the kit to satisfy the needs of most facilities is a difficult task. Some medicines are supplied in inadequate amounts and others in excess with the risk of expiry. Recognizing that a kit system is never a "best fit for all," this study evaluated the kit's current composition and quantities and assessed the funding of EMHS per patient for primary health care.

Prior to the kit system, each facility ordered EMHS against a budget line at NMS (Vote 116) reflecting the facility's annual budget. Their ability to use their budget to procure EMHS effectively depended on their stock management and quantification expertise. Moreover, the budget available was insufficient to ensure that EMHS were available at all times. With the introduction of the kit, the EMHS funding for HC IIs and IIIs increased compared to what was previously available under the Vote 116 budget. The introduction of the kit, therefore, succeeded in increasing the per capita EMHS funding, which was needed to increase availability; however, the effectiveness of this increased funding will depend fully on the composition of the kit and how well it supplies what facilities need the most.

We collected data from 35 primary health care facilities (HC IIs and IIIs) using a pre and post kit study design. The facilities were randomly sampled from nine districts covering all NMS delivery zones. There is no control group because the kit was introduced nationwide.

Executive summary

The study found that two-thirds of staff were happy with the kit system and that it had improved their supply situation. To best accommodate differences between HC IIs and HC IIIs, two kits were introduced. The HC II and III kits contained 56 and 115 EMHS, respectively. Classifying the EMHS into VEN classifications (vital, essential, and necessary), the study found that in both kits, 59% of the total EMHS were vital. Moreover, the study found that 18% and 22% of the EMHS supplied in the HC II and HC III kits, respectively, were inappropriate for the primary health care level and should only be used at a higher level of care (HC IV and hospital) according to the Essential Medicine List for Uganda (EMLU) 2007[1]. Each facility received one kit per delivery cycle, and the present set-up did not allow for considering patient load at each facility.

After the kit system was introduced, the average EMHS funding per patient at the facilities surveyed was 0.36 (0.18 – 0.62) US dollars (USD) and 0.52 (0.28 – 0.93) USD for HC II and III, respectively. Facilities with high funding per patient have low patient load; whereas, facilities with heavy patient load receive a smaller amount per patient because they only receive one kit each. Before and after data on funding were only available for the Kibaale district, where EMHS funding per patient increased by 38%, reaching an average of 0.44 USD per patient after the kit system was introduced.

Availability improved significantly. Average stock-out days per month for all EMHS in the facilities decreased from 20 days to 5 days. A 69% decrease in the number of stock-out days before and after kit introduction was observed for five tracer drugs; however, 63% of items were oversupplied with the risk of expiry. In particular, two EMHS in HC II and seven EMHS in HC III kits were oversupplied, with more than 12 months' supply in each kit compared to estimated facility consumption. We estimated the cost of these oversupplies, should they expire, at 1.5 million USD per year for all HC II and III facilities in the country, which is equivalent to about 7% of the EMHS budget.

Findings showed that 27% of facility staff had been trained in stock management, but none could correctly calculate order quantities. Furthermore, less than half of the medical commodities had stock cards and less than a quarter had stock card balances equal to the physical counts. The result showed that the supply management for commodities was worse than for medicines.

The national ordering and supply schedule calls for kits to be delivered bimonthly; however, NMS delivery frequency varies, and the current NMS delivery schedule includes six planned deliveries over a nine months period making the deliveries more frequent than bimonthly.

Introduction of the kit system together with increased funding for EMHS have significantly improved availability in the resource-limited, primary health care setting. However, the composition of the kits needs to be optimized by giving priority to vital products that are still out of stock, although for fewer days than before. Increasing quantities of vital EMHS can be achieved within the same budget by eliminating the EMHS classified as necessary and by reducing the EMHS classified as essential. Items for levels of care higher than HC II and III need to be removed in line with recommendations from the revised 2011 essential lists for medicines and health supplies[2]. In addition, for the kit system to be successful, the

[1] The EMLU list is in the process of being updated, which could result in more EMHS moved to lower heath care levels.

[2] Essential medicines and health supplies list for Uganda is in the process of being developed.

oversupplied EMHS must be reduced and a system set up to redistribute the excess items. Finally, to make the kit system more efficient, distribution needs to consider patient load at facilities, and the busiest facilities may need to receive more kits.

BACKGROUND

In December 2010, the Ministry of Health (MOH), together with the Securing Ugandans' Right to Essential Medicines (SURE) program, implemented an assessment of the kit-based supply system introduced nationwide in Uganda in June 2010.

In 1985, when Uganda was struggling to ensure the availability of essential medicines and health supplies (EMHS), public health facilities were using a kit or push- based order system. In 2002, the kit system was abolished and a pull or order-based system replaced it to make better use and reduce waste of the limited resources available to EMHS.

The pull system was introduced together with intensified capacity building in supply chain management at facility level, an effort that has since been ongoing and supported by Danida, USAID|DELIVER, SCMS, and other health care partners; however, medicines management remains weak. Only 50% of items was in the SURE 2010 baseline found to have the correct stock balance on the stock card. The poor medicines management combined with insufficient funding of EMHS has led to serious availability constraints, threatening provision of health care to the people of Uganda.

In an attempt to rectify the unsatisfactory supply situation, with consistently low availability of medicine for life threatening conditions, the MOH together with the National Medical Stores (NMS), decided to reintroduce a kit supply system for lower-level health facilities found to have the weakest supply management skills.

Each health center (HC) at the II and III levels receives one kit customized to that level of care (LOC) six times annually regardless of the facility's catchment area population or patient load. The original list of kit items for HC II included 56 items of which 34 are medicine and 22 are commodities; the HC III kit contains 115 items, of which 73 are medicines and 42 are commodities. The kit values are 470 USD and 825 USD for HC II and III, respectively.

STUDY OBJECTIVE

This study was implemented in December 2010, after several kit-based supply cycles, to assess the impact on the supply situation and look at availability of EMHS at HC IIs and IIIs. The appropriateness (in terms of composition and quantities) of the kits depends on several factors, such as patient load, morbidity, disease prevalence, and prescribing and dispensing practices. These factors differ greatly from facility to facility and from district to district. Therefore, it is a most difficult task to compose the kit to satisfy the need of most facilities. Some medicines are supplied at inadequate amounts and other in excess with the risk of expiry. Recognizing that a kit system is never a "best fit for all", this study aimed at evaluating kit appropriateness to better guide its composition.

Prior to the kit system, EMHS were ordered against a budget line at NMS (Vote 116) with each facility having an annual budget they could draw from. The cost of the kit exceeded the previous budget for EMHS at HCs II and III. The introduction of the kit therefore increased the per patient funding on EMHS, something which was much needed to increase availability. The effectiveness and benefit of this increased funding for EMHS will depend fully on the composition of the kit and how well it supplies what is most needed. The study therefore also aimed to assess the cost effectiveness of introducing a kit system for primary health care.

The overall objective was to assess the appropriateness of the kit system in Uganda with the following specific objectives—

- To assess the change in availability of EMHS in health facilities
- To assess how well the kit content and quantities meet the EMHS needs of health facilities
- To assess EMHS fundings per patient changes
- To assess facility staff's stock management capacity
- To assess change in rational pharmacotherapy
- To assess timeliness and frequency of deliveries according to NMS schedule
- To assess staff's views on the kit system

METHOD

The study was designed as a before and after intervention study to assess the impact of kit introduction by using an indicator-based quantitative and qualitative data collection tool. The kit system was introduced nationally, so no control was available.

The NMS delivery schedule divides all Uganda's districts into five delivery zones. Sampling for this study was done on the basis of these five zones to ensure that all zones were represented. Districts within each distribution zone (four to 44 districts) were stratified according to population size; one district with high and one with low population were randomly sampled from each NMS zone, resulting in two districts sampled from each zone. Only one district from NMS delivery zone five (central region) was sampled because the zone is smaller than the remaining zones including only four districts. Two HC IIs, two HC IIIs, and back-up facilities were randomly sampled from each sampled district. A total of 35 facilities were included for data collection. In each district visited, the district health teams were interviewed to get their view on the kit system. The district and facilities sampled are listed in table 1 with backup facilities in brackets and not visited facilities in red italic.

Table 1. Visited Facilities

Zone	High-population districts	Health facilities	Low-population districts	Health facilities
1	Tororo	Kalait HC II Magolo HC II Kiyeyi HC III Mudacor HC III *(Serena HC II)* *(Osukuru HC III)*	Sironko	Simu-Pondo HC II Buwalasi HC III Buhugu HC III *Tunyi HC II* *(Buboolo HC II)* *(Gamatimbel HC III)*
2	Rakai	Bbaale HC II Kifamba HC III (Kasensero HC II) (Mutukula HC III) *Gwanda HC II* *Kibanda HC III*	Ibanda	Rubaya (Banda) HC II Bugarama HC II Nyamarebe HC III Rukiri HC III *(Kakinga HC II)* *(Kikyenkye HC III)*
3	Kibaale	Muhorro HC II Kabuubwa HC II Nkooko HC III Nyamarwa HC III (Kigando HC II) *(Kisiita HC III)*	Bundibugyo	Bundingoma HC II Bukangama HC III Bubukwanga HC III *Kasulenge HC II* *(Ngamba HC II)* *(Kakuba HC III)*
4	Pader	Lagile HC II Paimol HC III Pader HC III (Omot HC II) *Lukole HC II* *(Patongo HC III)*	Dokolo	Anyacoto HC II Atabu HC II Agwata HC III Bata HC III (Adok HC II) *(Kwera HC III)*
5	Wakiso	Kanzize HC II[b] Bulondo HC III Mende HC III *Magoggo HC II*		

[a]Facilities in brackets were back-up facilities and *red italic* facilities were not visited because of unavailability on the day of the survey.
[b]Facility never received kit.

Because of mountainous districts and induced time constraints, it was possible to visit only three facilities in Sironko district and three facilities in Bundibugyo district and, instead, additional facilities were visited in Dokolo and Kibaale districts. Only three facilities were visited in Wakiso district because of time constraints and unfortunately one of the facilities had never received a kit as it was a newly opened facility, which did not yet receive supplies from NMS. Pader had previously been divided into two districts, but by mistake, Pader's sampled facilities were in both Pader and Agago districts. Only Pader district headquarters was visited.

Separate data collection tools for district headquarter level, HC II, and HC III were developed to take the differences in kit composition into consideration. Facility tools included staff capability of calculating quantities to order; the staff's view of the kit system; assessment of kit content; rational medicine use; kit delivery dates; stock assessment; and stock management capacity. The district level tool was shorter and included only the district view on the kit system, district population, the number of health facilities, and financial knowledge.

Data was collected in December 2010 after a minimum of three kits were received by each facility. Data collectors with pharmaceutical backgrounds and experience in data collection were divided into two teams of two data collectors each. All data collectors were trained in the use of the data collection tool prior to the data collection exercise. Microsoft Excel 2007 was used for data analysis.

RESULTS

The results are arranged according to the specific objectives, availability of items, appropriateness of the kit content and quantities, funding of EMHS per patient, stock management capacity, rational pharmacotherapy, timeliness and frequency of delivery, and staff's views on kit system.

Items are divided into three groups—medicines, including family planning and malaria medicine; health supplies including condoms, syringes, sutures, etc.; and other items including dispensing envelopes, hypochlorite 5% (JIK), and stock management items (stock cards, etc.). In some analyses, health supplies and other items are grouped together under commodities.

Availability of Items

Availability is measured as the average number of stock-out days for all EMHS included in the kits before and after the kits were introduced. After kit introduction, medicines in HC II are stocked out around half the month, whereas the commodities in HC II and HC III are stocked out less than a week. Before kit introduction, all items were stocked out for approximately three weeks per month (table 2).

Table 2. Stock-Out Days/Month Before and After Kit Introduction and Percentage Decrease

	HC II			HC III		
Items	**Before**	**After**	**Decrease (%)**	**Before**	**After**	**Decrease (%)**
Medicine	20	14	30	19	5	74
Commodities	18	5	72	21	4	81

The number of stock-out days has been reduced by 30% for medicines and 72% for commodities in HC II and 74% and 81%, respectively, for HC III. Availability improved, whereby continuous availability was assured for six items in HC II and 16 items in HC III in the most recent three-month period. Before kit introduction, only two items, cotrimoxazole 960 mg tablets and vitamin A tablets, did not stock-out in a three-month period. After kit introduction, ethinylestradiol–levonorgestrel 0.03–0.15 mg tablets (Microgynon), levonorgestrel 0.75 mg (emergency contraceptives,) and sutures are among the items that had no stock-out days in a three-months period.

Considering availability only for the five tracer medicines[3] included in the kits, there is a 69% decrease in stock-out days before and after kit introduction. Table 3 shows that there is a large decrease in stock-out days, especially for sulfadoxine + pyrimethamine (SP), oral rehydration salts (ORS), and artemisinin-based combination therapy (ACT) at both levels of care. Depo Provera is not part of the HC II kit, but at the HC III level, introduction of the kit

[3] Cotrimoxazole 480 mg, Depo Provera, measles vaccine, ORS, artemisinin-based combination therapy (ACT), SP 525 mg (Fansidar)

reduced the number of stock-out days for Depo-Provera. The number of stock-out days for cotrimoxazole 480 mg did not change after kit introduction.

Table 3. Stock-Out Days For Tracer Medicine

	HC II[a]		HC III	
Medicine	**Before**	**After**	**Before**	**After**
Cotrimoxazole 480 mg	11	10	11	11
Depo Provera	NA	NA	19	0
SP 500 mg + 25 mg	22	3	19	4
ORS	16	2	13	2
ACT (lowest weight band)	17	4	17	7

[a] Depo Provera not included in HC II kit

Of the tracer medicines, availability on the day of the survey was lowest for cotrimoxazole with 56% and 61% availability in HC IIs and HC IIIs, respectively. In HC IIs, there was 100% availability of ACT and SP, whereas availability in HC IIIs was 94% for Depo Provera, ORS, and SP.

Appropriateness of Kit Content and Quantities

This section includes an analysis of the contents of the two kits surveyed for—

- VEN classification[4] and level of care (LOC) analysis
- Supply quantities
- Consistency in supply
- Malaria medicine assessment

A summary of the content of the two kits is provided in table 4. Both kits contain approximately 60% medicine items, and 59% of all EMHS are vital according to VEN classification[5]. Four out of five items are suitable for the designated LOC[6]. The analysis also found that some items on the list were never supplied to facilities.

Table 4. Summary of Kit Content

Kit content	HC II	HC III
Number of medicines	34	74
Number of health supplies	16	35
Number of other items (stock cards, etc)	6	6
Total items	56	115
% Vital items	59%	59%
% Items right for health care level	82%	78%

[4] VEN classification is a system of setting priorities for purchasing medicine and keeping stock, in which medicine is divided according to their health impact into vital, essential, and necessary categories.
[5] Based on 5th Essential Drugs List and Treatment Guidelines for Zimbabwe, 2006. No VEN classification included in Essential Medicines List for Uganda 2007 and the 2011 version is not yet finalized.
[6] Items level of care is according to the Essential Medicine List for Uganda 2007 by MOH.

Results

VEN classification and LOC analysis of kit items

Figure 1 shows the percentages of vital, essential and necessary medicines and commodities in HC IIs and HC IIIs. HC II has a higher percent of both medicines and commodities compared to the HC IIIs. The highest percent of necessary items is seen for the medicines in HC IIs, where a quarter of the items in the kit are necessary.

According to VEN classification and LOC analysis, the HC II kit includes 31 vital items; 45% of items were either necessary (neither vital nor essential items) or not right for HC II level. Annex 4 provides a full list of the VEN classification and LOC analysis for the HC II kit.

The HC III kit contains a total of 115 items with 56 vital items to be used at the HC III LOC (or lower) according to the Essential Medicine List Uganda (EMLU) 2007. In the HC III kit, 51% of the items are necessary according to VEN analysis or unsuitable for HC III health care level. Annex 5 gives a full list of the HC III kit items with VEN classification and LOC analysis. Overall, the average of suitable and vital items for the two kits is only 50%. Though the kit introduction resulted in increased funding of EMHS, the funding is still insufficient, so prioritization in procurement is necessary.

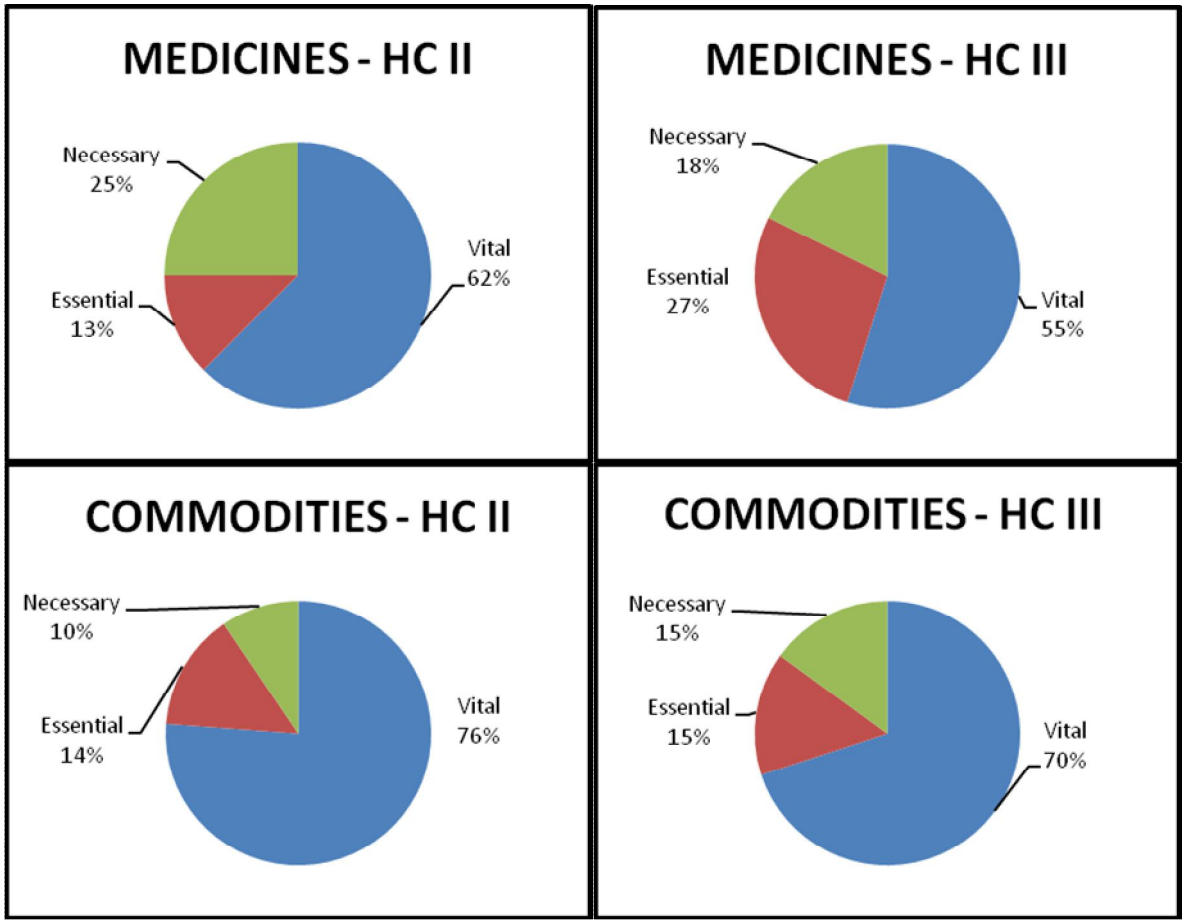

Figure 1. VEN classified items divided in medicines and commodities at HC II and HC III level

Among the necessary items found in both kits are acetylsalicylic acid tablets, calamine lotion, magnesium trisilicate tablets and multivitamin tablets. All necessary items should be considered removed from the kit and replaced by vital or essential items. The red-colored items in annexes 4 and 5 are the items suggested to be removed from the kits.

Supply Quantities

Kit deliveries are bimonthly and hence should ideally contain a two-month supply of all items to ensure no stock-outs or build-up of supplies (overstocking). Figure 2 classifies medicines and commodities into groups related to quantities supplied versus consumption by months of supplies. The consumption by month was calculated for each item based on stock card information. If a stock card was missing the calculation could not be undertaken and thus was done for 93 medicines and 36 health supplies. In one group, items are undersupplied (less than two months) and are likely to stock-out before the next delivery. Another group is adequately supplied (two months), which is optimal, because stock-outs and overstocking are unlikely. Oversupplied items (more than two months supply per kit) are divided into oversupplied (3–4 month supply per kit), severely oversupplied (5–12 month supply), and extremely oversupplied (more than 12 months supply). Oversupplied items might or might not result in overstocking, because the frequency of deliveries is not exactly two months. Severe and extremely oversupplied items are likely to be overstocked.

We found that medicines compared to commodities are undersupplied, 20% compared to 3%, and 75% of commodities are oversupplied compared to 53% of medicines. Percentage of extremely oversupplied items is close to equal in the two groups, whereas severely oversupplied items differ between medicines (17%) and commodities (39%). Adequate supplied items accounts for 27% of medicines and 22% of commodities. Annexes 6 through 9 contain full lists of items in the different “supply groups.”

Considering health care levels, there are more severe and extreme oversupplied medicines in HC IIIs (29%) than HC IIs (13%) and 39 % of medicines are adequately supplied in HC IIs compared to 21 % in HC IIIs. At both health care levels, around 75 % of commodities are oversupplied.

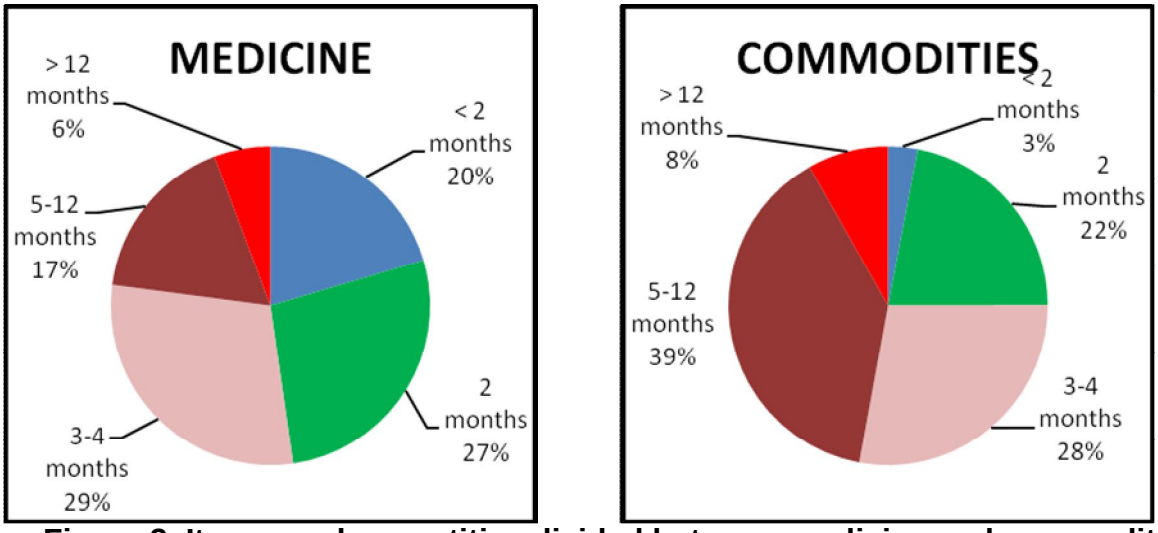

Figure 2. Item supply quantities divided between medicine and commodities

Results

On the basis of NMS prices, we estimated that extremely oversupplied items would annually cost 500 USD for each HC II and 1100 USD for each HC III, which is equal to 1.5 million USD annually for all HC IIs and IIIs in Uganda or 7%[7] of total cost of EMHS (annex 10). Safety boxes and ORS are the only extreme oversupplied items in HC IIs, and ergometrine (51% of oversupplied item cost) and lidocaine injections (32%) are responsible for most of the cost of extremely oversupplied items in HC IIIs.

The oversupplied items are in low risk of expiry due to their longer shelf life. Table 5 shows that health supplies have longer expiry periods than medicines, which means that health supplies are at less risk of stocking out. For medicines, almost a quarter of the items on the shelves in facilities have 12 months of shelf life left and only 3% are at risk of expiry with less than six months of shelf life remaining.

Table 5. Items by Number of Months Remaining Before Expiry.

Expiry of items	< 6 months (%)	6–12 months (%)	13–24 months (%)	> 24 months (%)
Medicine (n = 940)	3	21	73	4
Health supplies (n = 392)	2	3	29	66
Other items (n = 26)	4	0	92	4
Total (n = 1358)	3	15	60	22

Over 80% of items have an expiry date of more than one year. Facilities have in the range of four – 43% of items with expiry less than one year. More than half the facilities have over 20% of items expiring within one year. Few items have short expiry time; the same item can have long or short expiry, depending on which facility it is found in, suggesting that NMS delivers products with sufficient shelf life and that expiry issues are more dependent on facility-level stock management.

Consistency in supply

According to supply lists prepared by MOH and NMS, the same quantities are to be delivered every time. Table 6 is a snapshot of quantities of artemether-lumefantrine (AL) 20–120 mg tablets (5–15 kg packs) delivered in three kit deliveries to nine HC IIs.

Table 6. AL Deliveries to HC IIs[a].

Facility	1	2	3	4	5	6	7	8	9
Quantities received from kit #1	20	20	20	20	20	20	20	20	10
Quantities received from kit #2	20	20	20	0	20	0	0	20	30
Quantities received from kit #3	20	10	10	10	10	10	10	0	15

[a]Columns represent facilities and rows delivery of kit numbers 1, 2, and 3. The numbers are packs of 30 blisters.

[7] 1.5 million USD/30 million Ugandans = 5 cents; Nationally for all health care levels EMHS cost /year is 70 cents; 5 cents/70 cents x 100% = 7%

The table shows that there is variations of quantities delivered both between delivery cycles and within the same delivery. Looking at facility 4, they received 20 packs in the first delivery, none in the second and 10 packs in the third delivery.

Malaria medicine assessment

The quantities of malaria medicines needed depend on the number of malaria cases, which varies depending on the prevalence of malaria in the specific area. Therefore, it is difficult to supply ACT on the basis of the average number of cases (calculated on the basis of the total national number of cases). As prevalence of malaria differs some facilities will stock out of ACT, while others will be overstocked. This is a good example of difficulties in one fit for all with a kit system.

The number of malaria cases per facility is compared with the number of doses received in the table below. It is seen that, by considering only the average number of malaria cases for the districts surveyed, the delivered average quantity is adequate according to health management information system (HMIS) reports. However, it can also be seen that the variation in malaria cases is considerable, resulting in facilities over- and under stocking of ACTs for all pack sizes and at both levels of care.

Table 7. Average Malaria Cases per Facility Compared with Average Doses Received

	HC II		HC III	
Pack size (tablets)	**Average malaria cases/2 months (range)**	**Average doses received**	**Average malaria cases/2 months (range)**	**Average doses received**
6	271 (115–549)	186	394 (194–627)	288
12	61 (26–123)	78	89 (44–141)	87
18	100 (42–202)	108	145 (72–231)	117
24	253 (108–513)	372	368 (181–586)	474

The table is based on HMIS data and delivered quantities. Data in HMIS is based on the number of patients treated for malaria in a facility, and treated patients must be equal to available doses. This table, therefore, does not show if facilities received enough doses. It only indicates that, because of variation in the number of malaria cases per facility, it is difficult to assume a one fit for all with regards to malaria medicine.

Funding per Patient

The kit system implemented in Uganda is not presently able to take patient load into consideration and provide more supplies to facilities with high patient-load compared to facilities with a low load. Therefore, the EMHS funding per patient is likely to differ, depending on the patient load, whereby busy facilities with a high patient-load will have fewer funds available for EMHS per patient. This section assesses EMHS funding per patient in HC IIs and IIIs and EMHS funding per patient before and after kit introduction.

Results

The funding per patient is calculated by dividing the kit value (according to MOH's Supplies Plan for HC IIs and IIIs) with the average number of patients attending a facility in a two-month period. HMIS outpatient department (OPD) patient data for all of 2010 was collected and the average number of patients per month before and after kit introduction was calculated. Facilities did not receive the first kit at the same time, so different numbers of months are used for each facility to calculate average patient load before and after kit introduction. The average Uganda Revenue Authority exchange rate for income tax from January to June 2010 (2022 UGX/USD) is used as the exchange rate before kit and the average for July to December 2010 (2261 UGX/USD) is used for the period after kit introduction[8]. Calculations are based on data for over 260,000 patients in 31 facilities.

For HC IIs, funding per patient is in the range 0.18–0.62 USD with an average of 0.36 USD (table 8), demonstrating the inequity in funds per patient. Facilities with high funding per patient have low patient load, whereas facilities with heavy patient load receive a smaller amount per patient as only one kit is delivered to each facility. Data shows that high funding per patient is not specific to districts. It could be expected that facilities with high funding per patient would prefer the kit system over order-based system, but the data shows that this is not the case.

Table 8. EMHS Funding Per Patient After Kit Introduction

LOC	Average funding per patient	Range of funding per patient
HC II	0.36	0.18 – 0.62
HC III	0.52	0.28 – 0.93

For HC IIIs, the average is 0.52 USD and the range 0.28–0.93 USD with two facilities having smaller patient loads, resulting in higher funding per patient (table 8).

In the visited districts, funding on EMHS before kit introduction was only available in Kibaale district. The annual EMHS budget for the district was divided with number of facilities and six months (number of annual deliveries) to get the bimonthly budget. All five Kibaale facilities had lower funding per patient before kit introduction compared to after (figure 3). Before the kit system, the average facility patient funding was 0.32 USD. The kit introduction resulted in a 38% increase in funding per patient to, on average, 0.44 USD per patient.

[8] http://www.ura.go.ug/exchange.do. Date: 30th March 2011.

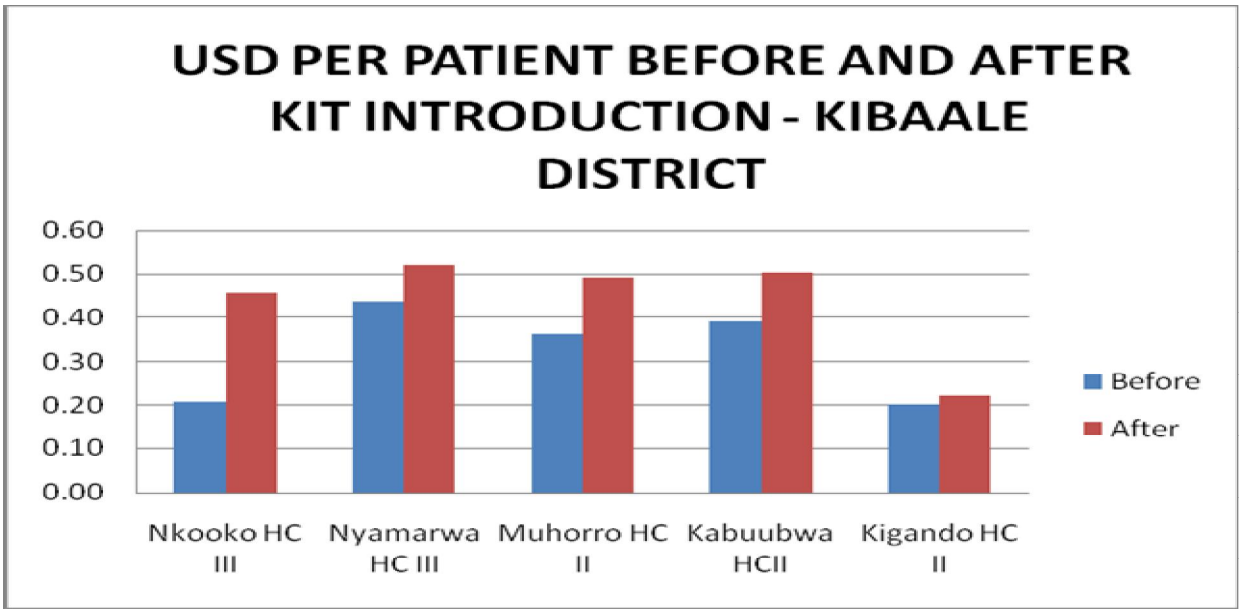

Figure 3. Increase of funding per patient after introduction of kit for facilities in Kibaale district

Stock Management Capacity

This result area focuses on staff stock management capacity and capability of quantifying the amount to order. Table 9 shows that over a quarter of the staff working with ordering and stock management has been trained and about 10% of facility staff was able to identify the right data to forecast quantities needed. Health workers are aware of the data needed, but they could not calculate the right quantity to order. There is no significant difference between HC II and HC III staff.

Table 9. Staff Ability to Manage Stock Orders

Indicator	HC II (n = 17)	HC III (n = 18)
% Staff trained in ordering and stock management	27 %	28 %
% Staff using right data to forecast	12 %	11 %
% Staff capable of calculating right quantity to order	0 %	0 %

A higher percentage of medicines than commodities have stock cards available with more correctly updated balance equal to the physical count (table 10). The header information on the stock card (name, strength, storage condition, and average monthly consumption [AMC]), is rarely filled in. For both medicines and commodities, stock management is better in HC IIIs.

Table 10. Stock Management in HC IIs and IIIs of Medicines and Health Supplies

	Medicines		Commodities	
Stock management indicators	HC II	HC III	HC II	HC III
% Items with stock card	30	55	7	16
% Items with correctly[a] filled stock cards	0	0	0	1
% Items with correct stock card balance	16	26	3	5

[a] header is correctly filled in if all spaces in stock card header are filled

Results

Rational Pharmacotherapy

Introduction of the kit system has increased availability of medicine, which may result in irrational use of medicine (poly pharmacy and overprescribing of antibiotics). We found no significant difference in prescribing patterns before and after kit introduction though there is a small increase in patients leaving with antibiotics after kit introduction. Generally, irrational prescribing is taking place with a high number of medicines per prescription and over prescribing of both antibiotics and injections.

Table 11. Comparison of Prescribing Patterns Before and After Kit Introduction

Rational prescribing indicators	Before (n = 35)	After (n = 34)
Average number of medicines per prescription	3.2	3.2
Average % patients leaving with ≥ 1 antibiotic	63	67
Average % antibiotics of total medicine prescribed	25	26
Average % patients leaving with ≥ 1 injection	20	22
Average % injections of total medicine prescribed	8	8

Timeliness and Frequency of Delivery

Timeliness of delivery was a challenge before kit introduction. A kit system does not require orders from facilities, and many facilities receive the same content and quantities, which potentially eases packing of orders. This might have an influence on timeliness of deliveries from NMS. On the other hand, district delivery timeliness is not expected to change because of a change in the logistic system.

Table 12 shows the percentage of on-time deliveries to facilities. An extra week was added to NMS's delivery schedule end-delivery date to cater for delivery from district to facility. The last two deliveries were in time in almost all instances. At the time of the survey, only a few facilities (n = 6) had received their fourth supply. For the third cycle, three facilities did not receive supplies in time. These three facilities are not in the same district and other facilities in the same districts did receive their kits on time, indicating the delay is likely due to district delivery rather than NMS supply to the district.

Table 12. Timeliness of Deliveries to Facilities According to NMS Delivery Schedule

Delivery cycle	Deliveries on time (%)
1 (n = 33)	61
2 (n = 33)	36
3 (n = 29)	90
4 (n = 6)	100
Average	72

The kit content is designed to cover a two-month period, but table 13 shows that the frequency of deliveries varies both within the same delivery cycle, but also between different deliveries. Some facilities receive almost monthly deliveries, whereas others receive less than bimonthly. Fifteen facilities received second and third kit deliveries within a period of 40 days. More frequent deliveries, than the planned bimonthly, further increase availability of and annual funds available for EHMS for HC IIs and HC IIIs.

Table 13. Number of Days Between Deliveries

	Between 1st and 2nd deliveries (n = 33)	Between 2nd and 3rd deliveries (n = 32)	Between 3rd and 4th deliveries (n = 7)
Average	56	46	42
Min-Max	(28–75)	(31–90)	(37–50)

Staff's view on kit system

Generally, all staff believes introduction of the essential kit has increased the range of medicine and that content (range of items) meets their needs and is constant between deliveries. Staff also agrees that quantities though increased are still not sufficient and do not fully meet their needs. Also, most health workers questioned find that the quantities delivered are constant. Taking a separate look at the views of district headquarter staff and facility staff, district staff is indecisive on whether content meets needs; facility staff is sure that content is constant and half believe that content meets needs.

Almost three-quarters of facility staff and more than three-fifths of district staff prefer the kit over an order-based system.

Table 14. Facility and District Staff Views of the Kit System[a]

	Facilities		Districts	
View of kit system, content, and quantities	% Yes	% No	% Yes	% No
In general, has the kit system increased the range of medicine available?	61	39	71	29
In general, does the content meet your needs?	72	28	50	50
In general, do the quantities meet your needs?	39	61	22	78
In general, is the content of the kit constant?	50	50	67	33
In general, are the quantities of items in the kit constant?	56	44	No data	No data
	Order-based	**Kit**	**Order-based**	**Kit**
Do you prefer kit or order-based system?	30	70	38	63

[a]Quantities that are constant are not included in the district tool.

Table 15 shows the percentage of HC II and III facilities that reported the wish that a certain item be part of the kit; also included are the levels of use according to EMLU 2007 and if the items are part of HC II and III kits. Some items that belong in the kits are reported missing; other items are reported missing even though the items are restricted to use at a higher level according to EMLU. "Other items" includes items reported missing by a few facilities.

Results

Table 15. Most Frequently Reported Items Missing According to Facility Staff

Item	% of HC IIs reporting items missing from kit	% of HC IIIs reporting items missing from kit	Level of use (EMLU 2007)	Part of kit (HC II, HC III)
Quinine 300 mg tablets	10	5	HC IV	None
Quinine 600 mg/2 mL injection	12	0	HC III	HC III
Doxycycline 100 mg tablets	6	2	HC II	HC III
Penicillin procaine (3 MU) benzyl (1 MU)	12	5	HC III	HC III
Ciprofloxacin 500 mg tablets	12	5	HC III	HC III
Diclofenac 50 mg enteric coated tablets	4	10	HC IV	HC III
Acetyl salicylic acid 300 mg tablets	4[a]	5[a]	HC I[9]	HC II, HC III
Ibuprofen 200 mg tablets	2	7	HC II	None
Erythromycin 250 mg tablets	6	2	HC II	HC III
Other items	31	25	-	

[a] The item was part of the kit for that level, but was not delivered to facilities.

Based on the most commonly reported missing items, the right level of use, and items currently included items in the kit, the following items could be considered included in a revised kit— doxycycline tablets, ibuprofen tablets[10], and erythromycin tablets in HC II kits, and ibuprofen in HC III kits. Adjustments according to the new treatment guidelines will be needed.

[9] HC I refers to the lowest level in the Ugandan health care system. Currently, community level is more often used for this LOC.
[10] Ibuprofen might not be classified as a vital item and might therefore not necessarily be included.

DISCUSSION

Stock Management

For several years, the MOH and implementing partners have tried to improve stock management in health facilities. The findings from this survey show, however, that stock management is weak at both levels of primary health care included in the study (HC II and III). For example, only a quarter of the health workers at the surveyed facilities had been trained in stock management, primarily because of high staff turnover, which jeopardizes the viability of capacity building. Stock cards are available for about half of all medicines, and less than a quarter of the stock cards are correctly updated. Only 5% of stock cards for commodities had been updated correctly so that the physical count agreed with the stock card balance. None of the staff were able to calculate correct quantities of products to order. The findings are in line with SURE baseline findings, indicating weak supply chain management at all health care levels but worse at lower levels—supply chain management was slightly better at HC IIIs than at HC IIs. In a setting with poor supply chain management, a kit system might be the most appropriate way to ensure availability of EMHS.

A disadvantage of introducing a push (kit) system is that the capacity of facility staff to manage stock is likely to decrease further. Continuous stock management training and supervision might have little effect if facility staff cannot practice their skills because they no longer need to calculate correct orders based on stock management data. As a result, the longer the kit system is in place, the more difficult it might be to change back to an order-based system.

Availability and Oversupply of Items

The introduction of the kit system has improved the availability of EMHS in health facilities. The increased funding linked to the kit contributed to a 69% reduction in stock-out days per month. However, the survey also found that 63% of EMHS are oversupplied with some extremely oversupplied products (> 12 months' supply per kit), which could potentially cost an estimated 1.5 million USD per year in expiries. These results indicate the need for adjustments in both the quantities and the composition of the kits. To avoid wastage of EMHS through expiry, currently oversupplied items urgently need to be redistributed.

The increased availability of medicines will undoubtedly improve health care, with fewer patients being turned away from facilities without their prescribed medicines. However, increased availability also brings the risk of promoting overprescribing; however, that does not seem to be the case because survey results show only a slight increase in the use of antibiotics and injections after kit introduction.

The difficulties of optimizing the quantities supplied in the kit to fit the needs of most facilities are well known, and a redistribution plan needs to be developed.

Funding per Patient

The cost of the kit was higher than the budget line (Vote 116) before kit introduction. An increase in funding of approximately 40% would be expected to increase availability by about the same magnitude. Staff interviewed during this assessment noted this increase,

which is the most likely reason they were mostly positive about the change to kit supply. Because some vital medicines continue to be out of stock, quantities of vital EMHS could be increased, while essential and necessary EMHS could be decreased.

The current kit system does not consider differences in patient load at the facilities. The issue of patient load must be addressed to improve availability and patient funding in an equitable manner. One solution is to supply two or more kits to facilities with high patient load, thereby, ensuring more equitable funding per patient.

The kit system is also not designed to cater to differences in disease prevalence, something that varies greatly throughout Uganda (e.g., malaria prevalence varies based on geography). A system able to take prevalence into consideration would require quantification skills to calculate consumption. A solution could be a top-up of medicines in districts with high disease prevalence for selected conditions.

The increased availability of EMHS as a result of increased funding has been accompanied by a high percentage of oversupplied items. Oversupply affects the cost-effectiveness of the kit system, because costly redistribution is necessary to avoid wastage due to expiries. A revision of the kit content and quantities would therefore increase the cost-effectiveness of the kit system. Furthermore, increasing the availability of vital items should potentially reduce health care costs, increase worker productivity by decreasing the number of sick days in the population, and save lives.

Kit Appropriateness

Family planning (FP) activities generally differ from facility to facility. Only 15–35% of facilities had stock cards for FP items, making it difficult to estimate consumption. Average monthly consumption (AMC) varies between facilities especially at the HC II level and, as annexes 6 through 9 document, some facilities have no consumption of FP items. The most common products not dispensed were oral contraceptives, Microgynon, and emergency contraceptives. Redistribution of these items is necessary to avoid wastage; however, redistribution is expensive, so reducing FP kit quantities while topping-up from district level must be considered to reduce overstocking in non- or low-consuming facilities. An order-based logistics system or supply according to FP activities could also be considered for these items.

Kit Content and Quantities

The kit introduction was accompanied by an increase in EMHS funding per patient. The increased funding has resulted in improved product availability; however, vital EMHS are still not available at all times. To remedy that situation, it will be necessary to adjust content and quantities in the kit by giving priority to EMHS classified as vital, while decreasing EMHS classified as essential and necessary. Annexes 4 and 5 illustrate how the content of the kits should be revised based on a VEN classification. We suggest adding vital items according to EMLU 2011 and Essential Health Supplies List for Uganda 2011or increasing the quantities of the EMHS items in green in annexes 4 and 5. In addition to these EMHS, items reported missing by facility staff could be added to the kit, including doxycycline,

ibuprofen[11], and erythromycin tablets in the HC II kit and ibuprofen in the HC III kit. The EMLU is being updated, and health supplies and laboratory commodities lists are being developed, including VEN classification. When these lists are updated, the tables in annexes 4 and 5 will need to be changed accordingly.

In the current kit, almost half the items are not vital, and quantities of some vital items are too low (annexes 6 through 9). Eliminating the items not suitable for the facility level or deleting necessary items (red-colored items in annexes 4 and 5) would make it possible to save 254,000 UGX and 410,500 UGX for HC II and HC III, respectively. The savings could be used to increase quantities of vital items, thereby increasing their availability. Moreover, quantities of oversupplied items should be reduced, leading to additional funds available to provide vital items in sufficient quantities.

Deliveries

NMS has committed to deliver the kits to the districts before the end-delivery date listed in its delivery schedule. The survey shows that timeliness has improved and 90% of deliveries were on time for the third kit delivery, indicating that the kit system has made it easier for NMS to meet deadlines. NMS no longer has to wait for facility orders, which were often delayed, and with a high percentage of facilities in Uganda now receiving kits; the packing process is much easier.

In addition, the introduction of third-party distributors has made the delivery process more efficient by cutting down on lead time and facilitating district-to-facility delivery. This will further contribute to ensuring the availability of EMHS.

The study found that delivery frequency was not always bimonthly, resulting in some facilities receiving supplies almost monthly and others less than bimonthly. The current version of the delivery schedule includes six cycles that should ideally cover a one-year period. However, a closer look reveals that according to delivery zone, the schedule covers only nine and a half months, clearly indicating that it is not bimonthly as expected. Because the kit quantities are based on bimonthly consumption, deliveries need to match this schedule. The budget includes six kit deliveries per year, so hopefully the more frequent deliveries during the current NMS delivery schedule will not result in a lower frequency in the coming delivery schedule.

The study shows that inconsistency in delivered quantities of individual products in each kit is common. Especially in the case of ACTs, but also other EMHS, there were differences in the number of packs delivered in each cycle. Furthermore, all facilities do not receive the same quantities within the same cycle, and some EMHS listed as parts of the kits were never supplied. Possible reasons could be packing mistakes, rationing, or an improvised solution to overstocking in facilities. It is important that supplies are consistent so health workers and patients can believe in the system.

[11] If not classified as “necessary.”

CONCLUSION AND RECOMMENDATIONS

The kit or push-based supply system was introduced in Uganda at the primary health care level to better ensure that facilities receive supplies bimonthly and to improve EMHS availability in a setting with weak stock management and poor quantification skills,. The kit system has resulted in increased funding for and availability of EMHS. However, a kit-based supply system is never a good fit for all, and several items have been oversupplied, while some vital EMHS have been supplied in insufficient quantities.

To optimize the appropriateness of the kit, ensure continuous availability of vital EMHS, and minimize waste, we recommend developing a redistribution plan and changing content and quantities of the two kits. The following recommendations provide detail on how to improve the appropriateness of the kit system—

- A redistribution plan is necessary to reduce waste. The district health teams must take the lead to identify overstocked products and collect them from all the HC IIs and IIIs based on MOH directives. HC IVs and hospitals with high consumption of items could receive the oversupplied items. If districts to not have facilities with high consumption, NMS delivery trucks can transport the products back to NMS stores for national redistribution. A redistribution system and practices need to be developed and implemented as soon as possible.

- Kit content and quantities must be changed to reduce over- and undersupply. The current kit contains several items classified as necessary that could be removed to increase funding for procurement of vital items and possibly essential items. This would avail lifesaving items to facilities, thereby reducing morbidity. Annexes 4 and 5 contain VEN classification of items, and annexes 6 through 9 show supply imbalances, which can be used to adjust content and quantities.

- HC II and HC III health workers should strengthen their capacity in supply chain management and quantification by applying the approach developed by the MOH in collaboration with the SURE program. If Uganda is to revert to an order-based system—which is presumably a better way of ensuring optimal use of limited resources than a kit system—then building the staff's ability to manage and order supplies is critical. In addition, as the staff's skills in supply chain management improve, the system must be flexible enough to allow HC II and III facilities to order their EMHS rather than receive EMHS in kits.

- Needed quantities of FP and malaria items vary greatly between facilities. Reducing quantities of these items in the kit may make top-up possible for facilities with high prevalence of malaria or many FP activities. If these items continue to be part of the kits, they should be closely monitored by the district health team to assure optimal redistribution. HMIS reports could be used to determine top-up quantities for the facilities that need more malaria and FP products.

- To better consider patient load in kit distribution, some facilities with high patient loads could receive more than one kit as needed.

ANNEX 1. DATA COLLECTION TOOL FOR HC II

KIT ASSESSMENT FOR HEALTH CENTER II

1. FACLITY AND SUPERVISOR/SUPERVISEE DATA

Name of facility: _____ Name of supervisor: _____
Name of district: _____ Name of supervisor: _____
Name of HSD: _____ Name of supervisor: _____

Record names and contacts of facility staff

Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____

2. ASSESSING STAFF CAPABILITY TO CALCULATE QUANTITIES TO ORDER

2.1 Staff training
a. Total number of staff working with ordering/stock management: _____
b. Total number of staff trained with ordering/stock management (including calculating average monthly consumption - AMC): _____

2.2 Calculation of quantity to order (before kit system)
a. Ask the supervisee how s/he used to decide the amount to order (before receiving the kit) and mark with 1 when mentioned.

No.	Responses	1/0
1	Based on stock card data	
2	Based on AMC	
3	Based on stock on hand	
4	Based on the amount of money available	
5	Based on experience	
6	Patient data (patient register)	
7	Dispensing log	
8	Others, specify	

b. Select a stock card (e.g., cotrimoxazole tabs) and check whether the person knows how to determine the quantity to order. Let the person show you how to calculate the quantity to order of the selected drug. **If the staff doesn't use stock cards to calculate quantities to order, tick 'staff doesn't use stock cards to calculate quantities' and go to next question.**

Annex 1.Data Collection Tool for HCII

Record: stock on hand = ...……...…; AMC =….....….;

Maximum quantity (AMC × 5) =…….....…

Quantity to order = Maximum stock (AMC × 5) – stock on hand

Calculated/correct quantity to order: _____ Quantity to order according to staff: _____

Does the calculated/correct quantity agree with the quantity to order according to staff?
Yes □ No□ Staff doesn't use stock cards to calculate quantities□

3. STAFF VIEW ON KIT SYSTEM

a. What is the procedure for receiving the kit?
I order the kit on the NMS order □
I don't do anything, the kit arrives automatically □

At your facility:

b. In general, has the kit system increased the range of medicine available? Yes □ No□
c. In general, does the content meet your needs? Yes □ No□
d. In general, do the quantities meet your needs? Yes □ No□
e. In general, is the content of the kit constant? Yes □ No□
f. In general, are the quantities of item in the kit constant? Yes □ No□
g. Which items, if any, are missing from the kit?

_____
_____
_____
_____
_____

h. Which items, if any, are supplied in too high quantities?

_____
_____
_____
_____

i. Which items, if any, are supplied in too low quantities?

_____
_____
_____
_____

j. Which items, if any, in the kit don't you need?

_____
_____
_____
_____

k. What is the biggest change in the medicine situation now compared to before the introduction of the kit system?

_____
_____
_____
_____
_____

l. Do you prefer the pull or push system? Pull □ Push□
Why?

_____
_____
_____
_____
_____

4. ASSESSMENT OF KIT CONTENT AND STOCK MANAGEMENT CAPABILITY

4.1 Patient data

a. What is the catchment population for this facility? _____

In case a new projection is not available, use a 3.5% growth rate to project from the current population; ex. 2007 catchment population is 2000, then the current will be 2210 (3.5% of 2000 is 70, so growth for 3 years is 210; 2000 + 210 = 2210)

Projected catchment population is: _____

b. Ask to see the HMIS 105 reports from January 2010 to present. Record the total number of OPD cases and malaria incidents per month.

January:	OPD cases _____	Malaria incidents _____
February:	OPD cases _____	Malaria incidents _____
March:	OPD cases _____	Malaria incidents _____
April:	OPD cases _____	Malaria incidents _____
May:	OPD cases _____	Malaria incidents _____
June:	OPD cases _____	Malaria incidents _____
July:	OPD cases _____	Malaria incidents _____
August:	OPD cases _____	Malaria incidents _____
September:	OPD cases _____	Malaria incidents _____
October:	OPD cases _____	Malaria incidents _____
November:	OPD cases _____	Malaria incidents _____

5. RATIONAL MEDICINE USE

5.1 Rational prescribing

Antibiotics does not include antihelminthics, TB, antifungal, or antiamoebic medicines, but should include penicillins and tetracycline eye ointments. Examples of brand names: Amoxil, Cotrim, Camtrim

Randomly select 20 prescriptions from 3 months before and from 3 months after introduction of the kit system. **The kit system was introduced in June/July 2010.** When there are two OPD books—one for below age 5 and one for above age 5—10 prescriptions from above and 10 prescriptions from below age 5 years should be sampled. Record information in table below.

	Number of medicines		**Number of antibiotics**		**Number of injections**	
No.	**Before kit introduction**	**After kit introduction**	**Before kit introduction**	**After kit introduction**	**Before kit introduction**	**After kit introduction**
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
Total						
Avg.	(Total/20)	(Total/20)	No. of encounters	No. of encounters	No. of encounters	No. of encounters
%			% of drugs	% of drugs	% of drugs	% of drugs

6. KIT DELIVERY DATES

a. Record the dates for kit deliveries. Use **delivery notes** to obtain data.

Kit #1 delivery date (day/month/year): _____

Kit #2 delivery date (day/month/year): _____

Kit #3 delivery date (day/month/year): _____

Kit #4 delivery date (day/month/year): _____

(use the 3 most recent deliveries to fill in the table under 7)

7. STOCK ASSESSMENT AND STOCK MANAGEMENT CAPACITY

Fill in the table below, which includes all the items available in the HC II kit.

Instructions:

Column A	The kit's contents are already listed. **If additional items are supplied, add them at the end of the table.**
Column B	Write unit. Example: 1000 for items with tins of 1000.
Column C	Record the shortest expiry date (month/year). Check the expiry dates when you do the **physical count**.
Column D	Conduct a **physical count** of useable items and record the available quantity.
Column E	Record if **stock card** for the item is available; 1 = yes and 0 = no
Column F	Record if **stock card** header is filled in correctly; header is correctly filled in if all spaces are filled; 1 = yes, 0 = no
Column G	Stock balance on day of visit according to **stock card**.
Column H	Quantities issued out from January 1–March 31, 2010, according to **stock card**.
Column I	Stock out days from January 1–March 31, 2010, according to **stock card**.
Column J	Quantities issued out in the past 3 months from today's date according to **stock card**.
Column K	Stock-out days in the last 3 months from today's date according to **stock card**.
Columns L, M, N	Quantities received in kits #1, #2, and #3 according to **stock card**.

No.	Item description/ name/form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Acetylsalicylic acid 300 mg													
2	Albendazole 400 mg													
3	Amoxicillin 250 mg													
4	Calamine lotion 100 mL													
5	Chloramphenicol 0.5% eye drops													
6	Chloramphenicol 5% ear drops													
7	Chlorhexidine gluconate 20%													
8	Chlorphenamine maleate 4 mg													
9	Clotrimazole 1% topical cream													
10	Cotrimoxazole 100 + 20 mg scored													
11	Cotrimoxazole 400 + 80 mg scored													
12	Ferrous sulfate (65 mg iron) + folic acid 0.25-0													
13	Folic acid 5 mg													
14	Gentamicin 0.30% eye/ear drop													
15	Hypochlorite (JIK) (calcium or sodium) 5% 750 mL													
16	Magnesium trisilicate comp 250 + 120 mg													
17	Mebendazole 100 mg tab													
18	Metronidazole tablets 200 mg													
19	Multivitamin (bpc 73)													
20	ORS for 1 L													
21	Paracetamol 500 mg													
22	Gentamycin 80 mg/2 mL inj IV/IM													
23	Penicillin. Benzyl 1 mu/600 mg inj IM													
24	Polyvidone-iodine 10% solution, bottle 200 mL													
25	Promethazine HCl 25 mg, film coated													
26	SP 500 mg + 25 mg													
27	Tetracycline 1% eye ointment													
28	Vitamin A (retinol) 200.000 IU, drops													

No.	Item description/ name/form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
29	Vitamin B complex (bpc 73) tab													
30	Water for injection 10 mL													
31	Condoms male generic, bulk foiled													
32	Ethinylestradiol 0.03 + levonorgestrel 0.15 mg tab (Microgynon)													
33	Levonorgestrel 750 micrograms tab (emergency contraceptive)													
34	Medroxyprogesterone w/syringe (Depo-Provera)													
35	Norgestrel 0.075 mg tab (ovrette/microlut)													
36	Artemether-lumefantrine (> 35 kg)													
37	Artemether-lumefantrine (25-35 kg)													
38	Artemether-lumefantrine (15-25 kg)													
39	Artemether-lumefantrine (5-15 kg)													
40	Rapid diagnostic tests													
41	Ad syringes 2 mL + needle disp. detached													
42	Ad syringes 5 mL+ needle disp. detached													
43	Bandage cotton w.o.w. hydrophilic, 75 mm x 4 m													
44	Blades scalpel size 23													
45	Dispensing envelopes plastic 75 x 110 mm													
46	Gauze w.o.w hydrophilic 90 cm x 50 m													
47	Gloves examination latex (or vinyl), medium													
48	Gloves surgeon 7½													
49	Outpatients register HMIS 031, 200 pages													
50	Medical form V													
51	Plaster adhesive zinc oxide, 75 mm x 5 m													
52	Requisition and issue voucher book mf124													
53	Safe delivery (mama) kit													

KIT ASSESSMENT SURVEY – DECEMBER 2010 FACILITY NAME_____

No.	Item description/ name/form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
54	Safety box for syringes & needle disposal													
55	Sheeting mcintosh red rubber, 20 m roll, 90 cm wide													
56	Stock card													
57	Syringe disp. hypodermic luer 5 mL													
58	Wool cotton b.p. 500 g													
59	Wound plaster adhesive (first aid) 6 cm x 5 m													
	List any additional items found in kit below													

Comments on table:

ANNEX 2. DATA COLLECTION TOOL FOR HC III

KIT ASSESSMENT FOR HEALTH CENTER III

1. FACLITY AND SUPERVISOR/SUPERVISEE DATA

Name of facility: _____ Names of supervisor: _____
Name of district: _____ Names of supervisor: _____
Name of HSD: _____ Names of supervisor: _____

Record names and contacts of facility staff.

Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____

2. ASSESSING STAFF CAPABILITY TO CALCULATE QUANTITIES TO ORDER

2.1 Staff training
a. Total number of staff working with ordering/stock management: _____
b. Total number of staff trained with ordering/stock management (including calculating average monthly consumption - AMC): _____

2.2 Calculation of quantity to order (before kit system)
a. Ask the supervisee how s/he used to decide the amount to order (before receiving the kit) and mark with 1 when mentioned.

No.	Responses	1/0
1	Based on stock card data	
2	Based on AMC	
3	Based on Stock on Hand	
4	Based on the amount of money available	
5	Based on experience	
6	Patient data (patient register)	
7	Dispensing log	
8	Others, specify	

b. Select a stock card (e.g. cotrimoxazole tabs) and check whether the person knows how to determine the quantity to order. Let the person show you how to calculate the quantity to order of the selected drug. **If the staff doesn't use stock cards to calculate quantities to order, tick 'staff doesn't use stock cards to calculate quantities' and go to next question.**

Annex 2. Data Collection Tool for HC III

Record: Stock on hand = ...…….....…; AMC =….....….;

Maximum quantity (AMC ×5) =…….....…

Quantity to order = Maximum stock (AMC ×5) – Stock on hand.

Calculated/correct quantity to order: _____ Quantity to order according to staff: _____

Does the calculated/correct quantity agree with the quantity to order according to staff?
Yes □ No□ Staff doesn't use stock cards to calculate quantities□

3. STAFF VIEW ON KIT SYSTEM

a. What is the procedure for receiving the kit?
I order the kit on the NMS order □
I don't do anything, the kit arrives automatically □

At your facility:

b. In general, has the kit system increased the range of medicine available? Yes □ No□
c. In general, does the content meet your needs? Yes □ No□
d. In general, do the quantities meet your needs? Yes □ No□
e. In general, is the content of the kit constant? Yes □ No□
f. In general, are the quantities of items in the kit constant? Yes □ No□
g. Which items, if any, are missing in the kit?

_____
_____
_____
_____
_____

h. Which items, if any, are supplied in too high quantities?

_____
_____
_____
_____

i. Which items, if any, are supplied in too low quantities?

_____
_____
_____
_____

j. Which items, if any, in the kit don't you need?

_____
_____
_____
_____

k. What is the biggest change in the medicine situation now compared to before the introduction of the kit system?

_____
_____
_____
_____
_____

l. Do you prefer the pull or push system? Pull □ Push□
Why?

_____
_____
_____
_____
_____

4. ASSESSMENT OF KIT CONTENT AND STOCK MANAGEMENT CAPABILITY

4.2 Patient data

a. What is the catchment population for this facility? _____

In case a new projection is not available use a 3.5% growth rate to project from the current population; ex. 2007 catchment population is 2000, then the current will be 2210 (3.5% of 2000 is 70, so growth for 3 years is 210; 2000 + 210 = 2210)

Projected catchment population is: _____

b. Ask to see the HMIS 105 reports from January 2010 to present. Record the total number of OPD cases and malaria incidents per month.

January:	OPD cases _____	Malaria incidents _____
February:	OPD cases _____	Malaria incidents _____
March:	OPD cases _____	Malaria incidents _____
April:	OPD cases _____	Malaria incidents _____
May:	OPD cases _____	Malaria incidents _____
June:	OPD cases _____	Malaria incidents _____
July:	OPD cases _____	Malaria incidents _____
August:	OPD cases _____	Malaria incidents _____
September:	OPD cases _____	Malaria incidents _____
October:	OPD cases _____	Malaria incidents _____
November:	OPD cases _____	Malaria incidents _____

5. RATIONAL MEDICINE USE

5.1 Rational prescribing

Antibiotics does not include antihelminthics, TB, antifungal, or antiamoebic medicines, but should include penicillins and tetracycline eye ointments. Examples of brand names: Amoxil, Cotrim, Camtrim

Randomly select 20 prescriptions from 3 months before and from 3 months after introduction of the kit system. **The kit system was introduced in June/July 2010.** When the OPD book is divided into two books—one for below age 5 years and one for above age 5—10 prescriptions from above and 10 prescriptions from below age 5 years should be sampled. Record information in table below.

	Number of medicines		**Number of antibiotics**		**Number of injections**	
No.	**Before kit introduction**	**After kit introduction**	**Before kit introduction**	**After kit introduction**	**Before kit introduction**	**After kit introduction**
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
Total						
Avg.	(Total/20)	(Total/20)	No. of encounters	No. of encounters	No. of encounters	No. of encounters
%			% of drugs	% of drugs	% of drugs	% of drugs

6. KIT DELIVERY DATES

b. Record the dates for kit deliveries. Use **delivery notes** to get the data.

Kit #1 delivery date (day/month/year): _____

Kit #2 delivery date (day/month/year): _____

Kit #3 delivery date (day/month/year): _____

Kit #4 delivery date (day/month/year): _____

(use the 3 most recent deliveries to fill the table under 7

7. STOCK ASSESSMENT AND STOCK MANAGEMENT CAPACITY

Fill the table below, which includes all the items available in the kit for HC III.

Instructions:

Column A	The kit's contents are already listed. **If additional items supplied, add them at the end of the table.**
Column B	Write unit. Example: 1000 for items with tins of 1000.
Column C	Record the shortest expiry date (month/year). Check the expiry dates when you do the **physical count**.
Column D	Conduct a **physical count** of useable items and record the available quantity.
Column E	Record if **stock card** for the item is available; 1 = yes and 0 = no
Column F	Record if **stock card** header is filled correctly; header is correctly filled in if all spaces are filled; 1 = yes, 0 = no
Column G	Stock balance on day of visit according to **stock card**.
Column H	Quantities issued out from January 1–March 31, 2010, according to **stock card**.
Column I	Stock out days from January 1–March 31, 2010, according to **stock card**.
Column J	Quantities issued out in the past 3 months from today's date according to **stock card**.
Column K	Stock out days in the last 3 months from today's date according to **stock card**.
Columns L, M, N	Quantities received in kits #1, #2, and #3 according to **stock card**.

No.	Item description/name/ form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock-out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in the last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Acetylsalicylic acid 300 mg													
2	Albendazole 400 mg													
3	Aminophylline 250 mg/10 mL inj. slow IV/inf													
4	Amoxicillin 250 mg													
5	Bendrofluazide 5 mg													
6	Benzyl benzoate 25% application													
7	Calamine lotion 100 mL													
8	Calcium lactate 100 mg tabs													
9	Charcoal activated 250 mg													
10	Chloramphenicol 0.5% eye drops													
11	Chloramphenicol 5% ear drops													
12	Chloramphenicol sodium succinate 1 g													
13	Chlorhexidine gluconate 20%													
14	Chlorphenamine maleate 4 mg													
15	Chlorpromazine 25 mg													
16	Chlorpromazine HCl 50 mg/ 2 mL inj deep IM													
17	Ciprofloxacin 500 mg													
18	Clotrimazole 1% topical cream													
19	Cotrimoxazole 100 + 20 mg scored													
20	Cotrimoxazole 400 + 80 mg scored													
21	Sodium(ringers) lactate comp. infusion													
22	Dexamethasone 4 mg/1 mL amp													
23	Diclofenac sodium 50 mg enteric coated													

No.	Item description/name/ form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock-out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in the last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
24	Doxycycline HCl 100 mg													
25	Epinephrine (adrenaline) 1 mg/mL inj IV/IM/SC													
26	Erythromycin stearate 250 mg													
27	Ferrous sulfate (65 mg iron) + folic acid 0.25-0													
28	Folic acid 5 mg													
29	Gentamycin 0.30% eye/ear drop													
30	Glucose 50% injection 100 mL													
31	Glucose/dextrose 5% infusion 500 mL													
32	Griseofulvin 500 mg													
33	Hydrocortisone sodium succin. 100 mg inj IV/IM													
34	Hypochlorite (JIK) (calcium or sodium) 5% 750 mL													
35	Ketoconazole 200 mg													
36	Lidocaine HCl 2% injection													
37	Magnesium sulfate 50% inj.													
38	Magnesium trisilicate comp 250 + 120 mg													
39	Mebendazole 100 mg tab													
40	Methylergometrine maleate 0.2 mg/1 mL inj IM/IV slow													
41	Metronidazole tablets 200 mg													
42	Multivitamin (bpc 73)													
43	ORS for 1 L													
44	Paracetamol 500 mg													
45	Gentamycin 80 mg/2 mL inj IV/IM													
46	Penicillin, benzathine benzyl 2.4 mu/1.44 g													

No.	Item description/name/ form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock-out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in the last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
47	Penicillin, procaine 3 mu + benzyl 1 mu													
48	Penicillin. Benzyl 1 mu/600 mg inj (pfr) IM													
49	Phenobarbital 30 mg													
50	Phenytoin sodium 100 mg, scored													
51	Polyvidone-iodine 10% solution, bottle 200 mL													
52	Promethazine HCl 25 mg, film coated													
53	SP 500 mg + 25 mg													
54	Quinine di-HCl 600 mg/2 mL inj IV//deep IM													
55	Salbutamol 4 mg													
56	Silver nitrate pencil 0.4%													
57	Silver sulfadiazine 1% cream 15-20 g tube													
58	Sodium chloride/normal saline 0.9% infusion													
59	Tetracycline 1% eye ointment													
60	Vitamin A (retinol) 200.000 IU, drops													
61	Vitamin B complex (bpc 73) tab													
62	Water for injection 10 mL													
63	Condoms male generic, bulk foiled													
64	Ethinylestradiol 0.03 + levonorgestrel 0.15 mg tab (Microgynon)													
65	Etonogestrel 68 mg implant (implanon)													
66	IUD-copper containing device													
67	Levonorgestrel 75 mg, implantable (Jadelle)													

No.	Item description/name/ form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock-out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in the last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
68	Levonorgestrel 750 microgram tab (emergency contraceptive)													
69	Medroxyprogesterone w/syringe (Depo-Provera)													
70	Norgestrel 0.075 mg tab (ovrette/microlut)													
71	Trocar for Norplant non-sterile 10 gauge x 2.75"													
72	Artemether-lumefantrine (> 35 kg)													
73	Artemether-lumefantrine (25-35 kg)													
74	Artemether-lumefantrine (15-25 kg)													
75	Artemether-lumefantrine (5-15 kg))													
76	Rapid diagnostic tests													
77	Ad syringes 10 mL + needle disp. detached													
78	Ad syringes 2 mL + needle disp. detached													
79	Ad syringes 5 mL + needle disp. detached													
80	Bandage cotton w.o.w. hydrophilic, 75 mm x 4 m													
81	Bandage crepe 100 mm x 4.5 m stretched													
82	Blades scalpel size 23													
83	Blades scalpel size 24													
84	Cannula IV, with inj. port & stopper 24g, 1.9													
85	Cannula IV 18g with inj. port & stopper, 1.2 mm													
86	Catgut chr.0(m4), 75 cm, n: 45 mm 1/2-c rbody													
87	Catgut chr.1(m5), 75 cm, n: 40 mm tapercut 1/2-c													

No.	Item description/name/ form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock-out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in the last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
88	Catg.chr.2(m6), 75 cm n: 45 mm tapercut 1/2-c heavy													
89	Catheter suction fg 16 od 5.3 mm													
90	Catheter suction fg 6 od 2 mm													
91	Catheter urethral nelaton													
92	Dispensing envelopes plastic 75 x 110 mm													
93	Gauze w.o.w hydrophilic 90 cm x 50 m													
94	Gloves examination latex (or vinyl), medium													
95	Gloves surgeon 7 ½													
96	Gloves surgeon 8													
97	Needle infusion butterfly, 19g													
98	Needle infusion butterfly, 25g													
99	Nylon blue monofil. 0(m3.5),1 m, n: 40 mm rev. Cutt.													
100	Out patients register HMIS 031, 200 pages													
101	Medical form V													
102	Plaster adhesive zinc oxide, 75 mm x 5 m													
103	Requisition and issue voucher book mf124													
104	Safe delivery (mama) kit													
105	Safety box for syringes & needle disposal													
106	Set infusion adult, 15-20 drops/mL, 120 cm long													
107	Set infusion pediatric, 60 drops/mL													
108	Sheeting mcintosh red rubber, 20 m roll, 90 cm wide													
109	Silk black 0(m3.5), 75 cm, n:													

No.	Item description/name/ form/strength	Unit	Expiry date (month/yr)	Stock balance on day of visit (physical count)	Stock card available (1/0)	Stock card header filled correctly (1/0)	Stock balance on day of visit according to stock card	Quantities issued January to March	Stock-out days January to March	Quantities issued in the last 3 months (from today's date)	Number of stock-out days in the last 3 months (from today's date)	Quantities received from		
												Kit #1	Kit #2	Kit #3
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	30 mm 1/2-c rbody													
110	Silk black 1(m4), 1 m, n: 90 mm 3/8-c cutting													
111	Stock card													
111	Syringe disp. hypodermic luer 5 mL													
113	Wool cotton b.p. 500 g													
114	Wound plaster adhesive (first aid) 6 cm x 5 m													
	List any additional items found in kit below													

Comments on table:

ANNEX 3. DATA COLLECTION TOOL FOR DISTRICT

KIT ASSESSMENT FOR DISTRICT

1. DISTRICT AND SUPERVISOR/SUPERVISEE DATA

Name of district: _____ Name of supervisor: _____
Name of supervisor: _____

Record names, titles and contacts of district staff interviewed.

Name:_____ Title: _____
Contact:_____
Name:_____ Title: _____
Contact:_____

2. DISTRICT VIEW ON KIT SYSTEM

a. In general, has the kit system increased the range of medicine available? Yes □ No□
b. In general, does the content meet your needs? Yes □ No□
c. In general, do the quantities meet your needs? Yes □ No□
d. In general, is the content of the kit constant? Yes □ No□
e. Which items, if any, are missing in the kit?

_____
_____
_____
_____

f. Which items, if any, are supplied in too high quantities?

_____
_____
_____
_____

g. Which items, if any, are supplied in too low quantities?

_____
_____
_____
_____

h. Which items, if any, in the kit don't you need?

_____
_____
_____
_____

i. What is the biggest change in the medicine situation now compared to before the introduction of the kit system?

_____
_____
_____
_____
_____
_____

j. Do you prefer the pull or the push system? Push □ Pull□
Why?

_____
_____
_____
_____

3. DISTRICT POPULATION AND NUMBER OF HEALTH FACILITIES

a. What is the population of the district? _____

b. Average number of malaria cases per month: _____

c. Number of public health facilities in the district

i. HC II _____

ii. HC III _____

iii. HC IV _____

iv. Hospitals _____

d. Number of private/NGO facilities in the district.

i. HC II _____

ii. HC III _____

iii. HC IV _____

iv. Hospitals _____

e. Number of non-functional facilities in the district.

i. HC II _____

ii. HC III _____

iii. HC IV _____

iv. Hospitals _____

4. FINANCIAL KNOWLEDGE

a. Do you know the annual budget for EMHS for

i. HC IIs? Yes □ No□ If yes, how much? _____
ii. HC IIIs? Yes □ No□ If yes, how much? _____

b. Do you know the credit line balance for EMHS for

i. HC IIs? Yes □ No□ If yes, how much?_____
ii. HC IIIs? Yes □ No□ If yes, how much?_____

ANNEX 4. VEN CLASSIFICATION AND LOC ANALYSIS OF HC II KIT

The items marked in green (no. 1–31) are vital items and the LOC is right for the HC II kit. The yellow items (1–6) are essential items with the right LOC. The purple items (1–19) are necessary items or items with the wrong LOC for the HC II kit. Green items should be included in the HC II kit, yellow items can be included if funding allows, and purple items are unsuitable. Items are classified according to the VEN classification and LOC analysis contained in the consultancy draft of EMLU 2007.

No.	VEN	LOC	Items in HC II kit
1	V	I	Mebendazole 100 mg tab
2	V	I	ORS for 1 L
3	V	I	Paracetamol 500 mg
4	V	II	Amoxicillin 250 mg
5	V	II	Chloramphenicol 0.5% eye drops
6	V	II	Cotrimoxazole 400 + 80 mg scored
7	V	II	Folic acid 5 mg
8	V	II	Metronidazole tablets 200 mg
9	V	II	Penicillin. Benzyl 1 mu/600 mg inj (pfr) IM
10	V	II	Tetracycline 1% eye ointment
11	V	II	Water for injection 10 mL
12	V	II	Condoms male generic, bulk foiled
13	V	II	AL (24 tablets)
14	V	II	AL (16 tablets)
15	V	II	AL (12 tablets)
16	V	II	AL (6 tablets)
17	V	II	Ad syringes 2 mL + needle disp. Detached
18	V	II	Ad syringes 5 mL + needle disp. Detached
19	V	II	Dispensing envelopes plastic 75 ×110 mm
20	V	II	Gauze w.o.w hydrophilic 90 cm ×50 m
21	V	II	Gloves examination latex, medium non-sterile
22	V	II	Gloves surgeon 7 ½
23	V	II	Medical form V
24	V	II	Outpatients register HMIS 031, 200 pages
25	V	II	Plaster adhesive zinc oxide, 75 mm ×5 m
26	V	II	Requisition and issue voucher book mf124
27	V	II	Safe delivery (mama) kit
28	V	II	Safety box for syringes and needle disposal
29	V	II	Stock card
30	V	II	Wool cotton b.p. 500 g
31	V	II	Wound plaster adhesive (first aid) 6 cm × 5 m
1	E	I	Albendazole 400 mg
2	E	I	Ferrous sulfate (65 mg iron) + folic acid 0.25-0
3	E	I	Hypochlorite (JIK) (calcium or sodium) 5% 750 mL
4	E	II	Ethinylestradiol 0.03 + levonorgestrel 0.15 mg tab
5	E	II	Bandage cotton w.o.w. hydrophilic, 75 mm × 4 m
6	E	II	Blades scalpel size 23
1	E	III	Polyvidone-iodine 10% solution, bottle 200 mL
2	E	H	Clotrimazole 1% topical cream

3	V	IV	Gentamycin 0.30% eye/ear drop
4	V	IV	Gentamycin 80 mg/2 mL inj IV/IM
5	N	I	Acetylsalicylic acid 300 mg
6	N	I	Calamine lotion 100 mL
7	N	I	Magnesium trisilicate comp 250 + 120 mg
8	N	I	Multivitamin (bpc 73)
9	N	I	SP
10	N	II	Promethazine HCl 25 mg, film coated
11	N	II	Sheeting mcintosh red rubber, 20 m roll, 90 cm wide
12	N	II	Syringe disp. hypodermic luer 5 mL
13	N	IV	Vitamin B complex (bpc 73) tab
14	N	REF	Vitamin A (retinol) 200.000 IU, drops
15			Chloramphenicol 5% ear drops
16			Chlorhexidine gluconate 20%
17			Chlorphenamine maleate 4 mg
18			Norgestrel 0.3 + ethinylestradiol 0.03 mg (lofemenol)
19			Rapid diagnostic tests

ANNEX 5. VEN CLASSIFICATION AND LOC ANALYSIS OF HC III KIT

The items marked in green (1–56) are vital items and the LOC is right for the HC III kit. The yellow items (1–20) are essential items with the right LOC. The purple items (1–39) are necessary or items with the wrong LOC for the HC III kit. Green items should be included in the HC III kit, yellow items can be included if funding allows, and purple items are unsuitable. Items are classified according to the VEN classification and LOC analysis contained in the consultancy draft of EMLU 2007.

No.	VEN	LOC	Items in HC III kit
1	V	I	Mebendazole 100 mg tab
2	V	I	ORS for 1 L
3	V	I	Paracetamol 500 mg
4	V	II	Amoxicillin 250 mg
5	V	II	Chloramphenicol 0.5% eye drops
6	V	II	Ciprofloxacin 500 mg
7	V	II	Cotrimoxazole 400 + 80 mg scored
8	V	II	Doxycycline HCl 100 mg
9	V	II	Epinephrine (adrenaline) 1 mg/mL inj IV/IM/SC
10	V	II	Erythromycin stearate 250 mg
11	V	II	Folic acid 5 mg
12	V	II	Glucose/dextrose 5% infusion 500 mL
13	V	II	Metronidazole tablets 200 mg
14	V	II	Sodium chloride/normal saline 0.9% infusion
15	V	II	Tetracycline 1% eye ointment
16	V	II	Water for injection 10 mL
17	V	II	Condoms male generic, bulk foiled
18	V	II	AL (24 tablets)
19	V	II	AL (16 tablets)
20	V	II	AL (12 tablets)
21	V	II	AL (6 tablets)
22	V	II	Ad syringes 10 mL+ needle disp. detached
23	V	II	Ad syringes 2 mL+ needle disp. detached
24	V	II	Ad syringes 5 mL+ needle disp. detached
25	V	II	Cannula IV, with inj. port and stopper 24g, 1.9
26	V	II	Cannula IV 18g with inj. port and stopper, 1.2 mm
27	V	II	Dispensing envelopes plastic 75 × 110 mm
28	V	II	Gauze w.o.w hydrophilic 90 cm × 50 m
29	V	II	Gloves examination latex (or vinyl), medium
30	V	II	Gloves surgeon 7 ½
31	V	II	Needle infusion butterfly, 25g
32	V	II	Outpatients register HMIS 031, 200 pages
33	V	II	Medical form V
34	V	II	Plaster adhesive zinc oxide, 75 mm × 5 m

No.	VEN	LOC	Items in HC III kit
35	V	II	Requisition and issue voucher book mf124
36	V	II	Safe delivery (mama) kit
37	V	II	Safety box for syringes & needle disposal
38	V	II	Stock card
39	V	II	Wool cotton b.p. 500 g
40	V	II	Wound plaster adhesive (first aid) 6 cm × 5 m
41	V	III	Glucose 50% injection 100 mL
42	V	III	Hydrocortisone sodium succin. 100 mg inj IV/IM
43	V	III	Magnesium sulfate 50% inj.
44	V	III	Penicillin, benzathine benzyl 2.4 mu/1.44 g
45	V	III	Penicillin, procaine 3 mu + benzyl 1 mu
46	V	III	Penicillin. Benzyl 1 mu/600 mg inj (pfr) IM
47	V	III	Quinine di-HCl 600 mg/2 mL inj IV/deep IM
48	V	III	Salbutamol 4 mg
49	V	III	Catgut chr.1(m5), 75 cm, n: 40 mm tapercut 1/2-c
50	V	III	Catg.chr.2(m6), 75 cm n: 45 mm tapercut 1/2-c heavy
51	V	III	Catheter suction fg 16 od 5.3 mm
52	V	III	Catheter suction fg 6 od 2 mm
53	V	III	Catheter urethral nelaton
54	V	III	Nylon blue monofil. 0(m3.5),1 m, n: 40mm rev. Cutt.
55	V	III	Set infusion adult, 15-20 drops/mL, 120 cm long
56	V	III	Set infusion pediatric, 60 drops/mL
1	E	I	Albendazole 400 mg
2	E	I	Ferrous sulfate (65 mg iron) + folic acid 0.25-0
3	E	I	Hypochlorite (JIK) (calcium or sodium) 5% 750 mL
4	E	II	Benzyl benzoate 25% application
5	E	II	Charcoal activated 250 mg
6	E	II	Chlorhexidine gluconate 20%
7	E	II	Ethinylestradiol 0.03 + levonorgestrel 0.15 mg tab
8	E	II	Norgestrel 0.075 mg tab
9	E	II	Bandage cotton w.o.w. hydrophilic, 75 mm × 4 m
10	E	II	Bandage crepe 100 mm × 4.5 m stretched
11	E	II	Blades scalpel size 23
12	E	II	Blades scalpel size 24
13	E	III	Bendrofluazide 5 mg
14	E	III	Phenobarbital 30 mg
15	E	III	Phenytoin sodium 100 mg, scored
16	E	III	Polyvidone-iodine 10% solution, bottle 200 mL
17	E	III	Silver sulfadiazine 1% cream 15-20 g tube
18	E	III	Medroxyprogesterone w/ syringe
19	E	III	Catgut chr.0(m4), 75 cm, n: 45mm 1/2-c rbody
20	E		Methylergometrine maleate 0.2 mg/1 mL inj IM/IV slow
1	V	IV	Aminophylline 250 mg/10 mL inj. slow IV/inf
2	V	IV	Gentamycin 0.30% eye/ear drop

No.	VEN	LOC	Items in HC III kit
3	V	IV	Gentamycin 80 mg/2 mL inj IV/IM
4	V	H	Dexamethasone 4 mg/1 mL amp
5	V		Chlorpromazine 25 mg
6	V		Chlorpromazine HCl 50 mg/2 mL inj deep IM
7	V	IV	Aminophylline 250 mg/10 mL inj. slow IV/inf
8	V	IV	Gentamycin 0.30% eye/ear drop
9	V	IV	Gentamycin 80 mg/2 mL inj IV/IM
10	V	H	Dexamethasone 4 mg/1 mL amp
11	V		Chlorpromazine 25 mg
12	V		Chlorpromazine HCl 50 mg/2 mL inj deep IM
13	E	IV	Sodium(ringers) lactate comp. infusion
14	E	IV	Diclofenac sodium 50 mg enteric coated
15	E	H	Clotrimazole 1% topical cream
16	N	I	Acetylsalicylic acid 300 mg
17	N	I	Calamine lotion 100 mL
18	N	I	Magnesium trisilicate comp 250 + 120 mg
19	N	I	Multivitamin (bpc 73)
20	N	I	SP
21	N	II	Promethazine HCl 25 mg, film coated
22	N	II	Gloves surgeon 8
23	N	II	Needle infusion butterfly, 19g
24	N	II	Sheeting mcintosh red rubber, 20 m roll, 90 cm wide
25	N	II	Syringe disp. hypodermic luer 5 mL
26	N	III	Griseofulvin 500 mg
27	N	III	Ketoconazole 200 mg
28	N	III	Silver nitrate pencil 0.4%
29	N	III	Silk black 0(m3.5), 75cm, n: 30 mm 1/2-c rbody
30	N	III	Silk black 1(m4), 1 m, n: 90 mm 3/8-c cutting
31	N	IV	Vitamin B complex (bpc 73) tab
32	N	REF	Calcium lactate 100 mg tabs
33	N	REF	Vitamin A (retinol) 200.000 IU, drops
34			Chloramphenicol 5% ear drops
35			Chloramphenicol sodium succinate 1 g
36			Chlorphenamine maleate 4 mg
37			Lidocaine HCl 2% injection
38			Levonorgestrel 750 micrograms tab
39			Rapid diagnostic tests

ANNEX 6. SUPPLY IMBALANCES OF MEDICINE ITEMS IN HC IIS

The table includes average number of months of stock (MOS) received including range, supply imbalance group, number of facilities, and number and percent of facilities not consuming. The average MOS received is based on the highest quantity received in case there was a difference between delivered quantities. For some items, there was not enough data to calculate MOS received.

Medicine delivered to HC II	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	No. of facilities	Facilities with no consumption (%)
Amoxicillin 400 mg	1	0/2	Undersupply	0	15	0
Metronidazole tablets 200 mg	1	1/2		0	15	0
AL 15-25 kg	1	0/3		0	12	0
Cotrimoxazole 120 mg	1	0/3		0	14	0
Cotrimoxazole 480 mg	1	0/3		0	15	0
Vitamin B complex tab	1	0/2		1	11	9
Chloramphenicol 0.5% eye drops	2	1/5	Adequate	0	14	0
AL 25-35 kg	2	0/15		0	14	0
Magnesium trisilicate comp 370 mg	2	1/6		0	15	0
AL > 35 kg	2	1/4		0	15	0
Clotrimazole 1% topical cream	2	0/8		1	14	7
Ferrous sulfate (65 mg iron) + folic acid 0.25-0	2	0/3		1	14	7
Promethazine HCl 25 mg, film coated	2	1/3		2	7	29
SP	2	1/3		6	15	40
Tetracycline 1% eye ointment	2	1/6		0	14	0
Gentamicin 0.30% eye/ear drop	2	1/4		1	14	7
Paracetamol 500 mg	2	1/4		0	15	0
Chlorphenamine maleate 4 mg	2	1/6		0	15	0
Penicillin benzyl 1 mu/600 mg inj/IM	3	0/9	Oversupply	1	14	7

Medicine delivered to HC II	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	No. of facilities	Facilities with no consumption (%)
Gentamycin 80 mg/2 mL inj IV/IM	3	0/12		1	16	6
Folic acid 5 mg	3	1/10		1	13	8
Multivitamin tablets	4	1/6		0	14	0
Albendazole 400 mg	3	0/6		1	13	8
Chlorhexidine gluconate 20%	3	1/6		1	7	14
Mebendazole 100 mg	4	1/9		0	12	0
Emergency contraceptives	3	1/6		2	5	40
Vitamin A 200.000 IU, drops	3	0/5		7	9	78
Water for injection	10	2/30	Severe oversupply	0	13	0
Chloramphenicol 5% ear drops	7	1/30		1	12	8
AL < 15 kg	5	1/15		0	14	0
ORS for 1 L	13	1/31	Extreme oversupply	1	14	7
Microgynon	NA	NA		3	4	75

ANNEX 7. SUPPLY IMBALANCES OF COMMODITIES IN HC IIS

The table includes average MOS received including range, supply imbalance group, number of facilities, and number and percent of facilities not consuming. The average MOS received is based on the highest quantity received in case there was a difference between delivered quantities. For some items, there was not enough data to calculate MOS received.

Health supplies and other items delivered to HC II	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	No. of facilities	Facilities with no consumption (%)
Ad syringes 2 mL+ needle disp. detached	1	0/3	Undersupply	2	10	20
Dispensing envelopes plastic 75 × 110 mm	1	0/2		0	6	0
Gauze w.o.w hydrophilic 90 cm x 50 m	2	1/6	Adequate	2	9	22
Condoms male generic, bulk foiled	3	0/10	Oversupply	1	5	20
Ad syringes 5 mL needle disp. detached	3	1/9		1	10	10
Wool cotton b.p. 500 g	3	0/5		0	11	0
Hypochlorite (JIK) (calcium or sodium) 5% 750 mL	4	2/8		1	5	20
Wound plaster adhesive (first aid) 6 cm × 5 m	4	1/6		1	4	25
Bandage cotton w.o.w. hydrophilic, 75 mm × 4 m	6	4/8	Severe oversupply	2	4	50
Gloves examination latex (or vinyl), medium	6	1/15		1	8	13
Gloves surgeon 7 ½	5	2/12		1	7	14
Plaster adhesive zinc oxide, 75 mm x 5 m	6	0/12		0	6	0
Safety box for syringes & needle disposal	30	13/75	Extreme oversupply	3	7	43
Sheeting mcintosh red rubber, 20 m roll, 90 cm wide	NA	NA		3	4	75
Outpatients register HMIS 031, 200 pages	NA	NA		0	2	0
Syringe disp. hypodermic luer 5 mL	NA	NA		2	2	100
Stock card	NA	NA		1	1	100

ANNEX 8. SUPPLY IMBALANCES OF MEDICINE IN HC IIIS

The table includes average MOS received including range, supply imbalance group, number of facilities, and number and percent of facilities not consuming. The average MOS received is based on the highest quantity received in case there was a difference between delivered quantities. For some items, there was not enough data to calculate MOS received.

Medicine delivered to HC III	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	Number of facilities	Facilities with no consumption (%)
AL 15-25 kg	1	0/4	Undersupply	0	17	0
Chlorphenamine maleate 4 mg	1	1/3		2	16	13
Griseofulvin 500 mg	1	0/3		3	15	20
Folic acid 5 mg	1	0/3		5	14	36
Charcoal activated 250 mg	1	0/3		5	13	38
Clotrimazole 1% topical cream	1	0/5		1	16	6
Vitamin B complex tab	1	0/2		0	15	0
Ciprofloxacin 25 mg	1	0/3		0	17	0
Doxycycline HCl 100 mg	1	0/2		0	17	0
Cotrimoxazole 480 mg	1	0/5		0	14	0
Amoxicillin 400 mg	1	0/4		0	18	0
Paracetamol 500 mg	1	0/4		0	17	0
Erythromycin stearate 250 mg	1	0/8		1	17	6
Magnesium trisilicate comp 370 mg	2	0/12	Adequate	0	17	0
AL > 35 kg	2	0/6		0	18	0
Penicillin, benzathine benzyl 2.4 mu/1.44 g	2	0/6		2	16	13
Albendazole 400 mg	2	0/6		2	18	11
Quinine 300 mg tablets	2	0/8		0	12	0
Cotrimoxazole 120 mg	2	0/5		0	14	0

Medicine delivered to HC III	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	Number of facilities	Facilities with no consumption (%)
Metronidazole tablets 200 mg	2	0/15		0	17	0
AL 25-35 kg	2	0/5		0	17	0
Penicillin, procaine 3 mu + benzyl 1 mu	2	0/12		0	16	0
Quinine di-HCl 600 mg/2 mL inj IV/deep IM	2	1/12		0	17	0
Salbutamol 4 mg	2	0/3		4	15	27
Chlorpromazine 25 mg	2	0/3		6	9	67
Silver nitrate pencil 0.4%	2	2/3		5	10	50
Bendrofluazide 5 mg	3	2/3		4	6	67
Phenobarbital 30 mg	3	1/5		7	14	50
Benzyl benzoate 25% application	4	0/12		2	15	13
Sodium (ringers) lactate comp. inf	4	1/7		2	11	18
Chloramphenicol 0.5% eye drops	4	1/12		2	15	13
Chloramphenicol sodium succinate 1 g	4	1/10		4	14	29
Gentamycin 80 mg/2 mL inj IV/IM	4	1/10		4	18	22
Cotrimoxazole 960 mg	4	1/4		0	5	0
Mebendazole 100 mg	3	1/9	Oversupply	0	16	0
Tetracycline 1% eye ointment	3	0/19		0	15	0
Penicillin benzyl 1 mu/600 mg inj/IM	3	1/8		0	17	0
ORS for 1 L	4	0/15		1	14	7
SP	4	1/30		0	15	0
Ferrous sulfate (65 mg iron) + folic acid 0.25-0	4	1/40		0	15	0
Chlorhexidine gluconate 20%	3	0/6		2	10	20
Calcium lactate 100 mg tabs	3	0/15		4	15	27
Multivitamin tablets	3	1/12		2	15	13
AL < 15 kg	3	1/5		0	16	0

Medicine delivered to HC III	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	Number of facilities	Facilities with no consumption (%)
Vitamin A 200.000 IU, drops	6	0/26	Severe oversupply	3	8	38
Sodium chloride/normal saline 0.9% inf	5	0/18		2	14	14
Chloramphenicol 5% ear drops	6	0/23		3	12	25
Glucose/dextrose 5% inf 500 mL	5	1/14		2	14	14
Silver sulfadiazine 1% cream 15/20 g tube	6	0/25		0	5	0
Calamine lotion 100 mL	7	2/7		0	4	0
Promethazine HCl 25 mg, film coated	6	0/10		3	6	50
Gentamicin 0.30% eye/ear drop	5	1/30		1	14	7
Glucose 50% injection 100 mL	11	2/30		2	10	20
Aminophylline 250 mg/10 ml inj slow IV/inf	6	0		4	14	29
Medroxyprogesterone w/syringe (Depo Provera)	7	2/24		2	12	17
Hydrocortisone sodium succin. 100 mg inj IV/IM	6	2/15		4	16	25
Water for injection	6	0/15		0	13	0
Ethinylestradiol 0.03 + levonorgestrel 0.15 mg tab (Microgynon)	15	0/30	Extreme oversupply	3	5	60
Lidocaine HCl 2% injection	13	1/90		1	15	7
Levonorgestrel 750 micrograms tab (emergency contraceptives)	29	12/60		2	5	40
Methylergometrine maleate 0.2 mg/1 mL inj IM/IV slow	39	2/137		2	16	13
Dexamethasone 4 mg/1 mL amp	20	4/60		4	13	31
Magnesium sulfate 50% inj	NA	NA		9	9	100

ANNEX 9. SUPPLY IMBALANCES OF COMMODITIES IN HC IIIS

The table includes average MOS received including range, supply imbalance group, number of facilities, and number and percent of facilities not consuming. The average MOS received is based on the highest quantity received in case there was a difference between delivered quantities. For some items, there was not enough data to calculate MOS received.

Health supplies and other items delivered to HC III	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	No. of facilities	Facilities with no consumption (%)
Ad syringes 5 mL+ needle disp. detached	2	0/5	Adequate	0	14	0
Ad syringes 10 mL+ needle disp. detached	2	0/8		1	11	9
Set infusion adult, 15-20 drops/mL, 120 cm long	2	0/5		4	10	40
Outpatients register HMIS 031, 200 pages	2	1/3		2	10	20
Gloves examination latex (or vinyl), medium	2	1/8		1	10	10
Ad syringes 2 mL+ needle disp. detached	2	1/6		0	14	0
Bandage crepe 100 mm × 4.5 m stretched	4	3/6	Oversupply	3	5	60
Gauze w.o.w hydrophilic 90 cm × 50 m	3	2/6		3	13	23
Gloves surgeon 8	3	3/4		1	4	25
Plaster adhesive zinc oxide, 75 mm × 5 m	3	1/12		2	11	18
Dispensing envelopes plastic 75 × 110 mm	3	0/18		1	14	7
Condoms male generic, bulk foiled	6	0/15	Severe oversupply	2	6	33
Cannula IV with inj. port and stopper 24g, 1.9	11	0/30		2	9	22
Catg.chr.2(m6), 75 cm n: 45 mm tapercut 1/2-c heavy	11	6/15		2	4	50
Gloves surgeon 7 ½	6	2/12		2	11	18
Safety box for syringes and needle disposal	6	1/15		3	8	38
Cannula IV 18g with inj. port and stopper, 1.2 mm	9	0/25		1	7	14
Safe delivery (mama) kit	8	0/30		0	15	0

Health supplies and other items delivered to HC III	Avg. MOS recd.	Min./max. MOS recd.	Supply imbalance	No. of facilities not consuming	No. of facilities	Facilities with no consumption (%)
Wool cotton b.p. 500 g	5	1/15		0	12	0
Hypochlorite (JIK) (calcium or sodium) 5% 750 mL	6	2/15		0	8	0
Stock card	5	3/6		0	4	0
Blades scalpel size 23	76	0/150	Extreme oversupply	1	5	20
Silk black 0(m3.5), 75 cm, n: 30 mm 1/2-c rbody	41	6/75		2	4	50
Bandage cotton w.o.w. hydrophilic, 75 mm × 4 m	NA	NA		4	4	100
Catgut chr.1(m5), 75 cm, n: 40 mm tapercut 1/2-c	NA	NA		5	6	83
Catheter urethral nelaton	NA	NA		5	6	83
Nylon blue monofil. 0(m3.5),1 m, n: 40 mm rev. Cutt.	NA	NA		3	4	75
Set infusion pediatric, 60 drops/mL	NA	NA		3	3	100
Wound plaster adhesive (first aid) 6 cm x 5 m	NA	NA		2	2	100
Catgut chr.0(m4), 75 cm, n: 45 mm 1/2-c rbody	NA	NA		3	4	75
Needle infusion butterfly, 25g	NA	NA		5	7	71
Sheeting mcintosh red rubber, 20 m roll, 90 cm wide	NA	NA		4	4	100
Silk black 1(m4), 1 m, n: 90 mm 3/8-c cutting	NA	NA		1	2	50
Requisition and issue voucher book mf124	NA	NA		2	3	67

ANNEX 10. COST OF EXTREMELY OVERSUPPLIED ITEMS

The table includes data used to quantify the cost of oversupplied items. The February 2011 URA exchange rate (2333) was used to convert to USD.

Extremely oversupplied items	Unit	Avg. delivery (months)	Ideal delivery (months)	Over-supply (no. of months)	AMC (packs)	Over-stocked quantity (packs)	Unit price (UGX)	Over-stocked price (UGX)	Over-stocked price (USD)/ kit	Cost per year/HC	Total for all HCs/year
HC II											
ORS for 1 L	25	13	2	11	4	44	3050	134200	57.11	342.64	
Safety box for syringes and needle disposal	20	30	2	28	0.06	1.7	35950	60,396	25.89	155.34	
Total cost										497.98	658,329.56
HC III											
Ethinylestradiol 0.03 + levonorgestrel 0.15 mg tab (Microgynon)	3 tablets	15	2	13	0.7	9.1	590	5369	2.28	13.71	
Lidocaine HCl 2% inj.	20 mL	13	2	11	1.5	16.5	8250	136125	57.93	347.55	
Levonorgestrel 750 micro-gram tabs (emergency contraceptives)	2 tablets	29	2	27	0.7	18.9	660	12474	5.31	31.85	
Methylergometrine maleate 0.2 mg/1 mL inj IM/IV slow	200 vials	39	2	37	0.1	3.7	58800	217560	92.58	555.47	
Dexamethasone 4 mg/1 mL amp	100	20	2	18	0.1	1.8	8900	16020	6.82	40.90	
Blades scalpel size 23	100	76	2	74	0.05	3.7	6350	23495	10.00	59.99	
Silk black 0(m3.5), 75 cm, n: 30 mm 1/2-c rbody	12	41	2	39	0.1	3.9	4450	17355	7.39	44.31	
Total cost										1,093.78	807,211.21
National total cost											1,465,540.77