REPORT ON NATIONAL QUANTIFICATION OF ESSENTIAL MEDICINES AND HEALTH SUPPLIES

REPORT

MARCH 2009

PHARMACY DIVISION

MINISTRY OF HEALTH

ACKNOWLEDGEMENT

On behalf of the pharmacy division, Ministry of health, I wish to express my sincere gratitude and appreciation to all those who worked tirelessly to ensure that the National Quantification of Essential Medicines and Health supplies (EMHS) exercise was carried out successfully and the results published.

My special thanks first and foremost go to the data collection and analysis team, together with the health facility staff, whose work was the foundation for the publication. Secondly I would like to acknowledge the Pharmacy Division team consisting of Mr. Khalid Mohammed, Mr. Thomas Obua, Mr. Morries Seru, Dr. Fred Sebisubi and Mr. Frans Bosman for coordinating the data collection, analysis and report writing

Finally I would like to extend my sincere appreciation to DANIDA who, through the HSPS III programme, supported this activity financially and technically.

It is our cherished belief that this exercise has not only provided us with the reference point from which future quantification exercises will be based, but also given us an in depth understanding of the resources needed to provide essential medicines and supplies for basic health care.

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Kampala,
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ACRONYMS

DQS	Drug Quantification System
EMHS	Essential Medicines And Health Supplies
GOU	Government of Uganda
HC II	Health centre level 2
HC III	Health center level 3
HC IV	Health center level 4
HMIS	Health Management Information System
HSPS III	Health sector support programme phase 3
IP	In Patients
IPD	In patients Department
OP	Out Patients
OPD	Out Patient Department
PNFP	Private –not- for- Profit
TRM	Technical Review Meeting
SWAP	Sector Wide Approach

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EXECUTIVE SUMMARY

The April 2007 Technical review meeting (4th MOH TRM) noted that whereas there were positive steps taken to improve on overall management of Essential Medicines and Health Supplies (EMHS), stock outs of essential medicines were still common. This was mainly attributed to under funding but the actual gap was not known. The pharmacy division was then charged with the responsibility of carrying out national quantification of EMHS so that planners are updated on national requirements and resource implications

The Quantification Exercise was finally launched in July 2008. The Objective was to estimate the annual requirement of essential medicines and health supplies for government and PNFP health facilities

The method chosen was the retrospective review of records at selected facilities and using the information to estimate the EMHS needs of the PNFP and GOU sectors. The Main records reviewed were prescriptions and the stock cards.

Thirteen teams of data collectors set out in a two stage process, to gather the data and were able to review 58,938 prescriptions from 101 facilities in 43 districts spread out in all regions of Uganda. Stock card data was also reviewed in all the facilities visited and data on total quantities issued from the store in 2007 was collected.

The data was analyzed using software developed by pharmacy division, MOH, known as the Drug Quantification System (DQS). The system was modeled to convert quantities of medicines prescribed into quantities required per 1000 cases for each facility. The team was then able to convert this into requirement for the country. The DQS was also used to convert stock Issues data from health facilities into annual requirements after adjusting for stock out days, expiries and wastage.

The methodology selected for the study involved standardization of data from a sample of facilities and extrapolation to estimate national requirements and hence was applicable for services that were universal i.e. found in all government and PNFP facilities.

For that reason we could not use the DQS estimates to calculate the cost for commodities used in providing the following categories of services which are provided in selected facilities. They include ARVs, Contraceptives, Laboratory chemicals and consumables, Blood and related supplies, anti-tuberculosis (TB) medicines, Vaccines, anticancer medicines, Dental chemicals, Oxygen and X- ray materials.

We have nevertheless been able to obtain data from previous quantification exercises that focused on specific programme areas and have included them in the report to give a picture of what is needed to meet the Uganda National Minimum Health Care Package (UNMHCP). The areas covered are the ARVs, Vaccines, and Anti- Cancer Medicines, Contraceptives and anti- TB medicines.

Results

Below is the value of items required to provide services at the PNFP and GOU facilities for one year. Figures are in Billions of Uganda Shillings:

Total funds required to provide essential medicines in all government and PNFP facilities is estimated to be **UGX 138.3 billion** using the consumption method and **UGX 112.0** based on the prescription method.

It is clear from the outset that consumption figures are higher and is mainly attributed to adjustments that are made to cater for days when the item is out of stock

The estimates above however exclude the funds needed for the following categories of items: Antiretroviral medicines including medicines for prevention of Mother to Child Transmission of HIV (PMTCT), Anti Cancer medicines, Vaccines, Contraceptives, Condoms, Commodities for Uganda Blood transfusion services, anti tuberculosis medicines, and Lab supplies and consumables. Estimates that are currently available in the Pharmacy Division of the MoH indicate that these excluded items require as much as **UGX 234 billion** annually**.**

Summary of Cost of EMHS required Using Consumption method alone or combined method consumption and prescription (figures in billion of UGX)					
		Essential Medicines	**Artemether /Lumefantrine**	**Sundries plus anesthetics**	**Total**
Government	Consumption	43.815	33.902	15.544	**93.261**
	Prescription*	40.675	24.497	15.544	**80.716**
PNFP	Consumption	18.548	7.593	5.977	**32.118**
	Prescription	9.724	2.49	5.977	**18.191**
Mulago	Consumption	4.268	0.215	7.835	**12.318**
	Prescription	4.291	0.284	7.835	**12.41**
Butabika	Consumption	0.576	0.0297	0.0767	**0.6824**
	Prescription	0.59	0.039	0.0767	**0.7057**
GRAND TOTAL	**Consumption**				**138.3794**
	Prescription				**112.0227**

- The total cost shown under prescription is in fact mixed because it includes cost of sundries which were obtained using consumption

Estimated annual cost for commodities used by vertical MOH programmes

	Categories	**Targets**	**Cost in Billions UGX***

1	ARV	Scale up to 216,528 patients by December 2009 (Annex 3.1)	109.698
2	PMTCT	To cover 80% of Pregnant women with HIV (Annex 3.1)	4.813
3	Anti Cancer Drugs	1st Line and Second line and estimated 230 new patients per Month (Annex 3.2)	2.69
4	Vaccines Routine and Supplemental (2008/09 Estimates)	See Annex 3.3	58.7
5	Contraceptives	See Annex 3.4	2.677
6	Condoms	See Annex 3.4	6.464
7	Uganda Blood Transfusion Services	See Annex 3.5	3.266
8	Anti TB drugs	Annex 3.6	2.57
9	Lab supplies and consumables	Annex 3.7	43.2
	Total		**234.078**

Limitations

When interpreting the results of the survey it is important to bear in mind that the accuracy of the information is impacted upon by the situation on the ground. Below are issues to take into consideration.

1. A number of practices observed during data collection affected the accuracy of prescription data. These included
   a. Poly-pharmacy at lower level units with some patients being prescribed up to 8 medicines
   b. Irrational prescribing at lower level units e.g. antibiotics prescribed for malaria and unnecessary use of injections
   c. Stock out of medicines leads prescribers to give what is available instead of what is best for the patient

2. A number of conditions impacted the accuracy of the Issues data from stock cards. These included:
   a. Prolonged stock out periods needed adjustments that may have led to an overestimation of the requirements of a particular medicine. Stock outs were more common in Government as compared to PNFP facilities. PNFP facilities have a more flexible procurement regime and decentralized decision making.
   b. Rationing of medicines, which is a common occurrence in GOU hospitals, leads to underestimation of requirement

Observations

1. While availability of records was one of the criteria used to include facilities in the survey, some were found to have incomplete records. Stock cards in particular were either missing for some items or were not up to date. In general prescription and stores records were better kept at government facilities than at PNFP facilities probably due to stricter enforcement of the use of HMIS forms in the GOU facilities. District supervision is also more frequent for GOU facilities. In both sectors, records improved as you moved from lower level facilities to HC IV and hospital.

2. Data collection was labour intensive due to the sheer number of prescriptions required. A lot of time was used up trying to locate patient records due to poor storage. Only one of the facilities visited had a computerized record of patient treatments but this was not helpful because they only recorded medicines bought from the hospital pharmacy and not the full treatment prescribed.

3. None of the hospitals visited had a functional computerized stock management system and even the manual stock cards were often not up to date. This delayed the data collection. The most significant finding for medicines management was that stock cards were not routinely used as inventory control tools. E.g. in determination of consumption rates, Monitoring of expiry or quantity to order

4. HMIS data on annual performance of health facilities were difficult to get because in more than half of the districts visited, annual reports were not compiled particularly for individual lower level units. Data collectors had to add up information from the monthly reports.

5. Prescribing of many medicines (Polypharmacy) and frequent use of antibiotics was common and could be partly attributed to lack of treatment guidelines and in some cases lack of diagnostic facilities. The current version of Uganda clinical guidelines available at the facilities is outdated.

6. there was no data on preventive supplies needs (ITNS and IRS Chemicals for malaria control)

Recommendations

1. There is need to identify a computer - based pharmaceutical management programme for use in government and PNFP facilities and train stores in-charges to use it starting from hospitals downwards to lower level units. This will go a long way in improving record keeping particularly in medicine stores

2. Pharmacy division should develop a mechanism of collecting consumption data on a routine basis from sentinel sites to enable expeditious determination of national requirements of essential medicines and health supplies.

3. Pharmacy Division should intensify supervision and training of staff managing medicines at facility level to improve the EMHS record keeping like the use of stock cards and records of issue which in turn will result in more accurate quantification records

4. There is need to update the Uganda clinical guidelines and distribute it to health workers as a way of promoting rational prescribing

Conclusion

While there were a number challenges in collection and analysis of data, the sample used was large enough to provide us with a reasonable degree of accuracy of the national requirements for Essential Medicines' and Health Supplies. There is no doubt that the exercise has provided the base to build on when carrying out quantification exercises in the future

1.0 BACKGROUND

The Health Sector Reforms that led to the SWAP have had a positive effect on the development and management of the health sector generally and Medicines Management in particular. The improvements during the process have led to a remarkable increase in demand for health care by the population and revealed that there are still big unmet needs in the sector. Specifically, the unmet needs in the area of essential medicines and supplies have frequently been raised by both providers and consumers despite some intermittent improvements. Only 35% of the health facilities

surveyed in the Financial Year 2006/07 registered no stock out of any of the six tracer items of the HSSP. The stock out situation further deteriorated in the FY 2007/2008 with only 28% of facilities surveyed found not to have had a stock out of any of the tracer medicines.

The April 2007 Technical Review Meeting (4th TRM) deliberated exclusively on the management as well as procurement of Essential Medicines and Health Supplies (EMHS) in the sector. The meeting noted among others;

- that serious under funding of the health sector combined with lack of reliable supply of EMHS by NMS, substantially affects health service delivery at facility level, thus compromising opportunities to determine EMHS requirements at local and national level based on rational demand driven ordering and supply within available budgets
- that adequate (national) quantification of needs for EMHS has not taken place for a long time and remains a capacity gap at all levels
- that capital requirements for procurement funding and cash flow in the NMS remain problems
- that the Rolling 3-Year Procurement Plan for EMHS constitutes a great step forward for financing and procurement planning of EMHS needs, provided these are adequately quantified and fed into the plan
- That Development Partners need better guidance for effective and efficient support in filling specific gaps for EMHS, informed by the Rolling 3-Year Procurement Plan and a reliable national quantification of EMHS needs.

The meeting therefore, recommended that a national quantification exercise be conducted every three years starting with the Financial Year (FY) 2007/08 to inform particularly procurement decisions and mobilization of resources needed as well as to support rational prioritization.

It is against this background that the pharmacy division, MOH, carried out the quantification of annual national EMHS requirements as part of the FY 2007/08 work plans of the Division for Pharmaceutical Services and Health Supplies in the MoH.

This report has two sections. Section one deals with the process of data collection and analysis and also includes the results of the survey, observations and recommendations. Section two is an annex that comprises tables showing estimates of individual items required at different levels of health care.

2.0 THE QUANTIFICATION EXERCISE

This chapter includes a review of the survey objective and the methodological approach to the quantification exercise.

2.1 OBJECTIVES

The aim of the quantification exercise was to determine the Essential Medicines and Health Supplies (EMHS) needs of the country and to estimate the cost of the needs per year.

The specific objectives were to:

1. Estimate the annual requirements of EMHS for the public and PNFP sectors using prescription based method
2. Estimate the annual requirements of EMHS for the public and PNFP sectors using Consumption based method
3. Determine the cost of the annual requirements for both sectors using the two methods

2.2 SCOPE

The quantification covered EMHS requirements for health services provided at government and Private –not- for- Profit (PNFP) facilities in the country. The estimates included requirements for all levels of health care from National referral hospitals to Health center level two. The quantification also focused on EMHS for primary health care and therefore the essential requirements to meet agreed content of the Uganda National Minimum Health Care Package.

2.3 METHODS AND TOOLS

The main approach to the study was a retrospective review of records in selected facilities representative of the public and PNFP sectors in all regions of the country

2.3.1 SAMPLE SIZE

101 (3.3% of all Government and PNFP facilities) was the final figure for data collection sites to be visited in the study. They were spread out at levels of care as shown in Table 1. The facilities were selected systematically to include all the regions of the country.

Table 1: Sampling plan for facilities to be included in the quantification study

Level of Care	Number of facilities Government	Number of facilities PNFP	Total Number of facilities Government	Total Number of facilities PNFP	Number of facilities sampled Government	Number of facilities sampled PNFP	Total Number sampled	% Sampled
Butabika Hospital	1	-	1	1	-	1	100	
Mulago Hospital	1	-	1	1	-	1	100	
Reg. Ref Hosp	11	4	15	4	1	5	29	

and Large Hosp PNFP							
Gen Hosp	44	36	80	5	5	10	10
HC IV	151	12	163	12	2	14	10
HC III	762	186	948	17	6	23	3
HC II	1,332	450	1,782	33	14	47	3
Total	**2302**	**688**	**2990**	**73**	**28**	**101**	3.3%

2.3.2 DATA COLLECTION TOOLS

Three types of data were collected namely prescription data, Issues data and HMIS data.

2.3.2.1 PRESCRIPTION DATA

Prescription data was collected from all the health facilities visited. A sample of 3%[1] of prescriptions in health facilities written in 2007 were reviewed. The prescriptions were systematically selected across the year and data entered in the DQS computer programme. 3% of prescriptions based on HMIS reports, were selected from each section within the out- patient (OP) or in –patient (IP) departments in a facility. Due to proportional sampling the interval was standard and the list of cases was followed chronologically from January to December 2007. i.e. every 33rd prescription was selected with the first case chosen randomly.

The following information was collected from each prescription chosen and entered into the DQS computer system:

- Age
- Sex
- Diagnosis
- Medicines prescribed, Dosage and duration

The DQS is a Microsoft access based quantification programme developed by Pharmacy Division MOH. It has been used largely within the department for over 4 years. The system is able to analyze large numbers of prescriptions and determine medicines requirement based on prevailing prescribing patterns.

2.3.2.2 ISSUES DATA

Quantities of EMHS issued out of the store in the sampled facilities for the calendar year 2007 were recorded from stock cards and entered into the DQS system. Care was taken to exclude items issued out because of expiry, damage or lending to other facilities. This was done for each of the facilities visited.

[1] While the WHO recommends 30 cases per facility previous surveys using the DQS tool by the pharmacy division revealed that 3% of cases systematically selected described the prescribing patterns within an acceptable margin of error.

2.3.2.3 HMIS DATA

In each of the districts visited data was collected on facility utilization on a number of areas. The main areas were

- Total new OPD cases for FY 2006/2007
- Total admissions per year FY 2006/2007
- Catchments population

This information was needed for purposes of extrapolation and was not readily available at national level where reports received are mainly reflecting utilization at district level.

2.3.2.4 DATA COLLECTION TEAMS

Data was collected in two phases[2] by 13 teams each comprising a team leader and two team members. Each team member had an expert on use of the DQS system, an experienced prescription reader and a data entry specialist. All teams underwent a two day orientation programme followed by pre-testing of the data collection tools. Detailed list of the data collection teams and orientation programme is in Annex 1a, 1b, 1c

3.0 RESULTS

In this Chapter a summary of the extent of the data collected is presented together with the data analysis plan. Finally the projected needs of EMHS for different levels of care are summarized.

3.1 NUMBER OF FACILITIES

Data was returned from all the 101 facilities from 43 districts surveyed as shown in annex 2. A summary of the number of facilities surveyed is shown in Table 2.

Table 2: Facilities surveyed for Quantification of EMHS

Level	Government	PNFP	Grand Total
HC II	33	14	47
HC III	17	6	23
HC IV	12	2	14
Hospital	5	5	10
REG. Hospital	4	1	5
National	2		2

[2] The exercise was split into two phases because funds available at the start were inadequate. The organization that pledged support at the beginning pulled out.

referral			
Grand Total	**73**	**28**	**101**

3.2 PRESCRIPTIONS

A total of 58,938 prescriptions were reviewed from the different levels of care in both government and PNF P facilities. A summary for each level is shown in Table 3.

Table 3: Number of prescriptions reviewed during the survey

Level	Government	PNFP	Total
HC II	7,819	2,258	10,077
HC III	6,110	1,206	7,316
HC IV	8,841	524	9,365
Hospital	3,481	3,747	7,228
National referral	13,070		13,070
REG. Hospital	6,945	4,937	11,882
Grand Total	46,266	12,672	58,938

3.3 ISSUES DATA

Stock card data was collected from the 101 facilities visited. Quantities of EMHS issued form the store for a period of one year was recorded. The figures were then adjusted to take care of period of stock outs and any wastage due to expiry or spoilage.

3.4 HEALTH MANAGEMENT INFORMATION SYSTEM (HMIS) DATA

HMIS data was collected from 26 districts. Annual data on utilization was obtained for 754 facilities in both the Government and PNFP sector as shown in table 4. This represents about 25% of facilities from both the government and the PNFP sectors.

Table 4: Number of facilities from where data on facility utilization was obtained

Level	Government facilities	PNFP facilities	Total
HC II	278	90	368
HC III	225	65	290
HC IV	52	3	55
Hospital	19	16	35

Regional Hospital	4	0	4
National referral	2	0	2
Total	**580**	**174**	**754**

3.5 DATA ANALYSIS

3.5.1 Demand for Essential Medicines

Demand was defined as requirements for medicines based on prevailing prescription patterns. Quantities of medicines prescribed were calculated for the number of prescriptions sampled and then standardized to quantities needed per 1000 cases. Values obtained were averaged for each level in the out patient departments (OPD) and for in-patients (IP). The averages were then extrapolated to estimate overall demand per level of care and for all facilities in the country.

The procedure for determining requirements using the prescription methods was as follows

1. A representative sample of prescriptions was selected from all departments in the health facility visited. The prescriptions were picked from all the months in the calendar year 2007
2. For each facility, quantities of individual medicines were determined from the sample of prescriptions
3. The quantities determined were Standardized by calculating requirement per 1000 cases for each department in the facility (Mainly OPD and IP departments)
4. Average requirements per 1000 were then calculated for each level of care for both OPD and IP departments. This was done separately for PNFP and GOU facilities
5. The cost of average requirements per 1000 cases was then determined
6. The cost of requirement for each level of care was calculated based on average number of cases per level
7. The cost of requirements for all facilities was determined based on number of facilities per level

3.5.2 Consumption of Essential Medicines and Health Supplies

Data on issues from the store was used to estimate annual needs of EMHS. As mentioned earlier, the estimates were adjusted to take into consideration stock out days and any other wastage.

The procedure for estimating EMHS needs using consumption method is as follows:

1. Quantities of individual items issued out from the medicines store were determined from the stock cards of each health facility for a one year period (Calendar year 2007)
2. The quantities were adjusted to take into consideration stock out days and any wastages due to expiry
3. An average figure was determined for each level of care and the cost calculated for each level of care
4. Cost per item per level was used to calculate the total cost of requirements based on number of facilities per level

Note that this was the only method used for estimating items like sundries, disinfectants and anesthetic that could not be easily determined from the prescriptions.

3.5.3 HMIS Data

Facility utilization data was obtained from annual HMIS facility report. Where annual reports were not available, monthly reports were summed to get annual figures. Data collectors were able to get the reports for 754 facilities and used the figures to calculate the average utilization for level II, III and IV as shown in Table 5.
For the hospitals the most recent figures were obtained from the annual health sector performance report for the financial year 2007/2008

Table 5: Average OPD and IP cases per level of care

Level	PNFP		GOVERNMENT	
HC II Average	3,362		6,294	
HC III Average	5,251		10,615	
	OPD	**IP**	**OPD**	**IP**
HC IV Average[3]	20,689	854	20,689	854
Hospital average	28,350	7,028	53,750	8,925
Regional referral Average	136,446	18,559	136,446	18,559
Mulago Hospital			846,574	108,695
Butabika Hospital			22,560	66,000

The total number of facilities for each level was based on the 2006 MOH facility inventory and the annual health sector performance report 2007/2008. Table 6 shows the number of facilities per level of care in the Government and PNFP sectors.

[3] Figures for PNFP level 4 were obtained from only two facilities during the survey and the variation was so big between them that it was decided to use the government utilization figures for the same level

Table 6: Number of facilities per level of care

Level	PNFP	GOVERNMENT
Health center level II	415	1332
Health center level III	186	762
Health center level IV	8	154
General Hospitals	42	45
Regional referral Hospitals	4	11
Mulago Hospital		1
Butabika Hospital		1

3.6 PRESCRIBING PATTERNS

Four Rational Medicines Use indicators were analyzed from the data collected. These were; average number of drugs prescribed per case; percentage of cases prescribed at least one injection, percentage cases prescribed at least one anti-malarial medicine, percentage of cases prescribed at least one antibiotic.

On average PNFP facilities prescribed more drugs per case than government facilities in both the out patient and in-patient departments. The in patients in both sectors were prescribed on average, 60% more types of medicines than the out patients.

The results show a general decline in prescription of injections particularly at the OPD which stood at 30 percent in 2004 (Seru and Khalid 2004). This is probably due to the introduction of Coartem which is an effective oral first line antimalarial. There was only a small difference between the PNFP and government facilities on this indicator.

Prescribing of antimalarial medicines was more frequent in government facilities than PNFP facilities. A higher proportion was prescribed antimalarial medicines in the OPD as compared to IP in both sectors.
The proportion of patients prescribed antibiotics is high both at OPD and IPD. These indicators have a direct effect on the unit cost of drugs needed to treat a case.

Table 7: Rational medicines use indicators for different level of care

Department	Owner	Level	Average No of drugs Per case	% Cases prescribed at least one injection	% Cases prescribed at least one anti-malarial medicine	% cases prescribed at least one antibiotic%
IP	Govt	HC IV Average	3.9	58%	61%	58%
IP	Govt	Hospital Average	3.1	65%	37%	58%
IP	Govt	REG. Hospital Average	4.4	77%	25%	63%
			3.8	**67%**	**41%**	**60%**
OP	Govt	HC III Average	3	24%	56%	55%
OP	Govt	HC II Average	2.9	23%	57%	56%
OP	Govt	HC IV Average	2.8	19%	48%	60%
OP	Govt	Hospital Average	2.4	19%	45%	54%
OP	Govt	REG. Hospital Average	2.2	14%	18%	36%
			2.7	**20%**	**45%**	**52%**
IP	PNFP	HC III Average	3.8	56%	30%	61%
IP	PNFP	HC IV Average	6	65%	20%	87%
IP	PNFP	Hospital Average	5.1	83%	28%	66%
IP	PNFP	REG. Hospital Average	6.7	68%	16%	63%
			5.40	**68%**	**24%**	**69%**
OP	PNFP	REG. Hospital Average	2.3	22%	27%	31%
OP	PNFP	Hospital Average	2.9	9%	47%	50%
OP	PNFP	HC II Average	3.1	45%	51%	64%
OP	PNFP	HC IV Average	2.7	6%	20%	65%
OP	PNFP	HC III Average	4.3	45%	52%	62%
			3.1	**25%**	**39%**	**54%**
IP	Govt	BUTABIKA	3.3	26%	1%	15%
OP	Govt	BUTABIKA	2.8	16%	4%	21%
IP	Govt	MULAGO	4.7	62%	13%	45%
OP	Govt	MULAGO	1.8	13%	7%	17%

3.7 ESTIMATED REQUIREMENTS FOR GOVERNMENT FACILITIES

Table 8 and 9 shows the estimates in millions of Uganda shillings (UGX) of EMHS requirements. In the Tables Coartem is highlighted for emphasis and the costs are based on the current prices of Coartem at NMS which is about US$ 1.4 per adult dose. The Essential health supplies and medicines for anesthesia are also highlighted to emphasize that they were estimated using consumption rather than the Prescription method

Uganda Shillings 80.7 billion is required to provide EMHS to Government facilities excluding the two national referral hospitals. This is based on the combination of the two methods of demand estimation; prescription and consumption. Estimates based on consumption only bring the total requirements to UGX 93.261 billion.
In section 2 details of quantities per item are listed

3.8 ESTIMATED REQUIREMENTS FOR PNFP FACILITIES

Table 10 and 11 shows estimated requirements in millions of Uganda Shillings for the PNFP facilities. A total of UGX 18.1 billion is required when estimates are based on mixed prescription and consumption methods. When estimates are based purely on consumption, total funds needed increase to UGX 32.1 billion

Table 8: ESSENTIAL MEDICINES AND HEALTH SUPPLIES REQUIREMENTS BY LEVEL OF CARE FOR GOVERNMENT FACILITIES USING THE PRESCRIPTION (DEMAND METHOD)Figures In Millions Of UGX

Item	Level II	Level III	Level IV		General Hospitals		Regional referral hospitals		Total Per item
			IP	OPD	IP	OPD	IP	OPD	
Cost of Essential medicines per 1000 cases	1.055	1.665	4.782	1.775	6.977	1.231	11.416	2.647	
Coartem per 1000 cases	1.506	0.649	0.705	1.045	0.429	0.85	0.355	0.599	
Average Number of cases per level	6,294	10,615	854	20,689	8,925	53,750	18,559	136,446	
Cost of Essential drugs per facility	6.64	17.67	4.08	36.73	62.27	66.18	211.86	361.13	
Cost of Coartem per facility	9.48	6.89	0.6	21.61	3.83	45.68	6.58	81.69	
Number of facilities per level	1,332	762	154	154	45	45	11	11	
Total cost of Essential medicines required	8,841.19	13,465.35	628.9	5,656.83	2,801.99	2,978.27	2,330.51	3,972.39	**40,675**
Total cost of Coartem required	12,624.71	5,251.42	92.66	3,328.58	172.49	2,055.73	72.39	898.59	**24,497**
Total cost of Essential medicines plus Coartem required	**21,466**	**18,717**	**722**	**8,985**	**2,974**	**5,034**	**2,403**	**4,871**	**65,172**
Sundries consumed per year per facility	2.11	3.72		15.31		94.99		189.15	
Anesthetics consumed per year Per facility	0.051	0.457		0.825		9.39		20.51	
Total sundries and anesthetics per Facility	2.16	4.17	-	16.14	-	104.38	-	209.67	
Number of facilities per level	1,332	762		154		45		11	
Total Cost sundries and anesthetics consumed in government facilities per year	**2,875**	**3,181**	**-**	**2,485**	**-**	**4,697**	**-**	**2,306**	**15,544**

Grand Total	**24,341**	**21,897**	**722**	**11,471**	**2,974**	**9,731**	**2,403**	**7,177**	**80,716**

Table 9: **ESSENTIAL MEDICINES AND HEALTH SUPPLIES REQUIREMENT BY LEVEL OF CARE FOR GOVERNMENT FACILITIES USING THE CONSUMPTION METHOD (FIGURES IN MILLIONS OF UGX)**

Item	Level II	Level III	Level IV	General Hospitals	Regional referral hospitals	Total Per Item
Cost of Essential drugs per facility	9.57	12	44.02	224.59	457.88	
Cost of Coartem per facility	8.98	11.43	26.99	161.34	164.84	
Number of facilities per level	1,332	762	154	45	11	
Total cost of EMHS required in Govt facilities	12,749	9,145	6,779	10,106	5,037	**43,815**
Total cost of Coartem required in Govt facilities	11,961	8,710	4,157	7,260	1,813	**33,902**
Total cost of Essential medicines required plus Coartem	**24,710**	**17,855**	**10,936**	**17,367**	**6,850**	**77,717**
Sundries consumed per year per facility	2.11	3.72	15.31	94.99	189.15	
Anesthetics consumed per year Per facility	0.051	0.457	0.825	9.385	20.514	
Total sundries and anesthetics per Facility	2.16	4.17	16.14	104.38	209.67	
Number of facilities per level	1,332	762	154	45	11	
TOTAL SUNDRIES PLUS ANETHETICS	**2,875**	**3,181**	**2,485**	**4,697**	**2,306**	**15,544**

GRAND TOTAL	**27,585**	**21,036**	**13,421**	**22,064**	**9,156**	**93,261**

Table 10: ESSENTIAL MEDICINES AND HEALTH SUPPLIES REQUIREMENT BY LEVEL OF CARE FOR PRIVATE- NOT-FOR- PROFIT (PNFP) FACILITIES BASED ON PRESCRIPTION METHOD (FIGURES IN MILLIONS OF UGX)

Item	Level II	Level III	Level IV		General Hospitals		Referral Hospitals		Total per item
			IP	OPD	IP	OPD	IP	OPD	
Cost of Essential Medicines Per 1000 Cases	0.966	1.008	1.498	1.284	5.134	2.145	12.07	3.84	
Cost of Coartem Per 1000 Cases	0.757	0.227	0.276	0.26	0.111	0.585	0.35	0.6	
Average Number Of Cases Per Level	3,632	5,251	854	20,689	7,028	28,350	18,559	136,446	
Cost Of Essential Drugs Per Facility	**3.51**	**5.29**	**1.28**	**26.57**	**36.08**	**60.81**	**223.99**	**523.54**	
Cost Of Coartem Per Facility	**2.75**	**1.19**	**0.24**	**5.38**	**0.78**	**16.58**	**6.57**	**81.59**	
Number Of Facilities Per Level	415	186	8	8	42	42	4		
Total Cost Of Essential Medicines	1,456.77	984.54	10.24	212.55	1,515.42	2,554.17	895.95	2,094.17	9,724
Total Cost Of Coartem	1,141.70	222.14	1.89	43	32.71	696.25	26.28	326.38	2,490
Total Cost Of Essential Medicines Plus Coartem	**2,598.47**	**1,206.68**	**12.12**	**255.55**	**1,548.13**	**3,250.42**	**922.23**	**2,420.55**	**12,214**
Sundries Consumed Per Year Per Facility	1.55	3.47		36.99		81.39		189.1	
Anesthetics Consumed Per Year Per Facility	0.02	0.07		0.46		2.58		20.54	

Total Sundries And Anesthetics Per Year	1.57	3.54		37.45		83.97		209.64	
Number Of Facilities Per Level	415	186		8		42		4	
Total Sundries And Anesthetics Consumed In PNFP Facilities Per Year	653.41	658.44		299.59		3,526.80		838.56	**5,977**
Grand Total	**3,251.90**	**1,865.10**	**12.1**	**555.1**	**1,548.10**	**6,777.20**	**922.2**	**3,259.10**	**18,191**

Table 11: ESSENTIAL MEDICINES AND HEALTH SUPPLIES REQUIREMENT BY LEVEL OF CARE FOR PRIVATE-NOT- FOR- PROFIT (PNFP) FACILITIES BASED ON CONSUMPTION METHOD (FIGURES IN MILLIONS OF UGX)

Item	Level II	Level III	Level IV	General Hospitals	Referral Hospitals	Total per item
Cost of Essential drugs per facility Per year	14.521	28.827	49.012	115.839	475.8	
Cost of Coartem per facility Per year	7.246	6.717	13.03	61.27	164.8	
Number of facilities per level	415	186	8	42	4	
Total cost of Essential medicines required	6,026	5,362	392	4,865	1,903	18,548
Total cost of Coartem required	3,007	1,249	104	2,573	659	7,593
Total cost of Essential medicines plus Coartem required for all PNFP facilities for one year	**9,033**	**6,611**	**496**	**7,439**	**2,562**	**26,141**
Sundries consumed per year per facility	**1.553**	**3.47**	**36.99**	**81.388**	189.1	

Anesthetics consumed per year per facility	**0.022**	**0.07**	**0.459**	**2.583**	20.54	
Total sundries and anesthetics per year	1.57	3.54	37.45	83.97	209.64	
Number of facilities per level	415	186	8	42	4	
Total sundries and anesthetics consumed required for all PNFP facilities per year	**653**	**658**	**300**	**3,527**	**839**	**5,977**
Grand Total	**9,686**	**7,270**	**796**	**10,965**	**3,401**	**32,118**

3.9 ESTIMATED REQUIREMENTS FOR MULAGO HOSPITAL

Table 13 and 14 is a breakdown of estimates for Mulago Hospital based on the mixed and consumption methods respectively. It is estimated that Mulago requires UGX 12.4 billion to meet its requirements of Essential medicines and Health supplies.

Table 13: Estimated cost of 1 year supply of EMHS for Mulago Hospital (figures in Million UGX)

Item	IP	OPD	Total item	Per
Cost of essential medicines per 1000 cases	0.178	2.478		
Cost of Coartem per 1000 cases	0.216	0.308		
Total cases seen per year	8,695	6,574		
Total cost of Essential medicines required Per year	2,193	2,098	**1**	**4,29**
Total cost of Coartem required per year	23	261	**4**	**28**
Total cost of Essential medicines required plus Coartem Per year	**2,217**	**2,359**	**5**	**4,57**
Cost of sundries required per year		7,375		
Cost of anesthetic required per year		460		
Total sundries and anesthetics consumed per year		**7,835**	**5**	**7,83**
Grand Total	**2,217**	**10,194**	**1**	**12,41**

Table 14: Estimated cost of EMHS required for Mulago Hospital based on Consumption Method (Figures in Millions of UGX)

Item	Total cost
Total cost of Essential medicines required Per year	4,268
Total cost of Coartem required per year	215
Total cost of Essential medicines plus Coartem Per year	**4,482**
Cost of sundries required per year	7,375

Cost of anesthetic required per year	460
Total sundries and anesthetics consumed per year	**7,835**
Grand Total	**12,318**

10 ESTIMATED REQUIREMENTS FOR BUTABIKA HOSPITAL

Butabika Hospital is estimated to require UGX 707 million for a year's supply of EMHS based on combined prescription and consumption method. When estimates are based on consumption only, total requirements drop to 683.47 million UGX. Details of requirements per item are in section 2 of the report

Table 15: Estimated Cost of 1 year requirement of EMHS for Butabika Hospital Based on the prescription methods (Figures in Millions UGX)

Item	IP	OPD	Total Cost IP and OPD
Cost of Essential Medicines Requirement Per 1000 Cases	9.168	5.807	
Cost of Coartem Per 1000 Cases	0.030	0.593	
Total Cases Per Year	22,560	66,000	
Total Cost Of Essential Medicines	206.83	383.26	**590.09**
Total Cost Of Coartem	0.68	39.14	**39.81**
Total Cost Of Essential Medicines Required Plus Coartem Per Year	**208**	**422**	**630**
Cost Of Sundries required Per Year			71.549
Cost Of Anesthetics required Per Year			5.18
Grand Total	**208**	**422**	**707**

Table 16: Estimated Cost of 1 year requirement of EMHS for Butabika Hospital Based on consumption method (Figures in Millions UGX)

Item	Total cost
Total cost of essential medicines	576.99
Total cost of Coartem	29.75

Total cost of Essential medicines required plus Coartem Per year	**606.74**
Cost of Sundries consumed per year	71.55
Cost of Anesthetics consumed per year	5.18
Grand Total	**683.47**

SUMMARY OF ESTIMATED REQUIREMENTS

Table 17 is a summary of the funds required to provide essential medicines in all government and PNFP facilities.
Total estimate for all sectors is **UGX 138.3 billion** using the consumption method and **UGX 112.0** based on the prescription method. Breakdown for the government and PNFP sectors is as follows:

A. Based on the prescription method, where necessary combined with consumption data for comprehensiveness, the following amount is required to fund the annual EMHS requirements of GOU health facilities including_the two National Referral Hospitals: **UGX 93.8 billion**.

B. Based on the consumption method, the following amount is required to fund the annual EMHS requirements of GOU health facilities including the two National Referral Hospitals: **UGX 106.2 billion.**

C. PNFP facilities' requirements for essential medicines and Health supplies was valued at **UGX 32.1** using the consumption method and **UGX 18.2 billion** using the prescription method

It is clear from the outset that consumption figures are higher and this is mainly attributed to adjustments that are made to cater for days when the item is out of stock

The estimates above however exclude the funds needed for the following categories of items: Antiretroviral medicines including medicines for prevention of Mother to Child Transmission of HIV (PMTCT), Anti Cancer medicines, Vaccines, Contraceptives, Condoms, Commodities for Uganda Blood transfusion services, anti tuberculosis medicines, and Lab supplies and consumables. Estimates that are currently available in the Pharmacy Division of the MoH indicate that these excluded items require annually as much as **UGX 234 billion.**

Table 17: Summary of Cost of EMHS required Using Consumption method alone or combined method consumption and prescription (figures in billion of UGX)

		Essential Medicines	Artemether/Lumefantrine	Sundries plus anesthetics	Total
Government	Consumption	43.815	33.902	15.544	**93.261**
	Prescription*	40.675	24.497	15.544	**80.716**
PNFP	Consumption	18.548	7.593	5.977	**32.118**
	Prescription	9.724	2.49	5.977	**18.191**
Mulago	Consumption	4.268	0.215	7.835	**12.318**
	Prescription	4.291	0.284	7.835	**12.41**
Butabika	Consumption	0.576	0.0297	0.0767	**0.6824**
	Prescription	0.59	0.039	0.0767	**0.7057**
GRAND TOTAL	**Consumption**				**138.3794**
	Prescription				**112.0227**

- The total cost shown under prescription is in fact mixed because it includes cost of sundries which were obtained using consumption

Limitations

When interpreting the results of the survey it is important to bear in mind that the accuracy of the information is impacted upon by the situation on the ground. Below are issues to take into consideration.

1. A number of practices observed during data collection affected the accuracy of prescription data. These included
    a. Poly-pharmacy at lower level units with some patients being prescribed up to 8 medicines
    b. Irrational prescribing at lower level units e.g. antibiotics prescribed for malaria and unnecessary use of injections
    c. Stock out of drugs leads prescribers to give what is available instead of what is best for the patient

2. A number of conditions impacted the accuracy of the Issues data from stock cards. These included:
    a. Prolonged stock out periods leads to adjustments that may overestimate the requirements of a particular medicine. Stock outs were more common in Government as compared to PNFP facilities. PNFP facilities have a more flexible procurement regime and decentralized decision making.
    b. Rationing of medicines, which is a common occurrence in GOU hospitals, leads to underestimation of requirement

Programmes in MOH, with support from partners, have at various times carried out quantification exercises in specific categories of medicines and health supplies. Total estimates of annual requirements amount to **UGX**. **234 billion.** About half of this amount will be used to provide ARVs to meet the increased demand as reflected in the scale up plan. Table 18 shows the estimated annual requirements of medicines. Details of Individual items under each programme are provided in ANNEX 3

Table 18: Estimated annual cost for commodities used by vertical MOH programmes

	Categories	Targets	Cost in Billions UGX*
1	ARV	Scale up to 216,528 patients by December 2009 (Annex 3.1)	109.698
2	PMTCT	To cover 80% of Pregnant women with HIV (Annex 3.1)	4.813
3	Anti Cancer Drugs	1st Line and Second line and estimated 230 new patients per Month (Annex 3.2)	2.69
4	Vaccines Routine and Supplemental (2008/09 Estimates)	Annex 3.3	58.7
5	Contraceptives	Annex 3.4	2.677
6	Condoms	Annex 3.4	6.464
7	Uganda Blood Transfusion Services	Annex 3.5	3.266
8	Anti TB drugs	Annex 3.6	2.57
9	Lab supplies and consumables	Annex 3.7	43.2
	Total		**234.078**

* The figures include Freight and Insurance Estimated at 8%, Clearing Charges 3.5%, NDA charges 2%, Estimated distribution and warehousing charges of 7%

4.0 OBSERVATION AND RECOMMENDATION

4.1 OBSERVATIONS

1. While availability of records was one of the criteria used for inclusion in the survey, some facilities were found to have incomplete ones. Stock cards in particular were either missing for some items or were not up to date. In general prescriptions and stores records were better kept at government facilities than at PNFP facilities probably due to stricter enforcement of the use of HMIS forms in the GOU facilities. District supervision is also more frequent for GOU facilities. In both sectors records improved as you moved from lower level facilities to HC IV and hospitals.

2. Data collection was labour intensive due to the sheer number of prescriptions required. A lot of time was spent trying to locate patient records due to poor storage. Only one of the facilities visited had computerized records of patient treatments although this was not helpful as well because they only recorded medicines bought from the hospital pharmacy and not the full treatment prescribed.

3. None of the hospitals visited had a functional computerized stock management system and even the manual stock cards were often not up to date. This not only delayed the data collection exercise but pointed to the poor medicines logistics management since stock cards were not used routinely as inventory control tools. E.g. in determination of consumption rates, monitoring of expiries or quantity to order

4. HMIS data on annual performance of health facilities were difficult to get because in more than half of the districts visited, annual reports were not compiled particularly for individual lower level units. Data collectors had to add up information from the monthly reports.

5. Prescribing of many drugs (poly-pharmacy) and frequent use of antibiotics was common and could be partly attributed to lack of treatment guidelines and in some cases lack of diagnostic facilities. The version of Uganda's clinical guidelines available at the facilities is outdated.

4.2 RECOMMENDATIONS

1. There is need to identify a pharmaceutical management computer programme for use in government and PNFP facilities and to train stores in-charges to use it starting from referral hospitals down to lower level units. This will go a long way in improving record keeping particularly in medicines stores

2. The Pharmacy division should develop a mechanism of collecting consumption data on a routine basis from sentinel sites to enable expeditious determination of national requirements of essential medicines and health supplies.

3. The Pharmacy Division should intensify supervision and training of staff managing medicines at facility level to improve drug record keeping like maintaining stock cards and records of issue which in turn will result in more accurate quantification records

4. There is need to update the Uganda clinical guidelines and distribute it to health workers as a way of promoting rational prescribing.

5. This process has not looked at the need for products for preventive interventions by programmes. There is need for the programmes to work with the Pharmacy Division to accurately quantify the needs for ITNs and related retreatment chemicals, IRS chemicals and related materials.

4.3 Conclusion

While there were a number challenges in collection and analysis of data, the sample used was large enough to provide us with reasonable degree of accuracy of the national requirements for Essential medicines and health supplies. In view of the importance of preventive interventions, there is need for public health programmes to work with the Pharmacy Division in determining supply needs for such interventions. In addition the lessons learnt during the exercise will ensure that future similar exercises will give an even better estimate of the needs of the country.

ANNEX 1A Data collection Teams Part 1

Team	Team Leader	Team Member	Data Specialist	Driver
1	Martin Oteba	Mukasa Joseph	Sewankambo Robert	Owora Goefrey
2	Obua Thomas	Okello Bosco	Ruth Nanyonga	Musa Mukulu
3	Khalid Mohammed	Sam Omalla	Sophia Nakazibwe	Peter Olungat
4	Fred Sebisubi	Chris Sembagare	Mulumba Kiviri	George Okongp
5	Mangusho Joseph	Opio Lugga	Bateta Justine	Levi Okiror
6	Morries Seru	Jane Mboningaba	Medad Rukaari	Driver 6
7	Gideon Kissule	Olum william	Bagarukayo	Driver 7

DISTRICTS AND FACILITIES

Team	Hospital 1	Hospital 2	HC IV Government	HC IV NGO	HC III Government	HC III Government	HC III NGO	HC II Government	HC II Government	HC II Government	HC II Government	HC II NGO	HC II NGO	Total Facilities
1	Lira	Aber	Lira		Lira		Pader		Pader		Kitgum	Pader		8
2	Mulago 1		Kampala		Wakiso	Wakiso	Wakiso	Mpigi	Mpigi	Mpigi	Mpigi	Mpigi		10
3	Jinja Hospital	Busolwe	Busia	Busia (dabani)	Busia		Bugiri			Tororo	Tororo	Busia	Bugiri	10
4		Kisiizi	Ntungamo		Ntungamo	Ntungamo		Rukungiri	Rukungiri	Kabale	Kabale		Kabale	9
5	Mulago 2		Nakaseke	Kampala (Old Kampala)	Nakaseke		Nakaseke	Nakaseke		Nakasongola	Nakasongola	Nakasongola		8
6		Anaka	Nebbi		Nebbi	Nebbi		Amuru (Amuru)	Amuru		Gulu			7
7	Butabika		Mukono		Mukono	Mukono	Makonge (Mukon	Kayunga	Kayunga	Kayunga		Mukono		9

							o)							
														61

ANNEX 1 B Data Collection Team Part 2

Team	Team Leader	Team Member	Data Entry Specialist
1	Martin Oteba	Mukasa Joseph	Ssewankambo
2	Obua Thomas	Topher Ruyooka	Ruth Nanyonga
3	Khalid Mohammed	Sam Omalla	Sophia Nakazibwe
4	Fred Sebisubi	Sembagare Chris	Justine Bateeta
5	Morries Seru	Olum William	Medad Rukaari
6	Mangusho Joseph	Opio Lugya	Justine Bateeta
7	Gideon Kisuule	Emmanuel Umirambe	Carol Bagarukayo

DISTRICTS AND FACILITIES

Team	Hospital 1	Hospital 2	Hospital PNFP	HC IV Government	HC IV NGO	HC III Government	HC III NGO	HC II Government	HC II Government	HC II Government	HC II NGO	HC II NGO	Facilities
1	Fort portal		Ibanda	Ibanda	Kasese (st Paul)	kasese			Kabarole	Bushenyi	Bushenyi		8
2		Masindi		Masindi			Hoima		Hoima	Kibaale		Kibaale	6
3	Soroti		Lwala	Amuria (Amuria)		Amuria	Kumi		Kumi	Bukedea	Bukedea		8
4		Lyantonde		Sembabule (Sembaule)		Lyantonde		Sembabule	Sembabule				5
5		Adjumani	Kuluva	Yumbe		Yumbe	Arua		Arua	Moyo	Moyo		8

6	Mengo			Mityana		Mityana		Mubende	Mubende		Mubende		6
Total	3	3	3	6	1	5	3	2	6	4	4	1	**41**

ANNEX 1 C Programme for Orientation Workshop in Preparation of Data Collection

Day 1		
8.30am	Registration	**Morries**
9.00am	Opening Remarks And Objectives Of Workshop	**Ag. ACHS**
9.30am	Quantification Methods (MORBIDITY AND	**Morries**
10.30am	Tea Break	
11.00am	Demand Based Quantification	**Khalid**
12.00pm	Tour Of The Rapid Assessment Tool	**Khalid**
1.00pm	Lunch	
2.00pm	Brief On Practice Exercise (Sampling For RPA)	**Khalid**
4.00pm	Data Collection Tools	**Morries**
Day 2		
8.00 Am	Field Work Data Entry Out Patients Departments	**ALL**
3.00pm	Data Cleaning And Discussions Of Field Experience	**ALL**
Day 3		
8.00am	Field Work Data Entry In Patients Department	**ALL**
3.00pm	Data Cleaning And Discussion Of Field Experiences	**ALL**
Day 4		
9.00pm	Field Work Data Collection Consumption	**ALL**
2.00pm	Lunch	**ALL**
3.00pm	Data Interpretation VEN Analysis, ABC Analysis,	**ALL**
4.00pm	Data Interpretation Rational Prescribing, Adjustment	**ALL**
Day 5		
9.00am	Preparation Of Field Work Reports	**ALL**
10.00	Break	
4.00pm	Presentation Of Field Work Reports	**Morris**
5.00pm	Closure	**Sebisubi**

ANNEX 2: Facilities from which prescription and stock card data was collected

DISTRICT	FACILITY	NUMBER OF PRESCRIPTIONS	OWNERSHIP	LEVEL
ADJUMANI	ADJUMANI HOSPITAL	927	GOVERNMENT	HOSPITAL
AMURIA	AMURIA	930	GOVERNMENT	HC IV
AMURU	ANAKA HOSPITAL	620	GOVERNMENT	HOSPITAL
ARUA	VURRA HEALTH CENTRE II	669	GOVERNMENT	HC II
ARUA	EDIOFE HEALTH CENTRE III	1,254	GOVERNMENT	HC III
ARUA	KULUVA HOSPITAL	791	PNFP	HOSPITAL
BUGIRI	KIRONGERO II	56	PNFP	HC II
BUGIRI	BUSOLWE HOSPITAL	167	GOVERNMENT	HOSPITAL
BUKEDEA	BUKEDEA	200	PNFP	HC II
BUSHENYI	RUGARAMA HC III	285	GOVERNMENT	HC III
BUSIA	LUMINO II	50	PNFP	HC II
BUSIA	BUTEBA III	209	GOVERNMENT	HC III
BUSIA	BUSIA IV	703	GOVERNMENT	HC IV
BUSIA	DABANI HOSPITAL	489	GOVERNMENT	HOSPITAL
GULU	TODORA HC II	155	GOVERNMENT	HC II
HOIMA	KYAKAPEA	183	GOVERNMENT	HC II
HOIMA	AZUR HC III	264	PNFP	HC III
HOIMA	BWIJANGA HC IV	377	GOVERNMENT	HC IV
IBANDA	IBANDA HOSPITAL PNFP	906	PNFP	HOSPITAL
JINJA	MPUMUDDE HCIII	304	PNFP	HC IV
JINJA	JINJA HOSPITAL	2,462	GOVERNMENT	REG. HOSPITAL
KABALE	KASHEKYE HCII NGO	60	GOVERNMENT	HC II
KABALE	KIBANDA HC II	315	GOVERNMENT	HC II
KABALE	RWENYANGYE HC II	195	PNFP	HC II
KABAROLE	FORTPORTAL REGIONAL HSPITAL	1,100	GOVERNMENT	REG. HOSPITAL
KABERAMAIDO	LWALA	358	PNFP	HOSPITAL
KAMPALA	NAGURU HC IV	480	GOVERNMENT	HC IV
KAMPALA	BUTABIKA	3,567	GOVERNMENT	NATIONAL REFERAL
KAMPALA	MULAGO	9,503	GOVERNMENT	NATIONAL REFERAL
KAMPALA	MENGO HOSPITAL	4,937	PNFP	REG. HOSPITAL
KASESE	MUHOKYA HCIII GOVERNMENT	275	GOVERNMENT	HC III
KASESE	ST PAUL HCIV NGO	220	PNFP	HC IV
KATAKWI	WERA	522	GOVERNMENT	HC II
KAYUNGA	BUKAMBA HC II	57	GOVERNMENT	HC II
KAYUNGA	NACATOVU	541	GOVERNMENT	HC II
KIBAALE	MATALE HC 11	172	GOVERNMENT	HC II
KIBAALE	ST DENIS NSONGA HC 11	45	GOVERNMENT	HC II
KIBAALE	ST LUKE BUJUNI HC 11	60	PNFP	HC II
KITGUM	GWENGCOO HC II	216	GOVERNMENT	HC II
KUMI	OMIITO	384	GOVERNMENT	HC II
LIRA	AMACH HC III	764	GOVERNMENT	HC III
LIRA	BAR	405	GOVERNMENT	HC III
LIRA	LIRA HOSPITAL	1,529	GOVERNMENT	REG.

				HOSPITAL
LYANTONDE	LYANTONDE HOSPITAL	1,075	GOVERNMENT	HC IV
MASINDI	KIGUMBA HC 111	479	GOVERNMENT	HC III
MASINDI	MASINDI	1,278	GOVERNMENT	HOSPITAL
MBARARA	RUHOKO HIV HSD	415	GOVERNMENT	HC IV
MITYANA	MWERA HCVI	382	GOVERNMENT	HC IV
MOYO	KWEYO HEALTH CENTRE II	371	GOVERNMENT	HC II
MOYO	PANYAGASI II	180	GOVERNMENT	HC II
MPIGI	KAFUMU HC II	200	GOVERNMENT	HC II
MPIGI	KIBUGGA HC II	140	GOVERNMENT	HC II
MPIGI	KONGE HC II	105	GOVERNMENT	HC II
MPIGI	NSOZIBIRYE HC II	190	GOVERNMENT	HC II
MPIGI	EPICENTER KIRINGENTE III	239	GOVERNMENT	HC III
MUBENDE	BUTAWATA	188	GOVERNMENT	HC II
MUBENDE	KABBO HC II	152	GOVERNMENT	HC II
MUBENDE	LUBIMBIRI HC 11	175	GOVERNMENT	HC II
MUBENDE	ST. MATIA MULUMBA HC II	199	PNFP	HC II
MUBENDE	KITONGO HC111	234	GOVERNMENT	HC III
MUKONO	KYETUME HCII NGO	50	GOVERNMENT	HC II
MUKONO	MAKONGE HC III NGO	122	PNFP	HC III
MUKONO	NAKIFUMA HCIII	487	GOVERNMENT	HC III
MUKONO	MUKONO HC IV	890	GOVERNMENT	HC IV
NAKASEKA	BULYAKE HC2- NAKASEKE	654	GOVERNMENT	HC II
NAKASEKA	BIDDABUGYA HC3 - NAKASEKE	243	GOVERNMENT	HC III
NAKASEKA	KAPEKA HC 3- NAKASEKE	293	GOVERNMENT	HC III
NAKASEKA	KIREMA HC3 - NAKASEKE	36	GOVERNMENT	HC III
NAKASEKA	SEMUTO HC4 - NAKASEKE	1,088	GOVERNMENT	HC IV
NAKASONGOLA	KAZWAMA	200	GOVERNMENT	HC II
NAKASONGOLA	MAIRIKITI	214	GOVERNMENT	HC II
NAKASONGOLA	OURLADY	84	GOVERNMENT	HC II
NAKASONGOLA	WALUKUNYU HC 2-NAKASONGOLA	78	PNFP	HC II
NEBBI	NYARAYUR HCIII	222	GOVERNMENT	HC III
NEBBI	PANYIGOLO HCIII	300	GOVERNMENT	HC III
NEBBI	PAKWACH HCIV	618	GOVERNMENT	HC IV
NTUNGAMO	NYABUSHENYI HC II	290	GOVERNMENT	HC II
NTUNGAMO	BWONGYERA HC III	260	GOVERNMENT	HC III
NTUNGAMO	RUBAARE HCIV	750	GOVERNMENT	HC IV
OYAM	ABER HOSPITAL	515	PNFP	HOSPITAL
PADER	KWONKIC HCII	231	PNFP	HC II
PADER	LATORO HCII	150	PNFP	HC II
PADER	APARANGA HCII	152	GOVERNMENT	HC II
PADER	ALL SAINTSHC III	48	PNFP	HC III
PADER	RWAKIKOCK	236	PNFP	HC III
RUKUNGIRI	BWANGA HC II	295	GOVERNMENT	HC II
RUKUNGIRI	KAJUNJU HC11 GOVERNMENT	250	GOVERNMENT	HC II
RUKUNGIRI	KITOJO HCII NGO	30	PNFP	HC II
RUKUNGIRI	NYANTABOONA HCII	303	GOVERNMENT	HC II
RUKUNGIRI	KISIIZI HSP	1,177	PNFP	HOSPITAL
SEMBABULE	NTETE HC II	114	GOVERNMENT	HC II
SEMBABULE	SEMBABULE, KYEERA HC II	193	GOVERNMENT	HC II
SOROTI	TRUE VINE	125	GOVERNMENT	HC III

SOROTI	SOROTI REGIONAL REFERAL HOSPITAL	1,854	GOVERNMENT	REG. HOSPITAL
TORORO	KAYOLO II	135	PNFP	HC II
TORORO	MIFUMI II	154	PNFP	HC II
TORORO	MAGOLA	333	PNFP	HC III
WAKISO	EPICENTER II	417	PNFP	HC II
WAKISO	ST URLIKA KIZIBA II	303	PNFP	HC II
WAKISO	KAJJANSI III	203	PNFP	HC III
YUMBE	MIDIGO HC IV	1,133	GOVERNMENT	HC IV
	GRAND TOTAL	58,938		

ANNEX 3

ANNEX 3.1 ANNUAL REQUIREMENTS OF ARV:

Source: National Four Year Forecast for ARV drugs, MOH 2009**Error! Not a valid link.**

Estimated Annual ARV drug Requirements for PMTCT

Product Description (drug name/Strength/formulation)	**Pack size**	**Annual Requirement**
Lamivudine-Zidovudine 150+300MG/tab	60 tablets	104,832
Nevirapine 10MG/ml oral suspension	20Ml bottle	3,120
Nevirapine 200MG/tab	60 tablets	832
Zidovudine 10MG/ml oral suspension	Bottle*	62,400
Zidovudine 300MG/tab	60 tablets	9,984

Note: *Bottle* as the pack size would remain unchanged with the assumption that every baby is given a bottle irrespective of the size. Ideal bottle size would be 20ml*

ANNUAL ART ARV DRUG COST ESTIMATES

	2,009		**2,010**		**2,011**		**2,012**	
Class	**MoH Costs**	**National Costs**	**MoH Costs**	**National Costs**	**MoH Costs**	**National Costs**	**MoH Costs**	**National Costs**
Adult first line	$16,037,183	$37,361,433	$20,611,966	$49,146,440	$24,944,069	$60,683,573	$29,276,173	$72,188,573
Adult second line	$1,557,367	$5,113,679	$1,654,082	$5,984,937	$1,750,800	$6,867,855	$1,847,515	$7,772,665
Pediatric first line	$400,559	$2,547,303	$467,776	$2,997,675	$532,094	$3,403,884	$596,412	$3,817,266
Pediatric second line	$90,118	$495,294	$189,423	$745,139	$295,034	$999,234	$400,718	$1,240,056

TOTAL FOB COSTS	**$18,085,226**	**$45,517,708**	**$22,923,247**	**$58,874,190**	**$27,521,996**	**$71,954,546**	**$32,120,818**	**$85,018,561**
*Estimated Insurance & Freight(8% *)*	$1,446,818	$3,641,417	$1,833,860	$4,709,935	$2,201,760	$5,756,364	$2,569,665	$6,801,485
*NDA Charges (2% *)*	$361,705	$910,354	$458,465	$1,177,484	$550,440	$1,439,091	$642,416	$1,700,371
*Estimated Clearing Charges (3.5% *)*	$632,983	$1,593,120	$802,314	$2,060,597	$963,270	$2,518,409	$1,124,229	$2,975,650
*Estimated Warehousing and Distribution (7% *)*	$1,265,966	$3,186,240	$1,604,627	$4,121,193	$1,926,540	$5,036,818	$2,248,457	$5,951,299
TOTAL HANDLING CHARGES (21% of FOB costs)	**$3,707,471**	**$9,331,130**	**$4,699,266**	**$12,069,209**	**$5,642,009**	**$14,750,682**	**$6,584,768**	**$17,428,805**
GRAND TOTAL COSTS	**$21,792,698**	**$54,848,838**	**$27,622,513**	**$70,943,399**	**$33,164,006**	**$86,705,228**	**$38,705,585**	**$102,447,365**

ANNUAL PMTCT ARV DRUG COST ESTIMATES

TYPE	PMTCT NVP drugs' costs	Other PMTCT ARV Drug costs	Total PMTCT ARV Drug costs
FOB ANNUAL DRUG COSTS	$22,464	$1,972,639	$1,995,103
TOTAL ANNUAL HANDLING CHARGES *(31% for NVP drugs, 21% for others of FOB costs)*	**$6,852**	**$404,391**	**$411,243**
GRAND TOTAL DPP COSTS	**$29,316**	**$2,377,030**	**$2,406,346**

NOTE*: Estimated Insurance & Freight(8% *),NDA Charges (2% *),Estimated Clearing Charges (3.5% *),Estimated Warehousing and Distribution (7% *) and Repackaging charges for NVP range (10%)*

ANNEX 3.2: List of Anticancer Drug Requirements Source: Anthony Natif, Pharmacist Uganda Cancer Institute Mulago August 2009

1st line:

Drug name	Estimated monthly consumption	Estimated unit cost (Ush)	Estimated total cost	Estimated Annual Cost (x12)

Doxorubicin 50mg	400	53,000	21,200,000	254,400,000
Bleomycin 15 IU	396	49,000	19,404,000	232,848,000
Vincristine 1mg	396	4700	I,861,200	22,334,400
Vincristine 2mg	396	7400	2,930,400	35,164,800
5-FU 500mg	240	6500	1,560,000	18,720,000
IV Cyclophosphamide 1g	450	10,000	4,500,000	54,000,000
Dacarbazine 200mg	120	62,000	7,440,000	89,280,000
Tamoxifen 20mg, 30's	800 tabs	5,200	4,160,000	49,920,000
Cytarabine 100mg	200	17,000	3,400,000	40,800,000
Melphalan 2mg	30x25's	75,000	2,250,000	27,000,000
2nd Line:				
6Mercaptopurine tabs 50mg	300	145,000	43,500,000	522,000,000
IV Methotrexate 50mg/2ml	200	10,200	2,040,000	24,480,000
Tab Methotrexate 2.5 mg 100's	300	40,000	12,000,000	144,000,000
Chlorambucil 2mg	20x25's	66,000	1,320,000	15,840,000
Dactinomycin 500µg	60	45,000	2,700,000	32,400,000
Docetaxel 80 mg inj	40	210,000	8,400,000	100,800,000
Paclitaxel 100mg/16.7ml	60	430,000	25,800,000	309,600,000
Daunorubicin 20mg	80	62,000	4,960,000	59,520,000
Etoposide 100mg/5ml	40	35,000	1,400,000	16,800,000
Leucovorin 50mg/5ml	50	31,000	1,550,000	18,600,000
Cisplatin 50mg/50ml	45	25,000	1,125,000	13,500,000
Carboplatin 450mg	10	320,000	3,200,000	38,400,000
Carboplatin150mg	10	150,000	1,500,000	18,000,000
Oxaliplatin 100mg	6	400,200	2,401,000	28,812,000
Oxaliplatin 50mg	4	240,000	960,000	11,520,000
Asparaginase 10,000 IU	60	450,000	27,000,000	324,000,000
Gemcitabine1gm	8	388,000	3,104,000	37,248,000
Gemcitabine 200mg	10	200,000	2,000,000	24,000,000
Capecitabine 500mg-120's	10	1,056,000	10,560,000	126,620,000

TOTAL	**2,691,067,200**

ANNEX 3.3 VACCINE REQUIREMENTS
Source: UNEPI presentation to Pharmacy Division Workshop

Vaccine	**Coverage in target pop**		
	2008	**2009**	**2010**
A- UNEPI Coverage Targets			
BCG	100%	100%	100%
OPV3	90%	90%	90%
DPT-HepB1	98%	99%	100%
Measles	95%	96%	97%
TT Preg	85%	85%	85%
TT Other	25%	25%	25%

B- Quantities and Value of Vaccines required annually

	2007/2008			2008/2009			2009/2010		
Vaccine	Quantity	Cost/vial-US$	Value+Freight & handling	Quantity	Cost/vial	Value+Freight & handling	Quantity	Cost/vial	Value+Freight & handling
BCG	4,727,000	1.92	508,247	4,952,800	1.92	532,525	5,121,100	1.92	550,621
OPV	5,441,000	2.88	877,524	5,928,000	2.88	956,068	6,129,500	2.88	988,566
DPT-HepB+Hib	224,300	7.00	879,256	4,252,624	7.00	14,884,184	4,441,630	7.00	17,411,190
Measles	1,498,000	2.16	362,396	1,806,600	2.16	437,053	3,523,300	2.16	852,357
TT	6,819,000	1.00	381,864	6,793,360	1.00	380,428	7,024,300	1.00	393,361

C- Quantities and value of injection Materials required annually

Injection materials	2007/2008			2008/2009			2009/2010		
	Quantity	Cost/box-US$	Value+Freight & handling	Quantity	Cost/box-US$	Value+Freight & handling	Quantity	Cost/box-US$	Value+Freight & handling
0.05 ml	1,997,000	7.73	949,364	1,649,243	7.73	784,042	1,705,317	7.73	810,699
0.5 ml	9,116,000	6.55	3,672,153	9,657,081	6.55	3,890,114	10,045,900	6.55	4,046,740
2 ml	2,144,400	2.64	348,165	3,293,850	2.64	534,789	3,436,654	2.64	557,975
5 ml	208,750	3.20	41,082	200,533	3.20	39,465	391,086	3.20	76,966
Safety boxes - 5 lt	66,625	21.00	86,046	164,569	21.00	212,541	164,569	21.00	212,541

D- Quantities and values of vaccines and injection material required for Supplemental immunization

Vaccine	2007/2008			2008/2009		
	Quantity	Cost/vial-US$	Value+Freight & handling	Quantity	Cost/vial	Value+Freight & handling
OPV	-	2.88	-	14,777,000	2.88	2,383,235
Measles	-	2.16	-	6,649,650	2.16	1,608,683
TT	1,397,000	1.00	78,232	-	1.00	-
Injection materials	**2007/2008**			**2008/2009**		
	Quantity	Cost/box-US$	Value+Freight & handling	Quantity	Cost/box-US$	Value+Freight & handling
0.5 ml	1,306,000	6.55	526,089	6,274,000	6.55	2,527,324
5 ml	-	3.20	-	665,000	3.20	130,872
Safety boxes - 5 lt	13,060	21.00	16,867	69,390	21.00	89,617

ANNEX 3.4 CONTRACEPTIVES AND CONDOM REQUIREMENTS

SOURCE: Projections by MOH Reproductive Health Commodity security Advisor

Item*	Annual Requirements**	Unit of measure	Unit cost***	Total Cost UGX
Implants	16,296	Each	32,433	528,528,168
Intra Uterine Device	10,736	1 device	3,450	37,039,200
Microgynon	622,842	1 cycle	454	282,770,268
Lofeminal	588,053	1 cycle	454	266,976,062
Ovrette	199,197	1 cycle	454	90,435,438
Medroxy Progesterone	945,801	1 Vial	1,556	1,471,666,356
Total				**2,677,415,492**

* A number of changes are anticipated in the near future-
1. Phase out of Lofeminal and maintaining Microgynon,
2. Phase out of Ovrette and replace with Microlute

** The annual requirements are based on average between NMS issue data and HMIS consumption figures for Medroxy progesterone, Microgynon, Lofeminal and Ovrette.
For Implants and IUD the estimates are based on 2% increase in CPR per year Using the 2006 DHS data to determine baseline requirements

*** This is based on NMS price list of December 2008

Item	Annual Requirements	Unit of measure	Unit cost (UGX)	Total Cost Billion UGX
CONDOMS	202 Million	Pack of 3	96	**6,464,000,000**

Estimates based on population involved in risky sex. This includes :•Commercial sex contacts , •Casual contacts ,•Marital contacts when at least one partner has outside partners ,•Marital contacts for positives & discordant couples

ANNEX 3.5

Estimates for Requirements for the Uganda National Blood Transfusion Services

SN	Conditions/Units	Estimated no handled/Year	Estimated Cost /Dose or Unit	Total Monetary Value /Year
1	Blood Bags	170,000	5,660	962,200,000
2	HIV Test Kits	180,000	11,468	2,064,240,000
3	Pasteur pipettes	140,000	140	19,600,000
4	Pipette tips	200,000	35	10,500,000
5	Test Tubes	200,000	90	18,000,000
6	Capillary Tubes	150,000	100	15,000,000
7	Gloves	500	4750	2,375,000
8	Gauze	1000	10,574	10,574,000
9	Vacutainer tubes	148,000	250	37,000,000
10	Microplates	15,500	5000	77,500,000
11	Blood Lancet	100,000	250	25,000,000
12	Ferrous Sulphate Tablet	1500	4000	6,000,000
13	Copper sulphate	200	45,000	9,000,000
14	Cotton wool	400	3,500	1,400,000
15	Aprons	40,000	200	8,000,000
	Total			**3,266,389,000**

Annex 3.6 Estimates for annual requirements of anti- TB treatment.

Source: Projections in the three year rolling plan 2006/07 to 2008/09

Est. Patient numbers

	2006/2007	2007/2008	2008/209
Cat. 1	37,875	40,640	47,040
Cat. 2	4,734	5,080	5,880
Cat. 3	4,734	5,080	5,880
Total	47,334	50,800	58,800

Cat 1: New Tuberculosis patients (Not treated before) (2EHRZ/6HE)
Cat 2: Retreatment Tuberculosis patients (Relapses, Failures and Sputum Smear positive after default (2SEHRZ/EHRZ/5RHE)
Cat 3: Children Tuberculosis patients (2RHZ/4HR
INH: Prophylaxis of children of smear positive mothers and HIV positive clients
Pyridoxine: remedy for INH toxicity

Estimated cost of Medicines USD

	2006/2007	**2007/2008**	**2008/2009**

Cat. 1	747,000	802,000	928,000
Cat. 2	188,000	202,000	232,000
Cat. 3	85,000	92,000	104,000
INH 100mg Tabs	20,000	20,000	20,000
Pyridoxine 25mg Tabs	1,000	1,000	1,000
Total in USD	**1,020,000**	**1,096,000**	**1,285,000**
Total In Billions UGX			**2.570**

ANNEX 3.7 -MOH- HIV TEST KITS AND LABORATORY REGENT REQUIREMENTS FOR 2009/2010
Source . CPHL MOH Estimates October 2009

Sr. No.	Description	UOM	Unit cost (USD)	Revised MOH AMC Based on NMS JMS and Facility issues and consumption Data	Projected 12 months consumption	Total Cost
	HIV Testing Kits					
1	Determine HIV 1/2 Test Kit + Chase Buffer*100% screening	100	73	6,178	74,140	5,397,392
2	Stat-Pak Dipstick HIV 1/2 Test Kit*30% confirmation	30	32	6,178	74,140	2,369,514
3	Unigold HIV 1/2 Test Kit*2% tie-breaker	20	36	618	7,414	267,201
	Subtotal					**8,034,107**
	Accessories					
4	Vacutainer [85% venous draw] 4 ml, EDTA, plastic	100	9	4,896	58,747	506,987
5	Needle 21G x 1"	100	6	4,896	58,747	379,506
6	Needle holder	1,000	16	490	5,875	93,995
7	Pipette puddlé pastette, 50 µl drop	100	4	6,178	74,140	296,560
8	Lancet single use, safety	500	80	185	2,224	177,936
9	Capillary tube [15% capillary draw] 200 µl, EDTA	250	39	371	4,448	173,488
10	Benchcote roll**49 cm x 50 m (150 sheets: 49 cm x 30 cm)	1	2	3,707	44,484	94,899
11	Parafilm roll***5 cm x 75 m (1500 pieces: 5 cm x 5 cm)	1	0	185,350	2,224,200	26,690
	Subtotal					**1,750,061**
	Blood/DBS sample collection and EID testing Review and give realistic Figures					
12	SS 903 paper 5-circles	1,000	340	62	741	252,076
13	Glassine paper single sheet	500	50	136	1,631	81,554
	Zip-lock bags 12 x 10 cm			62	7	17,0

4		100	23		41	52
15	Dessicant packs 4 x 4 cm, indicating,rechargeable	1	0	6,178	74,140	14,087
16	DBS Collection Bundles (Roche/Lasec)	50	130		-	-
	Subtotal					**364,769**
	Laboratory Related Testing Kits					
17	Anti Serum A	10ml	3	541	6,492	20,320
18	Anti Serum B	10ml	3	541	6,492	22,657
19	Anti serum AB	10ml	7	541	6,492	44,925
20	Anti serum D	10ml	7	541	6,492	44,925
21	Anti human globulin serum	5ml	6	300	3,600	22,104
22	HCG pregnancy test strips	100	8	2,000	24,000	192,000
23	HCG Latex antigen	100	22	350	4,200	90,426
24	RPR test strips	100	20	10,000	120,000	2,400,000
25	RPR antigen	100	25	7,000	84,000	2,074,800
26	TPHA antigen	100	25	4,000	48,000	1,181,760
27	Blood Glucose test strips	50	60	2,200	26,400	1,584,000
28	Glucose oxidize colorimetric kit	100	44	700	8,400	368,340
29	Cryoptococcal latex antigen	100	200	180	2,160	432,000
30	Salmonella O and H antigens	100	4	350	4,200	16,800
31	Brucella A and B antigens	100	4	200	2,400	9,600
32	Hepatisis A/B surface antigen	100	6	210	2,520	15,120
33	Urine test strips	50	11	600	7,200	80,640
	Subtotal					**8,600,416**
	Reconstituted Laboratory reagents for Malaria/CBC/TB and OI					
34	0.04% Ammonium hydroxide	500mls	3	459	5,508	17,515
35	2% Turks Solution	500mls	2	500	6,000	12,000
36	0.1ml HCL	1000mls	3	350	4,200	12,600
37	10% Formal Saline	1000mls	2	200	2,400	5,640
38	Leishman's Stain	1000mls	4	750	9,000	36,000
39	Strong Carbol Fuschsin	1000mls	7	600	7,200	50,400
40	50% Acetone Alcohol	1000mls	3	972	11,664	34,992
41	Fields A Stain solution	1000mls	7	860	10,320	70,176
42	Fields B Stain solution	1000mls	7	860	10,320	70,176

43	0.85% Sodium Chloride	1000mls	3	689	8,268	20,670
44	3% Sulphosalicyclic Acid	1000mls	5	80	960	4,320
45	Gram's Iodine Solution	1000mls	6	920	11,040	66,240
46	20% Sulphuric Acid	1000mls	6	1,105	13,260	72,930
47	2% Crystal Violet	1000mls	14	650	7,800	109,200
48	0.1% Neutral Red	1000mls	4	670	8,040	33,768
49	0.5% Methylene Blue	1000mls	6	679	8,148	48,888
50	10% Potassium Hydroxide	1000mls	7	86	1,032	7,224
51	Stuart Transport Medium-ready to use	5mls	2	6,000	72,000	144,000
52	Cary-blair transport medium ready to use	5mls	2	6,000	72,000	144,000
	Subtotal					**960,739**
	Other laboratory Consumables					
53	Alcohol swabs Isoproparhly	100pcs	3	700	8,400	26,880
54	Paster Pipettes -paddle 5mls	100pcs	35	200	2,400	84,000
55	Cryo-vial free standing with srew cap	100pcs	250	100	1,200	300,000
56	Capillary tubes,EDTA 200µl	250pcs	67	160	1,920	128,640
57	Container stool plastic with srew	100pcs	18	2,000	24,000	432,000
58	Microscope slides single frosted	50pcs	2	3,500	42,000	79,800
59	Paper towel	1 roll	15	200	2,400	36,000
60	Biohazard Bags 21 inch	100pcs	26	600	7,200	187,200
61	Biohazard bags 30 inch	100pcs	69	600	7,200	493,200
62	Sodium hypochorite laboratory disinfectant	5litres	5	560	6,720	32,928
63	Swabs Cotton throat/Plus plain	100pcs	3	120	1,440	3,600
64	Benchcoat roll plus 460 x 520	100pcs	23	40	480	11,040
65	Microscope Cover slips	50pcs	1	800	9,600	11,520
66	Humidity indicator cards	250pcs	19	60	720	13,536
67	Plascicine-adhensive strength 75%	5pcs	32	80	960	30,912
68	Teepol disinfectant	5litres	19	180	2,160	40,176
69	oil Immersion Analar	100ml	10	96	1,152	11,750
70	Parafilm roll-wax 100mm x 75mm	Roll	35	50	600	20,700
	Subtotal					**1,943,882**
	GRAND TOTAL					**21,653,975**

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SECTION 2