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BASELINE LABORATORY CAPACITY ASSESSMENT OF PRIVATE AND NON- GOVERNMENTAL HEALTH FACILITIES FOR INITIATION OF ART SERVICES

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ACRONYMS

ART	Anti Retroviral Therapy
BC	Blood Count
CD4	Cluster of Differentiation 4
EQA	External Quality Assurance
FMOH	Federal Ministry of Health
HC	Health Center
HIV	Human Immune Deficiency Virus
IQA	Internal Quality Assurance
HC	Health Center
NGO	Non-governmental Organization
PFSA	Pharmaceutical Fund and Supply Agency
PHSP	Private Health Sector Program
PPP	Public Private Partnership
SOP	Standard Operation Procedure

I. SUMMARY

In Ethiopia, private health care facilities serve a significant portion of the society. However, despite Federal Ministry of Health's (FMOH) stated strategy to involve the private sector in providing HIV care, major obstacles remain that impede the full participation of the private sector in the provision of HIV services.

The capacity of private facilities in laboratory services and their willingness to perform sample transfer to referral sites are extremely important for expanding anti-retroviral therapy (ART) service delivery. Moreover, ensuring sustainable collaboration among partner organizations (including the public health sector) is essential to expand successful implementation of public-private partnership (PPP) ART services.

The Private Health Sector Program (PHSP) conducted a readiness assessment of 17 private and non-governmental organization (NGO) facilities in Amhara (nine in Bahir Dar, Burie, and Dessie towns), Tigray (three in Mekele) and Addis Ababa (five) for initiation of HIV care and treatment services by using an observation checklist.

Gaps were identified and subsequent recommendations made to address the gaps in staffing, training, availability of lab services, equipment needs, standard operating procedures (SOPs) and sample referral.

2. ASSESSMENT OBJECTIVES

The main objectives were to:

- Determine the capacity of laboratories in the private facilities to support HIV care
- Assess the capability of the private facility labs to refer out specimens
- Document willingness of the public facilities to perform CD4 counts on samples referred from the private clinics

3. METHODOLOGY

The assessment was conducted May 10-20, 2011. A cross sectional assessment checklist was used to collect data.

4. FINDINGS

4.1 GENERAL INFRASTRUCTURE

The National ART Implementation Guideline requires the following for ART laboratory services:

- Adequate laboratory space for specimen collection and testing,
- Continuous supply of clean water,
- Electricity supply with backup generator,
- Telephone line,
- Adequate space for waste disposal,
- Paper or computer-based database system.

Most of the facilities assessed fulfilled the basic infrastructure requirements. However, laboratory space in 26 percent of assessed facilities was inadequate.

TABLE 2. LABORATORY INFRASTRUCTURE (N= 17)

Facilities	Clinics with adequate lab space (#/%)
Adequate laboratory space	13/76
Electric and water supply	17/100
Backup generator	17/100
Telephone	17/100
Incinerator	17/100
Computer	3/18
Laboratory database	0/0

4.2 STAFFING

Availability of well-qualified personnel is necessary for ART laboratory services. Almost all laboratories assessed had at least one trained laboratory professional.

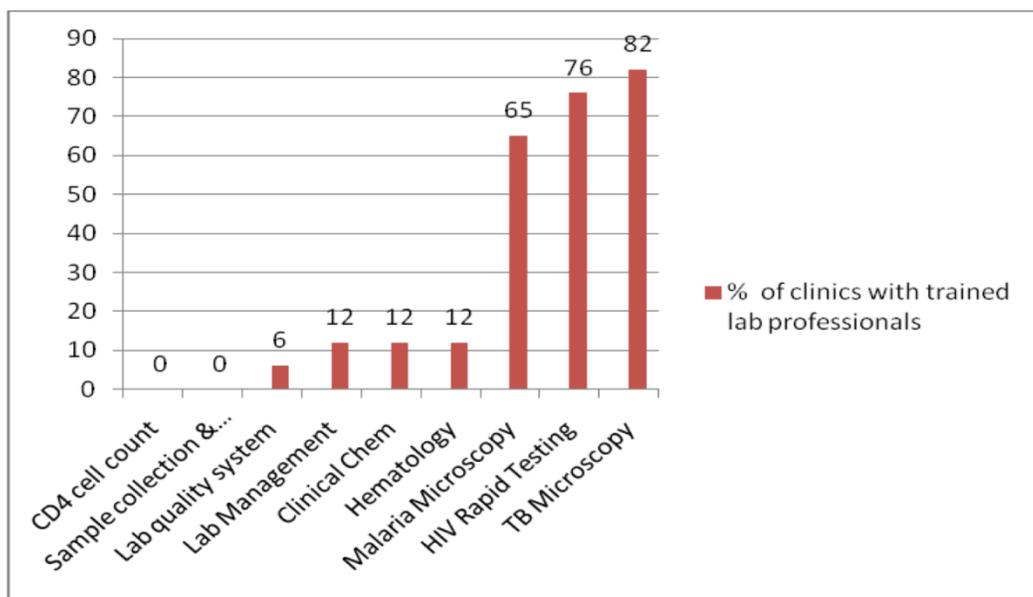
TABLE 3. NUMBERS OF LABORATORY PROFESSIONALS IN PRIVATE CLINICS (17)

Number of lab professionals/clinic	Number/% clinics with lab staff
One lab professional	3/18
Two lab professionals	5/29
Three lab professionals	4/24
Four lab professionals	4/18
Five lab professionals	0/0
Six lab professionals	1/12

4.3 BUILDING HUMAN CAPACITY

Training is a major component required to improve quality of laboratory services. Figure I describes private facilities with laboratory personnel trained in different ART related laboratory services. Areas of training priorities include sample collection, clinical chemistry, hematology, laboratory quality, and management.

FIGURE I. TRAINING PROFILE OF LAB PROFESSIONALS IN THE FACILITIES



4.4 LABORATORY SERVICES

The majority of the facilities assessed have basic laboratory services. The capability to address opportunistic infections (OIs) was available in only one laboratory.

TABLE 4. MAJOR LAB SERVICES AVAILABLE IN THE PRIVATE CLINICS (N=17)

Lab services	Clinics with lab services (#/%)	Remark
Rapid HIV Test	17/100	
CD4	2/12	
LFT	17/100	
RFT	17/100	
Glucose	17/100	
Hematology	17/100	Manual CBC is done 5 clinics
ESR	15/88	
AFB microscopy	14/82	
Malaria microscopy	15/88	
Gram stain	14/82	
KOH	14/82	
OI (Indian inc)	1/6	
Hormone test (Immunoassay)	3/18	

4.5 EQUIPMENT

A laboratory should have appropriate equipment, specialized test kits and consumables. Microscopes, chemistry analyzers, centrifuges and refrigerators are available in almost all facilities. Seventy-one percent of the clinics have a hematology analyzer. A CD4 machine is only available in three health facilities (two in Addis Ababa and one in Tigray). Sample referral is required for 29 percent of facilities that do not have a hematology analyzer as well as for 82 percent of facilities without a CD4 machine.

Table 5. Lab equipment (N=17)

Lab equipment	Clinics with functioning equipment (#/%)
Microscope	17/100
CD4 machine	3/18
Chemistry analyzer	17/100
Hematology analyzer	12/71
Centrifuge	17/100
Vortex mixer	4/24
Refrigerator	17/100
Cold box	4/24
Autoclave	2/12
Dry oven	6/35
Incubator	4/24
Shaker	6/35
Water distiller	2/12
Thermometers	8/47
Ups	9/53

The national laboratory standard requires a minimum laboratory configuration of equipment for the different laboratory functional levels, which in turn determines the volume and complexity of tests they can perform. This was developed to improve service delivery by limiting bulk purchase of reagents for a variety of platforms, which also affects staff training requirements.

The CD4 cell count machine platform in the three facilities met the national standard. All the 17 facilities have clinical chemistry machines; 11 (65 percent) have machines that conform to the national recommendation; three (25 percent) have an analyzer that meets the standard; and 50 percent have a similar platform for the same machines. Of the remaining, three facilities have three types of machines with different platforms.

These configurations suggest that facilities with equipment similar to the national platform could receive reagents from Pharmaceutical Fund and Supply Agency (PFSA) if they agree to provide free CD4 services and are willing to reduce reagent costs for clinical chemistry and hematology tests. In addition, local vendors that have hematology and clinical chemistry analyzers with different equipment platforms can conduct training for the facilities' staff.

TABLE 6. EQUIPMENT CONFIGURATION

Type of analyzers	# of clinics with equipment	System
CD4		
FACS count	3	Closed but can use reagents from PFSA
Clinical Chemistry		
3000 Evolution (Biochemical System International)	3	Open
Humalyser 2000	3	Closed but can receive reagents from PFSA
Humalyser 3000	3	Closed but can receive reagents from PFSA
Humastar 80	1	Closed but can receive reagents from PFSA
Photometer 5010	4	Open
BS-120 Automated	1	Closed
Visual	1	Open
Lab assistant; Spinreact	1	
Hematology		
Symex KX-21N	3	Closed but can receive reagents from PFSA
Humacount	6	Closed
BC - 1800 Mindany auto hematology analyzer	1	Closed
TC Hemaxa 1000 auto hematology analyzer	1	Closed
BC 3000 plus	1	Closed

4.6 STANDARD OPERATING PROCEDURES

The SOP helps to ensure uniformity, consistency and control over the processes carried out in laboratory. Almost none of the facilities assessed had an SOP for tests they were providing.

TABLE 7. SOP FOR AVAILABLE LAB SERVICES

Lab SOP	Clinics with LAB services available	Clinics with SOPs (#/%)
Sample collection and processing	17	0/0
HIV testing	17	3/18
AFB microscopy	14	8/57
Malaria microscopy	15	0/0
Hematology tests	17	0/0
Clinical chemistry	17	0/0
CD4	3	2/12
IP and waste management	17	0/0

4.7 INTERNAL QUALITY ASSURANCE/EXTERNAL QUALITY ASSURANCE

Quality laboratory reports will lead to correct diagnosis. The two important tools toward sustaining laboratory quality are Internal Quality Control (IQC) and External Quality Assurance (EQA). These tools help detect and minimize immediate errors as well as ensure long-term precision and accuracy of results. Almost all assessed facility laboratories did not have IQC measures and had minimal EQA participation. However, IQC and EQA measures were implemented for AFB microscopy in more than 50 percent of the assessed facilities.

TABLE 8. LAB QUALITY CONTROL AND QUALITY ASSESSMENT FOR MAJOR AVAILABLE LAB SERVICES

Lab services	Clinics with lab service	Clinics with IQC # (%)	Clinics EQA # (%)
Hematology	17	3(18)	0(0)
Clinical chemistry	17	6(35)	0(0)
HIV testing	17	2(12)	9(53)
AFB microscopy	14	9(64)	9(64)
Malaria microscopy	15	0(0)	0(0)
CD4	3	2(67)	1(33)

4.8 SAMPLE REFERRAL LINKAGES

Having the capability and ability to network between peripheral and higher laboratories allows the collection of specimens at a peripheral location and transporting them to higher centers for testing. These higher centers will then communicate results back to the peripheral location without having to transfer the patient.

This assessment attempted to identify the willingness of public facilities to provide CD4 tests on samples referred from private health facilities.

Table 9 describes samples from facilities that referred these and those that received these for CD4 count and the average transportation distance that the sample traveled (average distance: 1.3 to 10 kilometers).

TABLE 9. DISTRIBUTION OF SAMPLE REFERRING AND RECEIVING FACILITIES AND THEIR AVERAGE DISTANCE

Region	Town	Facility	Referral site	Average distance (km)
West Amhara	Bahir Dar	Gamby HC	Bahir Dar Regional Lab	2.7
		Kidanemheret HC		
		Aflagat General Hospital		
		St Johon HC	Felegehiwot Hospital	
	Alemsaga HC			
Bure	St Jourg Hospital	Enjibara HCs	10	

Region	Town	Facility	Referral site	Average distance (km)
East Amhara	Dessie	Bati General Hospital Selam General Hospital Ethio General Hospital	I. Dessie Regional Lab	1.3
Tigray	Mekele	Markos General Hospital	African Service Committee Mekele Regional Lab Hewo Hospital	3.7
		Meskerem General Hospital		
Addis Ababa Admin. City	Addis ababa	Free Methodist	Missionary of Charity African Service Committee	4
		Merry Joy		
		Selam Children's Village		

5. RECOMMENDATIONS

Based on the assessment findings, the following are the team's recommendations:

- Improve the laboratory infrastructure
- Provide trainings on sample collection, ART monitoring tests based on equipment configurations, laboratory management and applying quality control measures
- Encourage CD4 testing to initiate and follow up treatment, though this will increase sample referral—this will strengthen the referral system
- Design CD4 sample transportation mechanisms
- Increase availability of SOP and guidelines at the facilities
- Support implementation of quality assurance for the laboratory services provided, through mentoring, and facilitate participation in the national/international EQA program

ANNEX A. AVAILABILITY OF LAB INFRASTRUCTURE IN ASSESSED PRIVATE FACILITIES

Name of facility	Adequate lab space	Electricity	Piped water supply r	Backup generator	Telephone	Incinerator	Computer
Gamby HC	N	Y	Y	Y	Y	Y	N
Kidanemeheret HC	Y	Y	Y	Y	Y	Y	N
Aflagat General Hospital	Y	Y	Y	Y	Y	Y	N
St Johon HC	Y	Y	Y	Y	Y	Y	N
Alemsaga HC	Y	Y	Y	Y	Y	Y	Y
St Jourg Hospital	Y	Y	Y	Y	Y	Y	N
Bati G/Hospital	Y	Y	Y	Y	Y	Y	N
Selam General Hospital	Y	Y	Y	Y	Y	Y	N
Ethio General Hospital	N	Y	Y	Y	Y	Y	Y
African Service Committee Mekele	Y	Y	Y	Y	Y	Y	N
Markos General Hospital	N	Y	Y	Y	Y	Y	N
Meskerem General Hospital	Y	Y	Y	Y	Y	Y	N
Missionary of Charity	Y	Y	Y	Y	Y	Y	N
Free Methodist	N	Y	Y	Y	Y	Y	N
Selam Children's Village	Y	Y	Y	Y	Y	Y	N
African Service Committee Addis Ababa	Y	Y	Y	Y	Y	Y	N
Merry Joy	Y	Y	Y	N	Y	Y	Y

ANNEX B. AVAILABILITY OF LAB WORKERS IN THE ASSESSED PRIVATE HEALTH FACILITIES

Name of facility	# of lab technologists	# of lab assistants	# of lab clerks
Gamby HC	1	5	4
Kidanemeheret HC	0	2	1
Aflagat General Hospital	2	2	0
St Johon HC	1	0	1
Alemsaga HC	0	4	0
St Jourg Hospital	2	0	1
Bati General Hospital	1	2	2
Selam General Hospital	0	3	2
Ethio General Hospital	1	3	2
African Service Committee	0	2	0
Markos General Hospital	0	1	1
Meskerem General Hospital	0	2	0
Missionary of Charity	1	2	0
Free Methodist	1	3	0
Selam Children's Village	1	2	1
African Service Committee Addis Ababa	1	1	0
Merry Joy	0	1	1

ANNEX C. AVAILABILITY OF TRAINED LAB PROFESSIONALS IN DIFFERENT LAB SERVICES

Name of facility	Lab management	Rapid HIV testing	CD4 cell count	Clinical chem.	Hematology	Sample collection	Malaria micro	TB microscopy	Equipment maintenance	Lab quality system
Gamby HC	0	4	0	0	0	0	2	2	0	0
Kidanemeheret HC	0	2	0	0	0	0	0	2	2	0
Aflagat General Hospital	0	0	0	1	1	0	1	1	0	0
St Johon HC	0	1	0	0	0	0	1	1	0	0
Alemsaga HC	1	3	0	0	0	0	2	3	0	0
St Jourg Hospital	0	2	0	0	0	0	2	2	0	0
Bati General Hospital	0	1	0	0	0	0	1	1	0	0
Selam General Hospital	0	3	0	0	0	0	3	3	0	0
Ethio General Hospital	0	2	0	0	0	0	2	2	0	0
African Service Committee Mekele	0	2	0	0	0	0	1	1	0	0
Markos General Hospital	0	1	0	0	0	0	1	1	0	0
Meskerem General Hospital	0	0	0	0	0	0	0	0	0	0
Missionary of Charity	0	0	0	0	0	0	0	0	0	1
Free Methodist	1	1	0	1	1	0	0	1	0	0
Selam Children's Village	0	2	0	0	0	0	1	1	0	0
African Service Committee Addis Ababa	0	2	0	0	0	0	0	1	0	0
Merry Joy	0	0	0	0	0	0	0	0	0	0

ANNEX D. AVAILABILITY OF LAB SERVICES IN THE ASSESSED PRIVATE FACILITIES

Name of facility	HIV rapid Testing	CD	LFT	RFT	Glucose	CBC	ESR	Manual WBC	AFB	Malaria	Gram stain	KOH	Indian inc	Hormone test
Gamby HC	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	Y
Kidanemeheret HC	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
Aflagat General Hospital	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
St Johon HC	Y	N	Y	Y	Y	Manual	Y	Y	Y	Y	Y	Y	N	N
Alemsaga HC	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
St Jourg Hospital	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
Bati General Hospital	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
Selam General Hospital	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y
Ethio General Hospital	Y	N	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
African Service Committee Mekele	Y	Y	Y	Y	Y	Y	N		N	N	N	N	N	N
Markos General Hospital	Y	N	Y	Y	Y	Manual	Y	Y	Y	Y	Y	Y	N	N
Meskerem General Hospital	Y	N	Y	Y	Y	Manual	Y	Y	Y	Y	Y	Y	N	Y
Missionary of Charity	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	N	N
Free Methodist	Y	N	Y	Y	Y	Manual	Y	Y	Y	Y	Y	Y	N	N
Selam Children's Village	Y	N	Y	Y	Y	Y	Y		N	Y	N	N	N	N
African Service Committee Mekele	Y	Y	Y	Y	Y	Y	N		N	N	N	N	N	N
Merry Joy	Y	N	Y	Y	Y	Manual	Y	Y	Y	Y	Y	Y	N	N

ANNEX E. LAB EQUIPMENT AVAILABLE IN THE ASSESSED HEALTH FACILITIES

Name of facility	Autoclave	Dry oven	Centrifuge	Incubator	Shaker	Vortex	Hem analyzer	Chem. Analyzer	CD4 machine	Refrigerator	Cold box	Distillater	Thermometers	UPS
Gamby HC	0	0	2	0	0	0	1	1	0	1	0	0	0	1
Kidanemeheret HC	0	0	1	0	0	0	1	1	0	1	0	0	1	1
Aflagat General Hospital	0	1	1	0	0	0	1	1	0	1	0	0	0	2
St Johon HC	0	0	1	0	0	0	0	1	0	1	0	0	1	0
Alemsaga HC	0	0	1	0	0	0	1	1	0	1	0	0	0	0
St Jourg Hospital	0	0	1	0	1	0	1	1	0	1	0	0	0	1
Bati General Hospital	0	1	3	1	1	0	1	2	0	2	1	0	2	0
Selam General Hospital	0	1	2	1	0	0	1	3	0	2	1	1	2	1
Ethio General Hospital	0	1	4	1	1	1	1	1	0	3	2	0	0	2
African Service Committee Mekele	0	0	1	0	0	1	1	1	1	1	0	0	1	0
Markos General Hospital	0	0	1	0	1	0	0	1	0	1	0	0	0	0
Meskerem General Hospital	0	0	1	0	0	0	0	2	0	1	0	0	0	0
Missionary of Charity	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Free Methodist	0	0	1	0	0	0	0	1	0	1	0	0	0	0
Selam Children's Village	0	1	2	0	1	0	1	1	0	2	0	0	1	1
African Service Committee Addis Ababa	1	0	3	0	0	1	1	1	1	2	0	0	2	1
Merry Joy	1	0	1	0	0	0	0	1	0	2	0	0	0	0

ANNEX F. AVAILABILITY OF LAB SERVICES' SOP

Name of facility	Sample collection	HIV testing	AFB	Malaria	CBC	Clinical chem	Infection control	Equipment operation
Gamby HC	N	Y	Y	N	N	N	N	N
Kidanemeheret HC	N	N	N	N	N	N	N	N
Aflagat General Hospital	N	N	Y	N	N	N	N	N
St Johon HC	N	N	Y	N	N	N	N	N
Alemsaga HC	N	Y	Y	N	N	N	N	N
St Jourg Hospital	N	N	Y	N	N	N	N	N
Bati General Hospital	N	N	N	N	N	N	N	N
Selam General Hospital	N	N	Y	N	N	N	N	N
Ethio General Hospital	N	N	N	N	N	N	N	N
African Service Committee Mekele	N	N	N	N	N	N	N	N
Markos General Hospital	N	N	N	N	N	N	N	N
Meskerem General Hospital	N	N	N	N	N	N	N	N
Missionary of Charity	N	N	N	N	N	Y	N	N
Free Methodist	N	N	Y	N	N	N	N	N
Selam Children's Village	N	N	Y	N	N	N	N	N
African Service Committee Addis Ababa	N	Y	N	N	N	N	N	N
Merry Joy	N	N	N	N	N	N	N	N

ANNEX G. AVAILABILITY OF IQA AND EQA

Name of facilities	IQC						EQA					
	HIV testing	CD4	Clinical chemistry	Hematology	Malaria	AFB	HIV testing	CD4	Clinical chemistry	Hem	Malaria microscopy	TB Microscopy m
Gamby HC	N	NA	N	N	N	Y	Y	NA	N	N	N	Y
Kidanemeheret HC	NA	NA	N	N	N	Y	Y	NA	N	N	N	Y
Aflagat General Hospital	Y	NA	N	N	N	Y	N	NA	N	N	N	N
St Johon HC	N	NA	N	N	N	Y	Y	NA	N	N	N	Y
Alemsaga HC	N	NA	Y	N	N	Y	Y	NA	N	N	N	Y
St Jourg Hospital	N	NA	N	N	N	Y	Y	NA	N	N	N	Y
Bati General Hospital	N	NA	Y	N	N	Y	Y	NA	N	N	N	Y
Selam General Hospital	NA	NA	Y	Y	N	Y	Y	NA	N	N	N	Y
Ethio General Hospital	N	NA	Y	Y	N	Y	Y	NA	N	N	N	Y
African Service Committee	N	Y	N	N	N	NA	N	Y	N	N	NA	NA
Markos General Hospital	N	NA	N	N	N	NA	N	NA	N	N	N	N
Meskerem General Hospital	N	NA	N	N	N	NA	N	NA	N	N	N	Y
Missionary of Charity	N	N	N	N	N	N	N	N	N	N	N	N
Free Methodist	N	NA	Y	N	N	N	N	NA	N	N	N	N
Selam Children's Village	NA	NA	Y	Y	N	NA	N	NA	N	N	N	NA
African Service Committee Addis Ababa	Y	Y	N	N	NA	NA	Y	N	N	N	NA	NA
Merry Joy	N	N	N	N	N	N	N	NA	N	N	N	N

ANNEX H. TYPE OF EQUIPMENT AVAILABLE

Town	Name of facility	Hem	Chem	CD4
Bahir Dar	Gamby HC	Sysmex KX-21N	Photometer 5010	
Bahir Dar	Kidanemeheret HC	TC Hemaxa1000 Autohematology Analyser	3000 Evolution (Biochemical System International)	0
Bahir Dar	Aflagat General Hospital	Humacount 60TS	3000 Evolution (Biochemical System International)	0
Bahir Dar	St Johon HC	0	3000 Evolution (Biochemical System International)	0
Bahir Dar	Alemsaga HC	Sysmex KX-21N	Photometer 5010 Version 5	0
Bure	St Jourg Hospital	BC3000plus	Visual	0
Dessie	Bati General Hospital	Sysmex KX-21N	Humalyzer 2000; 5010	0
Dessie	Selam General Hospital	Humacount	Photometer 5010; Human Junier	0
Dessie	Ethio General Hospital	BC - 1800 Mindany Auto Hematology Analyser	BS-120 Automated	0
Mekele	African Service Committee	Humacount	Humalyser 2000	BD FACS Count
Mekele	Markos General Hospital	0	Humalyzer 3000	0
Mekele	Meskerem General Hospital	0	Spinreact	0
Addis Ababa	Missionary of Charity	Humacount	Humalyzer 3000	BD FACS Count
Addis Ababa	Free Methodist	0	Photometer 5010	0
Addis Ababa	Selam Children's Village	Humacount	Humalyzer 2000	0
Addis Ababa	African Service Committee CH clinic	Humacount	Humastar 80	BD FACS Count