6 Blood Use

In this section we discuss the process of decision-making in transfusing blood, procedures for evaluating the recipient, blood selection, operational details on transfusion, the general use of blood and storage. The experience during a one-year period preceding the study is discussed.

6.1 Reasons for transfusion

Only 43 hospitals provided the breakdown of blood used. This accounted for 24219 units out of 81817 units used. Based on the 24219 units there are six main reasons cited for blood transfusion. Anaemia adults 36.6%, Anaemia children 32.8%, Surgical 13.9%, Pregnancy cases account for 7.5%, Ceaserian cases 6.8%, and accidents 2.4%. The main reasons for transfusion in the country are given in table 6.1.

Table 6.1 Frequent reasons for blood transfusion 2000/2001

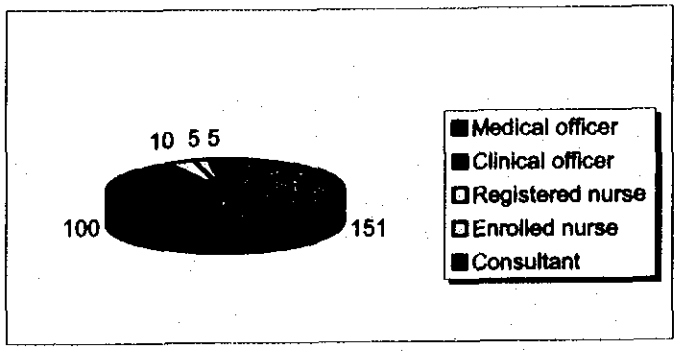
	Frequent reasons for transfusion (units transfused)						Total
	Post/after pattern Haemorgage	Ceaserian Section	Anaemia-child	Anaemia adult	Accidents	Surgical	
Nairobi	15	34	4	100	2	13	168
Central	220	179	425	137	71	975	1507
Eastern	104	113	750	938	32	108	2045
North Eastern	36	16	84	75	16	6	233
Coast	136	206	1228	3595	133	149	5445
Rift Valley	1180	516	1140	1197	300	832	161
Nyanza	139	536	2945	1993	32	1785	7430
Western	5	0	1378	829	4	10	2226
Total percent	1838	1600	7954	8862	590	3378	24219

Source: BTS study 2001

6.2 Decision-making

Usually it is the clinician who makes the diagnosis and therefore the decision to order for a transfusion. In the study, medical officers are the principal initiators of blood transfusion. In 151(78.2%) facilities the medical officer decides on who will be transfused and when this should be done. Clinical officers make the decision in 100 (51.8%) institutions while in 10 (5.2%) facilities registered nurses request for the transfusion. In 5 (2.6%) institutions, enrolled nurses make the request. Consultants and other doctors made decisions in 6 facilities. Figure 6.1 shows the relative frequency in the decision-making.

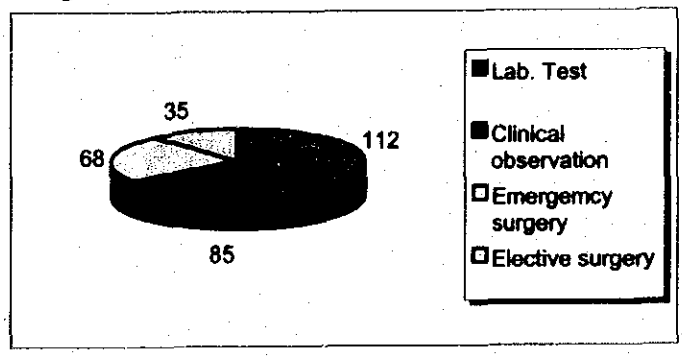
Figure 6.1 Request to transfuse blood



Source: BTS Study, 2001

The decision to transfuse is usually made on the basis of established guidelines, laboratory test, clinical observation or for surgery. The relative frequency of each reason is given in figure 6.2.

Figure 6.2 Parameters used for ordering transfusion



Source: BTS Study, 2001

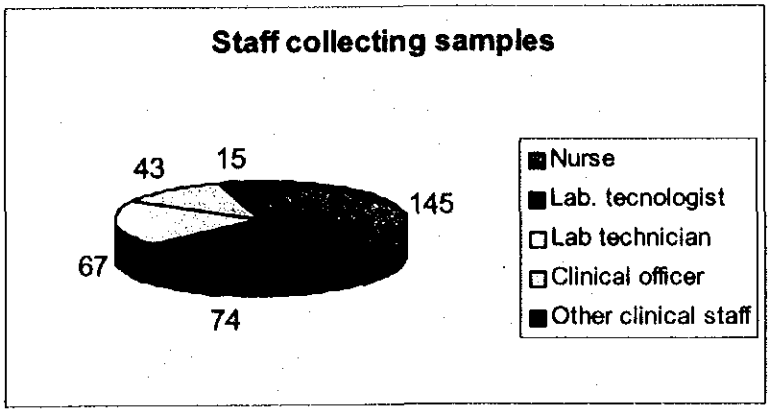
6.3 The Practice of Blood Transfusion

Collection of blood sample from the recipient

On average 2 ml of blood is collected for grouping and cross match. In 57.7% of the facilities 2 ml of blood are drawn. Twenty nine percent collect 5ml while 7.7% and 5.6 collect 10 and 1 ml respectively. There is no rationale for the wide range in the quantity of the sample collected from recipients.

No specific cadre is specifically assigned to drawing blood from the recipient as shown in figure 6.3. Frequently laboratory technicians, laboratory technologists, registered nurses, enrolled nurses or clinical officers draw blood. Other staff include doctors, Phlebotomists or laboratory assistants.

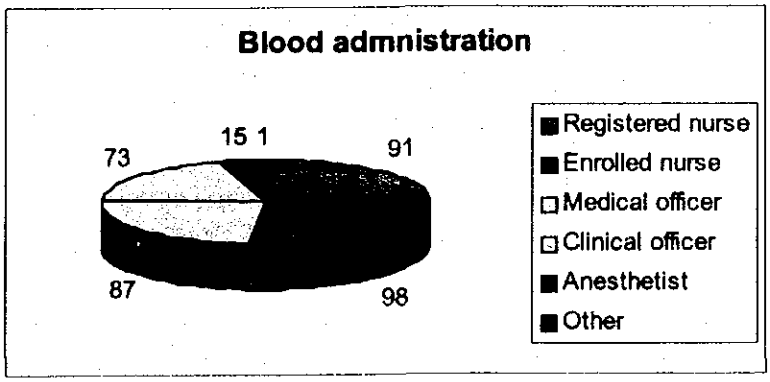
Figure 6.3 Cadres of staff drawing blood samples



Source: BTS Study, 2001.

In all facilities, usually it is nurses or doctors who administer blood. Others who may administer blood include anesthetists or rarely technicians. Figure 6.4 is the frequency with which different cadres administer blood.

Figure 6.4 Cadre of staff commencing transfusion



Source: BTS Study, 2001

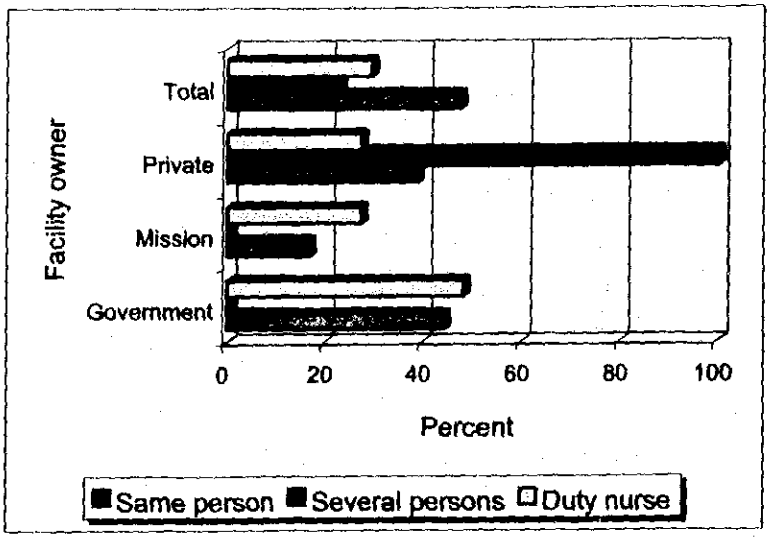
Evidently whereas decision-making is in the realm of clinicians, the more operational and practical aspects are the responsibility of nurses.

Monitoring of transfusion

Monitoring of the transfusion is almost exclusively by the nurse on duty (75.9%) and to a much less extent (11.4%) the same person who started the transfusion.

There is no much variation in monitoring. In all provider types, the nurse on duty does the monitoring rarely the same person commencing the administration and often more than one person carrying out the activity.

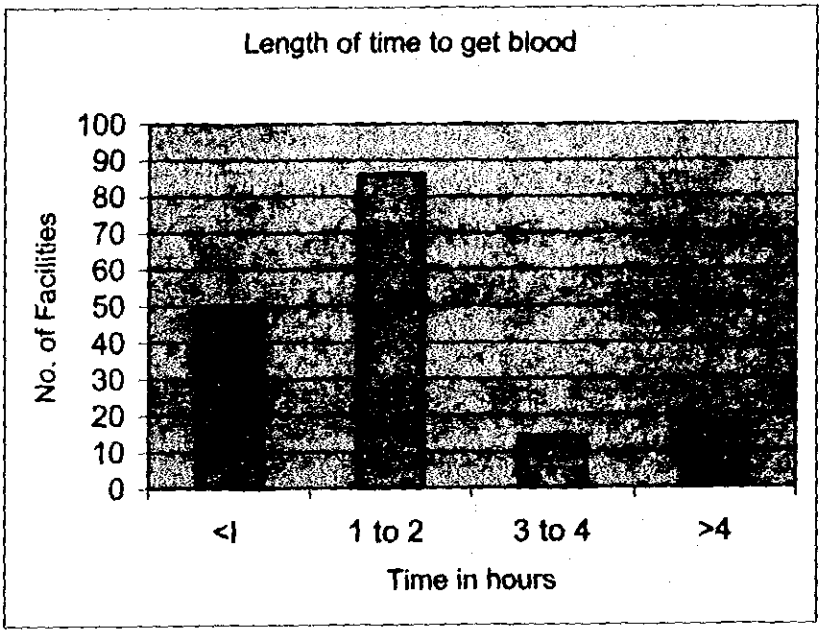
Figure 6.5 Person monitoring blood transfusion



Efficiency of processing

Freshly donated blood is used for transfusion more frequently than self-donor or stored blood. 61.7% of the facilities use freshly donated blood while 66.8% used reserved or stored blood. Only 11.4% of the institutions use self-donor blood. This would suggest that three quarters of the institutions can provide blood in a timely manner (have prior availability of blood). This is consistent with the findings of the study that 81.0% of the institutions have access to blood within 2 hours of the request reaching the laboratory. Figure 6.6 shows the time it takes to receive blood from the moment the request is made.

Figure 6.6 Length of time it takes to get blood



Source: BTS Study, 2001

Decision to transfuse

Differences exist on how the decision to transfuse is reached in the various provinces of Kenya. In particular the regularity with which objective criteria is used. Table 6.2 provides the national picture.

Table 6.2 Decision to transfuse

	Criteria for transfusion (%)		
	Guidelines	Clinical	Lab. Tests
Nairobi	100	36.4	45.5
Central	100	72.2	83.3
Eastern	100	15.8	57.9
North Eastern	100	66.7	66.7
Coast	100	62.5	87.5
Rift Valley	97	54.5	78.8
Nyanza	94.7	57.9	81.6
Western	100	72.2	38.9
Total	98.1	54.5	71.2

Whereas there is no much variation in the use of guidelines, wide variability among the provinces characterizes the use of laboratory tests and reliance on clinical observations. It is noteworthy that although almost all facilities indicated that they use written guidelines, less than 10% of those surveyed were able to show these guidelines. There are no differences on how the presence of an emergency or elective surgical indications influences decision-making.

Provider Analysis

There is wide variation in blood transfusion practices amongst the three categories of providers. The differences noted in blood collection procedures, administration and monitoring are depicted in figures 6.7 to 6.10. If all the required tests are being performed, then 2ml or less blood specimen is not adequate.

Figure 6.7 Amount of blood collected for testing by provider

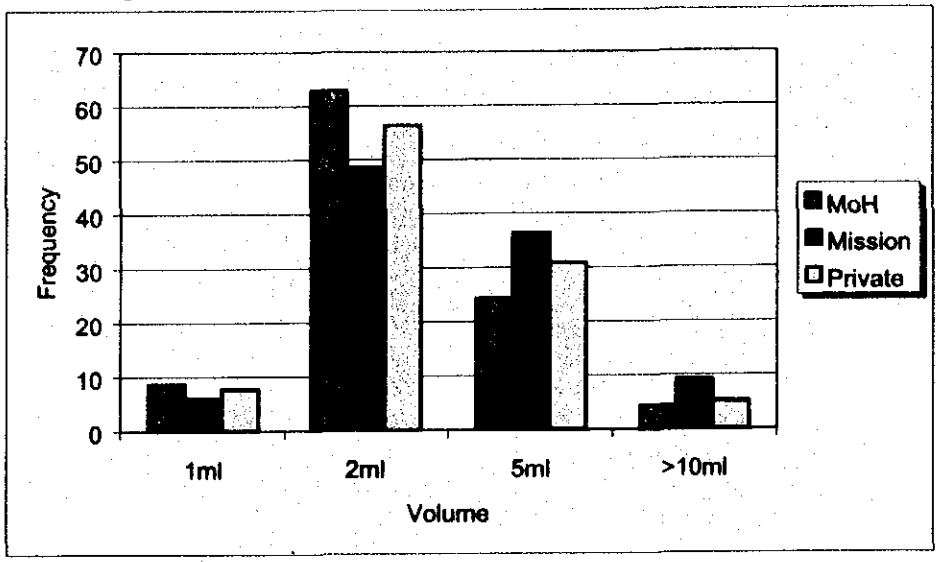
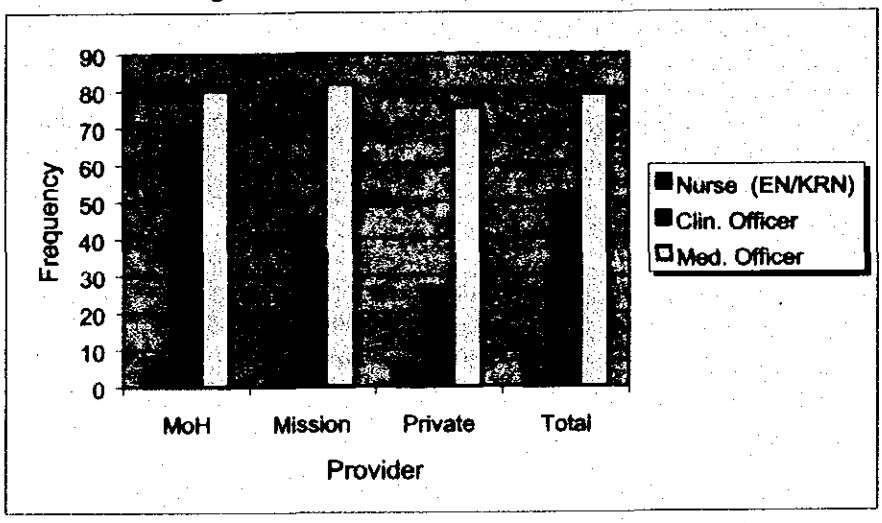
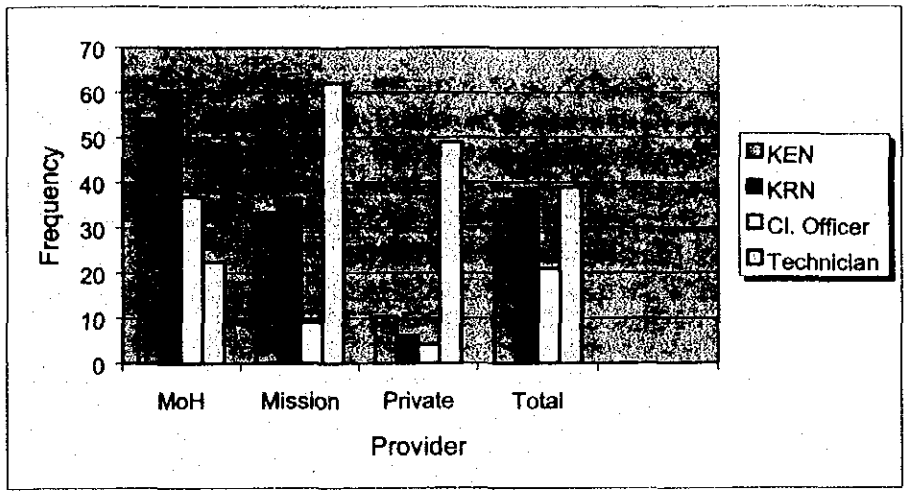


Figure 6.8 Clinician requesting transfusion



In Government, medical officers and clinical officers request for blood with almost equal frequency. The role of clinical officers in mission and private facilities is relatively small.

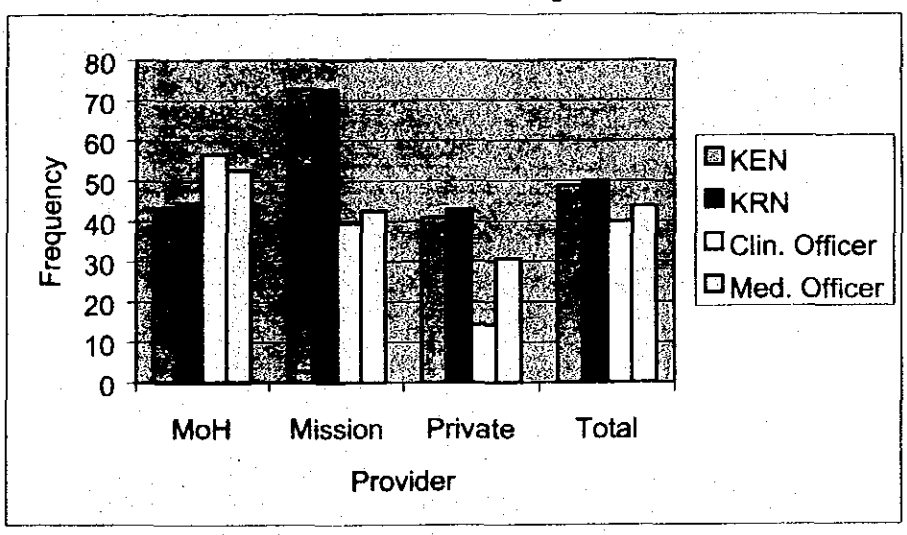
Figure 6.9 Person collecting blood sample



In Government facilities it is predominantly nurses who take blood samples. Technicians play this role in mission and private institutions.

In Government facilities it is predominantly nurses who take blood samples. Technicians play this role in mission and private institutions.

6.10 Person administering blood

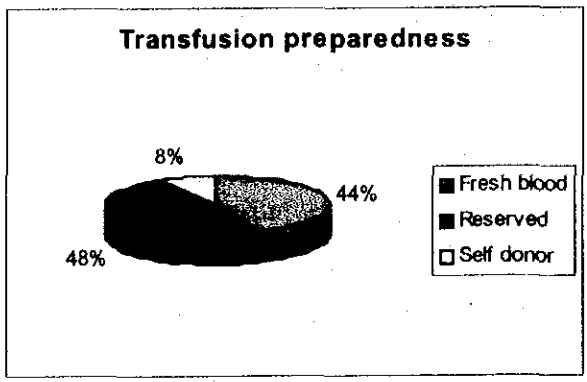


In mission and private institutions, nurses play a major role in administering blood to patients while in Government the role is shared with clinical officers and medical officers.

Cost-effectiveness in use of blood- parsimony

Cost-effectiveness /efficiency was assessed from the perspective of fractionation of blood and use of specific products as opposed to use of whole blood. This was also from the perspective of planning for transfusion as opposed to being reactive. The use of freshly donated blood was used as the indicator for reactive management. In almost all instances whole blood is used. In slightly under 50% of the instances, freshly donated blood is used for transfusion. Figure 6.11 gives the relative frequency.

Figure 6.11 Preparedness for transfusion



Regional Analysis

As shown in table 6.3, only Nairobi province appears to have a mix of strategies that could provide reliable BTS.

Table 6.3. Regional preparedness to transfuse

	Fresh blood	Reserved	Self donor
Nairobi	63.6	90.9	18.2
Central	50.0	66.7	22.2
Eastern	63.2	36.8	5.3
North Eastern	100	33.3	0
Coast	37.5	93.9	12.5
Rift Valley	78.8	75.8	12.1
Nyanza	71.1	52.6	7.9
Western	66.7	55.6	7.9
Total	65.4	64.1	10.3

Blood being transfused to a patient: Anaemia, pregnancy complications, surgical and accident are the main reasons for transfusion

Chapter 7 Logistic Management

7.1 Access and Logistics management

From available past records, the annual blood requirement in the country was estimated at over 300,000 units in 1994 and was expected to double by the year 2004. During this study this projection was confirmed as relevant for planning purposes through discussions with NPHLS management. It is based on hospital bed capacity in the country.

Units of Blood Collected 2000/2001

In order to determine the blood screened in the country, data for period October 2000 to September 2001 was collected and analyzed. Figure 7.1 and table 7.1 gives the findings.

Figure 7.1 Units of blood screened during 2000/2001

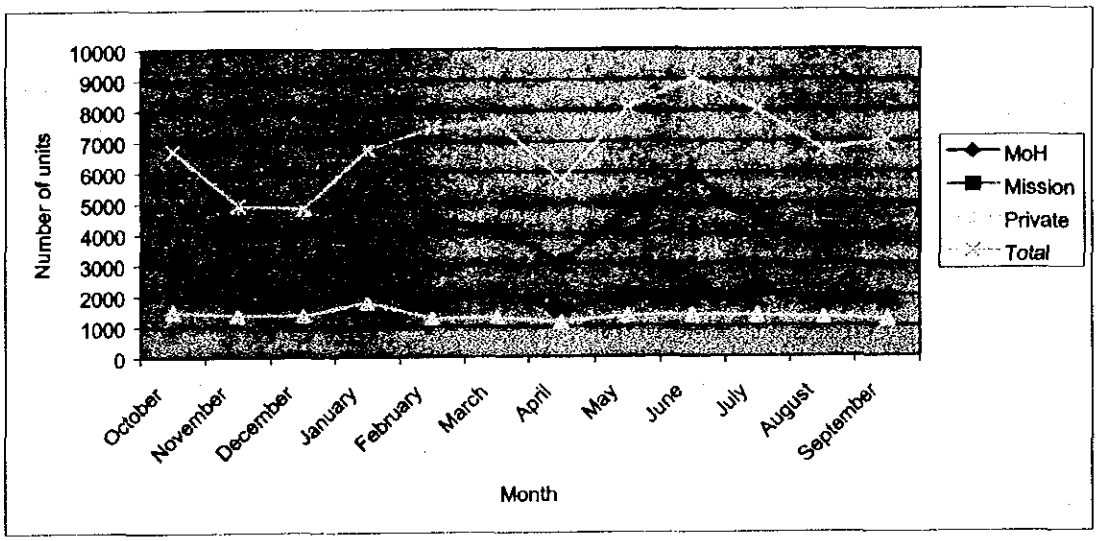


Table 7.1: Blood screened by province and provider – October 2000-September 2001

Province	GOK		Mission Hospital	Private Hospital	Total
	Provincial /BTS	District Hospitals			
Nairobi	7000	583	-	6119	13702
Central	918	3084	5126	63	9191
Eastern	828	5071	1446	36	7381
North Eastern	373	508	-	-	881
Coast	-	4063	-	1340	5403
Rift Valley	1683	12870	3629	1033	19215
Nyanza	5856	6489	1923	2566	16834
Western	1359	6706	2287	135	10487
Total	18017	39374	14411	11292	83094

7.2 Adequacy of services: provider perceptions

In order to determine the adequacy of basic physical facilities, equipment and supplies to provide reliable and effective BTS, the usual status, functionality and availability were asked for. Adequacy was determined by the provider based on workload in each facility. On average over 58.1% of facilities had adequate physical facilities and that were functional all the time. Equipment were available and in working conditions in over 70% of the hospitals while supplies were available in over 90% of the hospitals.

The Ministry of health has the lowest capacity to provide effective and reliable BTS. 46.2% of the physical facilities are always working compared to 65% of equipment and 80% availability of supplies. The probability of all Government facilities meeting the necessary conditions to provide reliable and effective BTS is low. Mission health providers have the highest likelihood of meeting these conditions.

Regional Pattern

Nairobi and central provinces have the highest proportions of facilities likely to be providing BTS all the time. Nyanza and Western have the least likelihood of meeting the needs for BTS.

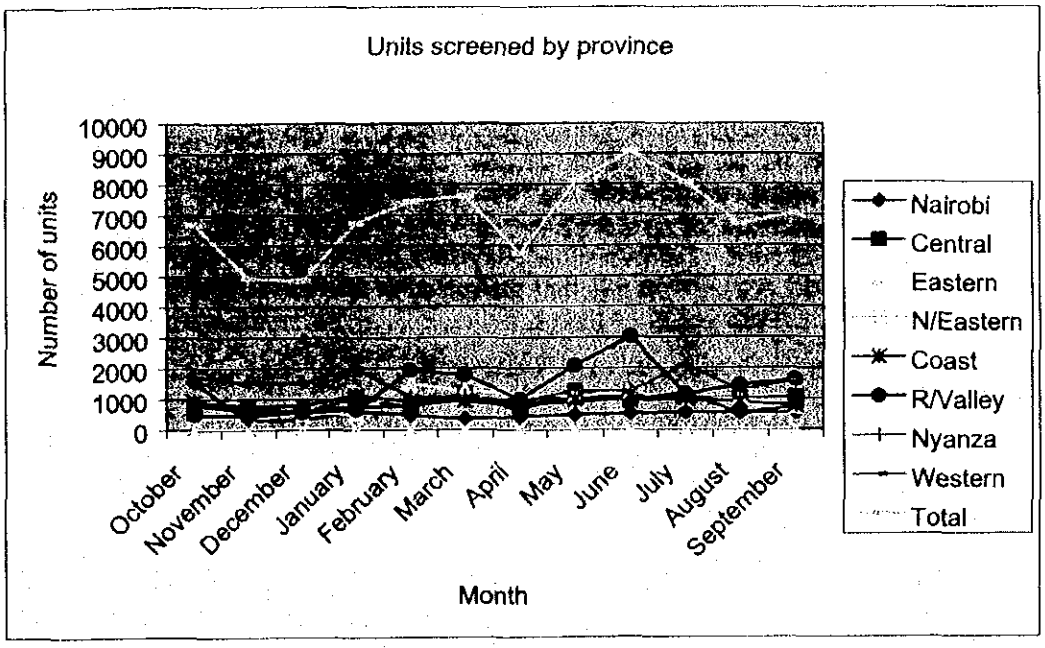
In order to determine the actual practice, data for the period October 2000 to September 2001 was collected and analyzed. There is evidence of monthly variations in the total number of units of blood screened. Table 7.1 shows the amount of blood screened during the one-year period prior to the study. Rift Valley had the highest units screened of 19215 followed by Nyanza with 16834 units. The lowest was North Eastern with 881 units. Results of the screening are shown in table 7.2.

Table 7.2 Results of the screening 2000/2001

	% Not screened					
Month	% HIV positive	% Hepatitis +	%Syphilis +	HIV	Hepatitis	Syphilis
October	7.25	2.98	1.33	0.17	1.07	1.17
November	8.25	2.6	2	0.28	0.7	0.91
December	10.32	2.7	2.11	1.07	1.09	0.25
January	8.6	2.4	1.8	0.16	0.33	0.51
February	7.59	2.6	1.8	0.16	0.61	0.67
March	7.59	3.02	1.8	0.18	0.47	1.4
April	8.7	3.25	2.3	2.4	0.57	1.95
May	7.72	3.3	1.92	0.14	0.44	0.69
June	7.5	3.02	1.78	0.15	0.34	1.02
July	7.3	3.2	1.52	0.16	0.35	1.43
August	6.9	2.6	1.8	0.19	0.74	0.64
September	7.2	2.2	1.76	0.17	0.67	0.7
Total	7.8	2.7	1.7	0.6	1.3	0.87

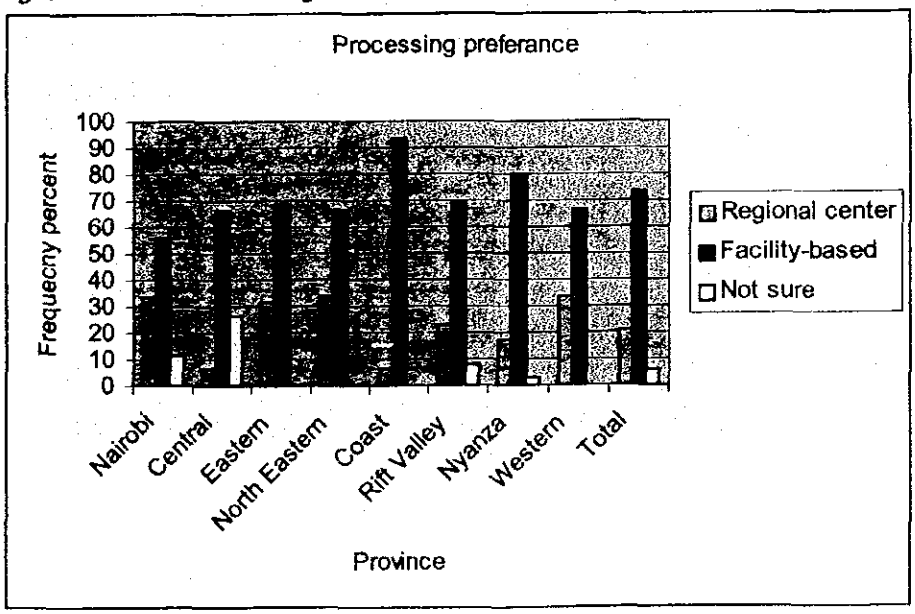
The screening done in the different provinces is given in figure 7.2

Figure 7.2 Units of Blood screened by province



There appear to be a preference for facility based processing as opposed to regional center facility. *Figure 7.3 shows the provincial preferences.*

Figure 7.7 Preferences: Regional center versus facility based processing



Approximately 70% of the facilities process their own blood and only 30% order from some other blood bank. For this purpose almost all facilities have established own blood bank (99%). In Central province, 20% of the facilities order blood from some other bank (not in their facility).

7.3 Blood Preservation

The shelf life of blood and blood products depend on availability of appropriate plastic packs and the anticoagulants used. Freezers, refrigerators and cold rooms with temperature alarm devices are also essential. The guidelines to ensure that this is done properly have been issued. However, the team found out that maintenance standards need to be stepped up to ensure guaranteed preservation of blood.

The Cold Chain

The cold-chain must be maintained during the transportation of blood and blood products. This will be particularly important with the creation of regional centers which will involve transportation of blood to and from the hospitals.

Facilities, equipment & supplies are part of logistical management issues to be addressed

RBTS Kisumu blood bank: well maintained and arranged

Chapter 8 Safety and Quality Assurance

Safety and quality assurance are premier goals of the Blood Transfusion Services in the country. This section seeks to answer the question: Are there operational policies, strategies and procedures to ensure safe and high quality blood transfusion services in the country? A subsidiary question is, what is the compliance rating amongst service providers? The parameters studied included polices, guidelines and procedures on:

- *Blood donors*
- Drawing of blood
- Screening of blood
- Blood storage
- Blood release and transport
- Transfusion of blood

8.1 Policies

Generally the BTS has operated on piecemeal policies issued by the Ministry of Health from time to time. There has been no comprehensive national blood policy until recently in November 2001 when one was published. A comprehensive national blood policies is necessary for safety and quality assurance.

Between 37% and 48% of all the facilities surveyed worked within established policies particularly amongst Government health providers. The extent with which the policies were available and consistently followed varied by province and facility ownership. Nairobi and Central provinces registered more than 66.7% compliance while Coast had the lowest rate. Table 8.1 and 8.2 show the inter-provider and regional observance of policies on different aspects of blood transfusion services.

Table 8.1 Policies available and always followed

	Availability and application of policies					
	Donors	Blood drawing	Screening	Storage	Transport	Transfusion
Not Available	46.4	44.4	40.7	42.9	46.7	42.6
Not displayed	13	17	10.4	12.1	12.4	12.5
Available & followed	39.1	37	48.1	44.3	40.1	41.9
Not sure	1.4	1.5	0.7	0.7	0.7	2.9
Total	100	100	100	100	100	100

Analysis of service provider

In general mission health providers have a marginally higher rate of use of written policies on blood transfusion.

Table 8.2 Policies available and followed: provider analysis

Facility administration	Policies are available and followed					
	Donors	Blood drawing	Screening	Storage	Transport	Transfusion
Government	33.3	30.2	47.7	43.9	40.6	40
Mission	61.3	51.6	58.1	50	45.2	46.7
Private	31.7	36.6	41	40.5	35.7	41.5
Total	39.1	37	48.1	44.3	40.1	41.9

Analysis of provinces

Facilities around mount Kenya reported a high prevalence of written policies that were consistently followed. The lowest prevalence was for institutions around lake Victoria and the coast. In general policies on blood donors were least followed in Western and Coast provinces.

Table 8.3 Policies available and followed: Provincial analysis

Province	Policies are available and followed					
	Donors	Blood drawing	Screening	Storage	Transport	Transfusion
Nairobi	66.7	66.7	66.7	66.7	66.7	62.5
Central	17.6	64.7	87.5	70.6	64.7	64.7
Eastern	30.8	58.3	83.8	78.6	72.7	84.6
North Eastern	66.7	66.7	100	100	66.7	66.7
Coast	6.7	14.3	20.0	13.3	13.3	13.3
Rift Valley	36.7	30.0	57.1	53.3	46.7	43.3
Nyanza	34.3	32.4	30.6	30.6	30.6	32.4
Western	20.0	13.3	13.3	6.7	6.7	13.3
Total	39.4	37.3	48.5	44.6	40.4	42.2

8.2 Guidelines

Translation of policies into guidelines has occurred in a very small scale as indicated in table 8.4.

Table 8.4 Availability and use of guidelines.

Facility administration	Guidelines are available and used					
	Donors	Blood drawing	Screening	Storage	Transport	Transfusion
Government	46.7	47.1	46.3	47.1	46.7	46.7
Mission	22.6	22.5	22.1	21.7	22.6	21.9
Private	29.9	29.7	30.9	30.4	29.9	30.7
Total	100	100	100	100	100	100

Differences are quite apparent across provinces as shown in table 6.5. Western province has the lowest prevalence and use of guidelines.

Table 8.5 Regular availability and use of guidelines

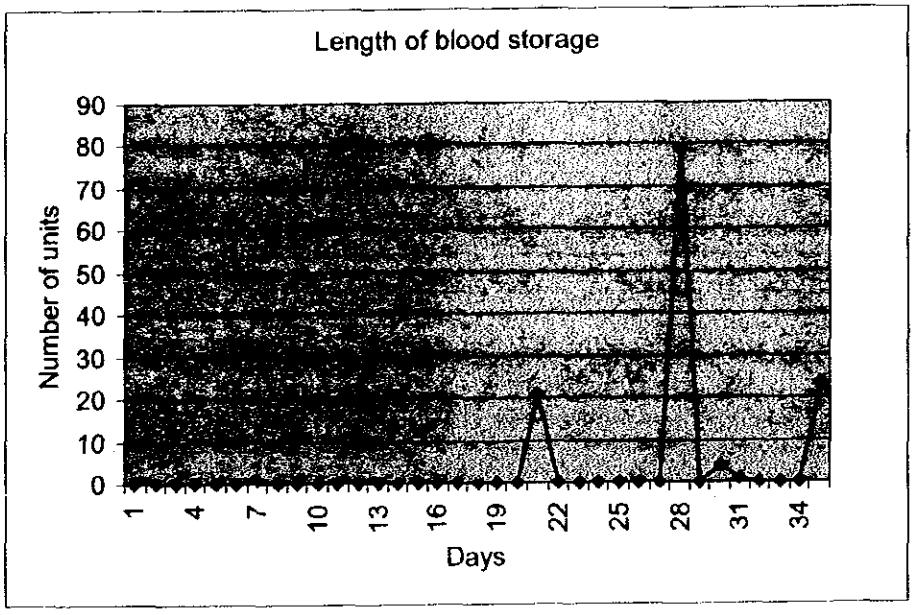
Province	Guidelines are available and used always					
	Donors	Blood drawing	Screening	Storage	Transport	Transfusion
Nairobi	30	70	70	70	50	40
Central	11.8	70.6	76.5	52.9	64.7	58.8
Eastern	27.3	66.7	90	72.7	50	75
North Eastern	66.7	66.7	100	100	66.7	66.7
Coast	13.3	20	20	13.3	6.7	13.3
Rift Valley	30	36.7	51.7	46.7	37.9	41.4
Nyanza	25.7	25.7	27.8	30.6	28.6	33.3
Western	13.3	6.7	13.3	6.7	6.7	7.1

8.3 Procedures

Blood storage-time

An estimated 65% of the institutions discard unused blood within 28 to 30 days while 17% discard blood between day land 27 while 18% do so after day 35. This graphically represented in figure 8.1.

Figure 8.1 Blood discard time



Side Effects

In general there were very few complications arising from blood transfusion. Table 8.6 gives the breakdown of the frequency of side effects and outcome.

Table 8.6 Frequency of transfusion complications

	Transfusion Reactions Reported and investigated				
	ABO	RH	Hemolytic	Hepatitis B	HIV
Investigated	120	115	111	766	792
Reported	11	6	11	72	150
Deaths	0	0	0	0	10

Chapter 9. Blood Transfusion Reporting Systems

9.1 Introduction

Part of the activities of this study was to examine and evaluate the reporting system that is in place at Government, Mission and Private hospitals. The objective was to establish its status and how it responds to the BTS reporting requirements. The output was a standardized reporting system for use by hospitals, blood banks, blood transfusion centres and other health facilities.

An effective information system requires that adequate facilities, equipment, supplies, trained staff, funding and system procedures be available. To document and assess the status of the information system currently in place for collecting, processing, analysing and reporting in BTS activities countrywide, a questionnaire focusing on the six components was designed. This questionnaire was administered in all the hospitals. Interviews were conducted to establish stakeholder information requirements from the BTS. The findings and recommendations are discussed in this section.

9.2 Current Reporting System

The reporting systems are similar at the government, mission and private hospitals and at the RBTCs. The data that is captured, the registers that are maintained and the processes that are used are not significantly different. Three sections are involved in BTS data recording and processing; the donor section, the serology section and the blood bank section.

Donor Records

The blood donor section is responsible for donor recruitment, blood collection, blood grouping and blood bank at the hospitals and RBTCs. The section captures donor details, maintains a donor register, a blood grouping and cross matching register.

The blood donor record card contains detailed information covering the following:

- Identification number
- Date of birth
- Physical addresses
- Phone number
- Marital status
- Sex
- Profession and
- Medical history

Information from the donor record card is posted to the blood donor register which is a permanent record of all those who have donated blood. The details in this register include:

- Date of donation
- Serial entry number (close referenced to the card)
- Donors name
- Sex
- Age
- Bag number
- Address
- Ward
- Blood group
- Screening results (in case of RBTC)
- Laboratory number (in case of RBTC)

Screening Records

Both at the hospitals and the RBTC, screening is the responsibility of the serology section. Unscreened blood is delivered to this section for screening. The screening and serology register is the next document available in the BTS system. The test results on screened blood are entered in this register which shows the following details:

- Date of testing
- Bag serial number
- Blood group
- HIV results (negative)
- Hepatitis results (negative)
- VDRL (negative)

Blood Bank Records

The blood bank section of the BTS is responsible for blood grouping and cross matching and issue of blood to the wards. The Request for Blood Grouping and Transfusion Form is completed by the doctor for each patient requiring transfusion and is the document against which blood is released from the blood bank. The document includes the following information:

- Patient's name, sex, age, ward, bed
- Reason for transfusion
- Consultant In-charge
- Houseman, Rhesus, Hb
- Patients group
- Date of previous transfusion
- Degree of urgency
- Details of any reactions to transfusion

A blood grouping and cross matching register is maintained to keep track of the usage of blood and shows the following details:

- Date
- Name of Patient
- Age

- Sex
- Ward
- Patient blood group
- Donor blood group
- Bag number
- Expiry date
- Time
- Compatibility
- Signature of collector

In the case of RBTCs, a separate register for issue of blood is maintained and shows the following details:

- Date of issue
- Laboratory number
- Bag serial number
- Blood group
- Recipient hospital
- Signature of recipient
- Receipt number
- Amount paid
- Signature of issuing officer

Reports
A monthly blood donation report is supposed to be prepared and submitted to the DMLT who sends it to NPHLS through the PMLT. The report shows the following details:

- Total number of units collected
- Total units screened
- Total positives
- Number confirmed
- Number transfused
- Number expired

Another report is the monthly laboratory report that is prepared and submitted to the DMLT. It covers all the laboratory activities including those of the BTS. On BTS it captures information on blood grouping and cross matching only.

9.3 Assessment

The hospitals and RBTCs maintain the registers which have been described in the preceeding paragraphs. However, the registers are poorly kept and are not up to date. During the study, the team had to update the registers to extract the information required. The other problem was that of obtaining past records. Both the blood donor cards and the registers for previous periods were not easily available. Copies of reports that were supposed to have been prepared and submitted to DMLT were not available. This state of affairs is explained by a number of factors including lack of space, equipment and

furniture, computers, supplies, funding, procedures and enforcement of regulations. Our findings on the status of these components were as outlined below.

Status of resources and equipment

Space

The study team considered availability of adequate space as an important component of an effective reporting system. Each hospital was therefore required to indicate the status of space available for information processing. Out of 174 hospitals that responded, 113 (64.9%) did not have adequate space.

Government hospitals were most affected by lack of space with 69 (82%) reporting lack of adequate space for their BTS information systems compared to 58% of private and 37.5% of mission hospitals.

This was collaborated with observation of the visiting teams. BTS records were scattered and there was no central office where information was collected, processed and stored for easy retrieval. What is probably more worrying is the inability of the hospitals to appropriately store and retrieve data and information for previous periods. Most hospitals could not locate registers for previous periods quickly enough.

Equipment and Furniture

Under this category, the study team was interested in establishing whether there were adequate typewriters, cabinets, calculators, desks and chairs for data management. Again the hospital staff were asked to indicate the adequacy of the equipment and furniture they were using.

Of the 172 hospitals that responded 62.2% did not have adequate equipment. Two hospitals indicated that the equipment were underutilized.

Hospitals most affected by inadequate equipment were those owned by the Government with 64 (78%) of their hospitals lacking adequate equipment compared to 21 (51.2%) and 22 (44.9%) of mission and private facilities respectively.

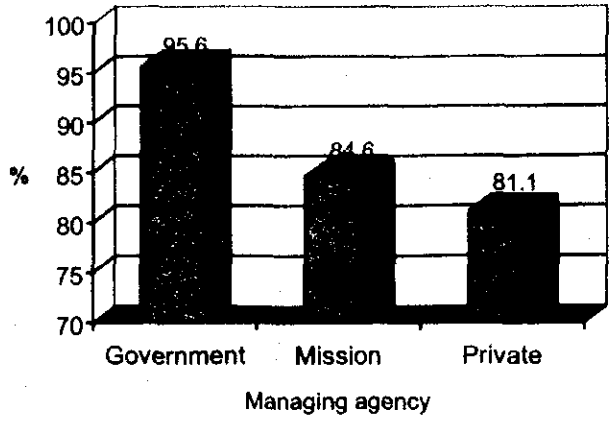
Generally it was observed that the BTS shared information processing equipment with the general laboratory services. However, due to shortages of filing cabinets, hospitals are not able to store and retrieve data in an orderly manner.

Computers

In view of the fact that technology is now advanced and effective information processing requires use of computers, the study team assessed computer availability for BTS information processing.

Of the 131 hospitals that responded, 117 (89.3%) did not have or lacked adequate computers. Differences by facility managing agency were within a narrow range as illustrated in the figure 9.1.

Figure 9.1 Percent distribution of hospitals lacking adequate computers for their BTS information system



This was collaborated by our observation. Most upcountry hospitals still operate manual systems.

Supplies

Sixty three percent of the 171 hospitals did not have adequate supplies. Government hospitals were affected most with 76.8% of their hospitals without adequate supplies followed by mission hospitals with 56.1% while 43.8% of private hospitals.

Observations revealed a shortage in a wide range of items from registers, files, official forms to simple writing materials. The situation in some institutions was such that staff resort to using pieces of paper that cannot be filed.

In view of the fact that BTS operations require that data be collected and filed for later reference, supply of appropriate stationery is important. Another issue was that of using one single register for collecting data on more than one activity. The result is mixing data to the extent that wrong figures are issued to users.

Staff

A key component of an effective information system environment is adequately trained staff. Of the 171 hospitals that responded, 102 (59.6%) of the hospitals lacked adequate staff to manage the BTS information and reporting system.

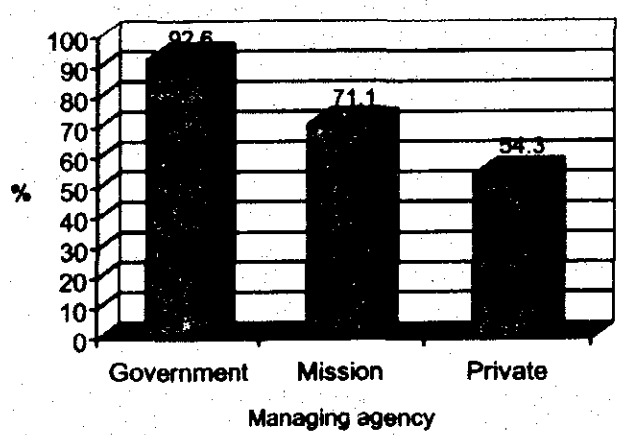
At the government hospitals, 65 (78.3%) reportedly lacked adequate staff compared to 21 (53.8%) and 16 (32.7%) of the mission and private ones respectively. Here again it is important to note that data collection and processing is handled by the technical staff who owing to various reasons are not able to maintain up to date records and provide reports that are required by hospital management and other decision making users.

Funding

Funding becomes an important factor in influencing the effectiveness of an information system. It was established that 77% of the hospitals did not have adequate funding for running their information system.

As illustrated in figure 9.2, majority of government hospitals experienced funding inadequacies compared to the other non-governmental hospitals.

Figure 9.2 Percent distribution of hospitals with inadequate funding for BTS information system



Status of Systems Procedures

An information system requires articulating the procedures to be followed in data capture, processing and reporting. The guidelines should clearly set out the data to be captured, type of records to be maintained, the reports to be generated and their distribution. Responsibilities should also be clearly stated.

As shown on table 9.1, 55.4% of the hospitals lacked adequate guidelines for data capture. There were notable differences by facility managing agency with 70.7% of government and 45.7% of mission hospitals indicating lack of adequate guidelines, respectively. A relatively smaller proportion (38.3%) of private hospitals reported a lack of adequate data capture guidelines.

It was observed that data was recorded on rough papers and then transferred to some registers, without any further processing.

Table 9.1 Percent distribution of hospitals without adequate BTS information system procedures by facility managing agency

System procedures	Facility managing agency			All hospitals
	Government	Mission	Private	
Data capture	70.7	45.7	38.3	55.4
Data processing	73.0	51.5	43.8	59.4
Data storage and retrieval	76.4	47.1	42.6	59.5
Reports and utilisation	57.5	31.0	46.8	49.0

As shown on table 9.1, 59.4% of the hospitals lacked adequate data processing guidelines a factor that may be responsible for the absence or lack of processed information in most hospitals and especially government ones.

Data storage and retrieval was another system procedure that lacked adequate guidelines; 59.5% of the hospitals indicated so. Differences by managing agency and particularly government versus the rest seem significant as illustrated in table 9.1.

Assessment in most hospitals showed that there were no guidelines for data storage. Files for original document of entry were not available. Only current registers were available while the previous ones could not be traced.

Concerning report preparations and utilization, 49% of the hospitals reported that guidelines were inadequate. Most of the hospitals reported that they prepare annual reports, which are submitted to the DMLT and PMLT. However, when asked to provide copies of some of these reports, they were unable to do so. Designed documents for monthly and annual reports were evident but reports are not prepared on a routine basis.

Stakeholders and Networking

There are no provisions for disseminating regular information to the stakeholders. All the stakeholders indicated that they require regular information from the BTS for purposes of making important decisions. However, because BTS is not able to provide the required information, the other stakeholders have been forced to design other mechanisms. *Consequently, hospitals are now forced to prepare duplicated information for different* users. For instance, NASCOP requires information on HIV cases detected in each hospital. They have designed forms to be completed by the hospital and submitted on regular basis. Same information is prepared for NBTS.

Networking of information in the BTS system may be looked at on two levels, networking among the hospital facilities themselves and the BTS headquarters on the one hand and networking with stakeholders who require information from the BTS system on the other hand

Networking among the hospitals and NBTS headquarters is not possible at this stage because of lack of basic facilities. However, the achievement of this would be very important as it would assist the hospitals to exchange information with BTS.

Networking with other stakeholders has not been done because all BTS operations are manual. Most of the stakeholders that were interviewed require BTS information for their operations and would be happy to be networked. USAID and FHI stakeholders are closely working with BTS and it is expected that the information system in Nairobi and Kisumu will be computerized in the near future. However, this will have to be extended to the hospital level for networking to be completed.

9.4 Proposed Standardized BTS Information System

One of the deliverables from this study was to review and propose an information system whose mandate is to standardize procedures and be more responsive to stakeholder requirements. What follows in this section is a proposal which as much as possible revolves around the existing systems and procedures.

Information Requirements

Two main stakeholders were identified, whose information requirements will be the basis of the proposed BTS information system:

BTS information needs include:

- Tracing a unit of blood for purpose of safety
- Predict the supply and demand for blood
- Trace the donors
- Trace the recipients
- Stock levels of blood of various categories
- Utilisation patterns

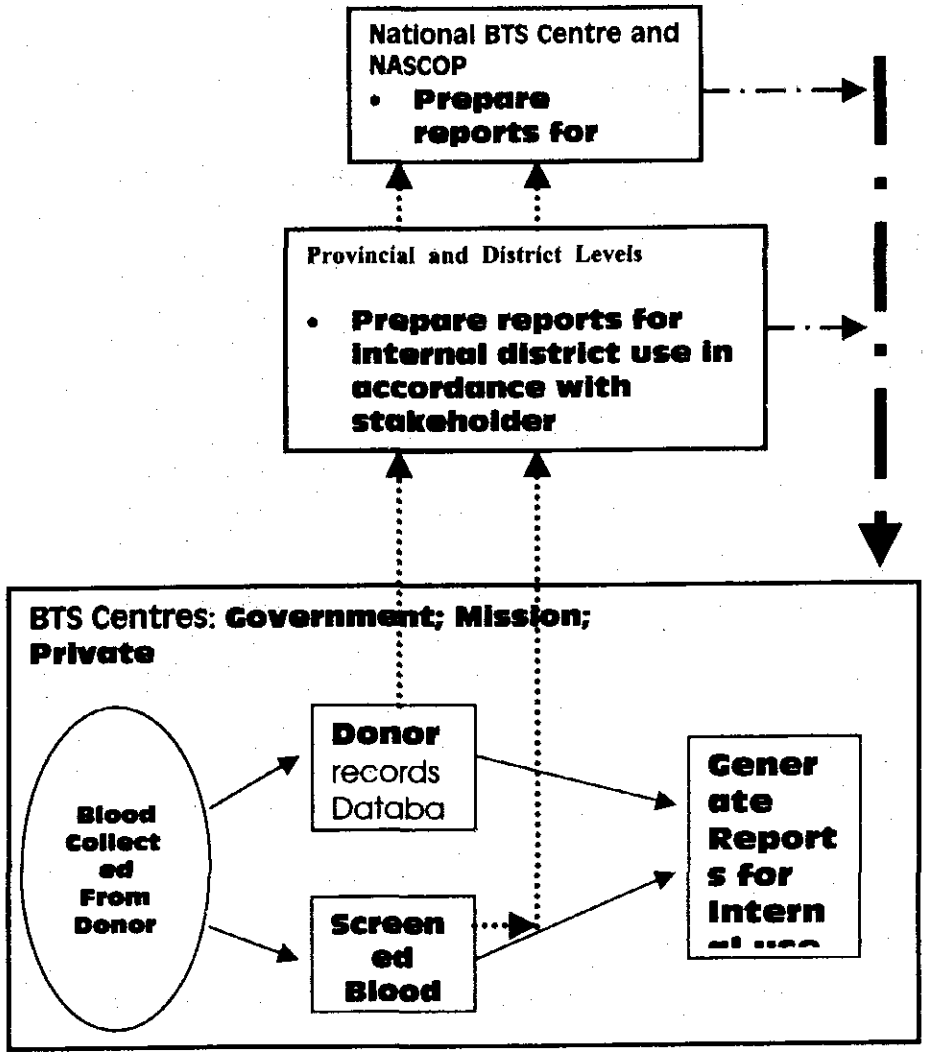
NASCOP will require information from BTS on the following:

- Position on testing reagents
- Blood tested statistics
- Testing algorithms
- Sero-status
- Positivity and negativity
- Discordance

Schematic view of the system

Figure 9.3 shows a schematic view of the proposed systems, showing inputs, data flow and outputs (reports).

Figure 9.3 Schematic view of the proposed BTS information system



It is proposed that during the actual design stage, which will involve all the stakeholders, specific variables of interest will be identified and means of data collection designed. The 'new' system may involve streamlining and harmonizing what currently is in place, without necessarily developing a completely new system.

The standardised report format that takes into account the stakeholders requirements is presented here below.

MINISTRY OF HEALTH
NATIONAL BLOOD TRANSFUSION SERVICES
MONTHLY BLOOD TRANSFUSION REPORT

NAME OF RBTC/HOSPITAL..... MONTH.....

SECTION A: BLOOD DONATED

Donor Type	No. of Units Male	No. of Units Female
Regular donors	.....	.....
New donors	.....	.....
Volunteer donors	.....	.....
Family /Replacement donors	.....	.....
Autologous donors	.....	.....
Others	.....	.....
No. of units donated	.....	.....
Blood received from other centres	.....	.....
Total blood available	.....	.....

SECTION B: BLOOD SCREENED

Type of Screening	No. of Units Male	No. of Units Female	Positives Male	Positives Female
HIV	.....	.....	.....	.....
Hepatitis B	.....	.....	.....	.....
Hepatitis C	.....	.....	.....	.....
Syphilis	.....	.....	.....	.....
Malaria	.....	.....	.....	.....
Others (specify).....	.....	.....	.....	.....
Total	.....	.....	.....	.....

SECTION C: DATA ON KITS

Type or kit/reagent Name	Quantity last order	Quantity used	Balance
HIV.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
Hepatitis B	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
Hepatitis C	.....	.....	.....
Anti A.....	.....	.....	.....
Anti B.....	.....	.....	.....
Anti D (Rh).....	.....	.....	.....
Anti Human Globulin	.....	.....	.....

SECTION D: COMPONENTS PREPARED

	Units
Packed RBC	.....
Platelets	.....
Cryoprecipitate	.....
Fresh frozen plasma	.....

SECTION E: BLOOD DISTRIBUTION

Institution	Units
Public hospitals	.....
Private hospitals	.....
RBTCs /Satellites	.....
Others (specify)	.....
Total units	.....

SECTION F: AMOUNT OF BLOOD DISCARDED

	Units
HIV	.....
Hepatitis B	.....
Hepatitis C	.....
Syphilis	.....
Expired	.....
Clotted	.....
Heamolysed	.....
Others - (specify)	.....

SECTION G: TRANSFUSION REACTIONS INVESTIGATED

No. of Antibody screening done	.....
Difficulty samples investigated	.....
No. of samples referred	.....

Prepared by ..... Approved by.....
Information compiling Clerk *Head of BTS/Hospital*

Remarks.....
.....

SECTION H: NATIONAL STATISTICS/SUMMARY (To be completed by NBTS)

Total blood donated	.....
Total blood grouped	.....
Total blood screened	.....
Total blood transfused	.....

Date received..... Date dispatched.....
Prepared by..... Approved by.....

Distribution

Original	-	NBTS
Duplicate	-	NBTS
Triplicate	-	RBTC/Hospital

10.0 Facilities, Equipment and Supplies

Availability of adequate and appropriate facilities, equipment and supplies (kits, bags, syringes) is an essential requirement for a BTS aiming at supplying sufficient and safe blood to satisfy a country's requirements. One objective of this study was to establish the general status of BTS facilities, equipment and supplies. Availability, adequacy, condition and utilization are some of the parameters that were assessed.

In order to focus on those items, separate lists of facilities, equipment and supplies that were regarded essential for proper operations of a BTS were prepared. These lists were then used at all the hospitals to take inventory, verify the condition, determine additional requirements and rate the utilisation of each item. The findings on the status of the facilities, equipment and supplies are discussed in the following paragraphs.

10.1 Availability of Facilities

Sixteen facilities categorized into buildings, offices, service departments, furniture and fittings, information processing and communication facilities were identified as essential for a BTS.

Table 10.1 summarises the findings on availability of the BTS facilities within the hospitals. A notable feature is the variation in availability of the selected facilities among the hospitals which ranged between 9.0% to 90.4%. The Laboratory units were available in 90.4% of the hospitals, closely followed by couch for donors which were in 80.8% of the hospitals. The least available were the Library and audiovisual rooms which were found in only 9.0% of the hospitals. This was followed by conference halls and counseling rooms which were in only 12.3% and 17.0% of the hospitals respectively.

All other facilities fell in between these two extremes and were available in 24.7% to 67.3% of the hospitals. An important observation is that out of the 16 facilities considered essential for effective operations of a BTS, none of them was found in all the hospitals countrywide. Only 6 of the facilities were available in 50% or more of the hospitals. The inevitable conclusion therefore is that the hospitals operate with minimum BTS essential facilities.

Table 10.1: National distribution of hospitals with selected facilities.

Item description	Total hospitals	No. of hospitals with facility	% of total
Reception Area	156	105	67.3
Laboratory unit	156	141	90.4
Wash rooms	154	91	59.1
Stores	153	93	60.8
Finance department	150	37	24.7
Records and data department	149	58	38.9
Office of Administrator	142	44	31.0
Office of Laboratory In-charge	155	65	41.0
Counselling room	147	25	17.0
Library and audio visual room	145	13	9.0
24 Hrs telephone exchange	149	54	36.2
Conference hall	146	18	12.3
Independent room for taking blood	151	64	42.3
Desks for taking blood	148	67	45.3
Couch for donor while donating	156	126	80.8
Rubber band/Torniquete	151	93	61.6

Source: BTS Survey 2001

Regional Analysis

A comparison of availability of the BTS facilities among hospitals on regional basis reveals interesting features as shown on table 10.2. Only four provinces ; Nairobi, Coast, Rift Valley and Nyanza had all the selected facilities. In North Eastern province, no hospital had a counseling room, a Library and audio visual room and a conference room. Library and visual rooms were not found in any hospital in Eastern, and North Eastern Provinces. In Central province, all hospitals did not have a conference hall. The regional pattern in availability of BTS facilities shows a wide variation similar to that reflected nationally.

Table 10.2 Percentage distribution of hospitals with selected facilities by province

Type of facility	Province/Region								
	Nairobi	Central	Eastern	N/Eastern	Coast	R/Valley	Nyanza	Western	Total
Reception area	84.6	55.6	87.5	66.7	37.5	60.6	73.0.7	75.0	67.3
Laboratory unit	92.3	88.2	100.0	100.0	50.0	97.0	94.7	95.0	90.4
Wash rooms	76.9	56.3	62.5	100.0	56.3	51.5	56.8	55.0	58.4
Stores	91.7	43.8	80.0	66.7	62.5	57.6	56.8	50.0	60.5
Finance department	54.5	0.0	23.1	0.0	25.0	9.1	47.4	15.0	24.8
Records and data dept	81.8	6.7	57.1	33.3	18.8	29.0	52.6	35.0	39.2
Administration office	54.5	6.7	28.6	0.0	37.5	21.9	51.4	15.0	31.2
Office of Laboratory i/c	54.5	6.7	28.6	0.0	37.5	21.9	51.4	15.0	31.2
Counselling room	45.5	13.3	30.8	0.0	25.0	12.9	16.2	0.0	17.1
Library and audio visual room	37.5	6.7	0.0	0.0	18.8	3.2	5.3	15.0	9.0
24 hour telephone exchange	81.8	81.3	30.8	33.3	50.0	21.9	21.1	25.0	36.9
Conference hall	60.0	0.0	21.4	0.0	25.0	6.5	7.9	0.0	12.4
Independent room for taking blood	77.8	50.0	62.5	66.7	37.5	51.5	28.9	20.0	43.0
Desks for taking blood	81.8	7.1	50.0	33.3	50.0	45.5	52.6	33.3	45.6
Couch for donor	81.8	94.4	88.2	100.0	75.0	75.8	86.6	65.0	81.4
Rubber band/torniquete	72.7	70.6	73.3	66.7	31.3	66.7	65.8	44.4	61.6

Source:BTS survey 2001

Provider Analysis

In all cases except for the laboratory unit, reception area, washrooms, stores, couch for donors and torniquete, less than 50% of the hospitals had the other facilities. Only 9 items were found in 50% or more of the private hospitals. This is better compared with mission and government hospitals which had 7 and 5 items respectively in 50% or more of the hospitals as shown on table 10.3

Table 10.3: percentage distribution of hospitals with selected facilities by provider

	Government	Mission	Private	Total
Reception area	57.1	83.9	72.9	67.3
Laboratory Unit	86.7	93.8	93.9	90.4
Washrooms	56.0	70.0	57.1	59.1
Stores	60.8	63.3	59.2	60.8
Finance Department	16.7	17.2	40.8	24.7
Records/Data Department	33.8	30.0	52.1	38.9
Office of Administrator	22.4	18.5	50.0	31.0
Office of Lab in charge	48.7	35.5	35.4	41.9
Counseling room	10.0	30.0	19.1	17.0
Laboratory and Audiovisual room	2.8	13.8	15.6	9.0
24 hours telephone exchange	31.5	37.9	42.6	36.2
Conference Room	5.6	10.7	23.4	12.3
Independent room for taking blood	34.7	63.3	41.3	42.4
Desks for taking blood	36.5	44.4	59.6	45.3
Couch for donors	77.9	84.4	83.0	80.3
Rubber band/Tornique	43.2	83.3	76.6	61.6

Source:BTS survey 2001

10.2 Adequacy of Facilities

The Hospital management was requested to assess the adequacy of the selected BTS facilities against the workload. Table 10.4 summarises the national findings. No single item was adequate in all hospitals. The telephone exchange was ranked highest with 68.0% of the hospitals reporting its adequacy. Lowest ranked was the Library and audio visual room at 25.0%. These findings indicate that about 50% of the hospitals operate with inadequate BTS facilities.

Table 10.4 National distribution of hospitals with adequate selected facilities.

Item description	Total No. of hospitals	No. of hospitals with adequate facility	% of total
Reception Area	118	62	52.5
Laboratory unit	139	65	46.8
Wash rooms	99	54	54.5
Stores	101	53	52.5
Finance department	47	25	53.2
Records and data department	66	34	51.5
Office of Administrator	50	33	66.0
Office of Laboratory In-charge	70	35	50.0
Counselling room	30	18	66.0
Library and audio visual room	24	6	25.0
24 Hrs telephone exchange	50	34	68.0
Conference hall	28	15	53.6
Independent room for taking blood	73	43	58.9
Desks for taking blood	75	40	53.3
Couch for donor while donating	127	63	49.6
Rubber band/Torniquete	102	63	61.8

Source: BTS Survey 2001

Regional Analysis

Table 10.5 shows the regional comparisons among hospitals with adequate facilities. Coast Province compares most favourably with facilities being reported adequate in 41.7% to 85.7% of the hospitals. Nyanza province followed very closely with facilities being adequate in between 25.5% and 71.4% of the hospitals. North Eastern province ranked last with 9 out of the 16 facilities being inadequate in all hospitals. In Central, 4 items were inadequate in all hospitals while in Eastern, Rift Valley and Western, Library and audio visual room were inadequate in all hospitals. A 24 telephone exchange was adequate in all hospitals in Nairobi and Central provinces, while counseling rooms were adequate in all hospitals in Central Province.

Table 10.5 Percentage distribution of hospitals with adequate selected facilities by province

Type of facility	Province/Region								
	Nairobi	Central	Eastern	N/Eastern	Coast	R/Valley	Nyanza	Western	Total
Reception area	54.5	63.6	64.3	0.0	50.0	58.3	51.5	33.3	52.5
Laboratory unit	40.0	57.1	60.0	0.0	44.4	39.4	55.6	36.8	46.8
Wash rooms	60.0	60.0	67.7	33.3	56.6	56.6	42.3	63.6	54.4
Stores	70.0	55.6	61.5	0.0	54.5	50.0	50.0	40.0	52.5
Finance department	83.3	0.0	0.0	-	66.7	33.3	54.5	66.7	53.2
Records and data dept	37.5	0.0	77.8	0.0	60.0	18.2	60.9	71.4	51.5
Administration office	80.0	0.0	25.0	-	85.7	55.6	71.4	66.7	66.0
Office of Incharge	66.7	62.5	66.7	0.0	61.5	42.9	35.3	0.0	50.0
Counselling room	75.0	100.0	75.0	-	60.0	33.0	60.0	-	60.0
Library and audio visual room	0.0	-	-	-	75.0	0.0	25.5	100.0	25.0
24 hour telephone exchange	100.0	100.0	60.0	0.0	62.5	60.0	54.5	75.0	68.0
Conference hall	75.0	-	66.7	-	80.0	25.0	33.3	-	53.6
Independent room for taking blood	55.6	71.4	70.0	0.0	57.1	60.0	57.1	50.0	58.9
Desks for taking blood	60.0	0.0	44.4	0.0	44.4	70.6	50.0	50.0	53.3
Couch for donor	41.7	42.9	50.0	66.7	41.7	57.7	54.5	38.5	49.6
Rubber band/torniquete	77.8	81.8	41.7	0.0	42.9	58.3	65.5	75.0	61.8

Source: BTS 2001

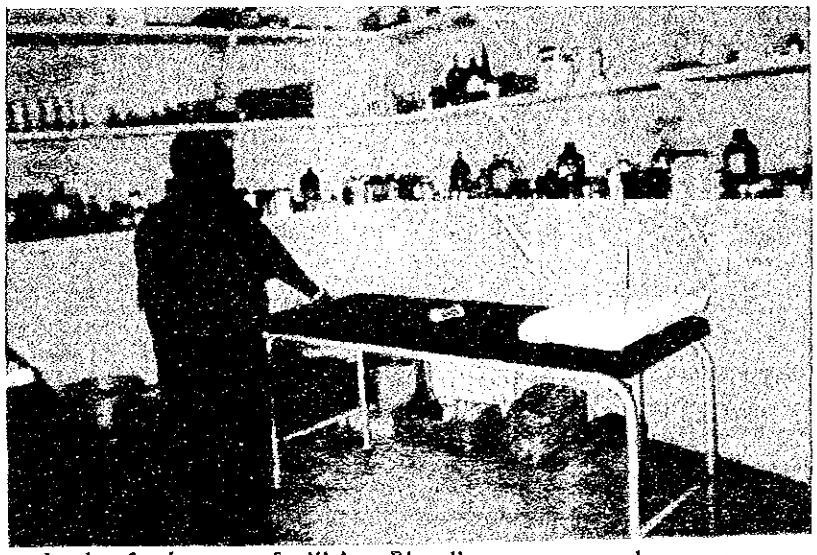
Provider Analysis

All facilities were adequate in 50% or more of the private hospitals (see table 10.6) compared to fourteen facilities reported adequate in 63% or more among the mission hospitals. Less than 50% of the Government hospitals had adequate facilities.

Table 10.6: Percentage distribution of hospitals with adequate selected facilities by Provider

	Government	Mission	Private	Total
Reception Area	28.8	77.8	66.7	52.5
Laboratory Unit	20.0	70.0	70.5	46.8
Washrooms	34.0	73.9	72.4	54.5
Stores	31.4	70.0	76.7	52.5
Finance Department	15.8	42.9	90.5	53.2
Record/Data Department	20.7	81.8	73.1	51.5
Office of Administrator	44.4	71.4	80.0	66.0
Office of Lab in-charge	36.6	63.3	72.2	50.0
Counselling room	30.8	87.5	77.8	60.0
Library and Audiovisual Room	0.0	28.6	50.0	25.0
24 hours telephone exchange	43.5	83.3	93.3	68.0
Conference room	25.0	66.7	80.0	53.6
Independent room for taking blood	38.7	78.9	69.6	58.9
Desks for taking blood	21.9	64.3	82.8	53.3
Couch for donors	29.5	63.0	71.8	49.6
Rubber Band/Turnique	28.2	80.0	84.2	61.8

Source: BTS Survey 2001



Lack of adequate facilities: Bleeding room used as a store

10.3 Condition of Facilities

Along with taking the physical inventory, the study team assessed the condition of the BTS facilities at the hospitals. Table 10.7 summarises the findings. Facilities were categorized as either in good or bad condition and the table shows the percentage of those that were in good condition. All facilities were found to be in good condition in 50% or more of the hospitals.

Table 10.7 National distribution of hospitals with working selected facilities.

Item description	Total No. of hospitals	No. of hospitals with working facilities	% of total
Reception Area	106	79	71.7
Laboratory unit	131	102	77.9
Wash rooms	96	67	69.8
Stores	93	66	71.0
Finance department	41	31	75.6
Records and data department	55	41	74.5
Office of Administrator	45	37	82.2
Office of Laboratory In-charge	61	47	77.0
Counselling room	26	18	69.2
Library and audio visual room	20	10	50.0
24 Hrs telephone exchange	45	37	82.2
Conference hall	22	16	72.7
Independent room for taking blood	62	46	74.2
Desks for taking blood	68	50	73.5
Couch for donor while donating	124	94	75.8
Rubber band/Torniquete	94	73	77.7

Source: BTS Survey 2001

Regional Analysis

Table 10.8 shows the condition of the facilities by regional distribution. In Nairobi province facilities were in good condition in 66.7% to 100% of the hospitals. The corresponding figures for Coast and Nyanza province were 63.6% to 100% and 50% to 89.7% of the hospitals. The other five provinces had similar variations but reflected a weaker condition. Generally, maintenance at the region is satisfactory in more than 50% of the hospitals in almost all facilities.

Table 10.8 Percentage distribution of hospitals with good facilities by province

Type of facility	Province/Region								
	Nairobi	Central	Eastern	N/Eastern	Coast	R/Valley	Nyanza	Western	Total
Reception area	80.0	80.0	84.6	0.0	100	63.6	75.9	53.3	71.7
Laboratory unit	88.9	86.7	84.6	50.0	100	68.8	80.0	68.4	77.9
Wash rooms	72.7	60.0	70.0	33.3	100	57.1	78.3	72.7	69.8
Stores	81.8	62.5	66.7	100	85.7	70.0	68.2	63.7	71.0
Finance department	100	-	50.0	-	100	50	73.3	100	76.5
Records and data dept	83.3	0.0	85.7	100	100	40.0	85.0	71.4	74.5
Administration office	100	0.0	66.7	-	83.3	71.4	89.7	66.7	82.2
Office of Laboratory i/c	100	87.5	83.3	100	90.0	58.3	69.2	33.3	77.0
Counselling room	100	100	33.3	-	100	33.3	75.0	-	69.2
Library and audio visual room	66.7	100	33.3	-	100	0.0	50.0	33.3	50.0
24 hour telephone exchange	100	100	50.0	100	100	66.7	75.0	75.0	82.2
Conference hall	100	-	60.0	-	100	33.3	66.7	-	72.7
Independent room for taking blood	83.3	85.7	75.0	100	80.0	63.2	66.7	100	74.2
Desks for taking blood	88.9	0.0	50.0	-	71.4	76.5	75.0	83.3	73.5
Couch for donor	90.0	73.3	83.3	33.3	63.6	70.4	87.9	61.5	75.8
Rubber band/torniquete	87.5	100	55.6	50.0	66.7	60.9	96.3	62.5	77.7

Source: BTS survey 2001

Provider analysis

Table 10.9 shows comparisons of conditions of facilities by provider. Only 8 facilities were in good condition in 50% or more of government hospitals. Government facilities performed poorer than mission and private hospitals where facilities were in good condition in over 80% of the hospitals.

Table 10.9 Percentage distribution of hospitals with working selected facilities by Provider

Type of facility	Government	Mission	Private	Total
Reception Area	48.9	88.5	90.9	71.7
Laboratory Unit	62.3	89.3	92.9	77.9
Washroom	47.9	90.0	92.9	69.8
Stores	54.3	88.9	86.2	71.0
Finance Department	41.2	100	100	75.6
Record/Data Department	53.8	100	90.9	74.5
Office of Administrator	70.6	80.0	913	82.2
Office of Lab In-charge	65.8	100	92.9	77.0
Counselling room	41.7	83.3	100	69.2
Laboratory and Audi Visual room	12.5	40.0	100	50.0
24 hour telephone exchange	68.2	90.0	100	82.2
Conference room	33,3	100	100	72.7
Independent room for taking blood	46.2	94.1	94.7	74.2
Desks for taking blood	46.4	83.3	96.4	73.5
Couch for donors	59.3	88.0	92.5	75.8
Rubber band/Tornique	54.4	90.9	98.7	77.7

Source: BTS survey 2001

10.4 Utilization of Facilities

Utilization rating was found to be satisfactory in all the hospitals. Table 10.10 shows the utilization rating for the 16 facilities among hospitals. Hospital management was requested to rate utilization of the facility using a scale ranging from 1 to 5. Where the facility was always used, a score of 1 was given. Where it was frequently used a score of 2 was given and so on. During analysis those facilities with a utilization rating of 1 or 2 were computed for each hospital. Overall, between 68.4% and 96.7% of the hospitals reported utilizing the facilities frequently.

Table 10.10 National distribution of hospitals frequently utilized selected facilities

Item description	Total No. of hospitals	No. of hospitals with high utility	% of total
Reception Area	107	88	90.7
Laboratory unit	133	123	92.5
Wash rooms	97	89	91.8
Stores	93	84	90.3
Finance department	42	40	95.2
Records and data department	57	50	87.7
Office of Administrator	46	43	93.5
Office of Laboratory In-charge	60	58	96.7
Counselling room	26	23	88.5
Library and audio visual room	19	13	68.4
24 Hrs telephone exchange	46	44	95.7
Conference hall	22	17	81.8
Independent room for taking blood	63	55	87.3
Desks for taking blood	69	55	79.7
Couch for donor while donating	121	108	89.3
Rubber band/Torniquete	93	80	86.0

Source: BTS Survey 2001

Regional Analysis

Generally, all provinces used the facilities adequately. In all provinces 100% of the hospitals reported utilization of the facilities frequently. Table 10.11 shows the regional distribution.

Table 10.11 Percentage distribution of frequently used facilities by province

Type of facility	Province/Region								
	Nairobi	Central	Eastern	N/Eastern	Coast	R/Valley	Nyanza	Western	Total
Reception area	100	100	100	50.0	100	77.3	86.2	100	90.7
Laboratory unit	100	100	100	33.3	100	90.6	91.7	89.5	92.5
Wash rooms	100	90.0	90.0	100	100	90.0	83.3	100	91.8
Stores	90.0	100	91.9	50.0	100	95.7	87.0	90.9	90.3
Finance department	100	-	100	-	100	100	90.0	100	95.0
Records and data dept	100	0.0	100	100	100	80.0	95.0	87.5	87.7
Administration office	100	0.0	66.7	-	83.3	85.7	90.0	100	87.0
Office of Laboratory i/c	100	100	100	100	100	100	84.6	100	96.7
Counselling room	100	100	100	-	100	100	75.0	-	88.4
Library and audio visual room	100	100	100	-	100	100	100	100	100
24 hour telephone exchange	100	100	100	100	100	88.9	87.5	100	95.6
Conference hall	100	-	80.0	-	100	66.6	66.7	-	81.8
Independent room for taking blood	100	100	100	50.0	100	83.7	91.7	83.3	87.3
Desks for taking blood	100	100	66.7	0.0	83.4	70.6	85.0	83.3	79.7
Couch for donor	100	100	83.4	66.6	77.8	80.8	93.9	92.3	89.3
Rubber band/torniquete	100	100	70.0	50.0	66.7	85.7	96.3	75.0	85.0

Source: BTS survey 2001

10.5 Availability of Equipment

Twenty four items ranging from refrigerators, ELISA machines, microscopes, centrifuge and blood pressure machines among others as shown on table 10.12 were selected as those that are essential in a BTS setting. This list was used to establish whether the equipment were available, in good working condition, adequate and lastly that they were adequately utilized.

The physical inventory results indicate that availability of the equipment in the hospitals varied between 7.6% and 92.9%. Centrifuge for blood bags were available in only 7.6% of the hospitals while plasma extractors were available in 10.7% of the hospitals. The most available equipment was binocular microscopes in 92.9% of the hospitals followed by ordinary centrifuge in 86.5 % of the hospitals. Twelve out of the 24 selected equipment were found in 50% or more of the hospitals. Table 10.12 shows how the equipment are distributed nationally.

Table 10.12: National distribution of hospitals with selected equipment

Item description	Total No. of hospitals	No. of hospitals with equipment	% of total
Couches/beds for bleeding donors	153	125	81.7
Refrigerators for unscreened blood	158	95	60.1
Elisa Machines complete with all components (Alisa reader)	156	90	57.7
Colorimeter	154	106	68.8
Sphygnomanometer	150	81	54.0
Stethoscope	147	40	27.2
Ordinary centrifuge	155	134	86.5
Blood pressure machines	89	38	42.7
Hot air oven	153	100	65.4
Water baths	155	122	78.7
Binocular microscopes	156	145	92.9
Autoclaves for sterilization	154	99	64.3
Incinerators	148	61	41.2
QBC system for malaria	150	34	22.7
Safety cabinets	147	60	40.8
Auto counter for blood (coulter)	151	40	26.5
Deep freezer	148	30	20.3
Centrifuge	111	69	62.2
Centrifuge for HT	144	47	32.6
Centrifuge for blood bags	145	11	7.6
Incubator	150	102	68.0
Plasma extractors	149	16	10.7
Fluorescent microscope	124	28	22.6
Safety cabinet	19	7	36.8

Source BTS Survey 2001

Regional Analysis

Table 10.13 gives a breakdown of the distribution of hospitals with equipment by provinces. Nairobi province leads with between 33.3% and 92.3% of the hospitals having all equipment. It is closely followed by Eastern, Coast and Nyanza provinces. Western has the most gaps with 4 equipment items missing in all hospitals. In North Eastern, 3 types of equipment were not available in all hospitals while there was 1 item missing in all hospitals in Rift Valley provinces respectively.

Table 10.13 Percentage distribution of hospitals with selected equipment by province

Type of equipment	Province/Region								
	Nairobi	Central	Eastern	N/Eastern	Coast	R/Valley	Nyanza	Western	Total
Couches/beds for donors	92.3	100	86.7	100	73.3	79.5	84.2	57.9	81.7
Refrigerators for unscreened blood	69.2	100	58.8	100	25.0	70.6	60.5	25.0	60.1
Elisa machines (complete)	76.9	64.7	68.8	66.7	68.8	70.6	28.9	52.6	57.7
Colorimeter	72.7	88.9	75.0	100	80.0	64.7	56.8	60.0	66.8
Sphygnomanometer	83.3	53.3	53.3	33.3	80.0	48.5	44.4	47.6	54.0
Stethoscope	54.4	5.9	33.3	0.0	21.4	21.2	41.7	19.0	27.2
Ordinary centrifuge	84.6	94.4	93.3	66.7	93.3	88.2	75.7	90.0	86.5
Blood pressure machines	81.8	80.0	63.3	0.0	13.3	28.6	47.8	12.5	42.7
Hot air oven	92.3	83.3	75.0	67.7	93.3	64.7	50.0	35.0	65.4
Water baths	92.3	94.1	100	100	100	73.5	63.2	60.0	78.7
Binocular microscopes	91.7	88.9	100	100	93.3	87.9	97.4	90.5	92.9
Autoclaves	91.7	64.7	86.7	100	80.0	55.9	57.9	40.0	64.3
Incinerators	83.3	20.0	50.0	66.7	53.3	31.3	51.4	10.0	41.2
QBC system for malaria	66.7	11.8	28.6	33.3	46.7	15.2	13.9	10.0	22.7
Safety cabinets	45.5	66.7	57.1	50.0	42.9	41.9	30.6	19.0	40.9
Auto counter for blood (coulter)	72.7	35.3	23.1	33.3	46.7	26.5	15.8	0.0	26.5
Deep freezer	27.3	6.3	38.5	33.3	14.3	18.2	10.5	40.0	20.3
Centrifuge	71.5	66.7	72.7	100	50.0	45.0	71.5	46.2	6.2
Centrifuge for HT	70.0	41.2	27.3	100	46.7	34.4	13.9	20.0	32.6
Centrifuge for blood bags	41.7	6.3	25.0	0.0	6.5	0.0	2.7	0.0	7.6
Incubator	91.7	72.2	85.7	6.7	73.3	53.1	72.2	50.0	68.0
Plasma extractors	33.3	22.2	8.3	33.3	20.0	9.4	0.0	0.0	10.7
Fluorescent microscope	33.3	18.2	25.0	100	30.0	10.7	23.5	19.0	22.6
Safety cabinet	50.3	50.0	50.0	33.3	100	25.0	33.0	0.0	36.8

Source: BTS survey 2001

Provider analysis

Details of the distribution of hospitals with selected equipment by provider are shown on table 10.14. Fifty percent of the private hospitals had 13 of the 24 items at their premises compared to only 12 and 10 in mission and government hospitals respectively.

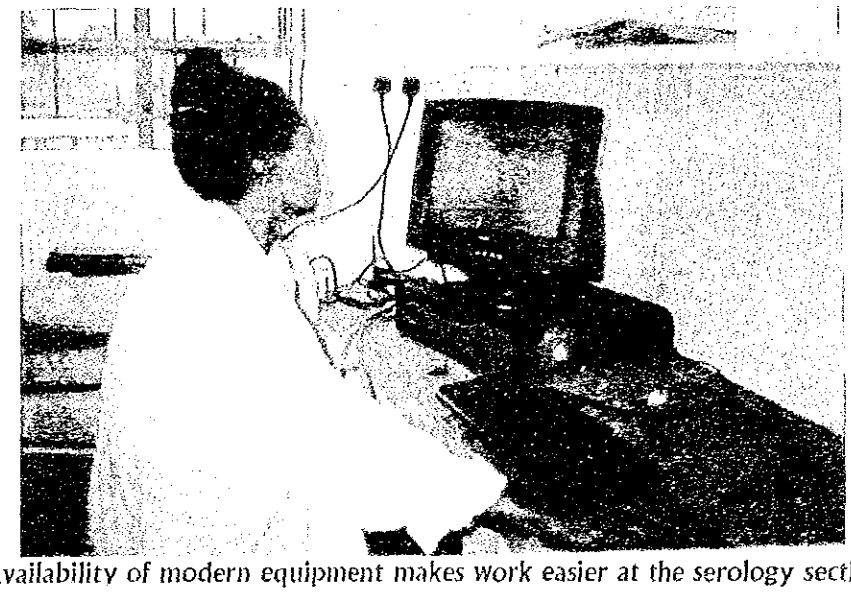
Table 10.14: Percentage distribution of hospitals with selected equipment by provider

	Government	Mission	Private	Total
Couches	75.0	90.6	85.7	81.7
Refrigerator for unscreened blood	61.0	71.9	51.0	60.1
Elisa machines	70.5	62.1	34.7	57.7
Calorimeter	72.0	71.0	62.5	68.8
Sphygnomanometer	44.3	54.8	67.3	54.0
Stethoscope	7.2	35.5	51.1	27.2
Ordinary centrifuge	88.2	90.0	81.6	86.5
Blood Pressure machines	20.5	60.0	66.7	42.7
Hot air oven	68.0	65.5	61.2	65.4
Water baths	82.9	80.0	71.4	78.7
Binocular Microscope	93.3	87.5	95.9	92.9
Autoclaves	62.2	64.2	67.3	64.3
Incenerator	28.6	36.7	66.5	41.2
QBC System for malaria	18.3	19.4	31.3	22.7
Safety Cabinets	48.6	27.6	36.4	30.8
Auto counter for blood (counter)	13.7	43.3	35.4	26.5
Deep Freezer	26.4	13.8	14.9	20.3
Centrifuge	22.6	9.1	23.5	20.3
Centrifuge for HT	40.8	34.5	18.2	32.6
Centrifuge for blood bags	5.6	27.3	9.1	7.6
Incubator	65.3	70.0	70.8	68.0
Plasma extraction	14.9	3.4	8.7	10.7
Fluorescent microscope	12.3	27.7	35.6	22.6
Safety cabinet	45.5	25.0	25.0	36.8

Source: BTS survey 2001

10.6 Condition of Equipment

The condition of equipment was good at between 50.0% to 86.4% of the hospitals as shown in table 10.15. At the top range 86.4% of the hospitals had fluorescent microscopes in good condition. Over 75% of the hospitals were found to have 9 of the 24 items in good condition while in 50% or more of the hospitals all equipment were found to be in good working condition. This is a satisfactory performance.



Availability of modern equipment makes work easier at the serology section

Table 10.15: National distribution of hospitals with working selected equipment

Item description	Total No. of hospitals	No. of hospitals with working equipment	% of total
Couches/beds for bleeding donors	118	94	79.7
Refrigerators for unscreened blood	93	74	79.6
Elisa Machines complete with all components (Alisa reader)	87	60	69.0
Colorimeter	101	75	74.3
Sphygnomanometer	79	55	69.3
Stethoscope	39	31	79.5
Ordinary centrifuge	121	89	73.6
Blood pressure machines	34	20	58.8
Hot air oven	91	63	69.2
Water baths	106	70	66.0
Binocular microscopes	129	95	73.6
Autoclaves for sterilization	89	61	68.5
Incinerators	52	39	75.0
QBC system for malaria	32	16	50.0
Safety cabinets	56	41	73.2
Auto counter for blood (coulter)	39	22	56.4
Deep freezer	32	25	78.1
Centrifuge	59	45	76.3
Centrifuge for HT	41	25	61.0
Centrifuge for blood bags	10	6	60.0
Incubator	88	74	84.1
Plasma extractors	14	8	57.1
Fluorescent microscope	22	19	86.4
Safety cabinet	5	4	80.0

Source BTS Survey 2001

Regional Analysis

Table 10.16 shows the regional distribution of hospitals with good working equipment by provinces. On average, more than 50% of the hospitals in each province had the majority of the equipment in good working condition.

Table 10.16 Percent distribution of hospitals with working selected equipment by Province

Type of equipment	Province/Region								
	Nairobi	Central	Eastern	N/Eastern	Coast	R/Valley	Nyanza	Western	Total
Couches/beds for donors	90.0	64.3	90.9	66.7	63.6	76.9	84.4	90.9	79.7
Refrigerators for unscreened blood	85.7	64.7	80.0	100	50.0	87.5	82.6	80.0	79.6
Elisa machines (complete)	88.9	40.0	60.0	0.0	62.5	79.2	78.6	70.0	69.0
Colorimeter	80.0	53.3	91.7	66.7	63.6	86.4	72.7	72.7	74.3
Sphygnomanometer	75.0	50.0	62.5	0.0	70.0	68.8	75.0	60.9	69.6
Stethoscope	75.0	50.0	100	-	66.7	100	64.3	100	79.5
Ordinary centrifuge	77.8	56.3	81.8	66.7	81.8	667.9	84.6	70.6	73.6
Blood pressure machines	71.4	50.0	83.3	0.0	0.0	75.0	40.0	100	58.8
Hot air oven	77.8	46.2	66.7	100	72.7	72.7	68.4	83.3	69.2
Water baths	70.0	33.3	75.0	66.7	83.3	66.7	72.7	54.5	66.0
Binocular microscopes	60.0	50.0	83.3	33.3	81.8	75.9	80.6	78.6	73.6
Autoclaves	77.8	50.0	81.8	66.7	44.4	68.4	75.0	75.0	68.5
Incinerators	66.7	50.0	83.3	50.0	42.9	100	842	50.0	75.0
QBC system for malaria	71.4	100	50.0	0.0	40.0	60.0	33.3	0.0	50.0
Safety cabinets	100	50.0	62.5	100	66.7	84.6	80.0	80.0	73.2
Auto counter for blood (coulter)	85.7	20.0	100	100	66.7	50.0	37.5	0.0	56.4
Deep freezer	100	00	100	100	66.7	66.7	50.0	100	78.1
Centrifuge	50.0	62.5	83.3	100	25.0	87.5	81.0	100	76.3
Centrifuge for HT	20.0	75.0	100	66.7	60.0	72.7	62.5	33.3	61.0
Centrifuge for blood bags	66.7	0.0	100	-	-	-	33.3	100	60.0
Incubator	88.6	63.6	100	100	75.0	87.5	87.0	80.0	84.1
Plasma extractors	66.7	0.0	100	100	50.0	66.7	0.0	100	57.1
Fluorescent microscope	100	50.0	50.0	100	50.0	100	100	100	86.4
Safety cabinet	-	-	-	-	100	0.0	100	100	80.0

Source: BTS survey 2001

Provider analysis

Table 10.17 shows the distribution of hospitals with working equipment by provider. Twenty three items in government and mission hospitals were in good condition compared to 19 in the private facilities.

Table 10.17: Percentage distribution of hospitals with working equipment by Provider

	Government	Mission	Private	Total
Couches/bed for donor	73.6	84.0	85.0	79.7
Refrigerator for unscreened blood	84.0	75.0	73.9	79.6
Elisa machines	67.9	56.3	83.3	69.0
Calorimeter	70.6	71.4	82.8	74.3
Sphygnomanometer	54.8	75.0	81.3	69.6
Stethoscope	57.1	90.0	81.8	79.5
Ordinary centrifuge	69.0	66.7	84.6	73.6
Blood Pressure machines	50.0	57.1	66.7	58.8
Hot air oven	69.4	58.8	76.0	69.2
Water baths	61.8	54.5	82.8	66.0
Binocular Microscope	69.4	73.9	79.5	73.6
Autoclaves	62.8	66.7	78.6	68.5
Incinerator	66.7	66.7	84.0	75.0
QBC System for malaria	0.0	83.3	91.7	50.0
Safety Cabinets	71.1	28.6	85.7	73.2
Auto counter for blood (counter)	50.0	36.4	75.0	56.4
Deep Freezer	76.2	75.0	85.7	78.1
Centrifuge	77.4	81.8	70.6	76.3
Centrifuge for HT	66.7	85.6	40.0	61.0
Centrifuge for blood bags	60.0	33.3	100	60.0
Incubator	90.2	68.4	85.7	84.1
Plasma extraction	60.0	50.0	50.0	57.1
Fluorescent microscope	66.7	100	91.7	86.4
Safety cabinet	100	-	0.0	80.0

Source: BTS survey 2001

10.7 Adequacy of Equipment

The hospital was provided with a list of essential equipment from which they specified quantities available and quantities required based on their needs. The number of hospitals which specified their requirements varied from 8 for safety cabinets to 132 for couches. Table 10.18 summarises the national requirements for those equipment considered essential for BTS operations. The quantities they require are shown in second column while what they currently have is shown on the third column. The last column shows what they should be supplied with to operate effectively. Couches were found to be the most required items with a total of 220 followed by 198 sphygnomanometers and 145 water baths. Generally more equipment are required but in varying quantities.

Table 10.18: BTS equipment requirements

Equipment Description	Required Qty	Quantity available	Shortage
Coaches/Beds for bleeding donors	384	164	220
Refrigerator for blood	229	117	112
ELISA machines	151	119	32
Colorimeter	191	128	63
Sphynomanometer	287	98	198
Stethoscope	195	50	145
Ordinary centrifuge	229	185	44
Blood pressure machines	154	56	98
Hot air oven	158	114	44
Water baths	187	139	48
Binocular microscope	347	264	83.
Autoclave for sterilization	188	108	80
Incinerators	110	55	55
QBC system for malaria	101	30	71
Safety cabinets	155	73	82
Auto counter for blood	125	44	81
Deep Freezer	119	28	91
Centrifuge	150	84	66
Centrifuge for HT	115	49	66
Centrifuge for blood	602	557	45
Incubator	154	113	41
Plasma extraction	131	22	109
Safety cabinets	19	8	11

Source: BTS survey 2001

Blood stored together with other items due to shortage of fridges

10.8 Utilization of Equipment

Table 10.19 shows the utilization of equipment at the hospitals. Other than two equipments; QBC system for malaria and centrifuge for blood bags which are used always by only 58.6% and 40% respectively of the hospital, all others were frequently used by 90% of the hospitals. Of the 24 items, 11 were frequently used by 90% of the hospitals. Both regional and provider utilization comparisons reflect the national trend.

Table 10.19: National distribution of hospitals with frequently utilized equipment

Item description	Total No. of hospitals	No. of hospitals with utilized equipment	% of total
Couches/beds for bleeding donors	120	109	90.8
Refrigerators for unscreened blood	88	85	96.6
Elisa Machines complete with all components (Alisa reader)	85	67	78.8
Colorimeter	93	84	90.3
Sphygmomanometer	75	66	88.0
Stethoscope	42	35	83.3
Ordinary centrifuge	105	96	91.4
Blood pressure machines	31	26	83.9
Hot air oven	84	77	91.7
Water baths	98	88	89.8
Binocular microscopes	119	113	95.0
Autoclaves for sterilization	84	75	89.3
Incinerators	53	48	90.6
QBC system for malaria	29	17	58.6
Safety cabinets	49	48	98.0
Auto counter for blood (coulter)	36	29	80.6
Deep freezer	27	22	81.0
Centrifuge	54	51	94.4
Centrifuge for HT	39	33	84.6
Centrifuge for blood bags	10	4	40.0
Incubator	85	75	88.2
Plasma extractors	13	11	84.6
Fluorescent microscope	21	20	95.2
Safety cabinet	6	6	100.0

Source BTS Survey 2001

10.9 Availability and utilization of Blood Bags

Blood bags are essential supplies in a blood transfusion environment. The government hospitals are supplied with these items by the NPHLS while Mission and private hospitals procure their requirements directly.

200ml and 500ml bags are the two types of blood bags used in hospitals. Only 35 hospitals out of the 189 hospitals used the 200ml bags. Out of the 35 hospitals 18 (51.4%) had the 200ml bags in stock. Hospitals were asked to rate how they utilize the bags on a score of 1 to 5. Hospitals which use them always got a score of 1, frequent utilization was given a score of 2,moderate utilization scored 3,rare utilisation was awarded 4. Where there was no use a score of 5 was given. Seventy five percent of the hospitals use them always, 8.3% indicated frequent usage while 16.7% use them moderately.

With regard to the 500ml bags 137 hospitals use them and 97.1% of the hospitals had them in stock. These are the commonly used bags because bleeding from adults is done in 450ml at a time. Of the 137 hospitals who responded 72.6% indicated that they always use them while 17.9% use them frequently.

Seventeen hospitals use bags that are more than 500 ml and of those, 8 (47.1%) had them in stock.

Regional Distribution
The regional distribution of the 200ml bags was as follows; 8 hospitals in Nyanza, 3 hospitals in Rift Valley, 3 hospitals in Coast, 2 hospitals in Eastern, 1 hospital each in Central and Nairobi. None was found in Western and North Eastern provinces. The 500ml bags were also available as follows; Nairobi (11), Central (18), Eastern (12), North Eastern (3), Coast (14), Rift Valley (31), Nyanza (29) and Western (15).

10.10 Availability and Utilisation of Screening Kits

Screening of blood is done for HIV/AIDS, Hepatitis B, Syphilis and Malaria. The following kits are used at the hospitals.

Screen Type	Kits type
HIV/AIDS	❑ Immuno comb ❑ Innotest ❑ Abbot (1st, 2nd, and 3rd generation)
Hepatits B	HepCell
Syphilis	RPR

Out of the 194 hospitals 153 use HIV screening kits and 147 (96.1%) had them in stock while 6 (3.9%) had run out of stock. Of the 153 hospitals that use them 77.0% use them always, 16.7% use them frequently while 5.6% use them moderately.

HBV screening kits were available in 113 (76.4%) of the 148 hospitals that use them. The other 35 (23.6%) hospitals had run out of stock but were expecting them. Of the 88 hospitals that responded, 66 (75.9%) use them always, 14 (16.1%) use them frequently, 5 (5.7%) use them moderately while 1.1% used them rarely.

With regard to Syphilis kits, 153 hospitals use them out of which 141 (92.8%) had them in stock. The other 11 (7.2%) did not have them in stock. There are 141 (92.8%) hospitals who use them always and 11 (7.2%) that use them frequently.

Malaria screening kits were available in 74 (64.3%) of the hospitals. Forty one (78.8%) of the hospitals use them always while 9 (17.3%) use them frequently.

Regional Distribution

The regional distribution of the HIV kits were as follows; Nairobi 12 (100%) of the hospitals had them while the corresponding figures for Central were 17 (100%), Eastern 17 (100%), North Eastern 3(100%), Coast 16(100%), Rift Valley 33 (96.6%), Nyanza 32 (91.4%) and Western 17 (85%).

HBV screening kits were available in the region as follows; Nairobi 12 (100%) of the hospitals, Central province 15 (93.8%) of the hospitals, Eastern 12 (80%), North Eastern 3 (100%), Coast 16 (100%), Rift Valley 24 (72.7%), Nyanza 20 (57.1%) and Western 11 (61.7%) of the hospitals. Regional availability of Syphilis screening kits was as follows: Nairobi 12 (100%), Central 17 (100%), Eastern 14 (87.5%), North Eastern 3 (100%), Coast 16 (100%), Rift Valley 30 (90.9%), Nyanza 32 (91.4%) and Western 17 (85%) of the hospitals.

Malaria screening kits had an even regional distribution. The kits were available in 10 (83.3%) of the hospitals in Central province, Nairobi - 9 (90%), Eastern - 12 (80%), North Eastern - 3 (100%), Coast - 6 (54.4%), Rift Valley - 8 (44.4%), Nyanza -19 (61.3%) and Western 9 (60%) of the hospitals.

11 Human Resource

11.1 Health Personnel in general

Information on availability of various cadres of staff was collected from all the facilities visited. Using established posts as a basis, one could say there is overstaffing for most categories. These include Laboratory Technologists, Laboratory Technicians and Enrolled Nurses. In the absence of staffing norms however, one cannot conclusively say there is overstaffing.

Table 11.1 provides information on the distribution of key staff in the facilities visited based on posts occupied. A review of this distribution by category shows that the Government employs most of the staff in all categories except for Physicians, Pharmaceutical Technologists and Accountants where the Private sector takes a lead.

Table 11.1 Distribution of key staff in health facilities by Provider

Cadre	Government	Mission	Private	Total
Physicians	23(25%)	34(36%)	36(39%)	93(100%)
Surgeons	49(50%)	27(28%)	21(22%)	97(100%)
Obs/Gynae	36(54%)	13(20%)	17(26%)	66(100%)
Paediatricians	31(57)	11(21%)	12(22%)	54(100%)
Radiologists	20(63)	7(16%)	5(22%)	32(100%)
Medical Officers	309(65%)	67(14%)	103(21%)	479(100%)
Clinical Officers	946(84%)	94(9%)	87(7%)	1127(100%)
Registered Nurses	1912(77%)	218(9%)	336(14%)	2466(100%)
Enrolled Nurses	3967(84%)	472(10%)	274(6%)	4713(100%)
Enrolled Community Nurses	4629(79%)	920(16%)	277(5%)	5826(100%)
Lab.Technologists	464(74%)	89(14%)	74(12%)	627(100%)
Lab Technicians	494(85%)	54(9%)	38(6%)	586(100%)
Pharmacists	379(59%)	8(13%)	18(28%)	63(100%)
Pharm Technologists	130(11%)	12(41%)	26(48%)	168(100%)
Pharm Technicians	7(77%)	25(7%)	29(16%)	61(100%)
Health Administrator	105(60%)	31(18%)	39(22%)	175(100%)
Accountants	32(16%)	55(28%)	113(56%)	200(100%)

Source: BTS Survey

The Provincial breakdown is given in Table 11.2. Rift Valley appears to have more staff than other provinces in many categories. However, in the absence of staffing norms and population served one cannot conclude the province is doing better than the others.

Table II.2: Distribution of key staff per province

Cadre	Nairobi	Central	Eastern	N.East	Coast	R.Valley	Nyanza	Western	Total
Physicians	4	15	8	1	6	23	28	8	93
Surgeons	1	21	10	-	4	29	20	12	97
Gynaecologists	5	14	6	-	5	15	17	4	66
Peadiatricians	4	9	6	-	8	10	13	4	54
Radiologists	2	5	5	-	8	7	5	0	32
Med. Officers	74	70	66	24	33	113	53	46	479
Clinical Officers	25	180	146	50	85	390	140	111	1127
Registered Nurses	58	486	390	32	406	607	320	167	2466
Enrolled Nurses	341	1269	482	12	665	1158	344	442	4713
Enrolled Com. Nurses	237	906	803	190	544	1671	650	825	5826
Lab. Technologists	17	121	65	23	96	195	66	44	627
Lab. Technicians	7	72	65	20	41	216	111	54	586
Pharmacists	3	12	5	-	10	20	8	5	63
Pharm. Technologists	12	17	16	10	13	65	21	14	168
Pharm. Technicians	0	5	11	-	10	13	13	9	61
Health Administrators	11	30	19	3	19	42	33	18	175
Accountants	25	47	6	1	56	29	25	11	200

Source: BTS Survey

II.2 Staff Involved in BTS

The key actors in the BTS are given in table II.3. Established posts are those that have been approved and budgeted for by running agency. Required posts are based on workload and occupied posts are those filled by existing staff. A comparison between established and required posts shows shortfalls in all cadres except one, namely laboratory technologists. The highest shortfall is in counsellors (58%) and the rest are registered nurses (47%), laboratory technicians (22%), enrolled nurses (12%), clinical officers (4%) and medical officers (3%).

A review of required versus occupied posts reveals understaffing amongst counsellors (54%), registered nurses (48%) and medical officers (23%). There is overstaffing of enrolled nurses (44%), laboratory technologists (38%), laboratory technicians (34%) and clinical officers (6%).

Table II.3 Overall distribution of staff active in BTS

Cadre	Number of Posts		
	Established	Required	Occupied
Medical Officers	38	39	30
Clinical Officers	47	49	52
Registered Nurses	55	103	54
Enrolled Nurses	76	86	124
Lab.Technologists	169	162	224
Lab Technicians	122	157	211
Counsellors	89	210	96

Based on occupied versus established posts there is understaffing of Medical Officers, Registered Nurses and Counsellors. There is over staffing of the other staff categories.

The current staffing of BTS Centres at Government, Mission and Private facilities is provided in Table II.4. The existing staff were reviewed against those required. The number of staff for each cadre is followed by either (-) or (+) percentage denoting understaffing and overstaffing respectively. Where the number required equals positions filled the percentage is given as zero.

The Government centres appear to have shortage of Counsellors (66%), Medical Officers (65%) and Registered Nurses (58%). The categories reflecting more staff than the posts are Clinical Officers, Enrolled Nurses, Laboratory Technologists and Technicians. Amongst these the Enrolled Nurses seem to have the highest level of overstaffing at 18 per cent.

The Mission Centres reflect overstaffing of Laboratory Technicians Laboratory Technologists, Counsellors and Clinical Officers. Like in Government Centres they have shortages of Registered Nurses.

The Private Centres seem to be doing better when compared to the other two (Government and Mission) because no shortages were recorded.

Table II.4: Distribution staff active in BTS by facility ownership

Cadre	Facility ownership			Overall
	Government	Mission	Private	
Medical Officers	9(-65%)	4(0%)	17(+89%)	30(-71%)
Clinical Officers	39(+5%)	6(+20%)	7(0%)	52(+6%)
Reg. Nurses	31(-58%)	12(-40%)	11(+10%)	54(-48%)
Enrolled Nurses	87(+18%)	2(-33%)	35(+289)	124(+44%)
Lab.Technologists	130(+11%)	50(+67%)	44(+193%)	224(+38%)
Lab. Technicians	137(+10%	48(+140%)	26(+117%)	211(+34%)
Counsellors	61(-66%)	18(+29%)	17(+6%)	96(-54%)

Source: BTS Survey

The distribution of BTS staff in the provinces is shown in table II.5 and appendix VI. The Medical Officers seem to be in short supply in all provinces except Nairobi and R.Valley while Clinical Officers, Registered and Enrolled Nurses are inadequate in all provinces apart from R.Valley. All provinces seem to have more Laboratory staff than required except Coast, N.Eastern and Nyanza. All provinces show shortfalls in staffing of counsellors except Eastern and Central.

Slightly less than half (47 per cent) of the Medical Officers are based in R.Valley and another 37 per cent are based in Nairobi. The two provinces account for nearly 84 percent of all the occupied posts of Medical Officers. Two provinces account for 95 per cent of all the Clinical Officers working in BTS centres countrywide. These are Rift Valley (85 per cent) and Nyanza (10 per cent).

Seventy four per cent of the Registered Nurses are working in two provinces (R.Valley- 52 % Nyanza-22 per cent). Three provinces account for 98 per cent of the Enrolled Nurses (R.Valley-67%, Nairobi-19 % and Nyanza-12%). The distribution of Laboratory Technologists shows a fair pattern; R.Valley (28%), Eastern (16%), Central (15%), Nairobi (14%), Nyanza (14%), Western (10%), Coast (3 %) and N.Eastern (2%). The Laboratory Technicians are distributed as follows: R.Valley-35%, Eastern-21%, Central-16%, Western-13%, Nyanza-10% and Coast-3%. There is a modest variation in the distribution of counsellors (Coast-25%, Nyanza-24%, R.Valley-17%, Western-13%, Nairobi-10%, Eastern-7% and Central-4%).

Table II.5: Distribution of BTS staff by province

Cadre	Nairobi	Central	Eastern	N.East	Coast	R.Valley	Nyanza	Western	Total
Medical Officers	11	0	1	-	-	14	4	0	30
Clinical Officers	1	1	0	-	-	44	5	1	52
Registered Nurses	9	4	0	-	1	28	12	0	54
Enrolled Nurses	23	0	1	-	1	83	15	1	124
Lab.Technologists	32	33	36	4	7	63	26	23	224
Lab. Technicians	2	34	45	1	6	74	21	28	211
Counsellors	10	4	7	-	24	16	23	12	96

Although Rift Valley Province reflects more staff categories than other providers, this does not necessarily mean the province is better than the others. Factors such as population served and quality of service need to be considered before making such conclusions.

12 Funding and sustainability

12.1 Funding Requirements

BTS services require adequate development and recurrent funding. Facilities, equipment and transport are important for BTS activities and form the basis for a development budget. Personnel, supplies (consumables), donor education and mobilisation, blood collection, processing, storage and distribution need adequate recurrent budgetary provisions.

The NPHS commissioned a study to carry out a needs assessment for the blood transfusion services in Kenya. The Consultant estimated the financial requirements of Nairobi RBTC. Excluding facilities, the equipment that existed and the salaries and wages it was established that a total of US$ 539,585 was required by the centre for additional equipment and annual recurrent expenditure. The breakdown is shown on table 12.1.

Table 12.1: Funding requirements for the Nairobi Centre

A. EQUIPMENT	Number	Estimated Unit Cost	Total
Four wheel drive 8-seater with roof rack	3	$30,000	$90,000
Small vehicle	1	$12,000	$12,000
Blood Bank refrigerator	2	$5,000	$10,000
Refrigerator for reagents - 20° C freezer - 80° C freezer	1 1 2	Available Available $5,000	 $10,000
Autoclave and accessories	2	$3,000	$6,000
Distiller (4 litres/hour)	1	$12,000	$12,000
Centrifuge – Refrigerated	2	$3,000	$6,000
Cool boxes	24	$15	$360
Weighing scale (Donor)	6	$25	$1,500
Blood unit weighing	5	$25	$125
Couches for 2 mobile teams	12	$350	$4,200
Portable table and chair	12 units	$150	$1,800
Computer, printer and Ups	1 unit	$6,000	$6,000
ELISA reader		Available	
ELISA printer		Available	
Rocker	1	$500	$500
Shaker	1	$500	$500
Water bath	1	$1,200	
Electronic balance	1	$900	$900
Adjustable printers	6	$200	$1,200
Sub total equipment			$163,085
B. CONSUMABLES			
ELISA KITS (HIV	32,000 units		
5% controls			

10% Repeats (HIV +ve)	36,800	$0.75	$27,600
ALISA KITS (BHAg)	36,800	$0.50	$18,400
Rapid Tests (10%)			
HIV	3,700	$2.00	$7,400
HbsAg	3,700	$2.00	$7,400
Blood bags (40,000)			
Single	20,000	$2.00	$40,000
Double	10,000	$4.00	$40,000
Quadruple	10,000	$8.00	$80,000
Blood giving sets	70,000	$0.60	$36,000
Gloves			
Eppendorf tubes			$20,000
Aprons			
Copper sulphate			
Refreshment – Soda & Biscuits			$20,000
Sub total consumables			**$297,300**
C.RECURRENT OPERATIONAL EXPENDITURE			
i) Operational (lunch) allowance: 50 people @US$ 2.00 x 21 working days per month X 12 months			$25,000
ii) Fuel, service repair: 4 vehicles @US$ 500 each per month X 12 months			$24,000
iii) Miscellaneous			$5,000
Sub total operational expenditure			**$54,200**
D. BLOOD DONOR EDUCATIONAL MATERIALS/RECORDS (FOR ABOUT 40,000 DONORS)			$20,000
- Cards, forms, files			$5,000
- Correspondence and			$25,000
Campaign in Media			
Total			U$539,585

A further US$ 641,026 and US$ 25,641 is required for BTS buildings, equipment and salaries and wages respectively bringing the total expenditure to US$.1,206,252.

As a start, NBTS plans to establish a total of 5 RBTCs and 4 Satellite centres which will be increased gradually to adequately cater for the regional safe blood requirements. More than US$ 10,856,268 broken down to US$ 7,154,657 for facilities, equipment and US$ 3,701,611 for supplies, operations and maintenance will be required.

12.2 Current Situation

The BTS system performance has been declining over the years due to inadequate funding. There is no budgetary provision for BTS activities as a single item in the national budget. Its budgetary provision is catered for under the hospital laboratory services. Because of the persistent government budgetary constraints, funds allocation to the Laboratory services have not been adequate to cater for all requirements. This has prompted cutting down of

activities and consequently the BTS has been most affected. The Government has only managed to provide adequate funding for salaries and wages and reagents.

The donor community, multilateral and bilateral agencies have been relied on for development and screening kits funding. The on-going construction of the RBTCs are funded by USAID while since 1998, IDA has been supplying the HIV/AIDS and Syphilis screening kits.

To some extent the funds from the recently introduced cost sharing system have also been used to bridge gaps that keep occurring at the hospital level. Because of logistical problems, hospitals run out of reagents, screening kits, blood bags and other supplies. .While waiting for supply from NPHLS funds collected from the patients under the cost sharing system are applied to purchase required items.

12.3 Cost Sharing

Declining economic and strained government resources forced serious attention to health sector reforms, particularly those related to increasing revenue. The cost sharing programme, started in 1989, accomplished a policy shift from free health care in government health facilities to modest payment by patients.

The MOH successfully implemented a cost-sharing programme in the health sector with technical assistance from the USAID through the KHCF in phases through 1994-1995. Nearly US$ 67 million has been collected in cost-sharing revenue by the year 2000 which has made a positive contribution to preserving and in many cases, improving services in hospitals while government support declined relative to inflation.

12.4 Income from Blood Transfusion Services

Blood has been issued free of charge to the patients over the years. Even with the introduction of the cost sharing system which requires patients to pay some fee for the services in government hospitals, there is no levy on blood as a separate item.

However, the Nairobi RBTC has introduced a charge for blood issued to private hospitals and individuals since June 2001. A modest fee of US$3.2 is charged on each unit issued. During the period, June-September 2000, a total of US$ 683 was collected from blood issued to private hospitals and individuals.

Since all government hospitals are now charging a fee for their services, there is no justification for not sharing this with the BTS system. Blood and its products are provided to patients to manage their conditions just like drugs are and should be paid for. If this policy were adopted, at the current performance a total revenue of US$ 115,385 per year based on current supply levels will be generated immediately. If cost recovery is set at 50% of the cost of a unit of blood, US$ 19.2 will be charged and annual revenue will be US$ 1,730,769.

12.5 Expenditure on Blood

The cost of collecting and processing blood in Kenya has not been established. However, a study carried out in Zambia to determine the total cost of processing one unit of blood established that a total of between US$ 38-51 is required out of which half constitutes recurrent expenditure.

Blood bags, screening kits, needles, reagents, transport services, storage, maintenance and laboratory consumables constitute the bulk of recurrent expenditure for BTS activities.

Information on funding and expenditure for each of the mentioned items was very limited and only a few facilities provided it.

Cost of Blood Bags

KEMSA which is the main procurement agency spent US$ 378132 for bags and reagents during the fiscal year 2000/2001. Out of this figure US$ 231,057 (61%) was spent on double blood bags US$ 138,791 (37%), on single blood bags and US$ 8283 (2%) on reagents.

A total of 44 facilities purchased 36,830 bags at a cost of US$ 183,093 (see table 12.2). The government facilities accounted for more than half of the expenditures. The cost per bag varies from US$ 1.9 (private hospitals) to over US$ 7.0 (GOK hospitals). A possible explanation could be differences in quality of the blood bags purchased unless the Government bought the bags from more expensive suppliers.

Table 12.2 Blood bags purchased by facility ownership

Facility Ownership	No of Facilities	Quantity of blood bags	Cost of Blood Bags-US$
Government	22	11,799	93413
Mission	7	20,417	80955
Private	15	4,614	8725
Total	44	3,6830	183,093

Cost of Kits

Thirty-three facilities purchased 3,863 kits at a cost of US$ 103,885 and the Mission facilities accounted for sixty per cent of the cost. The cost per kit is higher on GOK hospitals (US$ 73.5) where it cost more than twice the price changed mission hospitals. At U$ 9.0 per kit, the private hospitals were charged the lowest price.

Table 12.3 Kits purchased per facility ownership

Facility Ownership	No of Facilities	No of Kits	Cost of Kits- (US$)
Government	15	412	30274
Mission	7	2,206	62380
Private	11	1,245	11231
Total	33	3,863	103085

Information was obtained from Kenya Medical Supplies Agency (KEMSA) on kits for screening HIV and syphilis over a three-year period (July 1998 to June 2001). Figure 12.1 gives the quantities procured per type of kit. The number of tests per Immunocomb testing kit is 36 giving 627,048 tests, Innotest kit- 96 resulting in 714,720 tests, Abbot kit-100 yielding 440,000 tests and RPR kit-100 enabling some 2,094,900 tests to be done.

Figure 12.1: Kits procured, 1998-2001

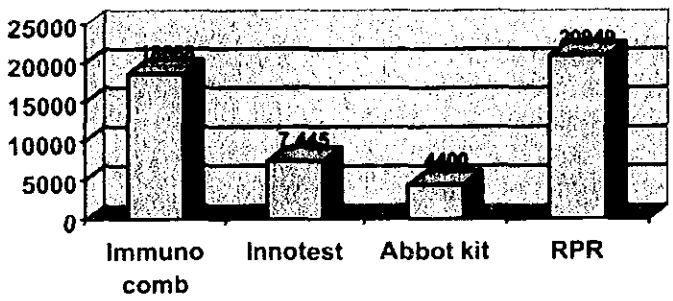


Table 12.4 provides information on the total number of kits supplied over varying periods for three types of kits. The expected number of tests from the kits are Immunocomb - 200,016; Abbott - 294,000 and Innotest-480, 384. Estimated annual requirements and cost of the kits are Immunocomb - 551,213 (US$24,407,712); Abbott - 171,600 (US$11,840,400) and Innotest-184, 704 (US$20,391,322). Therefore in order to meet these requirements some US$ 56,639,434 must be made available.

Table 12.4 Kits received between 1998 and 2000

Kit Type	Quantity received	Unit Cost (US $)	Total Cost (US $)	Period covered
Immunocomb	5,556	44.28	246,019.68	Aug.98-Nov.99
Abbott	2,940	69.00	202,860.00	Aug.98-Dec.99
Innotest	5,004	110.40	552,441.60	Nov.98-Dec.00
Total			1,001,321.28	

Source: GTZ Procurement Management Unit

Table 12.5 gives estimates of HIV test requirements over a five year period, giving an annual average of 2,855,138 tests. The estimate for pregnant women takes into account factors such as birth rate; number of women aged 15-45 years; percentage sterilisation and anticipated pregnancies. The estimates for population testing for HIV is based on the assumption that 0.5 per cent of the population will give blood for testing out of which 10

per cent will require repeat testing. The estimates for HIV testing in STI cases takes into consideration number of sexually active adults and excludes the proportion protected by using condoms. The estimates for HIV voluntary testing is based on population between 15-49 years, the three already tested categories, HIV positive infections, proportion of adults not tested and that voluntarily testing.

Table 12.5 Estimated HIV test requirements per year

Test Type	2001	2002	2003	2004	2005
Pregnant Women	768,201	699,339	603,856	614,231	550,071
Testing blood for HIV	171,052	172,686	174,395	175,886	177,136
HIV Testing in STI Cases	522,903	569,048	604,331	632,553	648,642
Voluntary HIV Testing	1,073,125	1,261,311	1,437,422	1,603,015	1,756,488
HIV Test requirements	2,535,280	2,702,383	2,880,004	3,025,686	3,132,337

Source: GTZ, PMU

Two kits namely HEPCELL II and AFP were developed jointly by JICA and KEMRI with a workforce of thirteen staff (9 Kenyans and 4 Japanese). The HEPCELL II kit is used in detection of HBsAg., which is an indicator of HBV infection, a major cause of liver cirrhosis, chronic hepatitis and hepatocellular carcinoma. The purpose is to prevent viral hepatitis and control related hepatocellular carcinoma and produce a cost effective, sensitive and specific reagent that uses simple equipment and requires neither electricity nor specialised manpower. Each HEPCELL II kit can be used for 200 tests. The Alpha Feto Protein (AFP) test kit is used as complementary to other imaging tests, for example Ultrasound for hepatocellular carcinoma. Elevated level of AFP particularly in liver disease patients is a strong pointer to the presence of hepatocellular carcinoma. The quantities of each type of kit produced and distributed to hospitals over a five year period is provided in table 12.6.

Table 12.6 Production and distribution of HEPCELL and AFP kits

Year	No of vials produced		No of vials distributed to Prov.& Dist.Hospitals	
	KHC II	AFP	KHC II	AFP
1996	720	120	246	50
1997	540	60	436	45
1998	690	120	542	60
1999	540	120	310	80
2000	180	60	242	45
Total	2,670	480	1,776	280

Cost of Needles

Information from thirty facilities (Table 12.7) shows that 224,114 needles were purchased at a total cost of over twelve million shillings. Most of the money was spent in Government institutions. Government purchased needles had the highest unit cost at US$ 0.84 per needle while mission and private facilities paid almost the same price (US$ 0.11)

Table 12.7 Utilisation of needles in BTS centres

Facility Ownership	No of Facilities	No of Needles	Cost of Needles- US$
Government	16	191,363	160903
Mission	6	4,531	536
Private	8	28,220	3213
Total	30	224,114	164652

Cost of Transport

Only ten facilities (three-Government, two-Mission and five-Private) provided information about transport costs in the past one year. The three Government facilities used US$ 263 for BTS, two Mission facilities US$ 5439 and five Private facilities US$ 394. Many of the government officials interviewed expressed concern that BTS is given a raw deal when it comes to allocation of funds for work in this area. The amount given above is clear proof that what they said is justified. The expenditure for the two mission hospitals is over 20 times what was available to Government facilities.

Cost of Storage

Information on storage costs was available in ten facilities (5 Government, 1 Mission and 4 Private). The Government and Private facilities spent almost the same amount at US$ 681 and US$ 690 respectively but on expenditure per facility the Private facilities spent more. The only Mission facility spent US$ 256.

Maintenance Cost

Only four facilities gave information on this item (1-mission, 3 private). The total maintenance cost for the one mission facility was US$ 256 and that of the three private facilities was US$ 519. Two private facilities were allocated US$ 522 for the year in question.

Cost of Laboratory Items

During the financial year 2000/2001 around forty seven items were ordered by the NPHLS for use in BTS. They were valued at US$ 83,494 excluding blood bags. It was not established whether all of them were delivered and distributed for use in the various BTS centres countrywide. The items ordered are shown in annex 6. Annex 7 provides another list of additional items for the same period.

13 Constraints, Conclusions and Recommendations

13.1 Constraints

Those involved in the management and day-to-day operations of the BTS services were asked to state the constraints affecting effective delivery of services. Interviews and discussions were held with the Director, NPHLS, his deputies and other staff. Heads of the BTS were also asked to state problems they encountered with a focus on staffing, working conditions, facilities, equipment and supplies, donors recruitment, operational guidelines, quality control, reporting system and provision of budgets. A total of 137 responded.

1. About sixty five percent (64.5%) of the respondents mentioned shortage of staff as a major constraint. Discussion with senior staff revealed that the most affected cadre was that of donor recruitment staff who require specialised training. However, because there is no institution in the country that provides these specialised training, Laboratory Technologists and Nurses were being used for donor recruitment.

2. Working conditions were cited by 54.6% of the respondents as poor and therefore affecting performance. Lack of adequate facilities, equipment and supplies, lack of operational guidelines, lack of adequate budgetary provision among others constitute a poor working environment.

3. A significant number of the respondents, 62.2%, complained of shortage of facilities, equipment and supplies with another 1.5% specifically mentioning inadequacy in privacy for blood donors. Because of lack of appropriate equipment, it has not been possible to institutionalise the separation of blood into its components. The modern practice is to transfuse blood components rather than whole blood because it is economical. Another issue which was mentioned was lack of appropriate bags for handling blood and blood components.

4. Programme for donor motivation, recruitment, retention are virtually non-existence in most hospitals, lack of donor motivation systems, lack of transport, lack of donor incentives, unwillingness of donors to donate, lack of skilled recruiters and ;lack of donor motivation were mentioned as constraints that need to be addressed. Majority of the hospitals (56.1%) did not have donor motivation programmes. The donor programme in the field include provision or refreshment (18.9%), issuance of certificates/cards (9.8%), and free blood grouping for those who donate blood (1.5%). There were no donor recruitment programmes in place in 55.7% of the hospitals. The few who have them in place use the schools/colleges, organise campaigns and lecturers, persuade relatives and replacement donors, and some frontiers as methods of recruiting donors. Donor retention programme are not in place in more than 60% of the hospitals. In facilities where there was some retention activity taking place, 23.4% stated they keep in touch with donors and less than 1% by to build donor confidence.

5. Operational guidelines on donor preparation, blood handling and transport, blood screening, blood transfusion were mentioned by 75.8% of the respondents as a major constraint. Discussions with them revealed that they were using reference book carried from previous training institutions. Further BTS management indicated that preparation of guidelines were in various stages of completion while others had been finalised and are being implemented.

6. Almost thirty four percent (33.6%) of the respondents indicated that there is no effective quality control system. Regular calibration and routine checking were mentioned as the procedures to ensure quality control. However, due to financial constraints, these procedures have not been enforced.

7. Reporting system has a number of shortcomings. There are lack of standardised system, poor record keeping and lack of computers each and lack of materials. More than half of the respondents are not satisfied with the current system reporting system. BTS management agreed that the system in place does not provide them with useful information to facilitate day-to-day operations and decision making. There is inadequate flow of information from the BTS facilities to NPHLS and rarely is necessary feedback given.

8. Budgetary constraints were mentioned by 64.5% of the respondents. Management concurred. It costs between US$19 to US$ 26 to produce one unit of safe blood for transfusion. This is the cost of collecting blood, processing, storage, distribution and transfusion. The current funding is not adequate to cover the country's requirements for sage blood.

9. Non-existence of a separate provision for BTS budget in the printed estimates was seen as a problem. Because the BTS budgetary requirements are lamped together with the Laboratory budget, there has been a tendency for priority shifts which affect planned activities.

10. Blood and its products have not been listed as one of those service lines for which a charge could be levied on the patients under the cost sharing and recovery system. Public hospitals are charging for the services they provide but there is no provision for sharing these proceeds with BTS.

11. The existing laws do not provide for regulation for blood collection, processing and use by health practioners.

12. The BTS system has not established a mechanism for research into use of blood substitutes in order to reduce pressure on blood and its products. Some of these substitutes are easy to access and cheaper to administer.

13. Lack of Blood Transfusion Committees and training of staff in hospitals to regulate appropriate clinical use of blood is a constraint. Blood in hospitals was being given for volume rather then the needed. There is irrational clinical use of blood.

14. Negative donor attitudes was cited as a constraint by 32.8% of the respondents. There is no doubt that some donors fear being screened for HIV/AIDS.

15. Operational guidelines on donor preparation, blood handling and transport, storage and clinical use need to be finalized and provided to all BTS centres so that they are implemented. This way high standards will be achieved.

16. To use blood cost effectively, use of blood components need to be encouraged in all BTS facilities.

13.2 Conclusions

Organisation and Management

1. Blood donor association, which are important institutions in a vibrant BTS system, were available in only nine hospitals in Kenya. The existence of such association will boost blood supply as was evident in the seventies.

2. The blood transfusion system at the hospital level did not have distinct institutional framework to facilitate the supply of adequate safe blood for the country's requirements. Currently, more than half of the hospitals operate without a BTS dedicated unit while a third have not allocated staff to BTS activities as well as specific rooms for BTS activities. Moreover, BTS does not have a budget for its activities. Absence of these reflects badly on the effectiveness and efficiency in provision of the intended services.

3. Hospital blood Committees to monitor the sourcing and utilisation of blood with a view to ensuring appropriate use of blood have not been established and operationalised in many of the hospitals in the country. Inappropriate clinical use of blood has been cited as one of the areas of concern in the BTS system. The Committees will therefore play an important role in ensuring that there is appropriate use of blood resources.

4. The national blood policy is due to be launched. There should be a strategic plan for its implementation. The strategic plan will address a few outstanding issues; Firstly, the organization structure and management of the RBTCs, Satellites and the primary banks has not been developed. Secondly, future role and responsibilities of the hospitals have not been defined. Thirdly, the facilities, equipment and supply requirements for the RBTCs, Satellites and the hospitals have not been identified. Fourth, the scheme of service for BTS personnel is not in place. Fifth, the legal framework to give the RBTC regulatory powers is not finalized. Sixth, the information system for the RBTCs has not been developed and lastly, funding requirements and their sources have not been identified. Without a strategic plan addressing these issues, it will not be possible to have effective action plans.

5. The takeover by NBTS will take many years to complete. Until such a time that there are enough and functional RBTCs and Satellites to serve the country adequately, NBTS will rely on the existing hospitals for supply of blood in those

areas that RBTCs are not available. During this transition period there is need to identify the existing resources and reallocate them so that they are not disused. Those hospitals where blood collection and screening activities are discontinued should surrender the equipment sto those that need them.

The Donor

6. By far the most frequent source of blood are replacement donors who constitute relatives or friends to replace used blood. There was also a small group of paid donors which was unexpected. The general characteristics of those source is non-predictability in their timely availability and sustainability to donate required blood.

7. Although the operational guidelines provides for donor motivation, recruitment, selection and retention, in practice , there were no programmes and strategies for achieving this. Donation is therefore a self-selection process and there is no operational strategy on donor retention. This is not conducive for a BTS seeking self sufficiency status.

8. Donors should be evaluated for sustainability and ability to donate blood on each occasion. Donors should be interviewed to determine their risk status particularly with respect to HIV/AIDS or known medical/communicable diseases. It was established that prospective donors are not subjected to the recommended battery of investigations and assessment. There are chances of unsuitable donors donating blood.

Technical Assessment of Blood

9. The current guidelines provide for mandatory screening for HIV, Hepatitis B and Syphilis. About 95.3% of surveyed facilities ensure that donated blood is screened for HIV at all times. The corresponding figures for Hepatitis B and Syphilis are 84.5% and 89.6% respectively. The BTS system does therefore not comply with the mandatory screening guidelines.

Blood Use

10. On average 2ml of blood is collected for grouping and cross matching. 5ml and 10ml and 1ml of blood were also drawn for the same purpose by some hospitals. There is no rationale for this wide range in the quantity of the samples collected from recipients.

11. Whereas, hospitals indicated that written guidelines were used as a criteria to make a decision for blood transfusion, it is noteworthy that less than 10% of the surveyed facilities were able to show those guidelines. However, Clinicians make the diagnosis and the decision to order for a transfusion.

12. Cost effective/efficiency was assessed from the perspective of factionation of blood and use of specific products as opposed to use of whole blood. This was also from

the perspective of planning for transfusion as opposed to being reactive. In almost all instances whole blood is used while slightly under 50% of the instances fresh blood is used for transfusion. The practice is therefore not cost effective.

Logistical Management and Safety

13. In order to determine the adequacy of basic facilities; equipment and supplies to provide reliable and effective BTS, the usual status, functionality and availability were assessed. About 58.1%, 70%, and 90% had reliable facilities, equipment and supplies respectively. The capacity to supply adequate safe blood is therefore impaired.

14. Less than half of all the facilities surveyed worked within the established policies and guidelines among government health providers. Translation of policies into guidelines has occurred in a very small scale. A vibrant BTS require that policies and guidelines be available and followed in order to secure safe blood.

15. No single hospital in the country has all the essential facilities and equipment required for a vibrant BTS facility. There are some provinces where some items are not available in any of the hospitals including the provincial hospitals. With this situation it is difficult to supply adequate safe blood in the country.

16. The condition of the facilities and equipment was satisfactory in between 50% and 86% of the hospitals. There were a number of facilities and equipment, which were not working because of minor breakdowns. However, they could not be repaired because of lack of maintenance units, lack of trained staff, lack of spares among other reasons. This implies lack of optimal use of resources on which a lot of money has been spent.

17. Some equipment were not utilized because staff had not been trained on how to operate them. This is an unnecessary waste of resources, which are scarce in the first place and must be avoided.

18. With the establishment of the RBTCs, transportation of blood is going to need more resources than before. An effective cold chain system must be established to ensure blood preservation during transportation.

Reporting System

19. Although the existing reporting systems are fairly adequate for reporting purposes, the BTS reporting system is not effective owing to lack of space, equipment, furniture, computers, supplies, staff and funding procedures. The other major reason for this state of affairs, is lack of enforcement of the existing procedures for data capture, processing and reporting. The NPHLS headquarters, PMLT, DMLT and hospital management have not been demanding that all data on donor, screening and use of blood be captured, processed and monthly reports be prepared as required. The other problem with the existing system is that it has not been reviewed regularly to cater for the requirements of other emerging users like NASCOP, NACC and the changing needs of those existing. The use of manual

system in most hospitals takes long and cannot be manipulated to respond to ad hoc management requirements. A system intended to address these issues has been designed as part of the deliverables of this study. However, it will require to be operationalised through further investments.

Resources

20. Provision of blood as one of the patient management procedures has not been incorporated in the cost sharing system so that it is directly billed like other items.

13.3 Recommendations

1. The NBTC need to support the establishment of blood donor organizations in the country. Each RBTC, Satellite, primary hospital bank need to work with several blood donor organizations in order to ensure steady supply of blood from willing donors.

2. All hospitals that collect, screen, store and distribute blood should have BTS units within their establishments. The units should have essential facilities, equipment, supplies, personnel, funding and procedures in place.

3. Hospital blood committees responsible for management of blood transfusion activities in accordance with the Ministry of Health guidelines on blood transfusion need to be revisited. All hospitals should be required to establish such committees without further delay.

4. A strategic plan for the implementation of NBTC needs to be developed. This will be used to derive action plans besides ensuring that the implementation achieves the desired objectives. The strategic plan would address outstanding issues on organization and management, personnel, facilities, equipment and supplies, establishment of an effective cold chain, legal framework and the management information system.

5. A programme that ensures a smooth take-over is required in view of the fact that the exercise may take many years. This will ensure that phasing out of the hospitals and replacing them with RBTCs runs without disruption. It is important to identify and reallocate existing BTS facilities, equipment and staff to ensure that no resources go to waste during the transition.

6. The proposed reporting system needs to be implemented. To do so, essential facilities, equipment, computers, appropriate software, personnel and training needs to be identified, procured and put in place.

7. There is need to establish long term BTS requirements in the country. This will be matched with the existing facilities and equipment and a long-term programme for addressing the shortfalls developed. Provision of adequate facilities, equipment and supplies in all BTS centres is critical in realizing the intended results.

8. There is need to establish BTS maintenance facilities that are adequately, equipped with qualified staff and provided with adequate funds.

9. Cost sharing for blood and its products should be introduced in public hospitals to make BTS sustainable.

10. There is urgent need to implement effective programmes for donor mobilization. Donor motivation, selection, recruitment and retention are important activities for a BTS that strive to achieve self sufficiency in supply adequate and safe blood.

11. There is a need for a policy shift from a replacement donor based service to that of voluntary non remunerated donors.

13. Policy guidelines on donor preparation, blood handling, storage and clinical use need to be availed to all blood transfusion practitioners

Panelists during the dessimination workshop

Plenary session during the workshop