Main Report

Blood Transfusion System in Kenya

A Study by JICA in collaboration with the Ministry of Health

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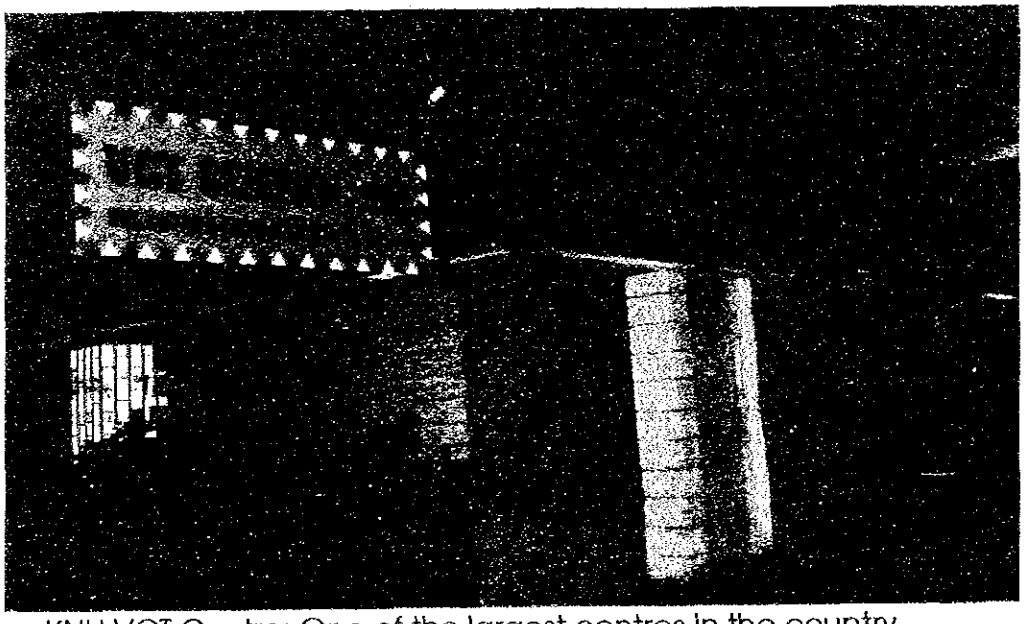
A donor being bled: More of them are required



KNH VCT Centre: One of the largest centres in the country

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Part Two: Voluntary Counselling & Testing Services

Abbreviations

ACU	-	AIDS Control Unit
AIDS	-	Acquired Immunity Deficiency Syndrome
AMREF	-	African Medical and Research Foundation
BTS	-	Blood Transfusion System
CPD	-	Citrates, Phosphates, Dextrose
CPR	-	Contraceptive Prevalence Rate
DCRHS	-	Department of Curative and Rehabilitation Health Services
DACC	-	District AIDS Control Committee
DASCO	-	District AIDS Coordinator
DFS	-	Diagnostic and Forensic Services
DHMT	-	District Health Management Team
DMLT	-	District Medical Laboratory Technologist
DMOH	-	District Medical Officer of Health
DMS	-	Director of Medical Services
GOK	-	Government of Kenya
HBV	-	Hepatitis Virus B
HIV	-	Human Immunodeficiency Virus
HMIS	-	Health Management Information System
IDA	-	International Development Agency
JICA	-	Japan International Cooperation Agency
KEMRI	-	Kenya Medical Research Institute
KEMSA	-	Kenya Medical Supplies Agency
KMTC	-	Kenya Medical Training College
KRCS	-	Kenya Red Cross Society
MOH	-	Ministry of Health
MSF	-	Mission San Frontiers
NACC	-	National AIDS Control Council
NASCOP	-	National AIDS/STD Control Programme
NBTS	-	National Blood Transfusion Services
NGO	-	Non Governmental Organisations
NGOs	-	Non-Governmental Organisations
NPHLS	-	National Public Health Laboratory Services
ODA	-	Overseas Development Assistance
PHMT	-	Provincial Health Management Team
PMLT	-	Provincial Medical Laboratory Technologist
PMO	-	Provincial Medical Officer
PS	-	Permanent Secretary
PPH	-	Post Pattern Haemorhage
RBTC	-	Regional Blood Transfusion Centre
STDs	-	Sexually Transmitted Diseases
STIs	-	Sexually Transmitted Infections
UNAIDS	-	United National AIDS Secretariat
VCT	-	Voluntary Counselling and Testing
VCTS	-	Voluntary Counselling and Testing Site
VDRL	-	Veneral Disease Research Laboratory
WHA	-	World Health Assembly
WHO	-	World Health Organisation

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PART ONE

Tables

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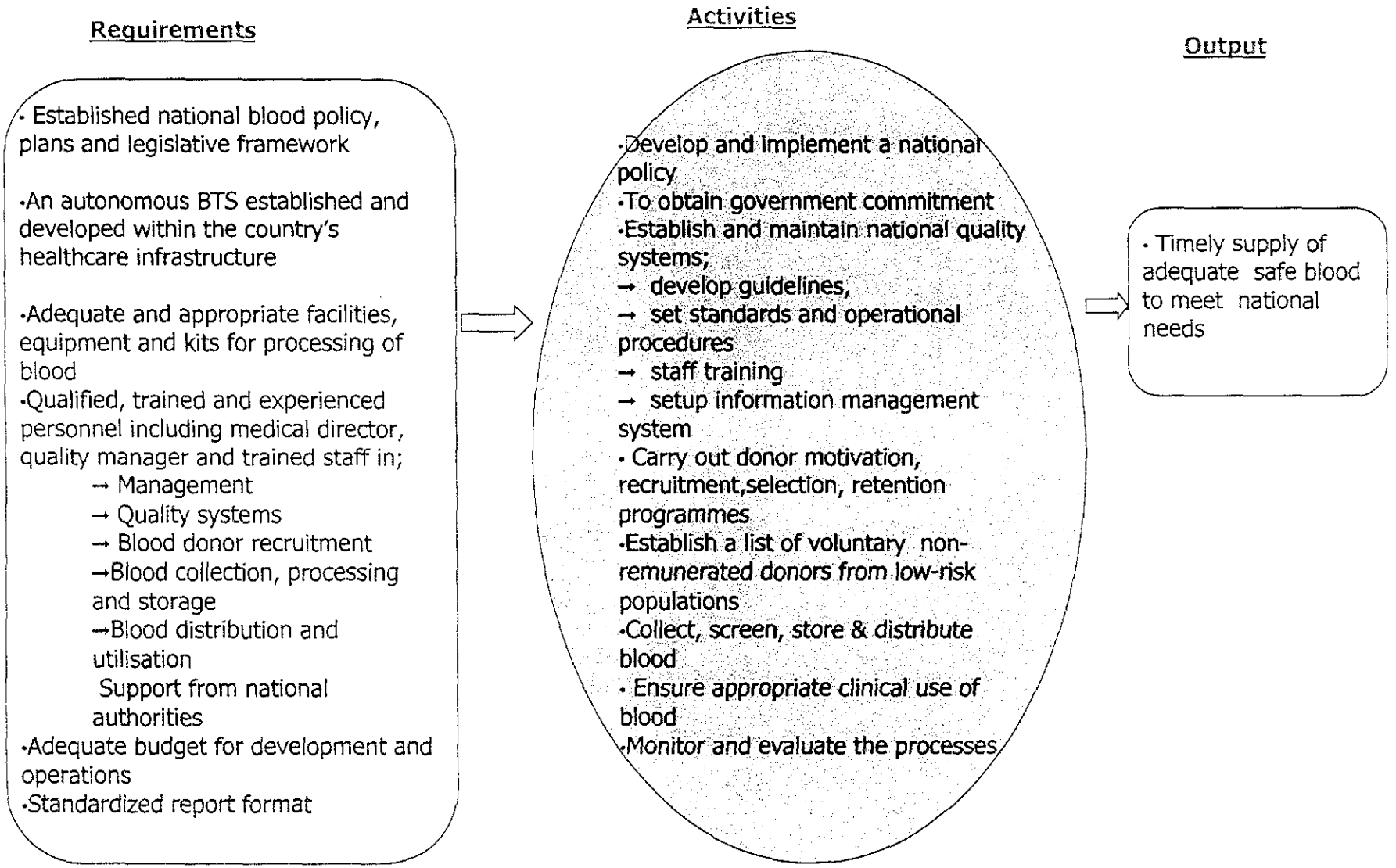
PART TWO

PART ONE:

BLOOD TRANSFUSION SYSTEM

Figure 1.1 AN INTEGRATED APPROACH TO A SAFE BLOOD TRANSFUSION SYSTEM AT A GLANCE



Chapter 1 Introduction

1.1 Introduction

This study on blood transfusion services in Kenya was commissioned and funded by Japan International Cooperation Agency (JICA) the implementing agency of Japanese Overseas Development Assistance (ODA) in collaboration with the Kenya Medical Research Institute (KEMRI) and the Ministry of Health (MOH) under the KEMRI/JICA Project. The KEMRI/JICA project is addressing the issue of blood safety in Kenya as a major component. Almaco Management Consultants Ltd were assigned to carryout the study over a five-month period covering September 2001 to January 2002.

The objectives of this study were threefold:

- To document data that will be used in the formulation of a strategy to facilitate effective distribution and utilization of the blood screening kits developed by KEMRI.
- To document data that will be used to strengthen VCT services in Kenya.
- To develop a standardized reporting format for use by hospitals, blood banks, blood transfusion centers and other health institutions.

1.2 Background to the study

Transfusion of blood and its products is an internationally established way of managing patients who are deficient in one or more blood constituents and is therefore a vital component of every health care delivery system. Most blood transfusions are given to treat Hemorrhage as a complication of pregnancy, severe aneamia, Accident victims and Surgical cases.

However, blood and its products are known to transmit infectious diseases. Blood transfusion therefore carries the inherent risk of transmitting infections through infected blood. It is estimated that between 5 and 10 percent of Human Immunodeficiency Virus (HIV) infections worldwide are transmitted through the transfusion of infected blood and blood products. The probability of being infected through transfusion of blood contaminated with HIV is estimated at over 90 percent; contrasting significantly with the risk associated with a single sexual intercourse act whose probability of infection is estimated at between 0.1 percent and 1.0 percent. Blood and blood products are also known to transmit other infectious diseases such as Hepatitis B, Hepatitis C, Syphilis and Malaria among others. It is therefore important that all blood for transfusion must be screened so that contaminated units are not transfused.

Worldwide, over 100 million units of blood are donated each year of which a significant proportion exposes recipients to unnecessary risks. In developing countries, less than 40

percent of the blood supply is collected from voluntary non-remunerated blood donors, who are at significantly lower risk of transfusion-transmissible infection than family replacement donors or paid donors. More than 13 million units of blood donated in developing countries are not screened for transfusion–transmissible infections, posing a great danger of infection to the recipients.

In 1975 the World Health Assembly recommended among other things that all countries should develop a national blood policy. All WHO member countries prescribe to the policy of screening all blood for transfusion for HIV, Hepatitis B Virus (HBV) and Syphilis. Part of the WHO strategy for blood safety is the establishment of a coordinated blood system for transfusion services (BTS) by all WHO members (see figure 1.1). Kenya is a member of WHO.

Current estimates of blood required for transfusion are not available but a workshop report on "Strengthening and Reorganisation of Blood Transfusion Services", published in June 1994 indicated that 300,000 units were needed annually. This number was expected to double by the year 2004 and this was confirmed as the current basis for planning purposes. The most frequent reasons for transfusion were the treatment of severe anaemia, hemorrhage during pregnancy complications among women, accident victims and surgical cases. Recipients are exposed to the risk of transfusion–transmissible infections such as HIV/AIDS, Hepatitis B, Syphilis and Malaria.

The blood transfusion services in Kenya are hospital based and are integrated with other hospital laboratory services. Major hospitals and other health facilities collect and screen blood for their own use. Until recently, there was no well developed and coordinated BTS and national blood policy in the country to oversee supply of adequate safe blood. (The national policy guidelines on blood transfusion in Kenya was published in November 2001 and is due to be launched soon).

The issue of developing a BTS national policy and the institutional framework was discussed in 1994 at a workshop on strengthening and reorganization of blood transfusion services. Some of the major problems identified during this workshop include the following:

- The BTS in Kenya operate as part of the hospital general laboratory services under the general administrative responsibility of the Head of National Public Health Laboratory Service (NPHLS). BTS are hospital or health facilities based and are integrated with the other laboratory services. The BTS are therefore not autonomous and depend on resources provided to the general laboratory services.

- There are no designated posts for personnel working in the BTS making it difficult to recruit, train and retain staff.

- The BTS, a part from the Nairobi Blood Donor Service do not have voted funding.

- There has been a steady decline in supply of safe blood and blood products caused by various factors such as ineffective donor recruitment, lack of funds

for recruitment campaigns, lack of trained personnel, lack of donor incentives, promotional materials and a suspicious community.

Several recommendations on establishing a stronger BTS to facilitate supply of adequate safe blood in Kenya were made for implementation. It was resolved that the Government should:

- Set up an integrated semi-autonomous BTS.
- Establish regional blood transfusion centers and several satellite centers.
- Formulate a blood policy to establish a body to manage BTS, procedures for sourcing blood and legislation to govern the BTS.
- Establish an effective blood donor recruitment department to provide donor care and pre-test and post-test donor counseling.
- Develop guidelines for appropriate use of blood and blood products.
- Provide adequate support to the BTS.
- Identify sources of funds for the BTS.
- Identify strategies for staff development and retention.

Since then, the Ministry of Health in collaboration with stakeholders and donor agencies has made concrete efforts to implement these recommendations. Some of the achievements made todate include the following:

- The policy guidelines on Blood Transfusion in Kenya have been developed and will be launched soon.
- Fundamental blood safety guidelines for the collection, processing, storage and distribution of blood and blood products have been established .
- The national blood transfusion management is being strengthened to ensure that the policy objectives are met, government commitment is secured and technical excellence of the BTS is ensured.
- Nairobi and Kisumu regional blood centers are operational and others are being established in Mombasa, Nakuru and Embu.
- Satellite Centres are being established in Eldoret, Naivasha, Kericho and Voi.
- Efforts are underway through MOH and Kenya Red Cross to mobilize a community of voluntary non-remunerated blood donors in Kenya through education, recruitment and counseling.

- National standards for all aspects of blood collection, processing and distribution as part of quality assurance have been established.
- Training programmes for clinicians, health workers have been put in place.

- Some technical and funding assurance has been secured. USAID has been assisting the Ministry of Health to establish physical facilities, procure equipment and install an information system in the RBTCs.

- The Government of Japan through JICA and the Government of Kenya through KEMRI have been collaborating in carrying out research on control and prevention of blood transfusion - transmissible infections. In this regard, KEMRI has successfully developed Hepatitis B and HIV/AIDS screening kits whose main objective is to ensure safe blood supply countrywide through the use of an appropriate, simple and sustainable technology.

Despite these developments, the Kenyan BTS is still faced with problems that have made it difficult to ensure the supply of safe and adequate blood for transfusion to all health facilities as a safeguard against transfusion-transmissible infections. The challenges facing the BTS in Kenya include ensuring that:

- All blood used for transfusion is screened.
- 100 percent safe blood supply for purposes of transfusion is sustained.
- There is rational use of available blood and blood products.
- Well developed blood banks exist at all levels.

1.3 Objectives of the study

KEMRI is in the forefront of promoting blood screening with a view to ensure supply of 100 percent safe blood for transfusion in the country. Through many years of research on the control and prevention of HIV/AIDS and Hepatitis B, KEMRI with the support of JICA has developed two kits; KEMRI -PA kit for HIV screening and KEMRI-HEPCELL II kit for Hepatitis B, Screening. This is expected to be a major contribution towards safe blood supply in the country. These kits are appropriate and use a simple technology. The technology does not require sophisticated equipment which makes the kits available and accessible to those health facilities which operate in the rural setting where there are no adequate facilities and trained personnel. It is the intention of KEMRI to have these kits made available and utilized in all provincial and district health facilities where blood is screened.

This study has been commissioned to provide data that will facilitate the development of strategies that will ensure effective distribution and utilization of these kits, document data that will be used to strengthen VCT services and develop a standardized reporting system.

To achieve this objective, it was felt necessary to evaluate and assess the current situation of blood transfusion in Kenya. The study aims at collecting and documenting data on the following aspects of the BTS system:

- Distribution of all government and major mission and private BTS facilities in the country.
- Inventory of facilities and equipment available for blood transfusion at hospitals, blood banks and health facilities and their level of utilization.
- Levels and qualifications of clinical officers, laboratory technologists, laboratory technicians available for blood transfusion services in hospitals, blood banks and health facilities.
- Working conditions for blood transfusion services in all hospitals, blood banks and health facilities.
- Amount of blood donated, type of donors and destination of donated blood in all hospitals, blood banks and health facilities.
- Amount of blood screened, types of screening services, types of screening methods, results and utilization.
- Amount of blood transfused, type of recipients, and origin of blood that is transfused.
- Blood groupings and the results .
- Document the BTS reporting system and develop a standardized system.
- Income generated from blood transfusion services.
- Expenditure incurred on blood transfusion services.
- Problems and requests by the hospitals, blood banks and health facilities
- Establish the status of the VCT services in the country.

1.4 Methodology

Study Area

This study covered the whole country and all the 8 provinces and 63 districts were visited. Hospitals and blood centers that either collected, screened and/or transfused blood were reached.

Sampling

The study required data to be collected from (i) the national/referral/teaching hospitals, provincial and district hospitals (ii) the blood banks and (iii)major private and mission hospitals in Kenya. It was a requirement that discussions be held with MOH officials, KEMRI staff and other BTS stakeholders. The process used in selection of the areas visited and officials interviewed was as follows:

i) Visit all national/referral teaching, provincial and district hospitals. There was no selection here. A list of all these facilities as at 15.9. 2001 was obtained from the Ministry of Health and all Government hospitals were identified. Table 1.1 shows the number of Government hospitals visited.

ii) The list of the blood banks (we interpret this to be the regional blood centers and satellite centers) was obtained from NPHLS. The only operational centers, Nairobi RBTC and Kisumu RBTC were visited.

iii) Private and mission hospitals were selected from the same list of all health facilities obtained from the Ministry of Health Headquarters. These included mission hospitals, private hospitals, maternity and nursing homes.

Further, a list of all hospitals registered with NHIF was obtained. Details of the bed capacity for each hospital was obtained. The list of the mission and private hospitals to be visited was drawn from hospitals with highest bed capacity. All districts were represented except those where mission/private hospitals did not exist. Table 1.1 shows the number of mission and private hospitals visited.

iv) At the province and district level the following MOH officers were selected for interview:

- Provincial Medical Officer of Health
- Provincial Medical Laboratory Technologist
- District Medical Officer of Health.
- District Medical Laboratory Technologist.

v) At the hospitals the following officers were selected for interview:
- Medical Superintendent or Matron
- Head of BTS Services.

vi) All BTS stakeholders were identified.

Table 1.1: Hospitals visited by Region and Provider

Province	Government			Mission	Private	Total
	Referral	Provincial	District			
Nairobi	1	-	5	1	15	22
Central	-	1	9	9	7	26
Eastern	-	1	12	10	10	33
North Eastern	-	1	5	-	1	7
Coast	-	1	13	-	11	25
Rift Valley	1	1	34	7	17	60
Nyanza	-	1	12	5	32	50
Western	-	1	6	9	13	29
Total	2	7	96	41	106	252

Questionnaire Pretesting

Questionnaire V and IV on hospital/blood banks and VCT centres respectively were pretested in 8 hospitals, there were six public hospitals including Kenyatta National Hospital, Pumwani Maternity, Kiambu, Machakos, Thika and Kajiado. The only two private hospitals were Nairobi and Metropolitan. This exercise took one day. Results were discussed and the questionnaires were revised to reflect the outcome of the pretesting exercise.

Supervision and Monitoring

Each province was assigned to a Consultant assisted by two Research Assistants. The Consultant was responsible for launching the study at the PMO's office and then supervising data collection in the province. He was also expected to interview the PMO,

PMLT and at least 5 DMOHs and 5 DMLTs in the province. The Research Assistants collected data from the hospitals and the VCTCs.

During the study period, progress reports were produced and discussed with JICA and NPHLS. The first report was produced and discussed on 17th November 2001, and the second and final report on 4th December 2001.

1.5 Main sources of data

Data and information for this study was obtained through (i) review of documents, (ii) discussions and interviews, and (iii) physical inventory.

Various documents on BTS policies, strategies and programmes, legal framework, organization and management, operational and system procedures were identified with the assistance of JICA and NPHLS for review and are shown in annex I.

Interviews with MOH officials, Hospital staff and stakeholders were a rich source of information on policies and strategic issues, current status, achievement, constraints and requirements. The list of all those interviewed is shown in annex 2 of this report.

Physical inventory of facilities and equipment available and used for blood transfusion services was taken in every hospital. This provided the current status of such facilities and equipment, their level of utilization and the shortfalls.

The thrust of the study was to collect data on blood donation, blood screening, blood grouping and blood transfusion activities in all hospitals and blood centers. It was expected that data indicating volumes of blood collected, screened, grouped and transfused for the 12 months (1st October 2000 to 30th September 2001) be collected for every hospital/blood bank. This information was obtained from registers that are maintained by the facilities.

1.6 Main Instruments

The main instruments used to capture data and information during the study were (i) questionnaires, (ii) checklist (iii) recordings and (iv) photographs.

Six questionnaires as shown in Annex 3 were designed for this study and were administered as follows:

i) Questionnaire I was administered at the Ministry of Health Headquarters. The respondents were the Permanent Secretary and the Director of Medical Services. The questionnaire focused on the policies, strategies and programs of the BTS. It sought to establish the status of the blood transfusion system as perceived by the Chief Officers in the Ministry.

ii) Questionnaire II was administered on the Provincial and District Health Officials. These included the PMO, PMLT, DMOH, DMLT. The purpose of this questionnaire was to solicit information that would enable the review

team establish the current BTS position, the constraints and the requirements.

iii) Questionnaire III was administered at the National Public Health Laboratory Services, the body responsible for the BTS. It sought to establish the existing policies, strategies, programmes, funding, facilities, equipment and supplies, constraints and requirements. It was administered on the Head of NPHLS/Head of blood transfusion services.

iv) Questionnaire IV was administered on major BTS stakeholders. These included NASCOP, NACC, KEMRI and many others. The respondents were the Chief Executives of the Institutions. The focus of the questionnaire was to obtain their perspectives regarding operations of the BTS system

v) Questionnaire V was administered in all hospitals and blood banks. It was probably the most important questionnaire to the extent that it captured data on general information, policies and guidelines, facilities, equipment and supplies, level and training of staff, donor programmes, blood donation, screening, grouping and transfusion activities, screening methods, screening types, categories of recipients, income and expenditure and problems encountered. The respondents were the Hospital Incharge and Heads of BTS.

vi) Questionnaire VI was the last questionnaire. It captured data and information on the VCT centres as provided by those in charge.

Checklists were used to take inventory of physical facilities, equipment, supplies and staff.

Recording as means to complement notes taken during discussions was used. Discussion with PS, DMS, Heads of Institutions, PMOs, PMLTs, DMOs, DMLTs were recorded.

Ordinary and digital photographs were taken for some facilities and equipment.

1.7 Data Management and Analysis

Quantitative data
Data from questionnaires in hospitals and VCT centers were checked and organised before being keyed into computer using Epiinfo statistical package. Preliminary frequencies were generated to aide in the data cleaning process. Analysis was done using SPSS version 10. Open-ended questions were coded before computerization.

Qualitative data
Qualitative data, generated from discussions and interviews with key stakeholders, was summarized and analysed by the consultants.

1.8 Stakeholders Workshop

A one-day workshop was organized and held on 31st January 2002 at the Panafric Hotel to discuss the draft report. A total of 56 participants whose details appear in Annex 4 drawn from the Ministry of Health, Provincial and District Medical Offices, Hospitals and the Stakeholders attended the workshop. The Director of Medical Services presided over the opening of the workshop while the Director, KEMRI closed. The deliberations were interesting and all the observations made during the workshop have been incorporated in the final report.

1.9 Limitations

There were a number of limitations of this study as follows:

i) Accessing some hospitals particularly in North Eastern, North Rift Valley, Eastern and Coast Provinces was difficult and time consuming. This is because either there was no public transport or if available they were far apart at times extending to alternate days. Research Assistants therefore used more time traveling than planned.

ii) Some private and mission hospitals failed to provide data as readily as expected arguing that they spend a lot of time providing data to the Ministry of Health which does not give them feedback. Despite the letters sent prior to the visits, they still wanted later appointments to discuss the exercise and get data.

iii) Data was not readily available. The team had to compile and extract data from the registers and other records which were poorly kept. This also consumed a lot of time.

iv) Some of the private institutions had closed down and therefore no data was available.

v) There were a number of hospitals that did not or had stopped to carry out blood transfusion services while others had no VCTCs operating.

vi) For what was referred to as ethical reasons, some hospitals declined to provide data on VCT services.

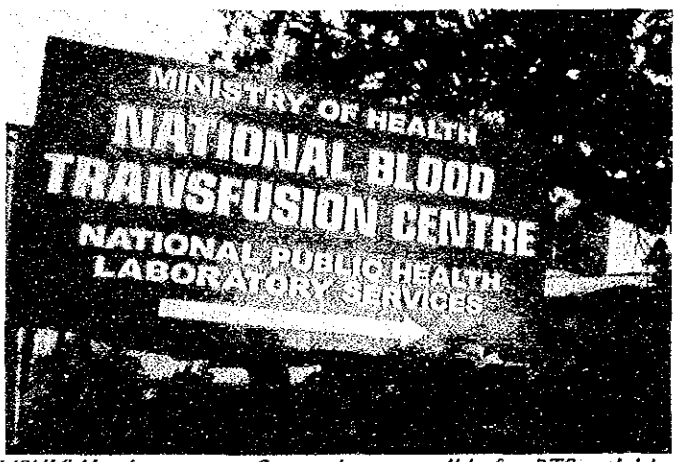
vii) In a number of hospitals, BTS shared facilities and equipment with the general laboratory services. Physical inventory was therefore not easy owing to difficulties in identifying those that belonged to BTS.

viii) In some hospitals there is no clear distinction between BTS staff and those providing other general laboratory services. Those staff allocated BTS services were assigned other duties outside BTS activities. Classifying them to BTS was therefore detectable.

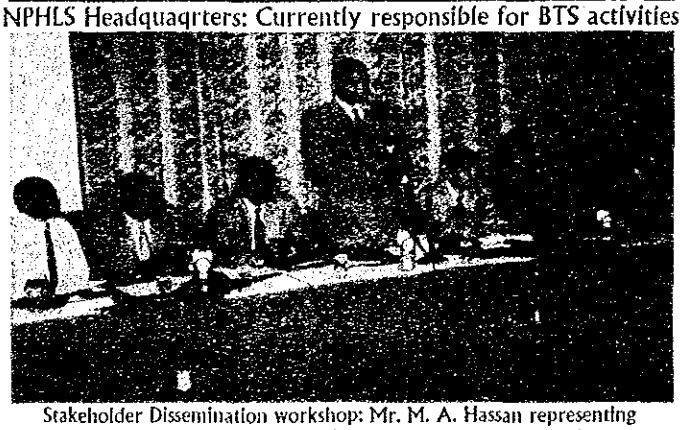
1.10 Structure of the report

This report is in two parts. Part one covers blood transfusion system while part two covers the voluntary Counseling and testing services. Part one of the report is comprised of twelve chapters. Chapter one outlines the background, objectives, methodology, main data sources and instruments used during the study. Situation Analysis; BTS Organizational Structure and Management; The Donor; Technical Assessment of Blood; Blood use; Logistical Management and Safety and Quality Assurance are covered in chapters 2, 3, 4, 5, 6, 7 and 8 respectively. Chapters 9, 10, 11, 12 provide information on BTS Reporting system; Facilities, Equipment and Supplies, Human Resources and Funding and Sustainability. Constraints, Conclusions and Recommendations are dealt with in chapters 13.

Part two of the report on VCTs has 9 chapters as follows; chapter 1, covers introduction while chapter 2,3,4,5,6,7,8, and 9 cover Organization and Management; Policy Guidelines; VCT Service; Facilities, Equipment and Supplies; Human Resources; Information Systems; Funding and Sustainability and Constraints, Conclusions and Recommendations respectively.



NPHLS Headquaqrters: Currently responsible for BTS activities


Stakeholder Dissemination workshop: Mr. M. A. Hassan representing DMS during the opening session flanked by BTS Director Dr. J. Nyamongo

Chapter 2 Situation Analysis

2.1 National Context: Major health and socio-economic indicators

During the period 1963-1985, Kenya made significant progress and achievements in almost all fronts of socio-economic development. However the last one to two decades have witnessed major erosion of these gains and in some cases reversals. Income per capita has declined to US$328 in 2000 from US$ 450 in 1986. Infant mortality has deteriorated from 60 per 1000 in 1985 to 74/1000 in 1998. One in every 9 Kenyan children does not live to the fifth birthday (Under 5 mortality rate in 1998 stood at 112 per 1000 births compared to 100 per 1000 in 1985). There is enormous regional variation with Nyanza and Western provinces having the worst indicators both in IMR and U5MR.

Table 2.1: Key socio-economic indicators

Indicator	Value (1998)
GDP per capita (provisional estimate)	US$328
GDP growth rate	1.8%
Recurrent health budget (as % of total government expenditure)	7.3%
MoH per capita recurrent health expenditure	US$4.95
Public health expenditure (as % of GDP)	2.3%
Infant mortality rate (IMR) per 1000 births	74
Maternal mortality rate (MMR)	365-650/1,000
Under five mortality rate (U5MR) per 1000 births	112

Source: The National Health Sector Strategic Plan 1999-2004

Total fertility for Kenya has experienced a major drop from 6.7 in 1989 to 4.7 in 1998 while the use of family planning among married women aged 15-49 has increased. CPR has risen in all provinces except Western province where it remains at the 1993 level. In Kakamega district for example, CPR in the use of modern methods has dropped from 25.8 in 1993 to 21.5 in 1998.

Poverty has increased during the last decade and currently it is estimated that 50% of the population lives below the poverty line.

2.2 Health Problems

Kenya like most developing countries faces disease conditions that are largely preventable. According to the latest report released in April 2001 for the period 1996-1999, Malaria continues to be the leading course of outpatient morbidity accounting for 32% of total new cases reported. Together with diseases of the respiratory system including pneumonia, skin diseases, diarrhoeal diseases and intestinal worms these form the top five. The other

five in order of ranking are accidents, urinary tract infections, eye infections, rheumatism and ear infections.

The fact that this trend has been the same for decades suggests exposure to similar health conditions with little change in the socio-economic status of most Kenyans. Estimates of the true incidence of major diseases has not been easy to establish because of factors such as lack of population based data, inadequate diagnosis and case reporting. Also there is inconsistent reporting. Table 2.2 gives detailed information on the top ten causes of morbidity for the year 1999.

Table 2.2: Top Causes of Outpatient Morbidity, 1999

	Disease	Number	%
1	Malaria	4,509,524	32.6
2	Diseases of respiratory system	3,436,632	24.9
3	Skin diseases	959,340	6.9
4	Diarrhoea	643,151	4.7
5	Intestinal worms	624,273	4.5
6	Accidents	386,627	2.8
7	Urinary tract infections	312,045	2.3
8	Eye infections	279,263	2.0
9	Rheumatism	249,286	1.8
10	Ear infections	179,067	1.3
	Others	2,245,506	16.2
	Total New cases	13,824,714	100.00

Source: HMIS Report 1996-1999

Comparison among provinces shows that Rift Valley, Nyanza, Western and Eastern have same top causes of outpatient morbidity although the order is not identical. Dental diseases become prominent in Central and North Eastern Provinces and diseases of the circulatory system join the top ten in Nairobi.

Again Malaria is the most common condition for inpatient admissions accounting for nearly twenty percent followed by conditions related to child delivery (14%) and Aneamia accounts for 4.1% of the total conditions. For the period under review once again Malaria accounted for 13% of all deaths reported in Government facilities, followed by pneumonia. HIV/AIDS accounted for less than 10% of all deaths but this was under-reported.

Early Childhood Mortality

Infant mortality is a key indicator of a nation's socio-economic situation and quality of life. According to the 1998 KDHS, infant mortality stands at 74 deaths per 1000 births and child mortality at 41 per 1000. Determinants of infant and child mortality differences include socio and economic factors (residence, mother's level of education). The risk of children dying varies significantly across provinces, with Nyanza having the highest under five mortality (199/1000), while Central Province has the lowest rate of 34 per 1000. The rates for other provinces are Nairobi- 66, Coast – 98, Eastern – 78, Rift Valley – 68 and Western – 123. Other factors that have a bearing on child mortality are sex of child, mothers age at

birth, length of preceeding birth interval, maternal care during pregnancy and delivery and child's size at birth.

Compared to the rates during the eighties and early nineties, the situation is worsening because under five mortality has risen by more than one third.

HIV/AIDS

In Kenya the progression of HIV/AIDS epidemic is taking a heavy toll on the population particularly young people. Since 1984, over 1.5 million Kenyans have developed AIDS of whom 1.1 million have died leaving behind 1 million orphans. By the end of 1999, there were 2.2 million Kenyans living with HIV. In one year alone close to 200,000 new HIV infections occur in the country. 70% of those already infected live in rural areas the majority being young people aged between 15-39 years. In 2000, the Government declared HIV/AIDS a national disaster and a public health emergency. Table 2.3 gives the breakdown of estimated HIV prevalence by province while table 2.4 is the situation in selected districts of Kenya.

Table 2.3: HIV Infection by Province - 2000

Province	Number HIV+	Prevalence
Nairobi	180,000	16%
Central	240,000	13%
Coast	130,000	10%
Eastern	300,000	13%
North Eastern	15,000	3%
Nyanza	480,000	22%
Rift Valley	390,000	11%
Western	210,000	12%
Total	1,900,000	100%

Source: NASCOP, MoH

Table 2.4: HIV Infection in selected districts of Kenya - 2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Busia	17	10	30	22	23	22	28	29	30	34	22
Garissa	5	0	5	4	15	6	5	8	6	6	-
Kajiado	-	-	-	-	-	6	7	10	8	-	-
Kakamega	5	13	15	9	14	12	10	10	16	12	12
Kisii	2	4	0	3	9	4	16	16	15	12	16
Kisumu	19	19	20	20	30	25	27	33	29	27	
Kitale	3	6	21	8	11	10	12	13	10	18	17
Kitui	1	5	2	8	20	4	4	6	10	9	14
Meru	3	-	-	2	11	9	16	14	23	23	-
Mombasa	10	17	11	17	11	16	12	17	16	-	12
Nairobi		12	13	17	15	16	16	-	-	17	-
Nakuru	10	13	13	23	59	27	11	25	25	27	-
Nyeri	3	4	9	3	6	21	9	7	17	-	14
Thika	3	10	3	28	40	-	13	23	34	33	21

Source: NACSOP, MoH

2.3 Health sector infrastructure

The Kenya Government shares almost equally the health care provision with the private health providers. Table 2.5 gives the breakdown of the health services by provider.

Table 2.5: Health service providers in Kenya

	GoK		NGO		PRIVATE		Total
Facility Type	Number	%	Number	%	Number	%	
Hospital	110	49.8	67	30.3	44	19.9	221
Health Centre	465	80.2	100	17.2	15	2.6	580
Dispensary	1,583	61.5	595	23.1	397	15.4	2,575
Nursing & Maternity Home	0	0.0	11	5.8	178	94.2	189
Health Clinic /Medical center	94	12.9	72	9.9	563	77.2	729
Total	2,252	52.4	845	19.7	1,197	27.9	4,294

Source: HMIS report 1996-1999

Of 110 GOK hospitals, there are 2 referrals and teaching hospitals, 7 provincial hospitals and 101 district and sub-district hospitals.

2.4 Decentralization of the health sector

Decentralization in the management of the health services is the central strategy of the health sector reforms as envisioned in the National Health Sector Strategic Plan: 1999-2004. Implementation of the plan commenced in 1999 targeting the priority health problems of HIV/AIDS, malaria, reproductive and health problems of women and children and the control of communicable diseases. Other health problems are considered of medium or low priority.

2.5 Financing the health sector

Financing of the health sector has continued to increase in nominal terms but in constant prices, there is no significant rise in the financing of the sector. Figure 2.1 and 2.2 show the funding trends during the past 10 years.

Figure 2.1: Actual expenditure in K Pounds.

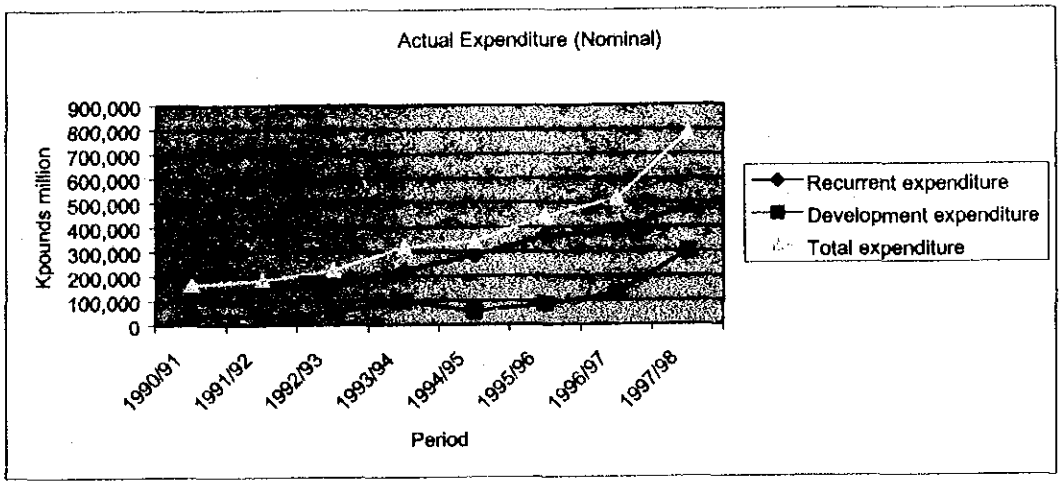
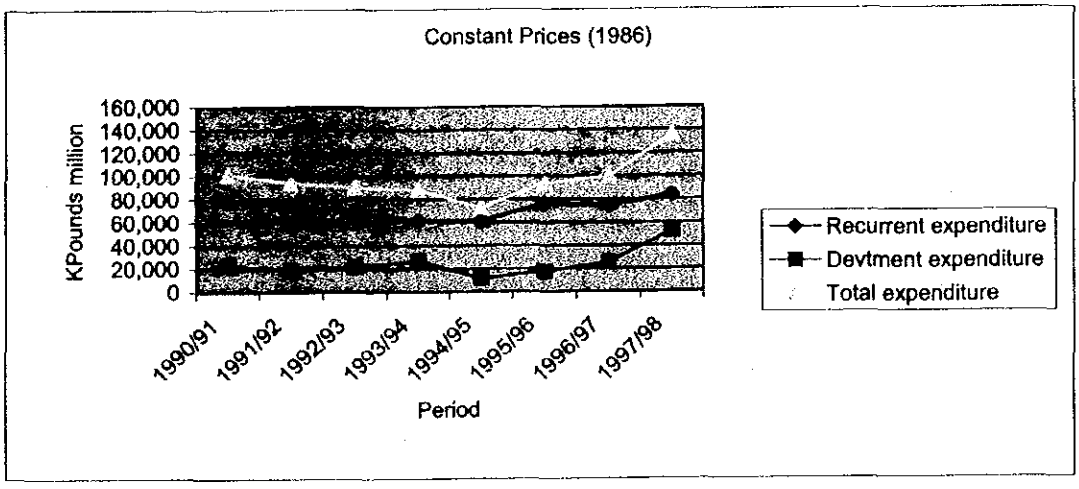


Figure 2.2: Expenditure at constant 1986 prices



2.6 Donor environment

Several multi-lateral and bilateral donors support the population and health sector in Kenya. DANIDA, IDA, JICA, EC and UNICEF are some of them. Donors in service delivery areas include, USAID, SIDA, UK, Germany, Belgium, Spain, IDA, ADB, DANIDA, UNFPA, UNICEF and UNDP. In general, during the 1980's and 1990's, donor

community has been critical to Kenya and the general donor-environment less than favorable.

2.7 BTS

The blood transfusion services in Kenya are hospital based and are integrated with other Hospital Laboratory Services. Government, Mission and Private Health Providers collect, process, store and distribute blood for transfusion.

NPHLS is responsible for BTS services in the country both public and private. NPHLS is responsible for blood policy formulation and implementation and coordination of the BTS services.

Though the number of the BTS facilities in the country is not known, it is expected that most of the 221 hospitals and the 189 Nursing and Maternity homes in the country transfuse blood. The study established that there were 190 BTS facilities out of the 252 hospitals visited of which 47.6% were government while mission and private hospitals accounted for 30.7% and 21.7% respectively. The full list of the BTS facilities is in Annex 5 of this report.

The national policy for blood transfusion in the country was published in November 2001. Before that, the country's BTS operated without a policy and this has been the main problem in ensuring adequate supply of safe blood.

2.8 Demand for Blood

It is estimated that the current demand for blood is in excess of 300,000 units annually. This demand is estimated to increase by 10% annually and is estimated to double by the year 2004.

2.9 Blood Collection

The blood supply has shown a steady decline over the years from an annual high of 150,000 units in the early 1980's to a low total of about 90,000 units in 2000. Consequently, there are frequent shortages of blood in virtually all the hospitals.

2.10 Blood Safety

The chronic shortage of blood means that most of the transfusion in the hospitals occur under urgent conditions. Blood is obtained and transfused at a short notice and is therefore not processed and screened under ideal conditions. A large percentage of the blood in the hospital is from family replacement donors which may not always meet the criteria for safe blood.

2.11 BTS Challenges

The BTS faces challenges in achieving its mission. Some of these challenges include:

- Establishing a well coordinated BTS system
- Ensuring that there is adequate safe blood for transfusion in the country.
- Ensuring 100% safe blood supply for purposes of transfusion is sustained
- Ensuring rational use of available blood and blood procedures.

Participants group photograph: The dissemination workshop on 31, January 2001 at Pan Afric Hotel, Nairobi

Stakeholders Dissemination workshop: Closing ceremony, Dr. Davy Koech, Director KEMRI closes the workshop

Chapter 3 Organisation structure and Management

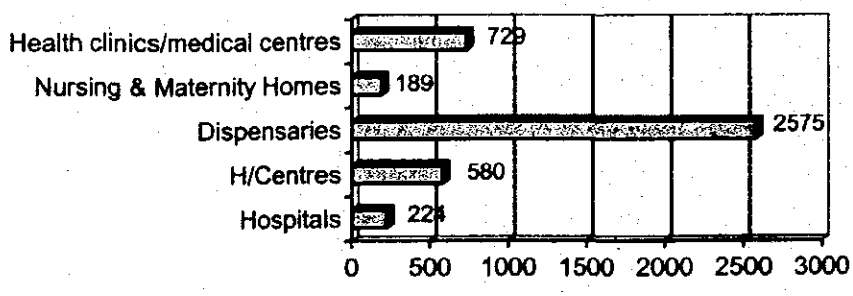
3.1 *Overview of the Organisation and Management of Health Services*

The Ministry of Health is mandated by law to promote and oversee all health activities in the country. The Ministry has the responsibility to formulate policy, establish and enforce standards and mobilize resources for health development. Various boards and councils that regulate the performance of service institutions and health workers have been established to supplement the Ministry's effort to administer the delivery of health services in the country.

At provincial and district level, the provincial and district health management teams respectively are responsible for implementation of programmes and ensuring that health services are delivered effectively. Health care is provided mainly by Government facilities that include dispensaries, health centres, district and provincial hospitals and national referral hospitals. The dispensaries and health centers are the first level contact with the Public and therefore provide most of the services. District and Provincial hospitals provide outpatient, inpatient and referral services. Kenyatta National Hospital is the apex of this hierarchical arrangement and is the major referral and teaching facility in Kenya. Mission and private hospitals significantly augment Government facilities in delivering health care to the public.

According to the HMIS, MOH 2001 report on health facilities in Kenya, the Health delivery system is comprised of 4,294 health facilities distributed by type as shown in figure 3.1. Fifty two percent of these are public facilities while 48% are private sector owned. The Ministry of Health and Ministry of Local Authorities are the major providers of the public facilities while NGOs, Missions and Private investors provide the private facilities.

Figure 3.1 Distribution of health facilities in Kenya by type



3.2 The Blood Transfusion Services (BTS)

Blood transfusion services in Kenya is an essential element of the health care system and is hospital based and run as part of the general hospital laboratory services, a system that has not satisfied the country's requirement for safe blood. This study has been carried out at a time when BTS services are being reorganized to establish a comprehensive and well coordinated blood transfusion system.

NPHLS is responsible for BTS services. In discharging these responsibilities NPHLS has delegated the collection, processing, storage, distribution and transfusion of blood to individual hospitals, while providing technical and advisory services. There are a number of organizations that have been involved in BTS activities over the years. These organizations have played different roles ranging from policy formulation to funding.

BTS Facilities and Regional Distribution

A total of 252 hospitals were visited for this study, all of which were expected to provide BTS services. It transpired that 25 hospitals had closed down while 38 did not provide BTS services. A total of 190 (83%) of the operating hospitals provided BTS services. Collection, screening, grouping and transfusion of blood is undertaken by 53.4%, 84.5% and 96.5% of the facilities respectively. The BTS facilities are located in all provinces in Kenya. Table 3.1 shows their distribution by Province while a detailed list is shown in Annex 5.

Table 3.1. Regional distribution of BTS facilities

Province	No. of BTS	% of total
Nairobi	16	8.4
Central	25	13.2
Eastern	26	13.8
North Eastern	3	1.6
Coast	16	8.4
Rift Valley	43	22.3
Nyanza	38	20.1
Western	23	12.2
Total	190	100

Source: BTS survey 2001

Rift Valley province has the highest number of BTS facilities representing 22.3% followed by Nyanza Province with 20.1% of the total. The least number was found in North Eastern province with only 1.6% of the total. These figures include the two RBTCs in Nairobi and Kisumu. The distribution of BTS facilities among the districts is contained in annex 5 of the report.

Distribution of BTS Facilities by Providers

Another characteristic of the BTS is their distribution by provider i.e. Government, Mission, Private. The Government has the highest number of facilities accounting for 47.6% followed by private hospitals, 30.7% and mission hospitals, 21.7%. Table 3.2 shows their distribution by Provider.

Table 3.2 : Distribution of BTS facilities by Provider

Provider	No. of BTS	% of total
Government	91	47.6
Private	58	30.7
Mission	41	21.7
Total	190	100

3.3 Roles of Organisations and Institutions in BTS

The BTS system is comprised of a number of organizations that in one way or the other contribute to its activities. Some of these organizations are involved in policy and guideline formulation, while others are involved in donor mobilization and education, training, research, funding, blood collection, processing and utilization. The following paragraphs discuss the major stakeholders and their roles.

The National Public Health Laboratory Services (NPHLS) is responsible for overseeing the organization and management of the blood transfusion services in the Country. It is the responsibility of NPHLS to ensure that the BTS system has adequate policies and guidelines, quality standards, facilities, equipment, supplies, personnel and that there is adequate and safe blood in the country.

The hospitals are responsible for the day-to-day sourcing, screening, storage and transfusion of blood. Each hospital is expected to collect, screen, group and transfuse blood to satisfy its individual requirements. In this regard all government, private and mission hospitals that transfuse blood are expected to have an infrastructural framework for donor recruitment, collection, screening, storage and transfusing blood.

Regional Blood Transfusion Centres (RBTCs) have been introduced recently. The BTS system in Kenya aims at establishing RBTCs at strategic regional centres which will be responsible for donor mobilization, collecting, processing and distribution of safe blood to those hospitals under their areas of jurisdiction. It is expected that they will replace the hospitals in screening, processing, storing and distributing blood and blood products. Already there are two such RBTCs in Nairobi and Kisumu.

The **Kenya Red Cross Society** has contributed immensely in donor mobilization, education and recruitment. The other areas of support include educational material development and dissemination of BTS information. The worldwide operations render the society an important source of experience on donor development and operations. The Secretary General of Kenya Red Cross Society is a member of the National blood transfusion board.

The **National AIDS and STI Control Programme (NASCOP)** has various roles in the BTS systems. It is involved in BTS policy guideline formulation, technical evaluation of HIV testing kits and equipment and training of BTS staff. NASCOP is also a member of blood safety committee which is responsible for issuing quality standards on screening of blood.

Kenya Medical Research Institute (KEMRI) as a research institution provides research services to BTS. It has already developed blood screening kits for HIV/AIDS and Hepatitis B. In addition KEMRI provides training to those who are involved in screening activities.

Samples of screening kits are tested at KEMRI which also provides follow-up services on the performance of the kits that are in use at the hospitals. KEMRI is also involved in dissemination of developed technology in blood screening to the districts through workshop training. The Chief Executive of KEMRI is a member of the National Blood Transfusion Board.

African Medical and Research Foundation (AMREF) is involved in training of staff in the BTS activities that it provides at provincial and district level. To some extent, it also provides information for policy formulation.

Kenya Medical Training College (KMTC) is the main source of middle level medical staff training in the country. It provides refresher courses to health providers in the country. Those who join the BTS services would have taken their basic training in haematology at KMTC.

The **World Health Organisation (WHO)** is a major player of the health delivery system in the country through training, quality assurance and control, the provision of facilities and equipment and policy guidelines formulation. WHO has assisted in the provision of the guidelines currently in use and it is a major participant in the drawing up of the policy guidelines to be launched.

The **National AIDS Control Council (NACC)** is another major stakeholder in the BTS system. With its mandate to control HIV/AIDS in the country, NACC plays a major role in policy formulation, blood surveillance and training

Kenya Medical Supplies Agency (KEMSA) is responsible for the procurement and distribution of screening kits, bags, reagents, syringes and other supplies required in BTS operations.

The **Blood Safety Committee** with membership comprising all stakeholders sets the standards for facilities, equipment and screening kits

Blood Donor Organisations are community organisations intended to facilitate sourcing of adequate blood. The study established that 161 representing 92.5% of the hospitals did not have a blood donor association while 9 (5.2%) of the hospitals had a donor organization. Four (2.3%) of the hospitals have plans to start one.

3.4 BTS Organisation Structure

The blood transfusion service has been managed and coordinated by the National Public Health Laboratory Services (NPHLS). However, a new policy to be launched soon, seeks to set up a new NBTS as an identifiable unit within MOH to take over blood transfusion responsibilities. This section examines the organization structures under the NPHLS and the proposed NBTS.

Current Organisation Structures

At the national level, NPHL is responsible for BTS activities. The NPHLS falls under the Division of Diagnostic and Forensic Services (DFS) in the Department of Curative and Rehabilitation Health Services (CRHS), Ministry of Health. NPHLS is responsible for blood

policy formulation and dissemination, coordination and management of the blood transfusion services, Procurement and distribution of reagents and supplies and training of personnel of the BTS.

At the NPHLS the blood transfusion services are the responsibility of the BTS department which is headed by the National Chief Laboratory Technologist who is directly responsible for the blood donor activities in the whole country. He supervises the governmnet, mission and private hospitals that undertake blood transfusion services at all levels.

The Provinces

At Provincial level, the BTS services are headed by the Provincial Medical Laboratory Technologist within the Provincial Medical Office. The PMLT is responsible for general laboratory and blood transfusion services in the province and oversees the delivery of BTS services in all hospitals in the Province.

The Districts

The District Medical Laboratory Technologist (DMLT) is responsible for blood transfusion services in the district. He is also responsible for the other general laboratory services in the district. The DMLT reports to the MOH on the day-to-day administrative activities while he reports to the PMLT on technical issues.

The Hospitals

At the hospitals the responsibility for blood transfusion is under the hospital laboratory services department which is headed by the Laboratory Technologist in-charge. The donor services section within the laboratory department is responsible for donor recruitment, blood collection, blood grouping and the blood bank. The responsibility for screening of blood falls under the serology section of the laboratory services department. In practice therefore BTS services are within the general responsibility of the head of the laboratory services who reports to the hospital incharge.

Hospital Blood Committees

It is expected that hospitals establish a blood transfusion committee to manage blood transfusion activities. Our interviews established that the idea of hospital blood committee has not been integrated in Kenyan BTS. Eighty nine percent of the hospitals did not have a committee on transfusion.

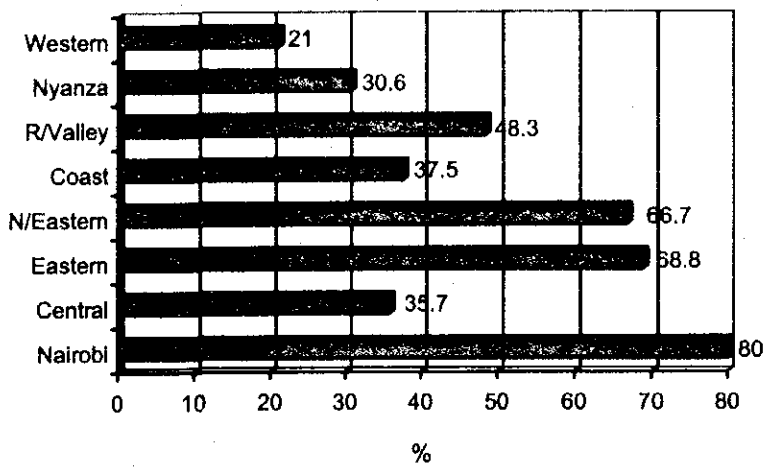
The review team attempted to establish the actual organization of the BTS at the hospital facilities in terms of existence of a specific unit, section or department; allocation of adequate facilities, level of person in charge and finally the staff allocated to BTS activities.

Hospitals were asked to indicate whether they had a unit dedicated to BTS services.
Of the 173 facilities that responded 43.4% had a unit dedicated to the BTS activities. The distribution of these according to the facilities providers showed that 53.4% were government, 25.3% private and 21.3% were mission.

A comparison within facility administration categories was interesting. Fifty percent of the government hospitals had a BTS unit while the corresponding figures for mission and private hospitals were 38.1% and 37.3% respectively.

There were significant regional differences. In Nairobi 79.2% of the hospitals had a BTS unit while in western province only 21.0% of the hospitals had one. The proportion of hospitals with BTS units in other provinces in descending order were Eastern 68.8%, North Eastern 66.7% each, Rift Valley 48.3%, Coast 37.5%, Central 35.7% and Nyanza 30.6%.

Figure 3.2 Percentage distribution of health facilities with a blood transfusion unit by province



In regard to staff allocation for BTS activities, 90 of the 158 hospitals that responded had allocated staff to BTS activities. Of the 90 hospitals, 44.4% were government while 30% and 25.6% were private and mission hospitals respectively.

A comparison within facility administration shows that 61.4% of the private hospitals had specific staff dedicated to BTS activities compared to 57.5% in the mission hospitals and 54.1% of the government hospitals.

In terms of regional comparisons Coast compared least favourably with 25.1% of the hospitals allocating staff to BTS activities while Nairobi was the best with 84.6% of the facilities allocating staff to BTS activities. Others were Eastern 73.9%, Rift Valley 63.9%, Western 63.9, Central 52.4%, Nyanza 38.7% and North Eastern 33.3%.
Laboratory services are headed by a Lab technologists in 68.5% of the hospitals while 26.3 % are headed by a Technician and 7.9% by a Nurse.

A review of adequacy of space provided for BTS activities showed that in general 42.6% of the hospitals had not allocated specific rooms for BTS activities. By administration agency, 41.1%, 36.1%, and 45.9% of the Government, Missions and Private hospitals respectively had not allocated room dedicated for BTS activities.

Shortcomings of Current Organisational Structure

The existing arrangements have not responded well to the country's requirements. It has not been possible to satisfy the country's demand for safe blood for transfusion. This was perhaps best demonstrated during the 1998 Nairobi bomb disaster when the country found

Itself unable to meet the demand for safe blood. This has been caused by a number of factors:

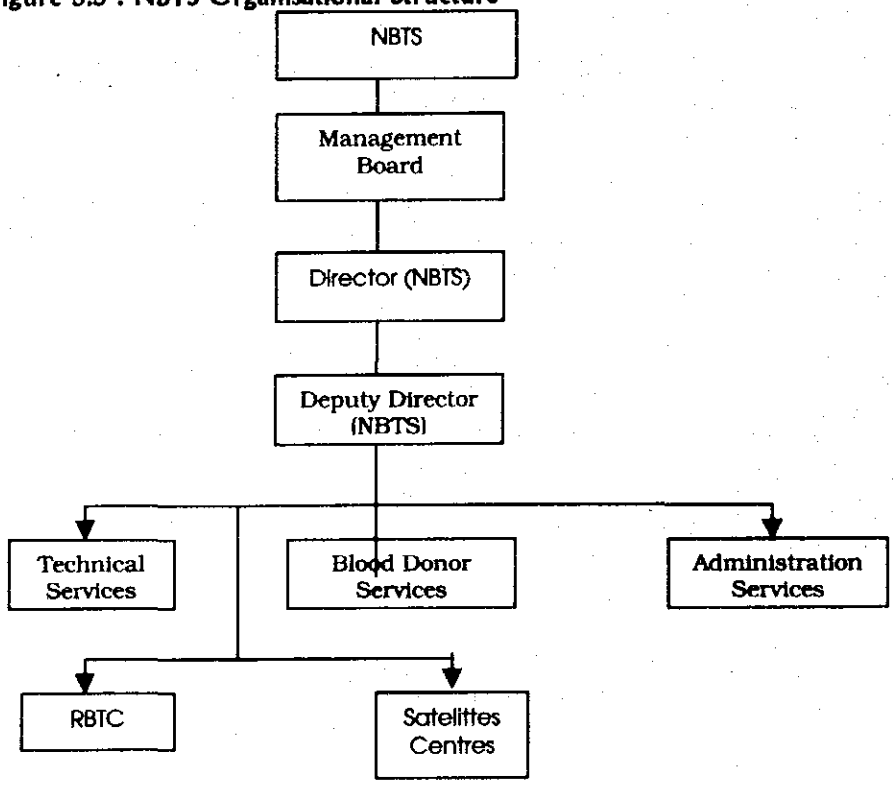
- It has been difficult to supervise the hospitals and ensure quality and safety in blood processing.
- There have been logistical problems in the distribution of reagents, screening kits and other supplies to hospitals.
- It has been difficult to dedicate staff and equipment to the BTS service.
- There has been no budget provision specific for BTS activities. BTS has been funded under the general laboratory budget which has been declining over the years.

3.5 Proposed National Blood Transfusion Services (NBTS)

The Government of Kenya has been assessing the options available for improving the BTS system in the Country. In this regard efforts including discussions, workshops, seminars and consultancy studies have been carried out for many years now. Finally, there was consensus that Kenya's BTS needed to be reformed. It was agreed that an autonomous body with a legal framework responsible for coordination of BTS services should be established.

The National Blood Transfusion Services (NBTS), a semi autonomous body with a Board of Management, Secretariat, funding and accounting system has been established to be responsible for BTS activities. The organizational structure of the NBTS is shown on figure 3.3.

Figure 3.3 : NBTS Organisational Structure



Management Board

The NBTS management board will be responsible for policy formulation and has the overall responsibility of ensuring that the NBTS objectives are achieved. In this regard it will ensure that it enlists government support and that of all other stakeholders in its activities. The membership of the board is drawn from all relevant Ministries, stakeholders and professionals and will be appointed by the Ministry of Health.

NBTS Secretariat

The day-to-day activities of the NBTS are under the NBTS secretariat which will be headed by a Director and assisted by a Deputy Director. The three departments in the secretariat are; Technical services, Blood donor services and Administration services. It will be the responsibility of NBTS to ensure that there is adequate and safe blood through monitoring of collection, processing and distribution of blood and its products and other related activities.

Regional Blood Transfusion Centres (RBTCs)

The RBTC will be responsible for meeting safe blood requirements in the respective region. The RBTCs will be established at strategic areas throughout the country and will be monitored from the NBTS Nairobi. Specifically they will implement BTS national policies and guidelines and coordinate BTS activities in their areas of responsibility.

Satellite/District and Primary Hospital Blood Banks

These will be established at strategic areas and will complement the efforts of the RBTCs in policy implementation and coordination of BTS activities in the areas they will be responsible for.

Funding of the NBTS

The NBTS will be expected to be self-sustaining through the following sources of funding:

- Subvention from the Treasury
- Operation of a cost recovery scheme
- Medical insurance schemes
- Private organizations and individuals
- External services
- Marketing of products

Legislation

Legislation on the collection, processing, preservation, distribution and supply of blood and its products will be enacted by the Government of Kenya.

3.6 Policy Guidelines for BTS

The World Health Organisation (WHO) resolution WHA 28.72 of 1975 and Commonwealth Ministry of Health resolution of 1989, require that each member state should develop a comprehensive and well coordinated blood transfusion service based on a voluntary non-remunerated blood donors. The International Society of Blood Transfusion and the International Red Cross Society have also urged member states to enact effective legislative policies governing operations of blood transfusion services. Kenya is a member of all these organizations.

Until November 2001, Kenya had not developed a comprehensive blood transfusion policy guideline which is essential to create a strong and reliable system for blood procurement, supply, processing, distribution and surveillance. During the study it was established that 45.6%,44.0%, 39.3% and 41.7% of the hospitals did not have policy guidelines on blood donors, collecting, screening, storage and transfusion of blood respectively.

Provision of BTS has been guided by piecemeal guidelines which have been issued from time to time by the MOH and other stakeholders like WHO, NASCOP and the Kenya Red Cross Society. These are the guidelines that have been used by the BTS staff to guide their activities.

The Ministry of Health with the assistance of CDC and the Global Programme on AIDS, WHO Kenya Country programme issued the Kenya National guidelines for the appropriate use of Blood and Essential Blood Bank. These guidelines sought to encourage appropriate use of blood and its products by the clinicians. Guidelines for appropriate use of blood in paediatric blood services, investigation and management of blood transfusion reactions are outlined in this document. It was recommended that each hospital establish a Hospital Transfusion Committee to implement these guidelines.

In 1977, NPHLS, Ministry of Health issued a handbook on Blood Transfusion Techniques for use by everyone involved in providing blood transfusion services. This handbook set out the standard methods in blood grouping, cross matching and related serology work as a means of improving blood transfusion work in the country and safeguarding the lives of patients. The handbook was availed to all laboratory staff in the country.

Major mission and private hospitals have also issued their own blood transfusion policies due to lack of a comprehensive blood policy and guideline. Nairobi Hospital and Gertrude hospital are examples of hospitals with such internal policy guidelines.

For lack of a comprehensive blood policy and guidelines, the country's BTS system is characterized by:

- Lack of coordination system for providing BTS services.
- Inability to cope with blood requirements in the country especially during disasters as demonstrated by the Nairobi bomb blast of 1998.
- No clear definition of roles and responsibilities of all the stakeholders and institutions that have the potential to improve BTS services.
- Lack of sufficient resources to support the goals and objectives of BTS.
- No budget provision dedicated to BTS activities.

- Lack of standardized facilities, equipment and supplies for blood transfusion services.
- Staff who are demotivated because of poor working conditions.
- Uncoordinated strategies that cannot be implemented due to lack of resources.
- Ineffective and irregular donor recruitment programmes owing to transport and communication difficulties.
- *Weak quality assurance owing to lack of equipment and supplies.*
- Inadequate standards enforcement owing to lack of resources.
- Lack of information systems.
- Lack of standard operational practices.

A national policy guideline on blood transfusion system will be launched soon in an attempt to resolve some of the shortcomings and also comply with the obligations of WHO. The policy guidelines address all issues pertaining to institutional framework, legal framework, blood collecting, processing, storage and distribution.

Proposed NBTS Headquarters to coordinate all BTS activities in the Country.

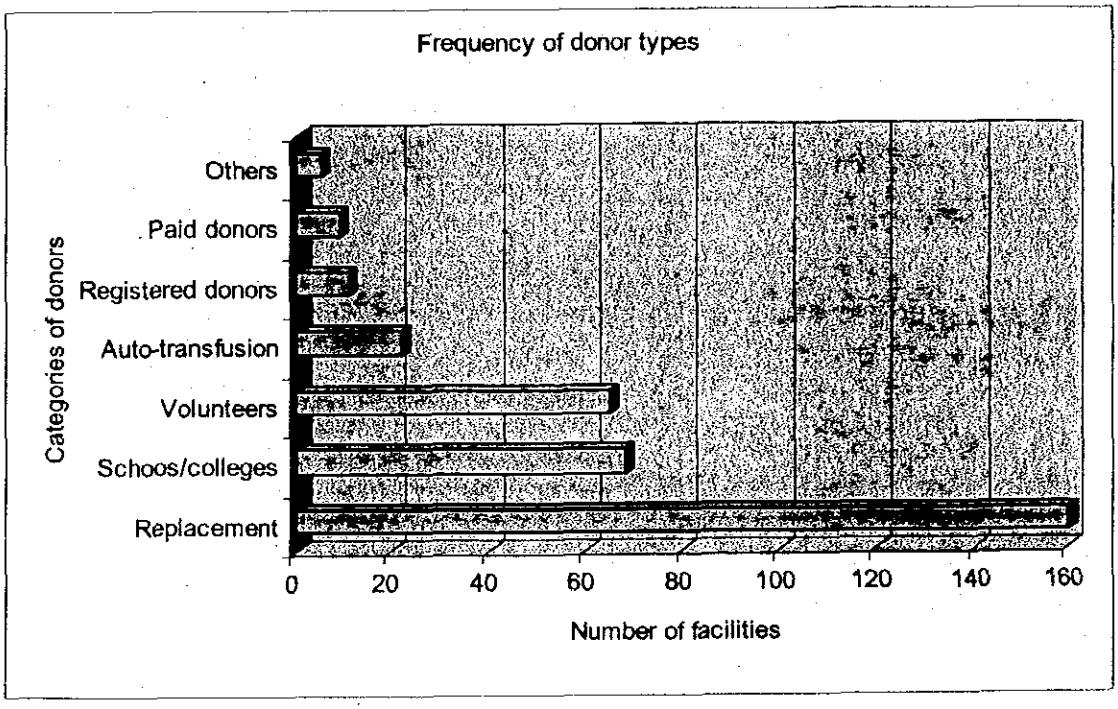
4 The Donor

The main goal of the BTS is to ensure constant availability of adequate amounts of safe blood and blood products in the country. In this and the next section we discuss the strategies and practices in place for achieving this goal as well as the outcome and gaps. Embedded in the discussion is an assessment of the technical capacity for BTS to carry out its core functions.

4.1 Sources of Blood and Blood Products

In Kenya there are seven potential sources of blood and blood products. By far the most frequent source is donations from relatives or friends to replace used blood. Groups from academic institutions also constitute an important source blood used in many health facilities in the country. Other sources include a small number of registered donors, auto-transfusion and paid donors. Figure 4.1 shows the distribution of all the major categories of blood donors.

Figure 4.1 Frequency of donor types



Source BTS Survey, 2001

The general characteristic of these main sources is non-predictability in their timely availability and suitability to donate required blood. The presence of a small group of paid donors was not expected as the current policies and guidelines while not explicitly prohibiting this practice nevertheless have no provision for monetary reward to donors.

Other reported sources of blood of less significance are various communities such as the Ismailia Community, hospitals and the regional center at Kisumu. However, relatives and institutions as blood donors represent stable entities that are probably easy to successfully mobilize.

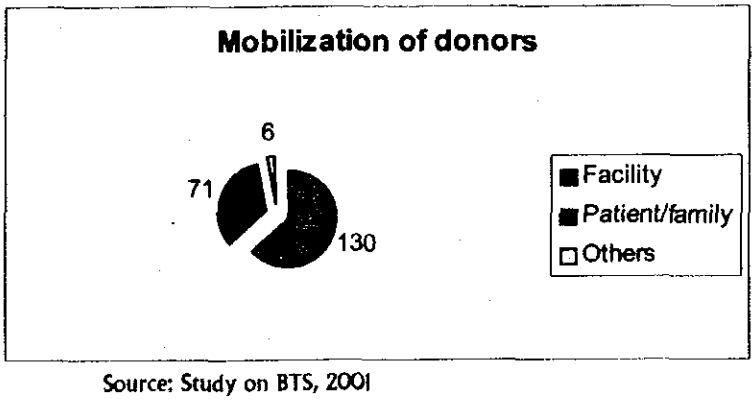
During the period October 2000 and September 2001, a total of 100760 units of blood was collected from these sources. Table 4.1 gives a breakdown of donated blood by facility provider while appendix I gives the details of blood donated at each BTS during the same period. Appendices II, III and IV gives a break down of blood donated, screening and used by province and district.

Table 4.1: Blood donated by facility provider

Province	GOK		Mission Hospitals	Private Hospitals	Total
	Provincial/BTS/ National Hospitals	District Hospitals			
Nairobi	7,000	12,537	87	6,064	25,688
Central	971	3,087	4,931	56	9,045
Eastern	828	4,836	1,454	9	7,127
North Eastern	373	508	-	-	881
Coast	1,715	5,638	-	1,800	9,153
Rift Valley	1,683	12,885	3,629	1,133	19,330
Nyanza	6,494	6,875	2,539	3,076	18,984
Western	1,359	6,601	2,413	179	10,552
Total	20,423	52,967	15,053	12,317	100,760

In Kenya the responsibility for mobilizing donors is borne by the individual hospitals and the patient or family. Figure 4.2 shows the relative contribution of the different individuals and organizations in mobilizing donations.

Figure 4.2 Mobilization of donors

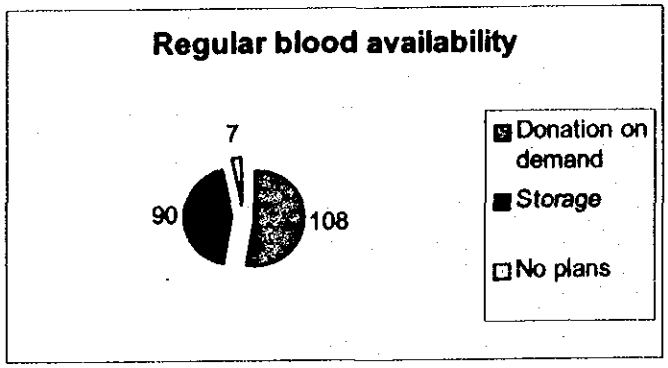


Source: Study on BTS, 2001

Six other organizations were mentioned as having some role in mobilizing for blood donation. This is probably for specific purposes. They are: Blood Donor Team, Hope Worldwide, KRCS, MSF and other agencies of the Ministry of Health.

In view of the unpredictable nature of sources of blood, health providers have developed several strategies for guaranteeing availability of blood. Donation on demand focuses on patients and family members (Figure 4.3). Fifty three percent of the facilities engage patients and family members in mobilizing for blood. Regular storage is the second most important strategy for introducing security into the availability of blood within institutions. Forty four percent of the facilities store variable amounts of blood while 3.6% of the institutions have no plans for ensuring regular availability of blood.

Figure 4.3 Strategies for regular availability of blood

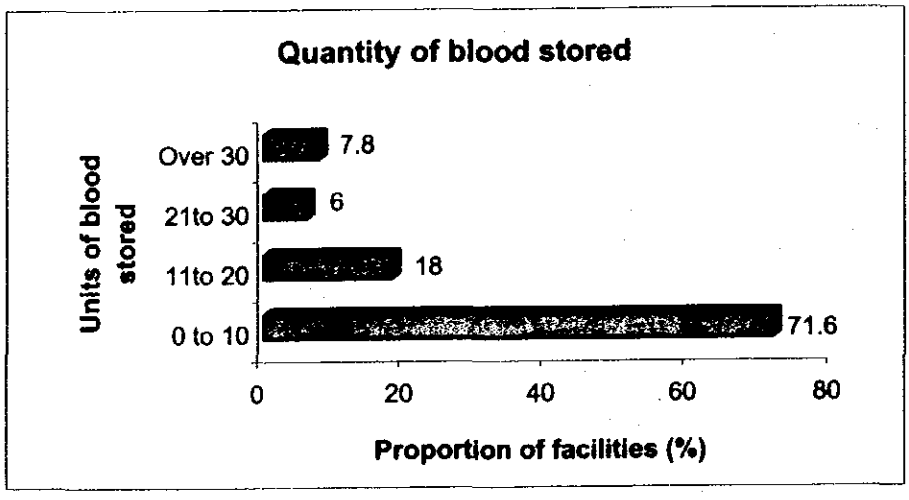


Source: BTS Study, 2001

As shown in figure 4.4 only small amounts of blood are stored. On average, 71.6% of the facilities store less than 10 units of blood while only 7.8% store 40 units or more at a time.

The major limitation on storage is actual availability of blood and not storage facilities. The strategy for ensuring regular availability of blood corresponds with the institution mobilizing for blood donation.

Figure 4.4 Quantity of stored Blood



Source: BTS Study, 2001

Emergency call-up for blood is directed at individuals and institutions and only to a limited extent on registered donors. The latter group is infinitesimal. Overall 142 (73.6%) of the facilities reported making institutional call-up to meet their emergency needs while 34

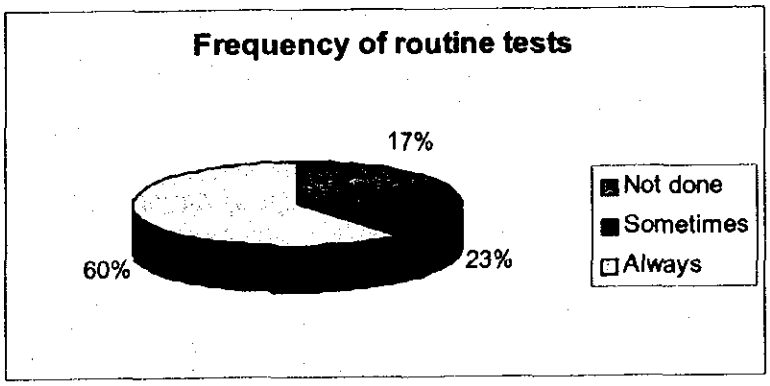
(17.6%) make a general call-up on the national radio. Only 21 (10.9%) call registered donors.

4.2 Donor Assessment and Preparation

Besides willingness to donate blood, all donors should be evaluated for suitability or 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 disease. Counseling is then done and donors informed about the tests that will be done on blood including screening for HIV, syphilis and other diseases. Finally, all donors should undergo a physical examination and subjected to routine tests on their blood prior to donation.

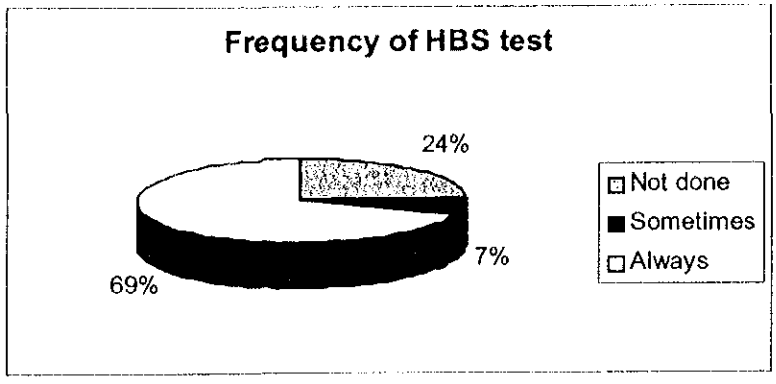
In practice this study revealed that it is not in all instances that prospective donors are subjected to the recommended battery of investigations and assessments. Out of 193 facilities, 52 (26.9%) have established Voluntary Counseling Centers for the purposes of donor preparation through pre-test counseling. The quality and utilization of these facilities is discussed later. Routine tests and HBS test and cross match occurred in less than 55.4% of all instances of blood donation. In the surveyed institutions, routine tests (hemoglobin, Blood Cell counts and HBS) is done most of the time but not always. Figures 4.5 and 4.6 give the number of facilities that carry out routine and HBS tests respectively.

Figure 4.5 Frequency of routine tests



Source: BTS Study, 2001

Figure 4.6 Frequency of HBS test



Source: BTS Study, 2001.

4.3 Donor motivation, recruitment, selection and retention

Although the operational guidelines provide for donor motivation, recruitment, selection and retention, in practice there are no programs or pragmatic strategies for achieving this. In this regard the services are based on chance and the goodwill of relatives, friends and individuals. Health education, information on blood group and refreshment are the most frequently sited methods for motivating and recruiting donors. Donation is therefore a self-selection process and there is no operational strategy on donor retention.

4.4 Blood Group-Types

In order to determine, distribution of the various blood group types among the donors, the most current data (October 2000 to September 2001) was used. Blood group O+ is the most predominant type among the donors accounting for 48.4% of the units collected during the year. This is followed by A+ and B+ respectively. Table 4.1 is the breakdown in the distribution of blood group types for all donated blood during the year.

Table 4.2 Distribution of blood group types 2000/2001

	Distribution of Blood Groups amongst donors								
Facility Type	A +ve	A -ve	B +ve	B -ve	O +ve	O -ve	AB +ve	AB -ve	Tot
Government	9948	524	10361	1096	24617	2770	3270	846	53
Mission	2949	102	2264	123	8236	502	216	30	14
Private	1894	89	1705	77	4966	324	437	51	9
Total	14791	715	14330	1296	37819	3596	3923	927	77

4.5 Regional Analysis

There are important regional variations in the relative contribution of the different categories of donors. All provinces depend on replacement donors as the prime source of blood. Schools/ colleges and volunteers are the next important sources of blood in all provinces. This pattern mirrors the national level. Significant variations are one, an absence of volunteers in North Eastern and two, the prominence of auto-transfusion in Nairobi and

coast provinces of Kenya. Paid donors are reported in 20% of institutions of western provinces while there are none in Nairobi, Central, North Eastern and Nyanza provinces. Table 4.2 gives the regional variation in sources of blood donors.

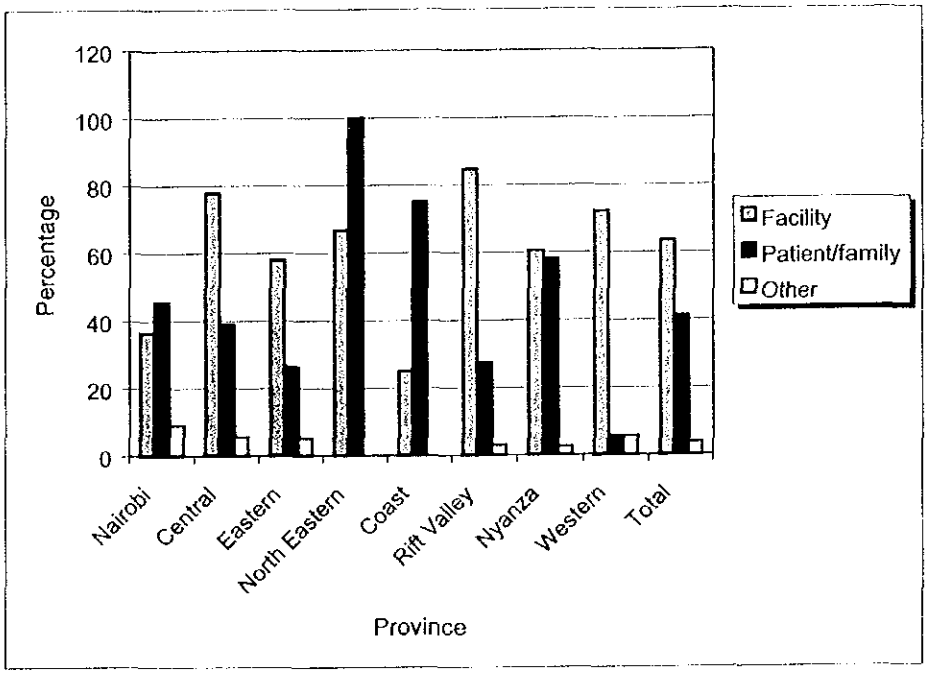
Table 4.3 Proportion of regional facilities by donor-source

	Type of Donor					
Province	Replacement	Schools/colleges	Volunteers	Auto-Transfusion	Registered donors	Paid donors
Nairobi	73.3	13.3	66.7	33.3	13.3	0
Central	84.0	24.0	36.0	16.0	4.0	0
Eastern	77.8	48.1	29.8	3.7	11.1	3.7
North Eastern	100	33.3	0	0	0	0
Coast	100	12.5	18.8	31.3	0	0
Rift Valley	86.4	50.0	29.5	4.7	4.5	6.8
Nyanza	84.6	30.8	41.0	5.1	2.8	2.8
Western	70.8	41.7	25,0	12.5	5.7	16.7
Total	82.9	35.2	33.7	11.4	5.7	4.7

Source: BTS Study, 2001

The relative role of the different institutions in mobilizing for donors at the provincial level is shown in figure 4.7. On average, the facility plays the main role in mobilizing for blood donors. However, in Nairobi, North Eastern and Coast provinces, the family or friend is the main player.

Figure 4.7 Mobilization of donors by province

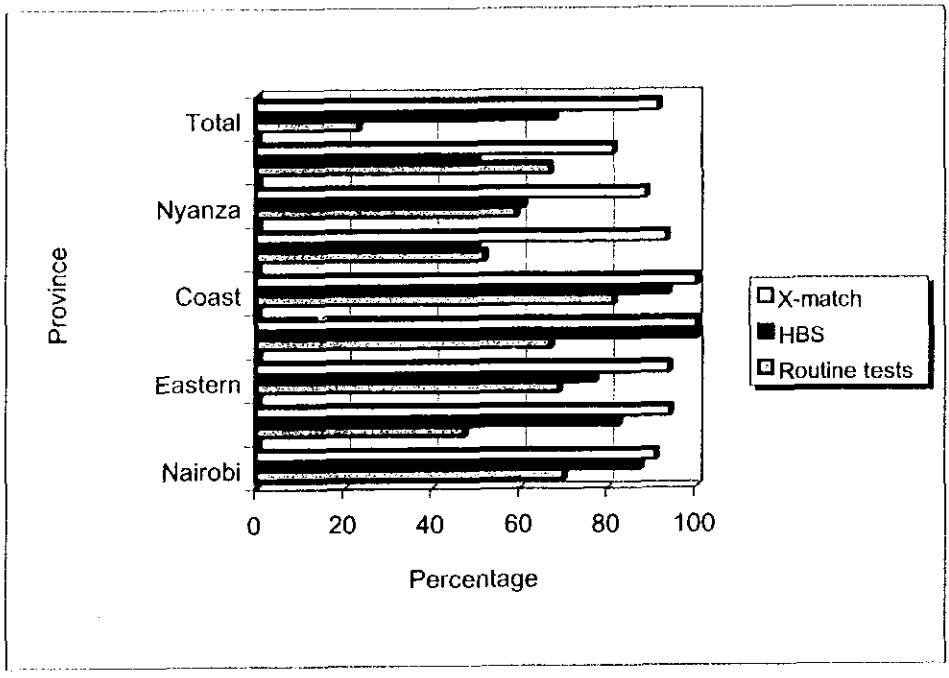


Source: BTS Study, 2001.

The relationship between the main source of blood and the strategy adopted for ensuring regular availability of blood is not apparent at the level of the province.

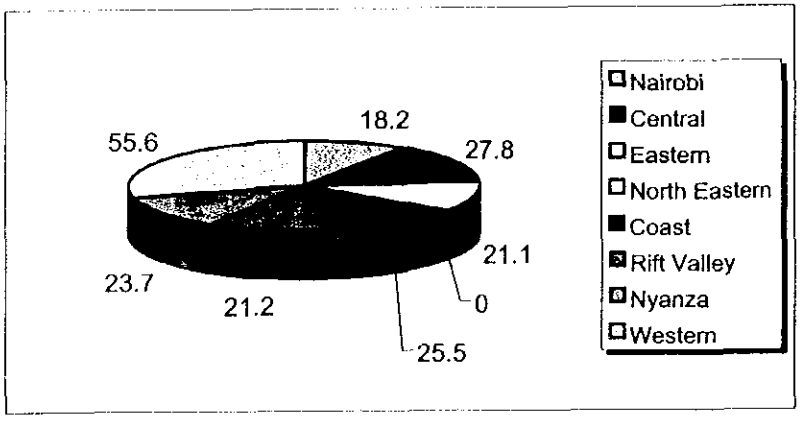
There is great variation in the frequency of routine tests carried out on blood in different province as given in figure 4.8. There is lack of uniformity in the approach to basic evaluation of donated blood. The reported frequency appears to be an overestimate.

Figure 4.8 Frequency of routine tests by province



Only 38.4% of the facilities have a functioning VCT Centre. Nairobi province has the highest proportion of facilities with established VCTCs (55.6%) followed by Western province (27.8%). Detailed discussion on VCT is given in part II of this report.

Figure 4.9 Proportion of facilities with VCTCs in 8 provinces



4.6 Donor Analysis amongst service providers

The comparative breakdown of donor-sources, donor mobilization, quantity of blood stored and donor call-up by service provider is shown in tables 4.4, 4.5,figure 4.10 and table 4.6.

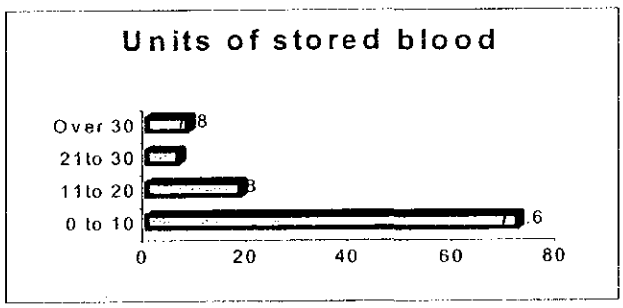
Table 4.4 Donor Sources by facility type

		Service provider			
Source	Number	MoH	Mission	Private	Total
Replacement	160	80.2	97.6	76.7	82.9
Schools/colleges	68	52.5	31	11.7	35.2
Volunteers	65	35.2	31	33.3	33.7
Auto-transfusion	22	7.7	9.5	18.3	11.4
Registered donors	11	5.5	7.1	5	5.7
Paid donors	9	5.5	0	6.7	4.7

Table 4.5 Donor Mobilization by facility type (Percent)

	Service provider			
	MoH	Mission	Private	Total
Facility/hospital	70.3	71.4	60	67.4
Patient/family	38.5	40.5	31.7	36.8
Other	5.5	0	1.7	3.1

Figure 4.10 Units of blood stored by facility type



Source: BTS 2002

Table 4.6 Call up of blood donors by facility type

	Emergency call-up for blood donation			
	MoH	Mission	Private	Total
Registered donor	12.1	11.9	8.3	10.9
Institutional group	70.3	83.3	71.7	73.6
General Call	24.2	4.8	16.7	17.6

Donor Evaluation by facility type

As noted before, donor evaluation through laboratory tests is done in somewhat fewer instances. In MoH facilities, 48.8% of the facilities regularly carry out routine tests (HB, Cell count), compared to 64.3% and 75.5% in private and mission facilities respectively. HBS on the other hand is done by 65.8%, 75.4% and 70.0% of government, private and mission facilities respectively.

Appears like a routine test before donation

Chapter 5 Technical Assessment of Blood

The management of the Blood Transfusion Services in Kenya is committed to ensuring that safe blood and blood products are used for transfusion in the country and that both are free from any contamination. Management vision is to guarantee close to zero risk of transmission of infection or side effects. Realization of this ideal is only as good as the rigor of the screening procedures and precautions taken at every stage of the process. In this section we present and discuss data on procedures carried out and practices designed to minimize the risks in blood use. Specifically we look at the skills of the personnel involved in laboratory processing of blood and the rigor in the testing.

5.1 Technical competence of the personnel

This assessment is limited to the roles different cadres of staff play in the processing of blood in relation to their training and job description. The general assumption is that competent and trained staff in the relevant clinical or laboratory disciplines are deployed in processing of the blood. Pathologists/Hematologists, Laboratory technicians /Technologists, phlebotomists or other specially trained personnel have the specific responsibility of collecting blood from donors and /or receiving the blood for screening. Pathologists/Hematologists, Laboratory Technicians or Technologists, are the only ones responsible for the preparation of the various products in readiness for use or storage. Other personnel may be assigned some of these responsibilities but do so under supervision of technical cadres. What is the extent of the deviation from this norm?

Laboratory Technologists and Technicians are the two cadres of personnel that carry out testing and screening of blood in almost all instances. Laboratory technologists are responsible for this activity in 75.1% of the facilities and technicians carry out testing/screening in 63.7% of the institutions. The relative frequency with which these procedures are carried out by the different cadres within GoK and non GoK facilities are given in table 5.1.

Table 5.1 Types of personnel screening blood (% facilities)

	Technician	Technologist	Other
MoH	72.5	89	1.1
Mission	71.4	66.7	4.8
Private	45	60	0
Total	63.7	75.1	2

5.2 Screening of Blood

The pillar for assuring safe blood at all times is consistent and effective screening of donor blood. The national target is to screen all blood for the specified blood-transmissible conditions. The current guidelines provide for mandatory screening for HIV, Hepatitis B and Syphilis. In selected districts this should include Trypanosomiais. In this study

institutions were asked to indicate the extent and the consistence with which they comply with these requirements.

95.3% of the surveyed facilities ensure that donated blood is screened for HIV at all times. The corresponding figures for Hepatitis B, Hepatitis C, Syphilis and Malaria are 84.5%, 23.8%, 89.6% and 46% respectively.

Other tests done on donor blood include Trypanosomiasis, Brucellosis and Typhoid in 12%, 1.3% and 3.7% of the hospitals.

5.3 Regional / provider variation

HIV Screening
All facilities in Nairobi, Central, Eastern, North Eastern and coast province carry out HIV screening at all times. The frequency with which this is done in most other provinces lies between 83-98%. Western province has the lowest frequency of always done followed by Nyanza province. Table 5.2 gives HIV screening frequencies by province.

Table 5.2 Percent distribution of frequency of HIV Screening in 8 provinces

Province	Frequency of screening
Nairobi	100
Central	100
Eastern	100
North Eastern	100
Coast	100
Rift Valley	97.7
Nyanza	89.7
Western	83.3
Total	95.3

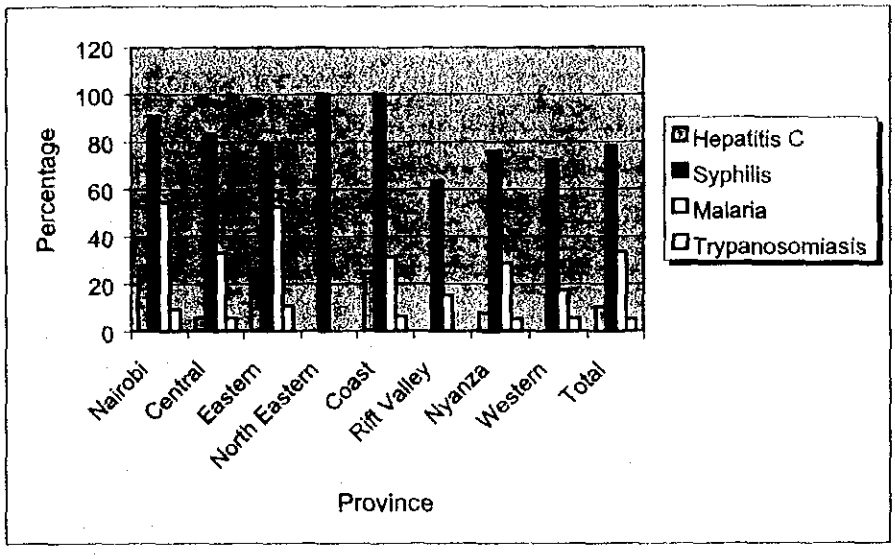
Source: BTS study 2001

Hepatitis B
Hepatitis B is always done in North Eastern and Coast provinces. In Nairobi 90.9% of the facilities and 88.9% in Central provinces carry out Hepatitis B screening all the time. The rest of the provinces reported between 44.4% and 68.4% frequency of testing amongst their facilities. Western province has the lowest testing rate of 44.4%.

Hepatitis C, Syphilis, Malaria and Trypanosomiasis
As shown in figure 5.1 there is probably random screening for Hepatitis C, Malaria and Trypanosomiasis. Syphilis testing is done regularly in all facilities in all provinces. However this is not done by between 10% and 30% of the facilities.

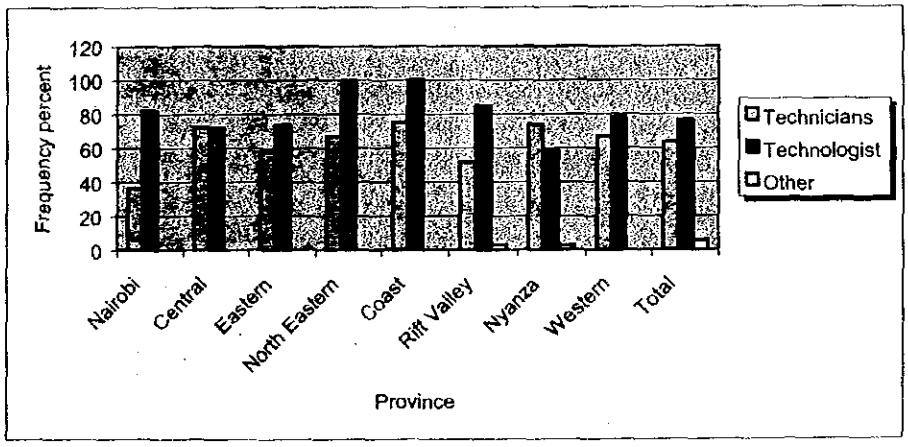
Uniformly, all facilities infrequently test for Hepatitis C, malaria and Trypanosomiasis (less than 50%).

Figure 5.1 Frequency of always screening for other common conditions



The role of different technical personnel in the processing of blood varies within a narrow range of laboratory technicians or technologists. The two cadres carryout close to 100%of the screening of blood. The distribution of these is given in figure 5.2.

Figure 5.2 Personnel screening blood in 8 provinces.



5.4 HIV Kits

Three Principal types of HIV testing kits are used. They are Immunocomb, Abbot and Innotest.

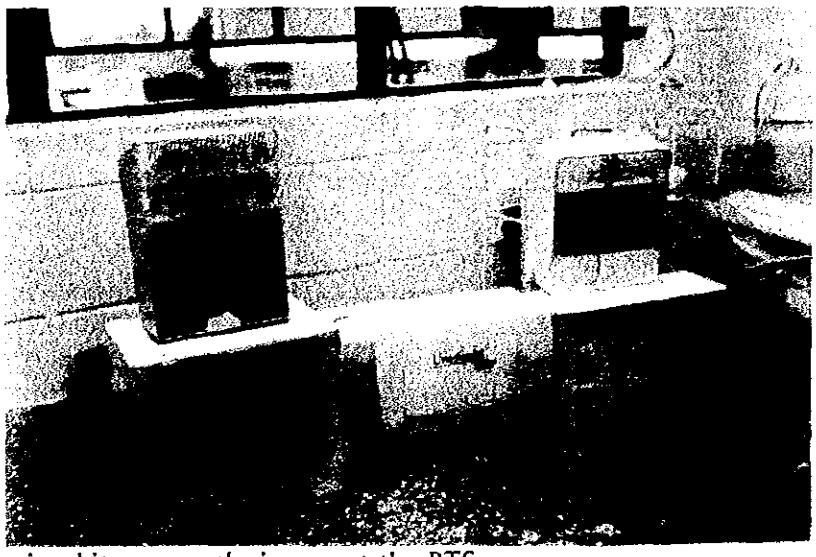
5.5 Type of Anticoagulant

CPD and CPD with additives are the anticoagulants most frequently used by different service providers. The relative frequency is given in table 5.3 below.

Table 5.3 Types of anticoagulants by provider.

	Type of Anticoagulant			
	MoH	Mission	Private	Total
ACD	9.1	15.8	10.4	11
CPD	37.7	47.4	31.3	38
CPD / Additives	48.1	34.2	43.8	43.6

Blood Screening in process at RBTS Nairobi



Types of testing kits currently in use at the BTS