

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF HEALTH
NATIONAL BLOOD BANK SERVICE



BLOOD BANK SERVICE TRANSFORMATION PLAN
2020/2021-2024/25



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NATIONAL BLOOD BANK SERVICE

DECEMBER 2020

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Acronyms

AABB	American Association of Blood Banks
ABO	Blood types A, B, O
ACUB	Appropriate clinical use of blood
AfSBT	African society for blood transfusion
AIDS	Acquired Immuno-Deficiency Syndrome
BBS	Blood Bank Service
BD	Blood donation
BSIS	Blood safety Information System
BTS	Blood Transfusion Services
CDC	Centre for Disease Control and Prevention
CMV	Cytomegalovirus
CRC	Concentrate/packed red cell
CSA	Central statistic agency
EDHS	Ethiopian demographic and health survey
EFY	Ethiopian fiscal year
ELISA	Enzyme Linked Immuno-Sorbent Assay
EQAS	External Quality Assurance Scheme
ERCS	Ethiopian Red Cross Society
FFP	Fresh Frozen Plasma
FMOH	Federal Ministry Of Health
GC	Gregorian calendar
GDP	Gross domestic product
GLP	Good laboratory practices
GMP	Good manufacturing practice
GTP	Growth and transformation plan
Hb	Haemoglobin
HBsAg	Hepatitis B Surface Antigen
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HDI	Human development index
HFBB	Health Facility-Based Blood Bank
HIV	Human Immune Deficiency Virus
HR	Human resource

HRIS	Human resource information system
HSTP	Health sector Transformation Plan
HTC	Hospital transfusion/therapeutic committee
IAT	Indirect Anti Human Globulin Test
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IQC	Internal Quality Control
ISBT	International Society of Blood Transfusion
ISBT	International Society of Blood Transfusion
LQMS	Laboratory Quality Management System
MOH	Ministry Of Health
NBBS	National Blood Bank service
NQAS	National Quality Assurance Scheme
PFSA	Pharmaceutical Fund and Supply Agency
QAS	Quality Assurance System
QIP	Quality improvement Projects
QMS	Quality Management System
RBB	Regional Blood Bank
Rh	Rhesus
RHB	Regional Health Bureau
SDG	Sustainable development goal
SLIMTA	Stepwise Laboratories Quality Improvement process Towards Accreditation
SOP	Standard Operating Procedures
TTIs	Transfusion Transmissible Infections
VNRBD	voluntary non-remunerated blood donors
WHO	World Health Organization

Foreword

Executive Summary

This is the second Blood Bank Service Transformation Plan covering the period between 2013-2017 Ethiopian fiscal years (July 2020 – June 2025). This second transformation plan is developed as the first part of a ten-year blood bank service plan. The preparation of this plan is based on an in-depth situational analysis and performance evaluation of the first transformation plan and considering the country's commitment at global level and based on international and national standards.

The Blood Transfusion Service has contributed to the reduction in maternal, child and infant mortality; and reduced burden of TTIs among blood donors and improved efficiency through increased coverage, thus less referral for transfusions and expenditure involved.

The establishment of the National blood bank service as an independent autonomous federal government institution in 2014 by the Ministers of Council Regulation No.330/2014 was a great opportunity for the blood transfusion service that happened at the beginning of the HSTP I.

The number of blood banks and collection and distribution centers has increased from 25 in 2006 EFY to 43 in 2019. Each covering the need of hospitals within 150 – 200 km radius. Through this service has increased in geographical coverage of the population/ hospitals accessing safe blood services from 65% (HSTP1) to 100 % in the last 5 years. One of the focus areas during the HSTP I was to increase blood donation and the proportion of blood from voluntary non- remunerated blood donors (VNRBD) to 100 % and phase-out family replacement donations. Accordingly, In 2006 EFY out of the total 87685 units collected 70% units were from VNRBD nationally. Whereas, in 2012 EFY 99.5. % of the total 288,966 units collected were from VNRBD. Total units of blood collected per annum increased from 87,685 in 2006 EC to 288,966 in 2012 EFY.

. Post donation counseling service has been started in 6 blood banks in 2007 EFY and currently offered in 25 blood banks for all blood donors as a means of donor retention strategy. Those blood donors found to be reactive for TTIS were linked to health facilities for further treatment and follow up.

The availability of blood components has improved with sixteen blood banks processing blood into blood components in 2012 EFY though there is still a long way to go in increasing the ration of blood component to whole blood transfusion. With regards to this the NBBS converted 64,016 (55%) of its whole blood collection into components. Because of the establishment and implementation of quality management system on blood collection, testing and processing the prevalence of HIV, HBV, HCV and Syphilis among blood donors dropped from 3.5% in 1996 to 0.33% in 2011 EFY, 5.6% in 1996 to 2.05% in 2011 EFY, 5.4% to 0.17%, 2% in 2005

EFY to 0.75% in 2011 EFY respectively. Blood grouping testing is also done on collected blood units as per the blood service SOPs.

The national blood bank service planned to improve rational clinical use of blood by developing ACUB and HTC guidelines and tools for the communication of data between the blood bank and health facilities. In terms of appropriate clinical use of blood, the number of health facilities that organized hospital transfusion/therapeutic committee in budget year has reached 122 (81%) in 2019/2020 from the the planned. Also training of clinicians, nurses, midwives and laboratory technical staff on clinical transfusion has been increased.

In the first Transformation plan the national blood bank planned to increase regular blood collection mobile sites to 1200 in budget year 2019/2020 and achieved 1164 (97%).

These remarkable achievements in blood donation were realized with the concerted team effort and appropriate strategies on Donor mobilization, enhancing community ownership, increase in number of mobile blood collection teams and increase in number of donor clubs.

With regards to Quality management System strengthening; Different standards and guidelines has been developed and adopted as part of the quality management system of the BTS including Quality and safety manual, Blood donor medical assessment guidelines, ACUB guidelines and standard operating procedure covering the activities from the mobilization and collection of blood from donors to the issuing of safe units to health facilities.

External quality assessment the blood service in collaboration with EPHI was able to increase the number of participating laboratories to 25 in 2019 from 1 in 2015. The Blood service also established a National quality assessment scheme with the national quality laboratory preparing assessment samples and enrolling the national and regional blood bank laboratories in the scheme as per WHO guidelines. So far, a total of 6 round of the NQAS samples were sent and the response rate is 75%.

The national center has been working towards attaining accreditation by the African Society for Blood transfusion (AfSBT), a regional body working on improving blood safety and accreditation of blood banks operating across the continent. Thus, the national center was granted certification at step 2 of the AfSBT accreditation scheme by the AfSBT board.

Regarding Information management system currently the national blood bank service designed National systems for standardized data collection and reporting encompassing all activities from blood donation to distribution to hospitals, issuing to patients and the recording of transfusions of blood and blood components to patients. The NBBS has been implemented and is using a Blood Safety Information (BSIS) in the national center since August 2017. The BSIS has greatly improved the service due to its ability to Support the AfSBT Certification and

Accreditation process by providing key information that is accurate, timely and complete. The Blood Service has also been strengthened with the recruitment and training of the workforce for all the blood banks in all the areas of the service. Nationally there were around 2803 staffs in the 43 blood banks and blood collection centers across the country by 2019.

A dedicated budget for national blood donor and national blood services is very crucial. Accordingly, Ethiopian government allocated 81,947,583.75 birr to the central blood bank service and the service utilized more than 95% of the allocated budget. In addition, ministry of health dedicated budget from sustainable development and goal pool fund. Though to a varying level the regional governments also allocate budgets to their respective blood banks from treasury. The blood bank with WHO has also conducted a study into the cost of a blood unit in the country.

The other important issue to give safe and adequate blood and blood product service to patients is standardized infrastructure and supply chain management system. Accordingly, the national blood bank service was provided with facilities and infrastructure that have been adequately planned and constructed with respect to requirements for space, design, utilities and waste disposal with support of development partners. Also when it comes to Logistics and supply systems the start of a framework agreement for blood bags and testing kits suppliers for three years in collaboration with EPSA was a great success in greatly reducing stockouts.

Blood bank service transformation plan-II was developed building upon the successes and challenges as well as making an in-depth situational analysis and performance evaluation of the first Transformation plan, and in consideration of the health ministry commitment to blood service. Led by the National blood bank service, the plan development process was participatory with the inclusion of representatives from various regional blood bank services and development partners particularly WHO.

The goal of this Transformation plan is to improve the availability, safety and accessibility of blood and blood products in order to reduce mortality and morbidity in the Ethiopia

The plan has set targets to measure its objectives and target setting was done by considering baseline, national and international standards and anticipated resources. The plan sets targets including Increase percentage of blood collected from voluntary blood donors from 99.4% in 2019 to 100% (2024) , Increase proportion of blood banks with component production service from 50% in 2019 to 75%(2024) , Increase number of blood banks fulfilling AfSBT step 3 standards from 0 in 2019 to 1 (2024), Increase proportion of mini blood banks fulfilling criteria from 79.7% in 2019 to 90% (2024), and the list of all indicators with the corresponding targets is presented in the “Targets” section.

To achieve the targets, a list of 9 Transformation directions is identified and each is described along with their major activities:

1. Enhance the provision of equitable and quality of blood service
2. Enhance Communication, Mobilization and Community Ownership
3. Improve logistics and supply chain management system
4. Improve human resource management
5. Improve Evidence based Decision-Making
6. Improve Blood Bank infrastructure
7. Improve blood bank leadership and governance
8. Enhance Blood Bank financing
9. Enhance partner engagement in the service

The blood bank Transformation plan shares Health Sector Transformation Plan -II five transformation agenda identified by ministry of health and customized to its sector. The customized transformation agenda of the BTS are identified within HSTP-II include:

1. Transformation in equity and quality of health service delivery – which refers to ensuring delivery of quality blood and blood product services, engaging the community in service delivery and consistently improving the outcome of clinical care ensuring universal coverage
2. Information revolution – which refers to the improvement on the methods and practice of collecting, analyzing, presenting, using and disseminating information that can influence decisions;
3. Transformation in blood bank service Workforce: - that aims at ensuring the availability of adequate workforce that are Motivated, Competent and compassionate to provide quality BTS
4. Transformation in health financing – which is about reforming the financing system.
5. Transformation in leadership – which deals with enhancing the leadership and governance system at all levels to drive attainment of the national Transformation objectives through improving aligning and harmonizing efforts, creating enabling environment to translate the plan to results and enhancing effective utilization of resources

The overall costing for blood bank service transformation plan-II implementation should be supported by the required resources. Given the complexity and volume of the operations of the blood bank an estimated total amount of USD 171,062,596.74 million will be required for implementation of the Transformation plan for the coming 5 years.

The plan will be cascaded to all levels and will be translated into annual operational plans. Its implementation will be regularly monitored using the agreed monitoring framework in a coordinated manner.

Chapter One: Introduction

Background

The National Blood bank is an autonomous agency under the ministry of Health of Ethiopia. The NBBS has been mandated to ensure the availability of safe and adequate blood to all in need in the country. The first blood service transformation/Strategic plan (BBTP-I) was developed in line with the first health sector transformation plan (HSTP-I). The performance of BBTP-I has been reviewed critically using its annual performance reviews, ad hoc assessments, the Joint steering meetings and onsite assessments to blood banks and health facilities. The BBTP_I review showed that the country has made tremendous achievements to full fill the demand of health facilities to safe and adequate blood and blood components.(Chapter 3) The Second Blood Bank Transformation Plan (BBTP II), covers the period between 2013-2017 Ethiopian fiscal years (July 2020 – June 2025 GC). In this Transformation period, the sector envisions to build on successes and consolidate the gains of the BBTP-I. As such, the preparation of BBTP-II was based on an in-depth situational analysis and understanding of the BBTP-I performance, and in line with HSTP II. Global, continental and national standards especially World Health Organization and African Society for blood Transfusion standards (AfSBT), for safe and quality blood transfusion service have been taken into consideration during the development of this plan.

The development of this plan paid particular attention to participatory process spearheaded by the NBBS and RBBs.

- A technical Working group was formed to from national and regional blood banks and partners
- The NBBS first identified the long-term Transformation goals of the sector with consultation of ministry of health and with the development partners particularly WHO.
- The objectives and Transformation directions were developed based on the situational analysis and performance of the BBTP_I and direction of ministry of health through HSTP II.
- Baselines and targets were set based on performance of the BBTP-I.
- Various Consultation workshops conducted through the different stages of development of the plan

Country profile

Ethiopia is located in the North Eastern part of Africa, also known as the Horn of Africa. It is bordered by Sudan and South Sudan on the west, Eritrea and Djibouti on the northeast, Somalia on the East and Southeast, and Kenya on the south. Ethiopia lies between the Equator and Tropic of Cancer, between the 30°N and 15°N Latitude and 33°E and 48°E Longitude.

The country occupies an area of 1.1 million square kilometres and the water bodies occupy 7,444 sq. km. Ethiopia is a country with rich geographical diversity. It consists of rugged mountains, flat-topped plateaus, deep gorges and river valleys. Its erosion, volcanic eruptions and tectonic movements over the ages have contributed to the nation's diverse topography. More than half of the geographic area of the country lies above 1,500 m. The highest altitude is at Ras Dashen (4,620 m above sea level) and the lowest altitude is at Danakil (Dallol) Depression (148 m below sea level).

With a population of about 101 million in 2020, Ethiopia is the second most populous country of Africa next to Nigeria and ranks 12th in the world. The country's population grew from about 18 million in 1950 to 40 million in 1984, and from 54 million in 1994 to 74 million in 2007. Ethiopia is the home to various ethnicities, with more than 80 different spoken languages. The population is characterized by rapid population growth (2.6%), young age structure and a high dependency ratio with a high rural-urban differential. Ethiopia has the highest total fertility rate of 4.6 births per woman (2.3 in urban areas and 5.2 in rural areas) and a corresponding crude birth rate of 32 per 1000 in 2016. The average household size is 4.6. According to the 2007 population and housing census, the population of the country is projected at 109.5 million by 2024 (CSA projection). If it follows its current rate of growth, the population will reach 122.3 million by 2030.

The age distribution of the population has children under age 15 accounted for 47% of the population and the age group of 15 and 65 years accounted for 49%, individuals aged 65 and older accounted for only 4% of the total population. While the sex ratio between male and females is almost equal, women of productive age constitute about 23% of the population. The population is predominantly rural with nearly 80% living in rural areas mainly based on subsistence agriculture. (EDHS 2016; CSA).

Ethiopia is classified by the World Bank as a low-income country with gross domestic product (GDP) per capita (current US\$) of 772 USD in 2018 up from about US\$340 in 2010. The country has been one of

the fastest growing economies in Africa, experiencing rapid economic growth with an average of about 10% annual growth rate between 2004 and 2014. (World Bank year of report)

Ethiopia has made huge progress towards the attainment of the Development Goals (SDG), particularly in hunger, gender parity in primary education, child mortality, HIV/AIDS, and malaria. Between 2016 and 2020, Ethiopia's HDI (Human development Index) value increased from 0.283 to 0.463, an increase of 63.5 percent still it shows below the average of 0.504.

Ethiopia is engaged in rapid and comprehensive development activities to transition from poverty to sustainable and reliable growth and prosperity. The country has registered commendable achievements on Millennium Development Goals (MDGs) mainly in reducing poverty head count, achieving universal primary education, narrowing gender disparities in primary education, reducing child and neonatal mortality, combating HIV, TB and malaria.

Encouraging improvements in life expectancy at birth are among the achievements recorded in HSTP-I period. The reduction in maternal mortality is also notable, as it went down from 676 deaths per 100,000 in 2011 to 401 in 2017. Under-5 mortality and infant mortality per 1000 live births has also reduced from 123 and 77 in 2005 to 59 and 47 in 2019, respectively. Dramatic decline has occurred in morbidity and mortality from common communicable diseases including malaria, HIV, TB and vaccine preventable diseases.

Blood Transfusion Service in Ethiopia

Blood transfusion therapy is an essential component of the practice of modern medicine. Safe and adequate supply of blood is needed to save lives because blood is often the only means of survival in certain medical conditions. It has been known for centuries that blood transfusion can have serious and fatal consequences if it is not practiced within set norms and standards. Mindful of this fact, WHO has adopted several resolutions urging Member States to organize their blood services in a manner that will minimize the attendant risks while ensuring adequate and safe blood supplies for their populations. However, like all treatments, blood transfusion may result in acute or delayed complications and carries the risk of transfusion-transmitted infections, including HIV, hepatitis viruses (hepatitis B and C viruses), and syphilis.

Blood Bank service in Ethiopia was established in 1969 GC by Ethiopian Red Cross Society at Addis Ababa. The service was being given through its 12 regional blood banks covering the requirement of 52% the hospitals in the country. In April 2012 GC, The Federal Ministry of Health (MOH) made a policy decision to revert the responsibility for from the Ethiopia Red Cross Society (ERCS) to a Government-owned and managed service under the MOH and the Regional blood banks to Regional health bureaus through a transition strategy and plan developed and supported by WHO. This was in a bid to improve efficiency, place the Blood Bank Service (BBS) under the mainstream health care delivery system and effectively manage the 25 functional blood banks (one Central Blood Bank located in Addis Ababa and 24 in regions) at that time. Since then, additional 17 blood collection centers have been established, each of these have at least one mobile and one center blood collection teams.

Based on the WHO strategies and recommendations, many national blood transfusion services established as agencies of the ministries of health developed into successful programs. Our development as part of health system strengthening within the context of the implementation of the 2008 Ouagadougou Declaration on Primary Health Care may be one way to ensure the consolidation and sustainability of, and universal access to, safe blood transfusion in our country. So, to improve the transfusion services and ensure accessibility of blood and blood products in the country, NBBS was established as independent autonomous federal government institution in 2014 by the Ministers of Council Regulation No.330/2014. Under this regulation, One of the mandates of the NBBS is to assure the availability of safe blood and blood products at the national level. (*National Blood Bank Service Establishment Council of Ministers Regulation No.330/2014*).

The National and Regional Blood Banks have been working tirelessly to contribute towards the achievement of HSTP_I through supplying adequate and safe blood and blood products to health facilities to mitigate various health related challenges (e.g., reduction of maternal and child mortality and anemia) and ensuring universal

health coverage. Testing which was not universal for all the WHO recommended disease markers (HIV, hepatitis B and C as well as Syphilis) had improved to cover 100% of all donations by 2008. Community involvement and ownership improved resulting not only in establishment of many community-based blood donor clubs but also involvement of community leaders including parliamentarians and celebrities as blood donors as well as advocates for blood services with the resultant increase in voluntary blood donation.

In the year 2019/20 total collected blood was 288,966 units which is 0.28 % of the required 1% of the total population of these 99.5% were from voluntary non-remunerated blood donors. An estimated Shortfall of around 711,034 from the 1 million collection as per WHO estimate, which is significant and requires a lot of effort to achieve.

To build and strengthen the blood service in the country focus has been given to achieve the World Health Organization blood safety strategy as stated below

- 🔥 Establishment of a well-organized, nationally-coordinated blood transfusion service that can provide adequate and timely supplies of safe blood for all patients in need
- 🔥 The collection of blood only from voluntary non-remunerated blood donors from low-risk populations
- 🔥 Testing of all donated blood for transfusion-transmissible infections per WHO recommendations, blood grouping, compatibility testing and component production
- 🔥 The appropriate clinical use of blood, including the use of alternatives to transfusion wherever possible, and the safe administration of blood and blood products
- 🔥 Quality system covering all stages of the transfusion process.

Chapter TWO: Performance of Blood Bank Transformation Plan I Situational Analysis

The Blood Transfusion Service has contributed to the reduction in maternal, child and infant mortality; and reduced burden of TTIs among blood donors and improved efficiency through increased coverage, thus less referral for transfusions and expenditure involved. The BBTP I for The National Blood Transfusion Services provided a clear guidance on where the blood bank service plans to reach by 2020. Hence, critical review of lesson learned from BBTP-I is crucial to be used as a basis for the next 5-year plan. The blood transfusion service performance is analyzed and depicted in the following sub units based on the building blocks of an effective blood transfusion service.

2.1 Leadership, National coordination and organization of BTS

Leadership and governance

The establishment of the National blood bank service as an independent autonomous federal government institution in 2014 by the Ministers of Council Regulation No.330/2014 was a great opportunity for the blood transfusion service that happened at the beginning of the HSTP I. The BBTP-I plan was developed and implemented which was instrumental in guiding the strengthening of a nationally coordinated blood system in Ethiopia.

Access to Blood Bank Service

The number of blood banks and collection centers has increased from 25 in 2006 EFY to 43 in 2019. [Annex D]; Each covering the need of hospitals within -150-200 km radius. These consist of full fledged Blood banks that carry out operation from donors' mobilization to testing and distribution to health facilities. The rest of the sites are blood collection centers focusing on the mobilization and recruitment and collection of blood from voluntary blood donors and which have been networked with their nearest blood banks for testing.

Through this service has increased in geographical coverage of the population/ hospitals accessing safe blood services from 65% (HSTP1) to 100 % in the last 5 years. Also the national blood bank service center was provided with facilities and infrastructure that have been adequately planned and constructed with respect to requirements for space, design, utilities and waste disposal with support of development partners. Through a network of the blood bank sites across the county, safe blood and blood products have been made available to 420 both government and private health facilities.

Though most of the expansions in the physical infrastructure of blood bank and blood collection centers have been critical in addressing the accessibility issues, it has also brought with it a challenge for the blood service. One of the recommendations for national blood systems by the WHO is the establishment of an efficient, cost-

effective organizational structure for blood transfusion services with an optimal level of centralization or consolidation of critical activities. But the location of some of the sites in regions has created unnecessary redundancy and competition among sites for blood donors pool and creating new testing sites leading to wastage of resources.

National Coordination

The national blood service has also been strengthened with much needed documents and national standards to consolidate the national coordination of the blood transfusion system. There is also a joint steering committee with regional blood banks to ensure coordination. Despite this there are still shortcomings to improve the national coordination and organization between the national center, regional health bureau and regional blood banks. There is a lack of clear guidance on the setup of the BTS in country outlining the organization and technical communication structure between stakeholders compounded by devolution of health services to the regional health bureaus. The BTS is facing a threat of horizontal fragmentation and weakening of the national coordination, with demand from communities and regional health bureaus for the expansion of the service specifically increasing the number of standalone blood banks.

Therefore, due attention will be given in this transformation plan to finalize and implement the national blood policy and proclamation to re-establish the service. A National advisory committee for blood transfusion services will be established. A regulatory mechanism for the registration, licensing, operation and inspection of the blood transfusion service will also be considered. Even though, there was joint steering committee platform, it was not guided by agreed guideline and there is challenge of coordination and collaboration among different stakeholders. Therefore, strengthening the joint steering committee with appropriate guideline and coordination mechanism with regional health bureaus will also be considered to strengthen collaboration.

Information management system

The National Blood bank service identified that one of the main areas to be addressed for improving the quality of service in HSTP I was to implement a Blood Establishment Computer system (BECS). Thus, the NBBS in consultation with FMOH, WHO, Information Network Security Agency of Ethiopia (INSA), South African National Blood Service (SANBS) and Center for disease control (CDC Atlanta and Ethiopia) decided to work with Jembi Health system NPC, based in South Africa, who were already in the process of developing a Blood Safety Information System (BSIS) for African Blood Banks in collaboration with the CDC.

The NBBS has been using the BSIS in the national center since August 2017. This came after the NBBS have carried out the Installation, Operational and Performance Qualification validations on the setup and the results

were acceptable. Competency assessment tests were administered to the staff using the systems to ensure its proper use.

The main benefits of the BSIS are its ability to Supports the AfSBT Certification and Accreditation process by providing key information that is accurate, timely and complete. It also Ensures the safety of donor and donations and Automated blocking of unsafe components. The system also Provides full traceability of donors and donations throughout the core blood service process value chain with features that also Provides Security and Confidentiality by ensuring strict access control to confidential data. Finally, the system is Configurable to meet blood service needs by system-administrator defined parameters.

But the system was not expanded to all regional blood banks and health facilities as a result getting data easily from regions is difficult. The NBBS has been able in further customizing the system to add more features that address some of the needs of the blood service in the country and to make it suitable to implement in regional blood banks. In line with this, expansion of the system to regions will be one of the top priorities in this transformation plan period.

Human Resource

The BTS has been strengthened with the recruitment and training of the workforce for all the blood banks in all the areas of the service from blood donor mobilization, recruitment, testing and component production to distribution and issue. Gradual decline in number of trained technical staff in some regions with a high turnover at blood banks that resulted from absence of retention and motivation systems.

Training for physicians, nurses and laboratory professionals on appropriate clinical use of blood, safe bedside practices and proper handling and storage of blood have been strengthened to ensure blood safety at the clinical interface. Considering this fact, the national blood bank service designed and approved by relevant body an organizational structure that allowed 339 human resources at central level. Of the allowed human resource 231 (68.1%) was full filled. There were 43 blood banks and blood collection centers at regional level with their own organizational structures and human resources, with around 2803 staff currently working across the blood services.

Even though, there were improvements in human resource management and development in transfusion service there are many issues that need improvement. There is a general shortage of trained specialized staff in blood transfusions services, together with a lack of opportunities for professional development and inadequate staff retention strategies and remuneration. Coordination in the teaching curricula between the ministry of health and ministry of education requires significant improvement to include subjects matters on blood transfusion science. There is no undergraduate and postgraduate educational and training programme in transfusion medicine in place

in the country. Therefore, addressing these issues with the intensive capacity building including short term and long-term trainings in transfusion medicine will be focused on the next Transformation plan period.

Finance

One of the objectives of the BBSP_I was ensuring the sustainability of the blood service by devising means to address implementations specially through increasing government budget allocation to the service. Through the years, the budget allocated from the government has shown increase with 81,947,583.75 birr to the central blood bank service in 2019/20 and the service utilized more than 95% of the allocated budget. In addition, ministry of health dedicated \$ 2,500,000 USD budget from sustainable development goal pool fund (SDG) and the organization utilized more than 65% of it. Though to a varying level the regional governments also allocate budgets to their respective blood banks from treasury.

When compared to the overall expenditure of the health service in the country the above report indicates that financing of blood transfusion services is still given low priority and many regions report a lack of adequate, sustainable and specific funding by government and development partners have decreased interest in supporting blood bank services. Difficulties in blood collection, processing and testing, follow up ACUB, monitoring and evaluation becoming important bottlenecks to blood transfusion service delivery system due to gradually decreased and finally absence of financial and other support from developmental partners. Especially during the second half of the first transformation the cessation of funding form PEPFAR through the CDC, which was instrumental in its support to the expansion of the blood service both in scope and service previously was big challenge. Also, there is lack of standardization of budget allocation to blood transfusion services across regions and blood banks making it sometimes difficult to carry out activities as planned and often compromising standards of practice.

Therefore, advocacy in area of budgeting to government and development partners and fund-raising programs shall be sought. In addition, cost recovery mechanism to every blood unit service should be designed and implemented in the Transformation plan period. The blood bank with WHO has conducted a study into the cost of a blood unit in the country. This study will further behave followed up with assessments to explore options, to put in place evidences, to policy makers to have a cost recovery mechanism in place.

Logistics and supply system

A standardized Inventory and supply chain management system is one of the components to ensure access of safe and adequate blood and blood product service to patients. The service was also dedicated to maintaining essential medical equipment and supply without stock out. One of the achievements in BBTP-I were the framework agreement with blood bags and testing kits suppliers for three years in collaboration with EPSA.

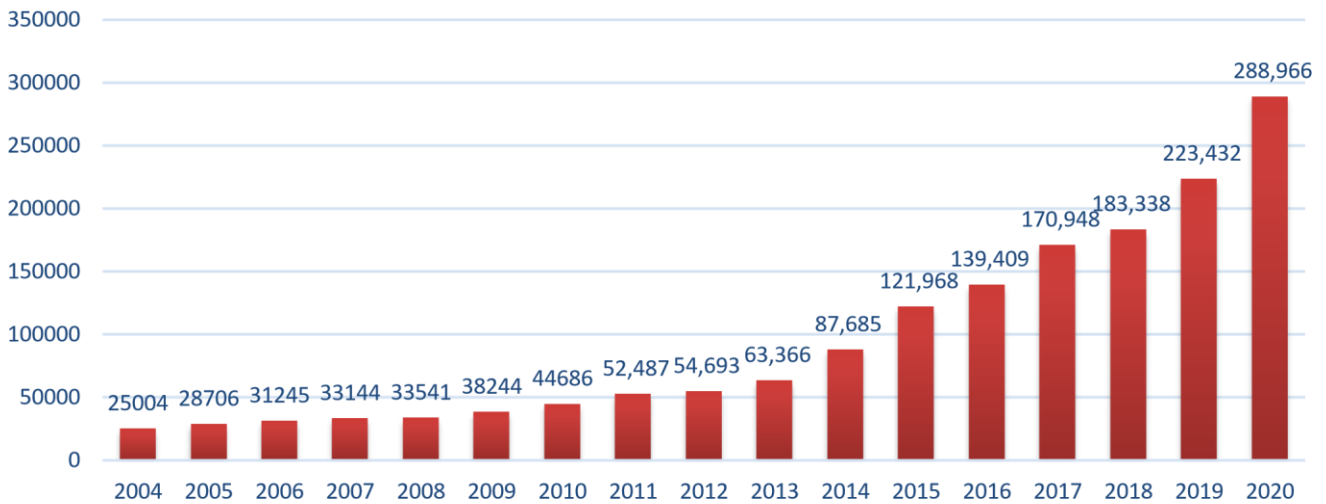
But there is still shortage in adequacy of equipment in many of the regions to maintain the required quality in Blood collection, Testing and Processing. Maintenance of equipment in line with good manufacturing practice (GMP) requirements is still critical problem as well. And there is still difficult to supply blood for hard-to-reach areas/remote hospitals through the blood bank supply /logistics system.

Therefore, in the transformation plan period focus will be given on further strengthening the supply chain management system and building equipment maintenance centers and also support will be provided for hospital mini blood banks to be equipped per minimum standard. Moreover, national or central blood product inventory management system will be strengthened to ensure improved supply chain management and to allow for the smooth movement of blood units between blood banks and health facilities.

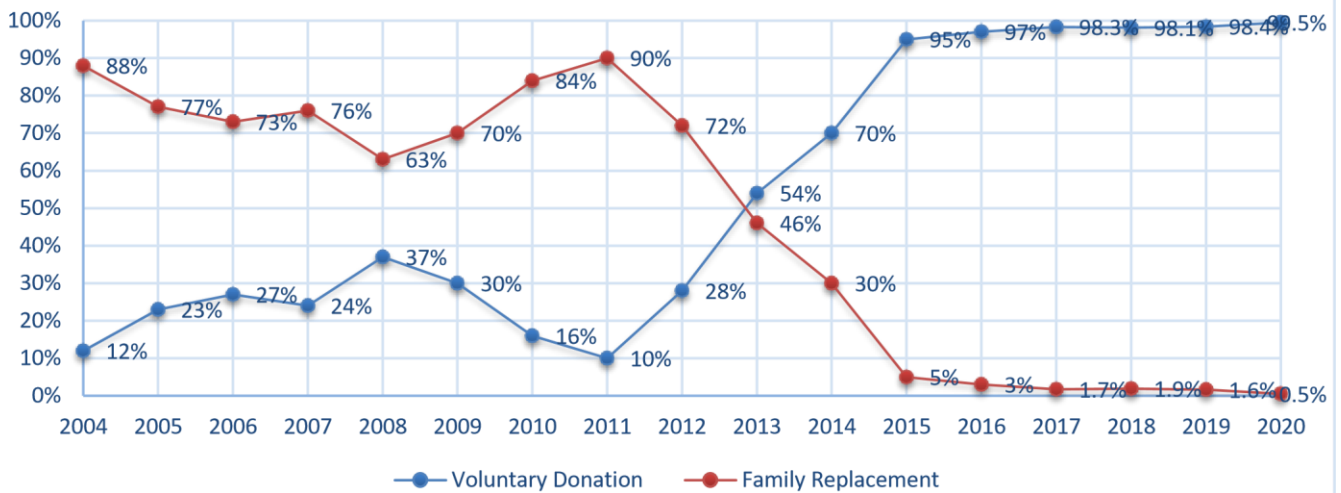
2.2 Blood Collection Status

Ethiopia was one of the countries who pledged to move towards 100 % voluntary blood donation, during the Melbourne declaration in 2009. Thus, one of the focus areas during the HSTP I was to increase the proportion of blood from voluntary non-remunerated blood donors (VNRBD) to 100 % and phase-out family replacement donors. In 2006 EFY out of the total 87685 units collected 70% units were from VNRBD nationally. Whereas, in 2012 EFY 99.5. % of the total 288,966 units collected were from VNRBD. Total units of blood collected per annum increased from 87,685 in 2006 EC to 288,966 in 2012 EFY; which is 0.28 % of the required 1% of the total population which indicated an estimated Shortfall of around 711,034 units from the 1 million collection as per WHO estimate, which is significant and requires a lot of effort to achieve.

National Blood Bank service ethiopia Whole Blood Collection Trend



National Blood Bank Service Ethiopia Voluntary Vs Family Replacement Donation Trend



These remarkable achievements in blood donation were realized with the concerted team effort and appropriate strategies on Donor mobilization, enhancing community ownership, increase in number of mobile blood collection teams and increase in number of donor clubs.

Blood donation is considered as a typical altruistic behavior and hence recruitment/retention campaigns give emphasis to altruism. Improving the level of knowledge and hastening the development of positive attitude towards VNRBD in the society has been the goal in designing an efficient strategy for sustaining a safe and adequate blood provision. The national blood bank was creating awareness of community through mainstream mass Medias and social media platform, Media release, announcements and printing materials as well as major social mobilization events were planned and implemented. There were also many forums conducted with religious and community leaders and media personnel to increase awareness of community towards voluntary non- remunerated blood donations. As a result, 99.5% of blood collections were from voluntary donors in 2019/20.

The demand of health facilities for safe and adequate blood and blood products cannot be met by collecting blood at fixed sites alone. Therefore, one of the directions taken was increasing the number and capacity of mobile blood collection teams. So, the national blood bank planned to increase regular blood collection mobile sites to 1200 in budget year 2019/2020 and achieved 1164 (97%). Sixty blood donors clubs were organized this year and the work is being done to increase the number of regular repeat donor clubs. For these activities the national blood bank at Centre level organized ten mobile teams and there are a total of 40 collection teams across all regional blood banks currently.

Even though the awareness of community towards blood donation is increasing, the blood and blood product demand is still very high. Therefore, awareness creation activity will be strategically considered and implemented in the coming transformation plan periods.

Donor counseling service

Blood transfusion services have a duty of care towards blood donors as well as to the recipients of transfusion. Thus, it has a responsibility to confirm test results and provide information, counselling and support to enable blood donors to understand and respond to unexpected information about their health or risk status. The NBBS has included counselling as part of the spectrum of care to provide to blood donors, including referral linkages.

Pre-donation counselling which is recognized as one element of the strategy to reduce the donation of blood by individuals who might be at risk for HIV and other TTI, including hepatitis B and C viruses, was scaled up to all blood banks in the country with the development, review and implementation of a well-structured donor health history questionnaire. And the pre-donation counseling service was strengthened with the development of a blood donor medical assessment guideline and related SOPs to inform donors of the donation process and testing of blood.

Post-donation counselling is also acknowledged to be a necessary element of donor management as an adjunct to informing donors of unusual or abnormal test results. Post donation counseling was started in 6 blood banks in 2007 EFY and currently it has been expanded and is offered in 17 blood banks for all blood donors as a means of donor retention strategy. Those blood donors found to be reactive for TTIs were linked to health facilities for further treatment and follow up. This helps the system to improve donor retention and to decrease the burden of TTIs among blood donors which has direct implication on the provision of safe blood. The challenge to the post donation counseling service has been a weak referral and linkage systems of reactive/positive donors for TTIs with limited support for some of the diseases.

More work will be done in this Transformation plan to scale up the post donation counseling service to all blood services in the country and to find innovative solution to make test results available to our blood donors.

2.3 Testing and Processing of blood

As health systems develop and become able to offer a wider range of diagnostic and treatment options, component therapy becomes increasingly important for the clinical management of patients. As the health service in our country is growing both in scope and coverage the availability of blood components for transfusion rather than whole blood will be critical. Though the collection and processing of blood units into components have seen improvement over the years there is still a big challenge. In 2019 the NBBS converted 64,016 units into blood components which is more than 55 % from the collection in the center. The component production in regional blood banks has seen increase especially when related to the number of sites which are now able to produce blood components.

From this a lot needs to be done when it comes to blood components production. Also, the capacity of the regional blood banks to produce more blood components needs to be strengthened hand in hand with the promotion of blood component usage at the clinical interface.

The Screening of Blood for Transfusion Transmissible infections is one of the critical activities of a blood service. All the blood banks in our country currently conduct TTIs Testing for HIV, HBV, HCV and Syphilis as per WHO recommendations. And hundred percent of the tests are conducted using ELISA Techniques. Because of the establishment and implementation of quality management system on blood collection, testing and processing the prevalence of HIV, HBV, HCV and Syphilis among blood donors dropped. from 3.5% to 0.33% in 2011 EFY, 5.6% in 1996 to 2.05% in 2011 EFY, 5.4% to 0.17%, 2% in 2005 EFY to 0.75% in 2011 EFY respectively. Blood grouping testing is also done on collected blood units as per the blood service SOPs.

The main challenges in the blood bank laboratory have been Inadequate space for some activities and storage for blood in some blood banks with layout that is not compliant with GMP and lack of implementation of up-to-date component processing and testing technologies and automation

Going forward emphasis shall be given to finalize the procurement of Automated testing platforms for TTIs and Blood Grouping. Also, consolidation of Testing and Blood Processing sites shall be considered to increase the efficiency and quality of laboratory testing. Strengthening the blood bank laboratory with updated testing technologies to make it a national reference center for testing related to blood transfusion shall also be given focus.

2.4 Clinical Interface and Appropriate Clinical use of Blood

Appropriate clinical use of blood is an important aspect of blood safety. It reduces unnecessary exposure of patients to allogeneic blood with its attendant risks while ensuring judicious utilization of a scarce resource. Accordingly, the national blood bank service planned to improve rational clinical use of blood by developing ACUB and HTC guidelines and tools for the communication of data between the blood bank and health facilities. The blood service also supported in the organization of hospital transfusion committee and training hospital staff and started implementing a hemovigilance systems. The number of health facilities that organized hospital transfusion/therapeutic committee in budget year 2019/2020 were 122 (81%) of the planned. This shows that, there is Significant gaps in the appropriate clinical use of blood and inappropriate storage of blood in hospitals. Also, communication is weak between the blood services, hospital blood banks and hospitals/clinicians (clinical interface), and there are shortcomings in appropriate clinical use of blood and blood products, safe transfusion practice at the bedside, and patient monitoring and follow-up. Therefore, training of clinicians, nurses, midwives and laboratory technical staff on clinical transfusion should be strengthened.

In this Transformation plan emphasis shall be given to ensure the functionality of existing hospital transfusion committees and ensuring their formation in all the health facilities that use blood. Further efforts should be directed towards educating and training health workers working on blood transfusion and support the system to monitor the clinical use of blood and products and transfusion practices and promotion of patient blood management concepts. The hemovigilance system, which includes efforts to monitor and evaluate adverse events associated with the blood supply and transfusion service and to use the findings to improve blood safety and transfusion outcomes, should be strengthened and scaled up to include regional blood banks and health facilities.

2.5 Quality Management system

The blood transfusion service has focused on the development of an effective quality system in the BBTP I. This is to ensure activities are established, performed in a quality-focused way and continuously monitored to improve outcomes. Thus, different standards and guidelines has been developed and adopted as part of the quality management system of the BTS. These include Quality and safety manual, Blood donor medical assessment guidelines, ACUB guidelines and standard operating procedure covering the activities from the mobilization and collection of blood from donors to the issuing of safe units to health facilities. Quality officers and Staff from all blood bank in the country have been trained on them and are used by the blood banks across the country.

The other focus area was the strengthening of the capacity of the testing laboratory by the establishment of internal and external quality assurance assessment schemes. With regards to External quality assessment the blood service in collaboration with EPHI was able to increase the number of participating laboratories to 25 in 2019 from 1 in 2015. The Blood service also established a National quality assessment scheme with the national quality laboratory preparing assessment samples and enrolling the national and regional blood bank laboratories in the scheme as per WHO guidelines. So far, a total of 6 round of the NQAS samples were sent and the response rate is 75%.

The National Blood Bank Service also has been working towards improving its quality management system to the level of accreditation. Thus, the national center has been working towards attaining accreditation by the African Society for Blood transfusion (AfSBT), a regional body working on improving blood safety and accreditation of blood banks operating across the continent. In collaboration with WHO Ethiopia, South African National Blood Service and CDC many activities have been done. After a series of onsite assessments, and addressing all the gaps identified, the national center was granted certification at step 2 of the AfSBT accreditation scheme by the AfSBT board. This is a huge achievement and it will be scaled up to include all regional blood banks in a stepwise manner and the NBBS will aim for full accreditation in the coming years.

The main challenges in the QMS are lack of strict adherence to standards and SOP by some staff and absence of dedicated quality officers in some regional blood bank. There is also a gap in the availability of equipment to carry out quality control testing of blood and blood products.

The achievement of the national center, of level two accreditation, presents a great opportunity to consolidate the gains made so far regarding the establishment of a strong QMS and it will be used as a stepping stone to support the regional blood banks in the country.

2.6 SWOT Analysis

For the preparation of this Transformation plan, SWOT analysis was used to identify and determine the most influential factors during the BBSP-I implementation period. The aim of the SWOT analysis is to properly identify and define all the factors that influence the working condition of the Blood Transfusion services in the country.

Strengths	Weaknesses
<ul style="list-style-type: none"> • The national center has received step two certification by the AFSBT • Clear national plan on blood bank services • National blood bank established as an autonomous agency • Increase in the number of blood collection and distribution centers • Recruitment and training of staffs for the increasing number of sites and collections at • Efficient financial utilization • Three years frame work agreement reached with suppliers to minimize stock outage • More efficient distribution of kits and blood bags through EPSA hubs has been started • National specification and forecast for the coming three years done • A blood Safety information system implemented in the NBBS • The beginning of online registration system of blood donors • Increase number of voluntary non-remunerated blood donors • Improved Effectiveness with limited human resource 	<ul style="list-style-type: none"> • Absence of blood regulatory system to control blood banks (Proclamation and policy) • Low collection rates per 1000 of the population due to inadequate number of voluntary blood Donors • Blood collection has not met the demand of the country • Low donor retention mechanism • Challenges in national coordination with regions • Lack of expanded post donation counseling service • Poor referral systems for donors reactive/positive for TTIs with limited support for some of the diseases. • Poor quality control system performance in blood transfusion service • Poor implementation of ACUB in transfusing health facilities • Inadequate production of blood components among blood component producing blood banks • Absence of holistic national equipment maintenance center • All blood bank facilities are not GMP (Good manufacturing practice) compliant • Inappropriate handling of blood in some blood banks • Inadequate focus on implementing up-to-date component processing and testing technologies including automation • Inadequate number of staff in some regions and absence of retention mechanism • There is no human resource development strategy and clear structure • Lack of career development pathways in the Blood bank service • Lack of blood management information system throughout regional blood banks in BTS • High rate of trained (skilled) staff turnover • Inadequate utilization of media
Opportunities	Threats

<ul style="list-style-type: none"> • Existence of HSTP • New center of excellence building constructed for the national center • Strong governmental commitment to blood transfusion services • Increased awareness in the community about blood donation • Increased support from and ownership of the service by the community • Some improvements in the procurement system such as the initiation of placement/reagent agreement procurement by EPSA • Availability of state-of-the-art automated testing platforms on equipment placement basis (reagent agreement plans) • Costing of blood transfusion service being carried out • Blood bank mapping and networking program started 	<ul style="list-style-type: none"> • Low number of regular blood donors • Significant gaps at the clinical interface including shortfalls in appropriate clinical use of blood • Blood banks not being established based on geographical proximity but being affected by political boundaries preventing the use of blood as a national resource • Inadequate budget allocation from government and some regions in particular • Horizontal fragmentation of the service through establishment of standalone blood banks (communities and regional health bureaus focusing on expansion through construction of blood banks). • Unavailability of standardized mini blood bank at transfusing health facilities • Decline and absence of financial and other supports from developmental partners • Inadequate medical supplies & blood bank equipment to maintain the required quality due to challenges with accessing forex • Increased blood demand among transfusing health facilities • Short shelf life of blood components e.g. 5 days for Platelet • High prevalence of TTIs
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2.7. Stakeholder Analysis

Stakeholders	Behaviors we desire	Their needs	Resistance issues	Their influence	Institutional response
Community	<ul style="list-style-type: none"> Participation, engagement Ownership to the service Healthy life style 	<ul style="list-style-type: none"> Empowerment, Access to blood service information quality care Stewardship 	<ul style="list-style-type: none"> Dissatisfaction with the service Under utilization Unsafe and poor quality service 	High	<ul style="list-style-type: none"> Improve Community participation Improve awareness of community Quality and equitable service
Volunteer non remunerated donors and patients who use blood and blood products	<ul style="list-style-type: none"> Ownership to the service participate in voluntary blood donation Healthy life style Receive blood and blood products 	<ul style="list-style-type: none"> quality care Stewardship Non-monetary recognition Awareness and knowledge Mobilization 	<ul style="list-style-type: none"> Dissatisfaction with the service Bureaucracy in stewardship 	High	<ul style="list-style-type: none"> Increase participation of voluntary blood donors Support and encourage clubs and associations engaged in blood donation Improve knowledge and awareness of donors
Parliaments, Prime Minister's Office, Council of Ministers, Regional Governments, Ministry of health	<ul style="list-style-type: none"> Ratification of proclamations, Policy, etc. Resources allocation Guidance and direction Evaluation and monitoring 	<ul style="list-style-type: none"> Implementation of proclamations, policy, etc. Timely plan and Reports Effective & efficient use of resources 	<ul style="list-style-type: none"> Administrative measures Influence on budget allocation 	High	<ul style="list-style-type: none"> Put in place strong M&E system & comprehensive capacity building mechanisms
Line Ministries (Water, Finance, Labor, Women's Affairs, Agriculture, civil service commission etc.)	<ul style="list-style-type: none"> Inter-sectoral collaboration Resource allocation Support restructuring of the organization 	<ul style="list-style-type: none"> Evidence-based plans; Reports Effective & efficient use of resources & coordination Technical support 	<ul style="list-style-type: none"> Dissatisfaction Considering blood bank service priority 	Medium	<ul style="list-style-type: none"> Collaboration Transparency Advocacy
Health professional training institutes	<ul style="list-style-type: none"> Knowledgeable, skilled and ethical health professionals produced 	<ul style="list-style-type: none"> Technical, policy support, guidance 	<ul style="list-style-type: none"> Curriculum revision 	Medium	<ul style="list-style-type: none"> Policy and leadership support
Development Partners	<ul style="list-style-type: none"> Harmonized & aligned plan More financing Technical support 	<ul style="list-style-type: none"> Financial system accountable & transparent Involved in planning, implementation & M&E 	<ul style="list-style-type: none"> High transaction cost Inefficiency & ineffective 	Medium	<ul style="list-style-type: none"> Blood bank service leadership Transparency Efficient resource use Build financial mgmt. capacity

Stakeholders	Behaviors we desire	Their needs	Resistance issues	Their influence	Institutional response
Government health institutions	<ul style="list-style-type: none"> Quality of care; Client oriented; Timely reporting Ministry of Women and children 	<ul style="list-style-type: none"> Partnership Rules , regulations and standards Blood and blood products Technical support 	<ul style="list-style-type: none"> Ineffective and inefficient service Inadequate blood and blood products 	High	<ul style="list-style-type: none"> Capacity building trainings Technical supportive supervisions Adequate blood supply Timely provision of Rules and regulations
Private health institutions	<ul style="list-style-type: none"> Quality of care; Client oriented; Ministry of youth and Sports 	<ul style="list-style-type: none"> Enabling environment for their engagement /public private partnership Rules, regulations and standards Blood and blood products Technical support 	<ul style="list-style-type: none"> Mistrust Violation of agreed rules 	Medium	<ul style="list-style-type: none"> Transparency Accountability Dialogue
Civil servants	<ul style="list-style-type: none"> Commitment, Participation Continuous professional development 	<ul style="list-style-type: none"> Conducive working environment Transparency Incentive 	<ul style="list-style-type: none"> Dissatisfaction Unproductive Attrition 	High	<ul style="list-style-type: none"> Motivation, Involvement
Religious organizations and military organizations	<ul style="list-style-type: none"> Participation, engagement and Ownership to the service Healthy life style 	<ul style="list-style-type: none"> Empowerment, Access to blood service information quality care Stewardship 	<ul style="list-style-type: none"> Dissatisfaction with the service Under utilization Unsafe and poor-quality service 	medium	<ul style="list-style-type: none"> Improve Community participation Improve awareness of community Quality and equitable service
Mass medias	<ul style="list-style-type: none"> Ownership to the service and participation community mobilization and communication Awareness creation 	<ul style="list-style-type: none"> Information about blood bank service Capacity building Through forums 	<ul style="list-style-type: none"> Lack of blood service information 	high	<ul style="list-style-type: none"> Improve public relation and media engagement Establish media forums Give timely and appropriate information to media
hotels	<ul style="list-style-type: none"> Ownership to the service and participation 	<ul style="list-style-type: none"> Enabling environment for their engagement Rules , regulations and standards Technical support 	<ul style="list-style-type: none"> Mistrust 	medium	<ul style="list-style-type: none"> Motivation, Involvement

Chapter Three: Blood Bank Transformation Plan II

3.1. Vision

To be Center of Excellence Blood Service in Africa.

3.2. Mission

To Provide Safe, Adequate and Quality Assured blood products and related services Sustainably to all in need while promoting proper clinical use.

3.3. Values

- Accountability
- Confidentiality
- Excellence
- Impartiality
- Integrity
- Professionalism
- Respect
- Teamwork
- Transparency

3.4 Principles

- Compassion
- Equity
- Ethics
- Integrated approach
- Ownership
- Participatory
- Partnership
- Quality service & products
- Sustainability
- Volunteerism

3.5. Objectives

The goal of the Transformation plan is to improve the availability, safety and accessibility of adequate blood and blood products in timely manner to reduce mortality and morbidity in the country. The objectives of the Transformation plan are:

1. To Consolidate a well-organized, nationally-coordinated blood transfusion service and provide adequate and timely supplies of safe blood for all patients in need
2. To increase the collection of blood only from voluntary non-remunerated blood donors from low-risk populations
3. To strengthen the testing of all donated blood for transfusion-transmissible infections, blood grouping and compatibility testing and component processing
4. To promote the appropriate clinical use of blood,
5. To strengthen the implementation of a Quality system covering all stages of the blood transfusion process.

3.5.1 Description of objectives

Consolidate a well-organized, nationally-coordinated blood transfusion service

This objective provides direction towards the consolidation of the national coordination of the blood Transfusion service in the country, which is an essential component for blood safety because it is a prerequisite for the preparation of blood and blood products to optimal standards of quality and safety.

The national blood service shall work closely with the federal and regional governments and MOH to ensure their sustained commitment, support and recognition for the blood service including the increase allocation of a budgeting and finance system that can ensure a sustainable blood program through cost recovery and/or annual budget allocation. The consolidation will focus on the promotion of adherence to quality standards, minimize duplication and achieve economies of scale through national systems for blood donor recruitment, blood screening and processing, and the central bulk purchasing of essential consumables and other supplies. The strengthening of the service through infrastructure maintenance and increasing the availability of essential supplies is also important.

This objective is set to provide direction for the national coordination and organization of blood service in the country to realize the availing of adequate and safe blood and blood product to all public and private health facilities.

Increase the voluntary blood donation

This objective provides direction for Blood Bank Service to work towards attaining and maintaining 100% voluntary non-remunerated blood collection. The Blood Bank Service shall collect Blood from healthy, regular voluntary non-remunerated donors identified by the facility to be at low-risk for transfusion transmissible infections.

Strengthen the testing of donated blood and component processing

This objective provides direction for the strengthening of the blood service laboratory capacity. This includes strengthening the testing of all donated blood and blood products from to transfusion transmissible infection and performing blood group testing. Also, implementing modern testing technologies to ensure the utmost safety of blood and blood products. The Production of Blood components needs to be increased to make blood products easily available for use for the recipients. Also, the capacity of the regional blood banks to produce more blood components needs to be strengthened.

Promote appropriate clinical use of blood and blood products

All patients requiring transfusion should have reliable access to safe blood products, including whole blood, blood components and plasma-derived medicinal products, appropriate to their clinical needs, provided in time and safely administered.

This objective focuses on the activities that have to be carried out by the Blood bank and stakeholders in the clinical interface on the promotion of the appropriate clinical use of blood, hospitals transfusion committees and on the strengthening of the Hemovigilance system including the reporting of serious hazards of transfusion.

strengthen the implementation of a Quality system covering all stages of the blood transfusion process. This objective provides QMS in blood transfusion service and focuses on the overall blood transfusion chain and the safety and risk management in blood banks where blood and /or blood components are collected, & Processed, and hospital departments where these products are handled administered. In line with this, the implementation of QMS is critically important in order to increase the safety of transfusion services. Thus, Improving the efficacy, quality and safety of blood and blood products will be one of the main objectives of BBTP-II.

3.6. Strategic Directions

1. Enhance the provision of equitable and quality of blood service
2. Enhance Communication, Mobilization Community Ownership
3. Improve logistics and supply chain management system
4. Improve human resource management
5. Improve Evidence based Decision-Making
6. Improve Blood Bank infrastructure
7. Improve blood bank leadership and governance
8. Enhance Blood Bank financing
9. Enhance partner engagement in the service

Description and Major Initiatives of Strategic Directions

3.6.1 Enhance the provision of equitable and quality of blood service

This Transformation direction is about provision of blood bank service in the equity and quality perspective. Even if tremendous efforts have been made to provide safe and adequate blood and blood products, still there are substantial challenges of blood transfusion service in Ethiopia, which are related to low awareness of blood donation, low number of regular blood donors, lack of implementation of up-to-date component processing and blood testing technologies automation, low coverage of post donation counseling service, poor referral and linkage of reactive/positive donors for TTIs, difficulty to supply blood for hard to reach areas/remote hospitals, significant gaps in the appropriate clinical use of blood and poor quality control system performance in blood transfusion service based on national and AFSBT standards.

It is expected that better and equitable accessibility to quality blood service will lead to improvements in the health facility service and reduce morbidity and mortality. Therefore, the key areas of interventions and initiatives in the blood bank Transformation plan is to bring about high standard of quality, equity and improved blood bank services are organized as follows:

3.6.1.1. Blood Donor Service Description

This Transformation direction is about improved voluntary blood donation by implementing different strategies to strengthen the community increase awareness of voluntary blood donation. Prior to collection the facility shall educate potential donors regarding the donation process and the risk of transmitting infectious diseases through blood transfusions to the risk during donation and after donation process. Also, the post donation counseling service for blood donors found to be reactive for TTIs and referral linkage to health facilities for further treatment and follow up will be strengthened. This helps the system to improve donor retention and to decrease the burden of TTIs among blood donors which has direct implication on the provision of safe blood; reduce wastage of supplies, manpower and cost.

Major Strategic Initiatives

- 🔥 Increase and Sustain blood collection from voluntary non-remunerated donors
- 🔥 Increase unit of blood collection from the center
- 🔥 Increase efficiency of mobile blood collection
- 🔥 Increase number of regular blood donors
- 🔥 Increase number of first-time blood donor
- 🔥 Increase the collection of units for component production including Apheresis donation
- 🔥 Increase and strengthen blood donor clubs
- 🔥 Reduce wastage of blood during blood collection
- 🔥 Implement and Strengthen post donation counseling services
- 🔥 Increase number of blood donors receiving counseling service after each donation
- 🔥 Implement and strengthen a referral system for blood donors who test positive for TTIs Implement a nationally adopted donor retention strategy

3.6.1.3. Laboratory Service

Description

Quality laboratory service is an essential component of blood transfusion services. This Transformation direction is about a good laboratory practices on TTIs, ABO serology, component production in all blood banks. Screening donated blood for the markers of HIV 1 &2, Hepatitis B, Hepatitis C and Syphilis. The blood bank service has been working towards quality laboratory service through capacity buildings, quality assurance programs, infrastructure development, maintenance towards laboratory quality assurance and accreditation program. While expanding the capacity of testing sites at a national level, more emphasis shall be given to Laboratory Quality Management System, and attainment of AfSBT accreditation standard fulfilling laboratories.

Major Strategic Initiatives

- 🔥 Implement Laboratory Quality Management System (LQMS)
- 🔥 Perform laboratory test as per requirement for screening donated blood for TTIs and blood grouping
- 🔥 Perform systems for external and internal laboratory quality assessments
- 🔥 Equip laboratories with state-of-the-art technologies for testing and processing
- 🔥 Enhance sample transportation, referral linkages and networks
- 🔥 Wastage of blood products during testing and component production
- 🔥 Implement a coordinated and integrated system of nationwide blood stock management

3.6.1.4. Quality and Safety

Description

QMS in blood transfusion service focus on the safety and risk management in blood establishments where blood is collected blood components are produced. Also included is the administration and handling of blood and use at hospital departments. The efficacy, quality and safety of blood and blood products are subject of ongoing concerns among the general public. This Transformation direction is about quality and safety of blood and blood products that assured the process from the selection of blood donors through to their administration to the patient. Providing the highest possible quality of blood bank services is the key

issue and integral part of this Transformation plan. This emphasis will be maintained and further strengthened by focusing on collaborative learning, capacity building, institutionalizing Quality improvement Projects (QIPs) and activities and implementing quality improvement reforms. The implementation of QMS is critically important in order to increase the safety of transfusion services. The strengthening of the Quality Management system in all blood banks to the level of accreditation will be given due emphasis.

Major Strategic Initiatives

- 🔥 Implement and monitor national quality management system
- 🔥 Increase the implementation of quality improvement activities
- 🔥 Improve the capacity of blood banks for Accreditation
- 🔥 Develop, standardize and implement blood Service scope of practice at all levels
- 🔥 Develop collaborative learning platform for improving quality
- 🔥 Increase national capacity for the evaluation and validation of blood bank technology methods and reagents
- 🔥 Improve blood bank medical equipment management and maintenance capabilities
- 🔥 Establish and strengthen occupational risk mitigation and management systems
- 🔥 Implement or enhance Infection Prevention and Control Policy

3.6.1.5. Medical Service

Description

WHO recommends for the safe and rational use of blood to reduce unnecessary and unsafe transfusions to improve patient outcome and maintain safety, and thus minimizing the risk of adverse events including errors, transfusion reactions and transmission of infections. This transformation direction is about ensuring that patients requiring transfusion have reliable access to safe blood and blood products appropriate to their clinical needs, provided in time and safely administered. Data on the use of blood and blood products in our country are still limited but, the available little data suggest that blood products are often over prescribed there is a long way to go in the functionality of HTC and strengthening of the hemovigilance system and promotion of ACUB.

Major Strategic Initiatives

- 🔥 Ensure an adequate and reliable supply of safe blood products throughout the transfusion chain
- 🔥 Establish, implement, and strengthen hemovigilance systems
- 🔥 Strengthen the use of guidelines and standard operating procedures to ensure consistency and reliability in the transfusion process.
- 🔥 Establish systems for safe clinical transfusion and patient safety in all health facilities
- 🔥 Develop and monitor indicators to assess trends in the quality and safety of the clinical transfusion process

3.6.2 Enhance communication, mobilization and Community Ownership

Description

This Transformation direction focuses on developing programs that aim to create awareness about the importance of the voluntary donation among the population. Generally, it is to raise public awareness about blood transfusion service, improve knowledge and promote positive attitude and beliefs towards blood donation, create a community culture that respect and supports voluntary blood donation and to promote community involvement in blood donor education. This work should not only ensure the necessary number of donors but also enhance the donation profile improving quality standards of collected and transfused blood.

This direction emphasizes on the strengthening of the ownership of the blood transfusion services by engaging the community nationwide to ensure sustainable blood and blood product supply. Community ownership guarantees self-reliance and solidarity at the population level, as citizens understanding of blood as a national resource will be strengthened.

Major Strategic Initiatives:

- 🔥 Strengthen community Education, information dissemination and mobilization on voluntary blood donation
- 🔥 Establish and strengthen Blood donor clubs and associations
- 🔥 Promote community representation throughout blood bank activities
- 🔥 Implement a non-monetary recognition and award system for best performing communities
- 🔥 Promote the participation of public figures and community leaders in the blood service activities
- 🔥 Promote model donor clubs, blood banks and blood transfusing health facilities and scale up their achievements to other sites
- 🔥 Increase education and advertisement on the need for safe blood through different media platforms to change attitude of the community
- 🔥 Establish and strengthen different community forums
- 🔥 Develop standardized Information Education Communication and Behavioral Change Communication
- 🔥 Establish different National advisory committees
- 🔥 Implement systems for handling of customer complaint and feedback mechanisms

3.6.3. Improve logistics and supply chain management system

Description

This strategy direction to ensure access to quality assured, safe, effective and essential medical supplies with which the service intends to respond to the demands of blood transfusion of the society. Effective and efficient logistic management system ensures that the right quality product, in the right quantities, and in the right condition is delivered to the right place, at the right time. Blood transfusion service is a service which needs to be equipped with high standard supplies and equipment thus a robust logistics management system is mandatory to ensure this.

Major Strategic Initiatives

- 🔥 Selection of essential Blood Bank equipment and supplies with proper forecasting and quantification
- 🔥 Establish well equipped blood banks with adequate and appropriate equipment and supply
- 🔥 Enhance the procurement efficiency by collaborating with stakeholders
- 🔥 Establish automated national logistic and supply management system
- 🔥 Promote the central procurement of blood bank supplies to ensure the same level of quality across sites
- 🔥 Establish Good Storage Practice (GSP) for cold chain and supplies in each blood bank
- 🔥 Improve the Inventory system to ensure the availability of supplies and decrease stock outs
- 🔥 Build the capacity in the proper management of supplies and equipment

3.6.4. Improve human resource management

Description:

This Transformation direction covers human resources planning, development and management and focuses on recruitment as per the need, deployment of staff, performance management and motivation. It also includes leadership development. One of the main focuses of this is to promote motivated and compassionate competent professional staffs. This will lead to the availability of adequate, competent, motivated and committed health professionals in the blood services across the country. The availability of such staff will be the key factor to ensure the safe blood availability.

Major Strategic Initiatives

- 🔥 Promote Motivated Compassionate and Competent professionals in the blood bank service
- 🔥 Implement a human resource strategy at all levels of the service
- 🔥 Staff all blood banks with the necessary human resource as per the standards
- 🔥 Enhance human resources motivation and retention strategies
- 🔥 Implement pre-service and in-service trainings as per the standards
- 🔥 Establish a Comprehensive Human Resources Information system (HRIS).
- 🔥 Scale up training and development of health professionals based on need
- 🔥 Implement an effective, efficient, and sustainable continuing professional development plan

- 🔥 Perform continuing quality audits of all existing preservice and in-service training programs.
- 🔥 Enhance performance and productivity of staff
- 🔥 Implement the career development and post graduate studies in blood transfusion for health professionals working in the blood service

3.6.5. Improve Evidence based Decision-Making

Description

This strategy direction focuses on decision making through evidence generation, translation, and dissemination. It promotes and advocates the culture of generating quality data, ensuring transmission and acquisition of complete and timely data, verification, analysis, and synthesis of data from multiple sources and using evidence at all levels to improve quality of Blood transfusion services. The process of evidence generation and decision-making includes research, surveys, administrative (financial, HR, logistics management) information systems, monitoring and evaluation and planning. The implementation of this strategy will lead to the availability of quality data which will in turn ensure the improvement of the service with efficient and effective timely decision making.

Major Strategic Initiatives






- 🔥 Develop and implement evidence-based, scientifically sound policy decision making and planning system
- 🔥 Promote the review and development of Blood transfusion standards and guidelines
- 🔥 Promote research in blood transfusion in blood banks and health facilities
- 🔥 Implement Knowledge Management Systems
- 🔥 Strengthen routine reporting and performance monitoring system
- 🔥 Promote the Supportive supervision and inspection of blood services and health facilities
- 🔥 Develop strategies and implement tools for Data quality assurance and auditing

3.6.6. Improve Blood Bank infrastructure

Description:

This Transformation direction encompasses the standardization of blood bank facilities. It involves development of standard design of blood bank service infrastructures, carrying out their construction, maintenance, renovation, rehabilitation as well as equipping and furnishing them in a blood donor-friendly manner. Ensure Utilities such as water, sanitation, and power. It also includes enhancing medical equipment management and developing basic ICT infrastructure. Emphasis will be given in setting up maintenance and facility management capability across all blood banks. Minimum Facility standards should be met to ensure that blood service activities can be carried out at the optimum level of quality expected.

Major Strategic Initiatives

-  Promote the standardization and functionality of blood banks, collection and storage centers and mini blood banks
-  Consolidate critical blood banking activities of component production and testing
-  Implement Blood Bank information systems across sites and make available the necessary infrastructure
-  Develop standard and guidelines for design and construction of blood bank, collection and storage centers
-  Construction of blood bank service facilities and medical equipment maintenance workshops,

3.6.7. Improve Blood Bank Leadership, Governance and Policy Guidance

Description

This transformation direction is about enhancing leadership and governance in the blood bank. Leadership and Governance is a component of blood bank service which designs and links strategies with effective team building, sound regulation and promote accountability. Accountability is fundamental feature of governance that involves the management of relationships between various stakeholders in the blood service. All actions of leadership should be derived by credible evidence especially in areas where local and/or global evidences are available.

Major Strategic Initiatives

- 🔥 Redesign and implement compatible organizational/institutional structure
- 🔥 Build leadership capacity
- 🔥 Strengthen the transparency, participatory and inclusiveness of planning, monitoring and evaluation mechanism
- 🔥 Ensure good governance practices
- 🔥 Promote equity and equality of all forms with emphasis to disparity on gender, geographic and vulnerable segment of the community.
- 🔥 Design and implement transparent resource allocation mechanism/system
- 🔥 Design and implement a national coordination system between the blood service and stakeholders

3.6.8. Enhance Blood Bank financing

Description

This transformation direction is about promotion of sustainable financing of the service. It includes mobilization of resources, utilization of resources, increasing resource allocation for blood bank from government treasury, developing and implementing innovative financing strategies to improve sustained blood bank self-financing, internal revenue generation and use, appropriate, budget utilization. It aims at increasing resource flows into the service and improving the efficiency of resource utilization, and ensuring sustainability of financing to improve the overall coverage and quality of blood bank services.

Major Strategic Initiatives

- 🔥 Promote the Increase of budget allocation from government to blood banks
- 🔥 Devise and implement additional financing and resource mobilization mechanisms
- 🔥 Enhance efficient and effective use of resources
- 🔥 Develop a harmonized financing and purchasing system
- 🔥 Enhance transparent, accountable & sound resource utilization and financial tracking management system

3.6.9. Enhance partner and non-governmental/NGO engagement

Description

This Transformation direction defined as the deliberate, systematic collaboration of the blood banks and the private sector to move priorities to blood collection, processing, testing and distribution. It aims to improve the engagement of partners and non-governmental/NGO in planning, implementation and monitoring and evaluation of a wide range of activities including medical device maintenance, human resource development and capacity building contributing to the strengthening of the blood bank service.

Key /Major Activities

- 🔥 Adopt and implement the policy framework and strategies for public-private partnership engagement in blood services
- 🔥 Promote quality service delivery by partners and non-governmental/NGO
- 🔥 Promote partners and non-governmental/NGO in capacity building/human resource development
- 🔥 Promote the private partners and non-governmental/NGO engagement in the planning, implementation and monitoring and evaluation of the service

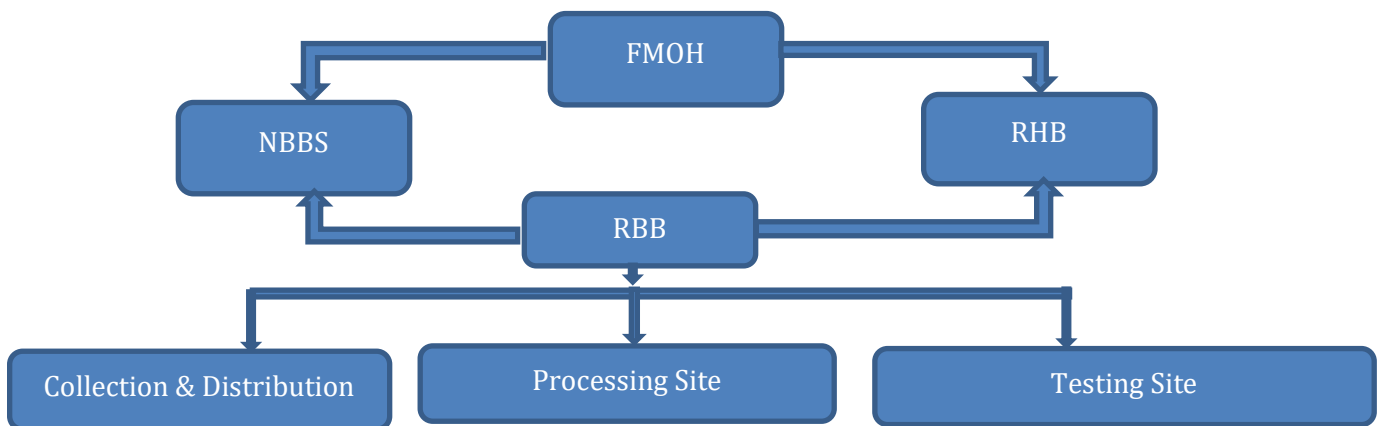
Chapter Four: Transformation Plan Implementation Arrangement

4.1. Institutional Arrangement

The Blood Transfusion Service in Ethiopia is organized in a decentralized (regional based) setup while at the same time being a nationally regulated and coordinated the system. In this case the NBBS is tasked with the establishment of an efficient blood system that is fully integrated to the regional blood bank by giving technical support and coordinating the system.

The BTS has strengthened its system with a total of 43 sites (30 fully functional blood banks and 13 collection and distribution centers) and by using 40 mobile blood collection teams which go out regularly to collect blood in different institutions. These sites are located strategically, in most occasions, in locations where they can provide the needed blood to health facilities in 150-200 KM radius covering most of the country.

Total units of blood collected per annum is 288,966 in 2012 EFY. But still a long way to go as the country demand as per WHO estimates is a minimum of 1 million units of blood donations per year a shortfall of about 700,000 units of blood. To increase the blood donation and overall capacity of the blood transfusion service of the country in line with the health system development, a strong organization and coordination mechanism needs to be put in place.



Organization of Blood Transfusion Services

4.2 Governance

The Blood Transfusion Service in Ethiopia is organized in a decentralized (regional based) setup while at the same time being a nationally regulated and coordinated system. Blood service requires coordination and collaboration with the community, government and nongovernmental organizations with an optimal level of consolidation of critical activities.

The blood system was heavily reliant on funding from partners but during the past five years government ownership has improved with a dedicated budget line created for the national service and some regional blood banks getting due support from the regional health bureaus.

National Blood bank has prepared planning, monitoring & evaluation, guidelines & blood service-related standard protocols. Through the development of BBTP-II the regional blood banks also played relevant role on the establishment of the tools to strengthen the governance system.

NBBS-RHBs Joint Steering Committee

The NBBS-RHBs blood bank service Joint Steering Committee is a forum that brings together the NBBS and RHBs. The meeting is chaired by the NBBS, and the participants include the Regional Health Bureau blood bank service coordinators and NBBS representative. The Committee meets every 3 months.

The basic objective of this forum is to facilitate the effective and smooth implementation of the Transformation plan by closely monitoring progress and problem solving at the operational level by taking joint corrective measures. The Joint Steering Committee will focus on a number of implementation issues including: overview of implementation progress and problems identification of major implementation bottlenecks; introduction of new initiatives and guidelines and creating systems and mechanisms for information and experience sharing etc.

Blood bank Annual review meeting

The Blood bank meeting occurs with the NBBS, regional blood bank and regional health bureau. In this meeting summing all blood banks the annual plan performance report, discussion on the detail report and give the direction based on the report and also announcing for the preparation of the next budget year

planning. The agenda of HSTP is one of the focused area by giving guides, oversees and facilitates the implementation of the HSTP.

The meeting is chaired by the NBBS, and the participants include the Regional Health Bureau blood bank coordinators, regional blood bank focal person, NBBS representative and stakeholders.

4.3. Risk Mitigation Strategy

S.N	Risks/Assumptions	Rating	Mitigation strategy
1.	Excessive demand of blood eg. due to mass causality	High	<ul style="list-style-type: none"> • Strengthen blood bank service to facilitate joint action on risk reduction • Response the service through improving of blood donation culture. • By availing minimum stock level that can manage mass causality.
2.	inadequate staffing	High	<ul style="list-style-type: none"> • Increased investment in Human resources for service development: train, recruit, deploy and retain sufficient HR for effective delivery of the desired blood services • Increasing pull factor for • Service implementation to address
3.	Inadequate budget allocation from government	Medium	<ul style="list-style-type: none"> • Has to be Continued political commitment at all levels (national, regional, zonal and district levels) to increase budget allocation to the blood service
4.	Inadequate private sector involvement especially in blood services	Medium	<ul style="list-style-type: none"> • The NBBS will work with other • Government Ministries and Agencies, Civil Society Organizations, the private sector to attract investment; strengthen • Public-Private Partnership
5.	Seasonal Decline in blood donors	High	<ul style="list-style-type: none"> • Proactive and innovative mechanism of enhancing blood donation through coordination of different donors

Chapter Five: Costing and Financing Implementation Arrangement

5.1 National Blood Bank Costing and Financing

Implementation of this Transformation document should be supported by the required resources. Given the complexity and volume of the operations of the blood bank is undertaking and the advancements planned to be achieved, financing the implementation will require more commitment from the government as well as development partners. It will require the blood bank to operate more efficiently by reducing unnecessary costs without compromising the quality of the blood service it provides. An estimated total amount of USD 171,062,596.74 will be required for implementation of the Transformation plan for the coming 5 years.

The required budget will be generated mostly from government for the provision of blood services. The cost is determined by identifying and costing the key activities that will be undertaken in each Transformation initiative. The total estimated costs over the years are summarized in Table below:

Table: Total estimated implementation costs

Blood Bank Service - Cost	Year					Total 5 years
	2020	2021	2022	2023	2024	
Whole Blood Collection	15,538,102.19	16,164,478.00	17,185,497.33	17,436,638.50	17,539,432.28	83,864,148.30
Component production	348,347.43	426,352.10	543,958.09	632,420.90	751,848.75	2,702,927.26
Programme Costs	9,343,776.38	7,919,998.78	8,871,005.72	9,963,701.65	10,056,371.65	46,154,854.18
Equipment cost	6,734,647.00	7,009,318.00	10,852,737.00	6,734,647.00	7,009,318.00	38,340,667.00
Total Annual cost	31,964,873.00	31,520,146.88	37,453,198.14	34,767,408.05	35,356,970.67	171,062,596.74

Table Blood Bank Program costing for BBTP II

Program Costing - Blood Bank Service	2020	2021	2022	2023	2024
	1. Program-Specific Human Resources	90,000.00	90,000.00	90,000.00	90,000.00
1.1 National-Level Staff	90,000.00	90,000.00	90,000.00	90,000.00	90,000.00
1.2 Regional-Level Staff	0	0	0	0	0
1.3 District-Level Staff	0	0	0	0	0
2. Training	2,027,738.12	2,069,365.12	2,509,165.45	2,701,591.45	3,377,878.45
2.1 In-service / Refresher Training	1,334,500.00	1,305,500.00	1,562,500.00	1,544,500.00	1,814,500.00
2.2 Training of Trainers	68,905.12	41,865.12	51,998.45	43,758.45	63,378.45
2.3 Development of Training Programs and Material	75,000.00	0	0	40,000.00	0
2.4 Changing the Pre-Service Training Curriculum	0	0	0	0	0
2.5 Support Activities	549,333.00	722,000.00	894,667.00	1,073,333.00	1,500,000.00
3. Supervision	202,628.00	202,394.00	202,700.00	203,284.00	213,000.00
3.1 Coordination Meetings	160,000.00	160,000.00	160,000.00	160,000.00	160,000.00
3.2 National Staff Visiting Local Staff	42,628.00	42,394.00	42,700.00	43,284.00	53,000.00
4. Monitoring and Evaluation	170,000.00	170,000.00	190,000.00	170,000.00	190,000.00
4.1 Design of M and E Frameworks and Systems	0	0	20,000.00	0	20,000.00
4.2 Design of Quality Control and Assurance	39,000.00	39,000.00	39,000.00	39,000.00	39,000.00
4.3 Design/Review of Data Management Systems	39,000.00	39,000.00	39,000.00	39,000.00	39,000.00
4.4 Data Collection and Analysis	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00
4.5 Quality Control/Quality Assurance	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00
5. Infrastructure and Equipment	2,250,000.00	2,300,000.00	2,450,000.00	2,500,000.00	2,550,000.00
5.1 Situational Assessment	50,000.00	0	50,000.00	0	50,000.00
5.2 Equipment upgrades for lower tier facilities	700,000.00	800,000.00	900,000.00	1,000,000.00	1,000,000.00
5.3 Equipment upgrades for hospitals	1,500,000.00	1,500,000.00	1,500,000.00	1,500,000.00	1,500,000.00
6. Transport	476,000.00	476,000.00	476,000.00	476,000.00	476,000.00
6.1 Situational Assessment	0	0	0	0	0
6.2 New Vehicle Purchase (USD)	340,000.00	340,000.00	340,000.00	340,000.00	340,000.00
6.3 Vehicle Operation and Maintenance	136,000.00	136,000.00	136,000.00	136,000.00	136,000.00
7. Communication, Media & Outreach	640,000.00	600,000.00	800,000.00	800,000.00	850,000.00
7.1 Development of Communication Strategy	40,000.00	0	0	0	50,000.00
7.2 Mass Media	300,000.00	300,000.00	400,000.00	400,000.00	400,000.00
7.3 Printed Materials	300,000.00	300,000.00	400,000.00	400,000.00	400,000.00
7.4 Social Outreach Activities	0	0	0	0	0
8. Advocacy	320,000.00	270,000.00	330,000.00	280,000.00	330,000.00
8.1 Planning an Advocacy Strategy	50,000.00	0	50,000.00	0	50,000.00
8.2 Advocacy Activities	240,000.00	240,000.00	240,000.00	240,000.00	240,000.00
8.3 Advocacy Materials	30,000.00	30,000.00	40,000.00	40,000.00	40,000.00
9. General Program Management	1,495,744.27	483,906.67	548,140.27	1,434,493.20	584,493.20

9.1 Design and Review of Country Strategy	0	0	0	0	50,000.00
9.2 Development and Review of Annual Work Plan	45,372.13	38,906.67	43,140.27	44,746.60	44,746.60
9.3 Development/Review of Human Resource Plan	45,372.13	0	0	44,746.60	44,746.60
9.4 Program Coordination Meetings	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00
9.5 Commodity Regulation and Policies	70,000.00	10,000.00	70,000.00	10,000.00	10,000.00
9.6 Situation Analysis	0	0	0	0	0
9.7 Office equipment and supplies	900,000.00	0	0	900,000.00	0
9.8 Utilities	335,000.00	335,000.00	335,000.00	335,000.00	335,000.00
Other	1,671,666.00	1,258,333.00	1,275,000.00	1,308,333.00	1,395,000.00
Total	9,343,776.38	7,919,998.78	8,871,005.72	9,963,701.65	10,056,371.65

Chapter Six: Monitoring and Evaluation

6.1. Indicators and Targets

No	Indicator	Type of Indicator	Category	Level of Data Collection	Data Source	Frequency	Responsible	Baseline	Target									
									Year-1	Year2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year9	Year10
1	Health facilities blood satisfaction rate	Outcome	Crosscutting	Blood Bank	Blood distribution form	Monthly	Laboratory	75%	80%	85%	90 %	95%	100%	100%	100%	100%	100%	100%
2	Blood donor satisfaction	Process	BDS	Blood Bank	Survey	Annually	BDS	90%	96%	97%	98%	99%	100%	100%	100%	100%	100%	100%
3	Percentage of blood collected from voluntary blood donors	Output	BDS	Blood Bank	Blood donor registration form/ enrollment form	Monthly	BDS	99.5%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
4	Total blood donation	Output	BDS	Blood bank	Monthly reporting form & CSA.gov.org	Quarterly	PPD/ RBB head	288966	343000	397292	490699	588693	691474	799234	912149	1030387	1154097	1283425
5	number of mobile sessions per month per blood bank	Process	BDS	National/ regional	Report format	Monthly	BDS	13	15	17	18	19	20	21	22	23	24	25
6	Average unit of blood per mobile session per blood bank	Output	BDS	Blood bank	Report format	Monthly	BDS	17.5	19	21	23	24	25	26	27	28	29	30
7	Percentage of active regular/repeat blood donors who donated in a reporting period	Process	BDS	Blood bank	Report format	Annually	BDS	17%	19.6%	22.2 %	24.8%	27.4%	30%	34%	38%	42%	46%	50%
8	Number of active mobile collection site	Process	BDS	Blood bank	Report format	Annually	BDS	5,176	5,680	6,184	6,688	7,192	7,700	8,000	8,300	8,600	8,900	9,200

No	Indicator	Type of Indicator	Category	Level of Data Collection	Data Source	Frequency	Responsible	Baseline	Target									
									Year-1	Year2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year9	Year10
9	Number of blood donor clubs	Process	BDS	Blood bank	National blood donor club register report format	Monthly	BDS	184	247	310	373	436	500	600	700	800	900	1,000
10	Number of blood donor clubs who are donating at least 2 times per year	Process	BDS	Blood bank	National blood donor club registration	Annually	BDS	38					400					850
11	Proportion of blood collected from the center	Output	BDS	Blood bank	Report format	Monthly	BDS	17.3 %	18.8%	20.4 %	21.9%	23.5%	25%	27%	29%	31%	33%	35%
12	number of apheresis donation	Output	BDS	Blood bank	Reporting format	Monthly	BDS	0	0	0	3300	3300	3300	3,600	3,600	4,200	4,800	5,000
13	Decrease total discard rate of blood	Output	crosscutting	Blood bank	Reporting format	Monthly	Blood bank	14.5	13	10	9	8	7	6	5	5	5	5
14	Percentage of overweight and underweight of blood unit	Process	BDS	Blood bank	Reporting format	Monthly	BDS	4.2%	3.7%	3.2%	2.7 %	2.2%	2%	1.8%	1.6 %	1.4 %	1.2%	1%
15	Percentage of TTIs positive blood donation	Output	BDS	Blood bank	Report format	Monthly	BDS	3.4%	3.3%	3.2%	3.16%	3.1%	3%	2.9%	2.8%	2.7%	2.6%	2.5%
16	Proportion of blood donors who received post donation counseling service	Output	BDS	Blood bank	Report format	Monthly	BDS	5.8%	9.64%	13.5 %	17%	21 %	25%	27 %	29%	31 %	33 %	35%
17	Proportion of donors TTIs positive who know their TTIs status	Output	BDS	Blood bank	Report format	Monthly	BDS	4.9%	10%	45%	60%	80%	90%	90%	90%	90%	90%	90%
18	Proportion of blood donors with positive TTIs who referral linked with health facility	Output	BDS	Blood bank	Report format	Monthly	BDS	2.3%	10%	45%	60%	80%	90%	90%	90%	90%	90%	90%
19	Proportion of WB separated into components	Output	Laboratory Service	Blood bank	Report format	Monthly	Lab	23%	30	35	40	45	50	55	60	65	70	75

No	Indicator	Type of Indicator	Category	Level of Data Collection	Data Source	Frequency	Responsible	Baseline	Target									
									Year-1	Year2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year9	Year10
20	Discard rate of blood and blood product due to laboratory processing	Process	Laboratory Service	Blood bank	Report format	Monthly	Lab	6.9%	5.9%	4.9%	3.9%	2.9%	2%	2%	2%	2%	2%	2%
21	Number of blood banks fulfilling AfSBT step 1 standards	Outcome	Crosscutting	Blood bank	checklist	Annually	Quality	1	4	8	12	16	20	23	26	29	30	32
22	Number of blood banks fulfilling AfSBT step 2 standards	Outcome	Crosscutting	Blood bank	checklist	Annually	Quality	1	1	1	2	4	6	6	6	8	9	10
23	Number of blood banks fulfilling AfSBT step 3 standards	Outcome	Crosscutting	Blood bank	checklist	annually	Quality	0	0	0	0	1	1	1	1	1	1	2
24	Number of blood banks that implement internal quality control	Process	Quality Service	Blood bank	Quality control format	Annually	Quality	8	20	24	28	30	32	32	32	32	32	32
25	Number of blood banks fulfilling 100% NQAS result	Process	Quality Service	Blood bank	NQAS data submission format	Quarterly	Quality	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26	Number of blood banks that participating in EQA	Process	Quality Service	Blood bank	EQA data submission format	Quarterly	Quality	78%	78%	100%	100%	100%	100%	100%	100%	100%	100%	100%
27	Number of standardized blood bank training manuals	Input	Quality Service	NBBS	Approval manual	2 years	Quality	0	5	9	9	9	9	9	9	9	9	9
28	Number of blood bank equipment maintenance workshop	Input	Quality Service	NBBS	Report format	annually	Quality	0	0	0	1	1	1	1	2	3	3	5
29	Proportion of mini blood banks fulfilling criteria	Outcome	Medical Service	Blood bank	Survey	Biannual	Medical	79.7%	85%	90%	90%	90%	90%	95%	100%	100%	100%	100%
30	Proportion of functional HTC	Process	Medical Service	Blood bank	Survey	Biannual	Medical	47.5%	50%	55	55	60	60%	65	70	75	80	80%

7. Annexes

Annex -1: List of Blood banks and Current Status

Blood Bank Sites Location and current status 2019				
	Site	Type	Component Production	Post Donation Counseling
National	Addis Ababa	Blood Bank	ü	Yes
	Yeka	Collection center	NA	NA
	ENDF	Blood Bank		
Amhara	Bahirdar	Blood Bank	ü	ü
	Gondar	Blood Bank	ü	ü
	Debre Tabor	Blood Bank	û	ü
	Debre Markos	Blood Bank	û	ü
	Dessie	Blood Bank	ü	ü
	Debre Birhan	Blood Bank	û	ü
	Kemise	Collection center	NA	û
	Woldeya	Collection center	NA	û
	Sekota	Blood Bank	û	û
	Metema	Collection center	NA	û
Oromia	Adama	Blood Bank	ü	ü
	Chiro	Blood Bank	û	ü
	Goba	Blood Bank	ü	ü
	Bule Hora	Blood Bank	û	û
	Negele	Blood Bank	û	û
	Shashemene	Collection center	NA	ü
	Woliso	Blood Bank	ü	ü
	Jimma	Blood Bank	ü	ü
	Mettu	Blood Bank	û	ü
	Nekemte	Blood Bank	ü	ü
Tigray	Mekelle	Blood Bank	ü	ü
	Axum	Blood Bank	ü	ü
	Humera	Blood Bank	û	ü
Sidama	Hawassa	Blood Bank	ü	ü
	Yirgalem	Collection center	NA	û
SNNP	Hossaena	Blood Bank	û	ü
	Arba Minch	Blood Bank	ü	ü
	Sodo	Blood Bank	û	û
	Dilla	Collection center	NA	û
	Jinka	Blood Bank	û	û
	Bonga	Collection center	NA	û
Benishangul	Assosa	Blood Bank	û	ü
	Gilgel Beles	Blood Bank	û	û
Afar	Semera	Blood Bank	û	û
	Awash	Collection center	NA	û
Somali	Jigjiga	Blood Bank	ü	ü
	Gode	Blood Bank	û	û
	Hargele	Blood Bank	û	û
Gambela	Gambela	Blood Bank	û	û
Harari	Harar	Blood Bank	ü	ü
DireDawa	Dire Dawa	Blood Bank	ü	ü

Annex -2: Operational Definition

Adequate: Enough or satisfactory for a particular or intended purpose

Adverse Event: A complication in a donor or patient. Adverse events may occur in relation to a donation, transfusion, or a diagnostic or therapeutic procedure.

Agreement: A contract, order, or understanding between two or more parties, such as between a facility and one of its customers.

Aphaeresis: withdrawal of blood from a donor's body, removal of one or more components (as plasma, blood platelets, or white blood cells) from the blood, and transfusion of the remaining blood back into the donor *called also* pheresis.

Assessment: A systematic, independent examination that is performed at defined intervals and at sufficient frequency to determine whether actual activities comply with planned activities, are implemented effectively, and achieve objectives. Assessments usually include comparison of actual results to expected results. Types of assessments include external assessments, internal assessments, quality assessments, peer-review assessments, and self-assessments.

Audit: An audit is an evaluation of an individual, organisation, system, process or product.

Backup: Digital data storage media (magnetic tape, disc, CD, etc) containing copies of computer data.

Blood Bank Service (Blood Service): Is a facility that performs one or more of the following activities: donor mobilization, donor screening, blood collection, processing of blood into products, storage, selection, and issuing of blood and blood products for health Institutions. The Blood Bank Service /Blood Service in this document describes national and all regional blood Banks.

National Blood Bank Service (NBBS): refers to the national centre located in Addis Ababa

Regional Blood Banks (RBBs): refers to the blood bank located in the respective regions in across the country

Blood Collection and Distribution Centre: is a facility that performs one or more of the following activities: donor mobilization, donor screening, blood collection, storage and issuing of safe blood and blood products for health Institutions. These facilities are mapped to their nearest blood bank for processing of blood into products and testing of donated blood.

Blood / Blood Products: Blood products are often also referred to as blood components. Blood products may be prepared from a whole blood collection or may be produced through an automated collection e.g. red blood cells, plasma and platelets.

Blood Bank Transformation Plan I (BBTP I): refers to the blood services strategic/transformation plan for the years 2016/17-2019/20 G.C

Blood Bank Transformation Plan II (BBTP II): refers to the blood services strategic/transformation plan for the years 2020/21-2024/25 G.C

Competence: Ability of an individual to perform a specific task according to procedures.

Compliance: Fulfilment of requirements defined by customers, standards, regulatory agencies, or law.

Conformance: Fulfilment of requirements. Requirements may be defined by customers, practice standards, regulatory agencies, or law.

Critical Equipment/Materials/Tasks: A piece of equipment, material, service, or task that can affect the quality of the facility's products, components, or services.

Customer: The receiver of a product, component or service. A customer may be internal (i.e., another department within the same organization) or external) i.e., another organization).

Disaster: An event (internal, local, or national) that can affect the blood supply or the safety of staff, patients, volunteers, and donors.

Document : Written or electronically generated information and work instructions. Examples of documents include quality manuals, procedures, or forms. Also means to capture information for use in documents though writing or electronic media.

Equipment: A durable item, instrument, or device used in a process or procedure.

Expiry: The last day or time in which the blood, component, tissue, or derivative is considered suitable for transfusion, transplantation, or infusion.

Final Inspection: To measure, examine, or test one or more characteristics of a unit of blood, component, tissue, or service and compare results with specified requirements in order to establish whether conformance is achieved before distribution, issue or transfusion.

Guideline: Documented recommendations.

Hospital (mini) blood bank: A Blood bank that is involved in the Receiving and storing screened blood and Blood products from an authorized Blood Bank service, Performing compatibility tests and Blood and Blood product issue for transfusion.

Inspect: To measure, examine, or test one or more characteristics of a component or service and compare results with specific requirements.

Issue: To release for clinical use (transfusion or transplantation).

Labelling: Information that is required or selected to accompany a unit of blood, component, tissue, or derivative, or sample, which may include content, identification, description of processes, storage requirements, expiration date, cautionary statements, or indications for use

Maintain: To keep in the current state.

Mitigation: Sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

Non-conformance: Failure to meet requirements.

Policy: A documented general principle that guides present and future decisions.

Preventive Action: An action taken to reduce the potential for non-conformance or other undesirable situations.

Procedure: A series of tasks usually performed by one person according to instructions.

Process: A set of related tasks and activities that accomplish a work goal.

Process Control: The efforts to standardize and control processes in order to produce predictable output.

Product: A tangible result of a process procedure. Result of a process (service or processed material)

Proficiency Testing: The structured evaluation of laboratory methods that assesses the suitability of processes, procedures, equipment, materials, and personnel.

Qualifications: With respect to individuals, the aspects of an individual's education, training, and experience that is necessary to successfully meet the requirements of a position. Specifically, for equipment, verification that specified attributes required to accomplish the desired task has been met.

Quality: Characteristics of a unit of blood, component, tissue, derivative, sample, critical material, or service that bear on its ability to meet requirements, including those defined during agreement review.

Quality Control: Testing routinely performed on materials and equipment to ensure their proper function.

Quality Indicator Data: Information that may be collected and used to determine whether an organization is meeting its quality objectives as defined by top management in its quality policy. Indicators are measured by data for movement or regression with regard to those quality intentions. The data used for monitoring a quality indicator may consist of single-source data or multiple-source data, as long as it is clear how the data will come together to define the indicator.

Quality System: The organizational structure, responsibilities, policies, processes, procedures, and resources established by executive management to achieve quality.

Quality Standard: Defined sets of minimum quality requirements for an organization or institution (including healthcare organizations)

Quarantine: To isolate nonconforming blood, components, tissue, derivatives, or materials to prevent distribution.

Record (noun): Information captured in writing or through electronically generated media that provides objective evidence of activities that have been performed or results that have been achieved, such as test records, or audit results. Records do not exist until the activity has been performed and documented. Also means to capture information for use in records through writing or electronic media.

Regulations: Rules promulgated by federal, regional state, or local authorities to implement laws enacted by legislative bodies.

Release: Removal of component from quarantine or in-process status for distribution or issue to health facilities.

Safe: Not causing harm or injury *esp.* having a low incidence of adverse reactions and significant side effects when adequate instructions for use are given and having a low potential for harm under conditions of widespread availability

Segregate: To separate or isolate products or components by a method known to clearly identify them and to minimize the possibility of their unintended distribution or use.

Service: An intangible result of a process or procedure.

Standard: A standard is an agreed way of doing something. It is minimum quality requirements for an organization or institution

Supplier: An entity that provides an input material or service.

Traceability: The ability to follow the history of a component or service by means of recorded identification.

Transfusion Service: A facility that performs one or more of the following activities: compatibility testing, storage, selection, and issuing of blood and components to intended recipients.

Unit: A container of blood or one of its components in a suitable volume of anticoagulant obtained from a collection of blood from one donor.

Annex -3: Donor satisfaction survey questionnaire



የብሔራዊ ደም ባንክ አገልግሎት የደም ለጋሾችን የአገልግሎት እርካታ ለመለካት የተዘጋጀ ዳሰሳዊ ጥናት መጠይቅ

የዚህ መጠይቅ ዋና ዓላማ ደም ለጋሾች ደም በሚለግሱበት ወቅት ያላቸውን እርካታ ለማግኘት በተጣይ መስተካከል ያለባቸውን ችግሮች ለመለየትና የደም ለጋሾችን እርካታ ተግባር ብቻ የሚውል ነው። ትክክለኛ መረጃን ለማግኘት የደም ለጋሾች መላሾች ቀና ትብብ ውጤት ከፍተኛ አስተዋፅኦ እንዳለው በመግለፅ ስለትብብረዎ ለባዊ ምስጋና እናቀርባለን።

ክፍል ሁለት:- ከዚህ በታች ለቀረቡት የፅሁፍ መጠይቆች በመልስዎ ረድፍ ሥር የ ✓ ምልክት በማድረግ እንዲገልጹልን እጠይቃለሁ።

በደም ለጋሾች/ የሚገኘው የጽሁፍ መጠይቅ

ክፍል አንድ: የመላኩ/ሷ አጠቃላይ መረጃ

መመሪያ: በተሰጠው ሳጥን ውስጥ የ ✓ ምልክት በማስቀመጥ መልስዎን ያመልክቱ

1. ስም ወንድ ሴት
2. ዕድሜ
3. የትምህርት ደረጃ
4. የጋብቻ ሁኔታ
 - ያለገባ ያገባ በጋራ እየኖሩ ያሉ
 - ባለቤቱ የሞተበት የፈታ/የተለያየ
5. አሁን ያሉበት የሥራ ሁኔታ ምንድን ነው?
 - ተማሪ የመንግስት ሰራተኛ
 - የግል ሰራተኛ የግል ድርጅት ተቀጣሪ ሰራተኛ
 - ሌላ ካለ ይግለፁ _____
6. የአሁኑ የሚለግሱት ለስንተኛ ጊዜ ነው _____

ቁ. ቁልፍ ጥያቄዎች	እጅግ በጣም ጥሩ	በጣም ጥሩ	ጥሩ	በጣም አነስተኛ	እጅግ በጣም አነስተኛ
1. በእንግዳ ማረፊያ ቦታ የቆይታ ጊዜ ተስማሚ ነው					
2. የደም መለገሻ አካባቢ ደም ለመለገስ ምቹ ነው					
3. በሚለገሱበት ወቅት የተሟላ እንክብካቤ አግኝተዋል					
4. በፈለጉት ወቅት የሚፈልጉትን መረጃ የማግኘት ሁኔታ					
5. ከደም ልገሳ በፊትና በኋላ ያገኙት ቅደመ መረጃ እና የምክር አገልግሎት ሁኔታ በቂ ነው					
6. ስለደረጉት በጎ ተግባር የተደረገለዎት ማበረታቻ ጠቃሚ ነው					
7. ስለደም ልገሳ ግንዛቤ የሚያገኙበት ሁኔታ በቂ ነው (ለመሳሌ በራሪ ወረቀት፣ ስልጠና፣ ብሮሽር ...ወዘተ)					
8. በአጠቃላይ ደም በሚለግሱበት ወቅት ያገኙት አገልግሎት አርክቶታል					

9. የደም መለገሻ አካባቢ ምቹ አይደለም ብለው ካመኑ ምቹ እንዳይሆን ያደረጉትን ምክንያቶች ይግለፁ?

_____ ::

10. በአጠቃላይ በደም ልገሳ ወቅት ያጋጠመዎት ችግር ካለና በተጣይ ቢስተካከል የሚሉት ነገር ካለ ቢያብራሩልን?

Annex - 4: Internal Quality Control implementation checklist

Monthly Internal Quality Control format

Date /Month /Year of Report

1. Monthly cold chain evaluation summary

Room	Refrigerator	Deep freezer	Incubator/Agitator	Temperature recorded (%)
Bleeding				
Labeling				
TTIs				
Distribution				
ABO				
Cold Room	-			
Average				

Case team	Cold chain transportation system Report for Mobile team			Remarks
	Forms Submitted	Forms Not submitted	Forms not checked by laboratory service	
1				
2				
3				
4				
5				

2 Quality control report on blood and blood components

Type of Blood product	QC results						Remarks
	No of Unit QC done	Volume passed	Hemolysis	HCT	Expiry	Count	
Whole blood 350ml							
CRC							
Platelet concentrate							
FFP							

Note:- NA- Not Applicable

3. Acceptable quality control criteria for blood and blood products (Specification)

- Whole blood 350 ml ⇨ 315ml-385ml
- Concentrated Red Cells ⇨ 217 ml-433ml
- Fresh Frozen Plasma ⇨ 150 ml-250ml
- Platelet concentrates ⇨ 50ml-70ml,
- Platelet Cell count ⇨ $\geq 5.5 \times 10^9$ /unit
- Hematocrit ⇨ 55 – 65%
- Factor VIII ⇨ $\geq 70\%$

4. Blood donor service

Month	Month and Date				
Case team	Collection	Under weight	Above weight	Total out of range (%)	Remarks
1					
2					
3					

5. Laboratory service

Discard unit during processing

Product	Over Weight	Under Weight	Lipemic	Lab. Accident	Cell Contaminant ion	Lack of storage space	Expired	Reason not specified	Hemolysis	Abnormal appearance	Cold chain problem	Total	Remark
CRC													
FFP													
PLT													
WB													
Cryo													
Total													

TTIs marker (Reactive)

No	HBV	HIV	HCV	Syphilis	Total	Remark
%		%	%	%	%	From TTI marker
%		%	%	%	%	From total collection

Annex - 5: Hospital Mini Blood Bank Criteria

No.	Equipment and reagents	Purpose	Specification
1	Blood bank refrigerator	-Heavy insulation for storage of the whole blood and packed red cells at $+4^{\circ}\text{C}\pm 2^{\circ}\text{C}$ <ul style="list-style-type: none"> • with special features of alarm alerts, • continuous temperature monitoring and display, • Uniform temperature maintenance throughout the equipment. • longer holdover time in the event of power failure. 	
2	Deep freezer	Rapid freezing process of the liquid plasma and subsequent storage of the plasma in the frozen state for 1 year at below -10°C	
3	Bench top centrifuge	For spinning the test samples to detect antigen-antibody reactions during the immunohematology testing	
4	Platelet agitator with incubator	Storage of platelets for five days at the required temperature of $+22^{\circ}\text{C}\pm 2^{\circ}\text{C}$ in an incubator with continuous agitation of the platelet units for an even suspension of platelets in plasma, thereby maintaining the quality of the platelet unit.	
5	Test tube and slide	For blood grouping and cross matching	
6	Anti- A,B,D Antisera	For blood grouping and compatibility tests	
7.	Anti human globulin antisera	To confirm weak D antigens.	
8.	Waste basket (Metallic)	For waste segregation	
9.	Water bath	Thawing (liquefaction) of the frozen plasma at controlled temperature of $+37^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and controlled time duration thus maintaining the properties of clotting factors in the plasma	
10	Blood warmer	For blood warming incase of clinically significant cold agglutinin disease, massive transfusion and double exchange transfusion.	
11	Infusion pump	Mechanical pump that facilitates infusion at controlled rates and achieves optimum flow rates. Commonly used in intensive care or high-dependency unit, or in paediatric care.	

No.	Furniture or fixture required	Size	Required number
1	Laboratory table with 3or 4 drawers	70 x 1.20cms	2
2	Chest of drawers to for filing	200 x 60 x40 CMS	1
3	Wash basin with two outlets	120 x 60 CMS	1

Annex – 6: HTC Functionality Criteria

HOSPITAL TRANSFUSION COMMITTEE /HTC/ FUNCTIONALITY ASSESSMENT TOOL

1. Is the hospital medical director a member of the transfusion committee and a chairperson for the committee?
Yes
No
2. Does HTC members assigned by official letter and the composition is from different disciplines?
Yes
No
3. The minimum number of members _____
4. Do the committee have approved TOR as per the national standard?
Yes
No
5. Do the committee meet regularly at least every 3 months with documented minute?
Yes
No
6. Do the committee conduct audit on the practice of blood transfusion against the national blood bank service standards and national guidelines, focusing on critical points for patient safety and the appropriate use of blood?
Yes
No
7. Regularly review and take appropriate action regarding data on blood stock management, wastage and blood utilization?
Yes
No
8. Develop and implement a strategy for the education and training for all clinical, laboratory and support staff involved in blood transfusion?
9. Do they report their performance activities to the management and blood bank?
Yes
No

Annex – 7: Essential Blood Bank supply list for Blood Banks

NO	ITEM
1	HIV Ag/Ab ½ ELISA test kit
2	HBsAg ELISA test kit
3	Anti HCV ELISA test kit
4	Syphilis ELISA test kit
5	Blood collecting bag 350ml single
6	Blood collecting bag 450ml triple
7	Blood collecting bag 450ml quadruple
8	Transfusion set
9	Coombs check cell for anti human globulin
10	Hepatitis B Rapid Test kit
11	Hepatitis C Rapid Test kit
12	Syphilis rapid kit
13	HIV rapid kit
14	Glove (disposable)
15	Vacutainer test tube 10ml
16	Test Tube Glass 10ml
17	Anti sera/Anti ABD
18	Blood lancet /automatic/
19	EDTA Capillary tube
20	Copper Sulfate powder
21	Sodium chloride powder
22	Adhesive plaster
23	Test Tube 5ml
24	First aid plaster
25	Face Mask
26	Ependrof tube
27	Alcohol Swab
28	70% alcohol
29	Cotton
30	Micro pipette tips
31	Pasture pipette
32	Safety box
33	First Aid Kit
34	Apron
35	Biohazard bag
36	Pack label
37	Ribbon