
Safe Blood Transfusion Programme
Government of Pakistan
National Blood Banks Data Collection Report

2016

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1. Executive Summary

In 2010, the Government of Pakistan, supported by Technical and Financial Assistance from the Government of the Federal Republic of Germany, initiated the Safe Blood Transfusion Project. The detailed operational planning and implementation of the Project lies with the federal, state, and provincial health departments. The overall objective of the project is the reform of the blood transfusion system towards a "nationally coordinated system" based on a centralized model with regional blood centres collecting, testing, processing and distributing blood to hospital blood banks which will store and select blood and blood components and issue them to clinical wards.

One of the key elements of blood safety reform process is the introduction of a harmonized computer based management information system which is the key tool for monitoring and decision making at system level allowing for the national monitoring of blood safety indicators. Currently there is no proper organized mechanism to facilitate the exchange of information and data between blood establishments and blood services on any aspect of blood supply management in Pakistan. Systematic approach of data reporting about blood centre activities does not exist in most of the blood centres. In the National Strategic Framework 2014-20, developed under the auspices of Safe Blood Transfusion Programme, data management is identified as one of the key strategic areas. Data and information management is essential as it provides the foundation for strengthening governance and leadership and an effective quality system.

The World Health Organization (WHO) established Global Database on Blood Safety (GDBS) in 1998 with the objectives to collect and analyze data on blood and blood product safety from all member states. GDBS is envisaged to serve as a basis for effective policy making and action to improve blood transfusion services globally. A uniform standardized questionnaire developed by WHO is sent to the national health authorities/ministries for completion and the data submitted is collated, analyzed and shared in the form of GDBS Reports. The data collected through the GDBS questionnaire and the Blood Safety Indicators are analyzed and reports are published on the WHO website, based on the availability of the latest data.

In 2011, Pakistan for the first time participated in this global effort, in spite of certain handicaps in the collection of the national data, i.e. the lack of overall system governance and absence of a proper national data collection system. The data was provided to WHO as estimates based on some information received from the provinces and some small scale research studies. The strategy followed by SBTP was to request the respective Provincial Blood Transfusion Programmes to provide their data. But as the provinces do not have a proper system of data collection even from their public sector blood banks therefore the data received from the provinces was of poor quality and sometimes contradictory to the previously reported data and in some cases contradictory to even some sections of the same form. In order to resolve this problem, the SBTP in 2016 decided to directly collect data from all the public and private sector BEs in the country. The practice proved to be quite beneficial and considerable national data of the year 2015 was successfully collected. The SBTP thus generated a National Data Collection Report in 2016 which documented and analyzed data received from 156 public and private sector blood centres covering almost 1.4 million donations collected in the year 2015 (~ 45% of the estimated national collections). The SBTP this year initiated the collection of 2016 data from all the provinces and the exercise was completed in last quarter of 2017 with a substantial increase in the coverage.
Ideally, the national data should be available with the regulatory authorities. In Pakistan, for the regulation of the transfusion sector, the respective provinces and regions have their own provincial Blood Transfusion Authorities (BTA) established under their respective blood safety legislations. The mandate of the BTAs also includes data collection. However, only the IBTA operating in ICT is properly functional and performing its assigned role and also generating accurate annual data. In Sindh and Punjab the BTAs had been notified and in existence but are not really properly functional as yet and do not collect or maintain the data from their respective regions. The Balochistan and AJK BTAs were also notified and in existence for long but until 2017 were not properly operational. But in the current year, these two BTAs become properly operational with the technical support provided by SBTP and initiated the system of blood banks registration, licensing, regular inspections, data collection etc. In KPK a new blood safety legislation was approved in 2017 and the new BTA is in the process of being established. In the meantime, the provincial blood Programme has initiated the exercise of mapping of blood banks and collecting their data. In GB region, the blood safety legislation is in the final stages of approval after which the BTA will be notified. But in the meantime, the G-B Blood Programme with the technical assistance of the SBTP has completed the mapping of the blood banks in the region and collected their annual data.

In AJK, a list of operational blood banks was prepared in light of the 2015 data collection report and through field and online survey. A total of 63 small and large blood banks in the public and private sector were mapped through the AJKBTA with the support of SBTP team. The data for the province of Balochistan was collected from 81 blood banks directly by the SBTP team in coordination with Balochistan BTA (recently operationalized). The statistics are compiled from the data received directly from the blood banks on the filled questionnaires and on the basis of the estimates calculated from the mapping exercise conducted in the city of Quetta of the small blood centers operating in miscellaneous settings in the vicinity of the Quetta Civil Hospital. In the province of Gilgit-Baltistan, the data of 23 blood banks operating in 10 different districts of the province were collected through a mapping exercise conducted by SBTP in collaboration with the provincial leadership. In KPK, the provincial blood Programme collected the data from 19 blood banks in the DHQ hospitals and 12 blood banks working in Peshawar city. In addition, the SBTP generated a comprehensive list of blood banks operating in the province with the help of google maps and a list of 50 blood banks was prepared. Data of only 40 was collected and included in this report. In Punjab, the limited data of 74 public sector blood banks was provided by the Institute of Blood Transfusion Service, while for the private sector, SBTP engaged directly with these Centres collecting data of 19 centres. In the province of Sindh, the BTA was able to provide the limited data of 36 blood banks in complete while for 66 blood banks only TTI screening data was available and shared.

The current national estimate of the annual blood collection in Pakistan is about 3.5 million from an estimated 1830 blood banks. In this Report, data for the year 2016 from 422 blood banks was collected comprising of 1,830,468 whole blood donations. The participating blood banks were from AJK (63 BBs), Balochistan (81), GB (23), ICT (20), KPK (40), Punjab (93) and Sindh (102). The province wise breakup of blood donations was AJK (30,633), Balochistan (104,838), G-B (21,829), ICT (68,274), KPK (211,650), Punjab (872,303) and Sindh (520,941).

The Armed Forces of Pakistan has an extensive healthcare system functioning across the country. The number of blood centers operated in large, medium and small hospitals is 112 category A, B, C, and D. The annual estimated blood collections in these centers and in the
field, is about 1.0 million. The SBTP submitted the blood collection questionnaires to the Medical Directorate with a request to provide the data of each individual center. The Medical Directorate shared the forms with the hospitals for provision of their respective data. The collected data has however not been shared with the SBTP yet as it is awaiting security clearance.

The subject study covered most of the known large blood banks in addition to many relatively smaller and unknown blood banks in the private sector. Many private sector blood banks, especially the smaller ones may have been missed out due to lack of knowledge about their existence.

Inclusion of the Armed Forces data, if shared, will increase the sample size of the study to about 2.8 million whole blood collections. This will then constitute about 36% of the total national data. Data from the public sector of G-B and Islamabad Capital Territory is fully covered but the compliance from the public sector blood banks from the other provinces and regions was poor. If the public sector data from the remaining provinces and the unknown smaller private sector blood banks is also received then the blood collection figure would come close to the national estimates of the 3.5 million blood collections annually.

It is believed that the number of private sector blood banks is greater than the number of public sector blood banks in Pakistan although the donations are probably more in the public sector BBs. In this study there were 199 public sector BBs and 223 private/NGO sector BBs.

The total blood collection in this study from 422 BBs was 1,830,468 for the year 2016. However, not all BBs kept proper record of the details of the blood donors (age, gender, type of donors etc.) Due to this reason, data on the type of donors was not provided by many BBs. Blood donations from 422 BBs consisted of 93% (n=1,693,790) from male donors and 7% (n=136,678) from female donors. 94% (n=1,719,206) of the donations were from family replacement donors and 6% (n=111,328) from VNRBD. A total of 68,892 blood donors were deferred from 1,830,468 blood donations. The details of deferrals were not documented.

The use of whole blood is still widely practiced although this practice is now on the decline and component therapy is gaining popularity. The facilities for component preparation are still not available in many blood centres especially the smaller ones. Out of the 422 BBs, 150 (36%) prepare components from whole blood while 230 (64%) do not process blood for component preparation. It is pertinent to add here that many BBs which prepare blood components do not do it on 100 % donations due to the clinician demand for whole blood or non-utilization or any other reason.

Regarding the TTI screening, ICT screening methods are used by 124 BBs for HBV and 132 BBs for HCV. 128 BBs used ICT for HIV, 110 for Malaria and 100 for Syphilis. ELISA is the second most widely used technology available in 74 BBs for screening of HBV, HCV, HIV, Malaria and Syphilis. CLIA is used by 40 BBs for HBV, HCV, HIV and 21 BBs for Malaria and Syphilis. 35 BBs use microscopy for Malaria and 5 uses RPR for screening of HBV, HCV, HIV, and Malaria. Pooled NAT is used by 16 blood centres for screening of HBV, HCV and HIV. Malaria and Syphilis screening is not performed by all BBs but where performed it is mostly by rapid screening devices. For CLIA, ELISA and NAT screening, multinational brands mostly WHO recommended or FDA or EU are used on the branded equipment. Quality assurance or equipment maintenance is an issue in many centres. In case of the manual ICT devices, most of the brands used are not internationally recommended and are usually very cheap with poor sensitivity and specificity. In most of the public sector blood
banks, these sub-standard ICT kits are used after bulk procurement by the provincial health departments.

In 2018, a similar national exercise will be initiated again for the collection of 2017 data. The rich experience gained and the feedback received from the partners is expected to result in smooth and prompt collection of data from a larger number of blood banks including the Armed Forces blood banks. The sharing of the subject report with the participating and non-participating partners is also expected to enhance compliance. It is anticipated that regular collection of this national data will improve the data management practices, quality of data and provide credible statistics for future planning and gap analysis.
2. Blood Transfusion Scenario in Pakistan

2.1 Background

The Blood Transfusion System in Pakistan has over the years evolved as a result of local initiatives, the result of which is the proliferation of various types of blood establishments of various sizes, relying on family donors, and according to various ethical principles, from non-profit to a service charge linked to the standard of services provided. It is clear that such a fragmented system is not safe and must be reviewed and reformed, even if some centres of excellence or of reasonable standards.

The current fragmented blood transfusion system is operating with insufficient regulatory oversight. There are no credible statistics on any aspects of blood transfusion as a national baseline survey has never been conducted. However, it is estimated that there are more than 1830 blood centres in the country with a significant contribution from the private and NGO sector. Not all the organisations cover the entire vein-to-vein transfusion chain. Several blood donor organizations are operating at various levels from online donor database to full-fledged transfusion services including managing thalassaemia centres. The blood safety standards in these blood banks are generally weak throughout the country but centres of excellence as well as satisfactory quality centres exist mostly in the larger cities.

In Pakistan, accidents and violence is one of the most common causes of need for blood transfusion in the age groups of 15-30 years. The other important area where provision of blood is crucial is women during child birth. The maternal mortality ratio in Pakistan is considerably high (276/100,000 live births) and a principal cause of death among women in this category is haemorrhage while most of them are already anaemic during their pregnancy. Pakistan also has a very large burden of thalassaemia and the number of transfusion dependant thalassaemics is believed to be about 100,000. Most of these patients are catered to by the private sector.

Blood-borne transmission remains a key vector for the Hepatitis B and C infections in Pakistan, affecting about 7.4 percent of the population. In case of blood donors, seroprevalence of HBV varies from 1.46% to 8.4% while Infection rate of HCV varies from 0.27% to 8.68%. The frequency of HIV and syphilis is low but High Risk Groups (HRGs) have shown a higher prevalence rate for syphilis and HIV/AIDS. Other high risk groups include intravenous drug users, male sex workers and transgenders. Previously published results show the prevalence of syphilis falling in the range of 0.01 – 0.78% while for HIV it is < 0.1%.

The annual blood collection in Pakistan has been estimated to be 3.5 million. The most critical point is that 1-3rd of this is dedicatedly collected and transfused to thalassaemia

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patients which suggests a change in the government policy who should focus on the preventive side rather than curative side of the disease. The annual demand will be much lower if we are able to eradicate this syndrome. This large community of thalassaemic patients in the country (6% carrier rate) is facing a looming risk with accumulating higher percentages of HBV (8.4%) and HCV (56.8%) as they receive multiple transfusions every year.

In addition to the public and private/NGO sector, Combined Military Hospitals (CMHs) are the base hospitals of the Pakistan Armed Forces, which are situated in various cantonments. These hospitals are managed by the doctors of Pakistan's Army Medical Corps. The administration is carried out by the General Duty Medical Officers (GDMOs) while the patients' management and care is primarily the responsibility of the doctors of specialist cadre. The CMHs are categorized into three major parts depending on their functions, governing and physical body and role as Class 'A' (≥ 500 beds), Class 'B' (100 – 400 beds) and Class 'C' Hospitals (≤ 100 beds). There are 11 Class A hospitals, 8 Class B hospitals and 10 Class C hospitals. All these hospitals have a well maintained blood transfusion service. The consumables and other equipment procurement for these blood banks are centralized and controlled by the General Headquarters. In addition, there are 7 hospitals under the Pakistan Air Force and all 3 under the Pakistan Navy and all these have blood banks adequately staffed. In addition to the armed forces hospital settings, transfusion services are also conducted in field settings at the border areas and in disaster affected areas.

2.2 Government’s Blood Transfusion Programme

Keeping the scenario in perspective, the Government of Pakistan initiated a new model of blood transfusion services based on the European Blood Transfusion System Reforms. In 2008, the Ministry of Health initiated these blood safety systems reforms in Pakistan from the platform of its National AIDS Control Programme with the assistance of the German government grant through GIZ and KfW. The most important element of the reforms process was the establishment of the National Blood Transfusion Programme in 2010 when blood safety was taken out of the confines of the AIDS Programme to ensure safe blood transfusions all over the country. Other measures of the reform process included the formulation of a National Blood Policy and Strategic Framework in the light of which the Federal and Provincial PC-1s of the project were developed and got approved from the respective provincial authorities and finally at the federal level in March 2010. The overall objective of the project is to provide safe, efficacious and quality assured blood to the citizens of Pakistan. The project concerns the improvement of blood transfusion services in Pakistan by strengthening its organizational and physical structure which complies with the World Health Organization (WHO) blood safety recommendations. At the federal level, the Programme performs the role of central coordinating body to oversee policy planning, provide strategic guidelines, set standards, monitor and evaluate programmes, liaise with development partners and report on international commitments and above all ensure smooth and seamless implementation of the project all over the country. The main responsibilities of the SBT Programme are:
- Project implementation and coordination with the donor and provincial partners
- Development of Policy and Framework for blood safety reforms and their implementation
- Development of Guidelines / Manuals / SOPs, and their adherence
- Monitoring and Evaluation of the project activities and blood safety reforms
- Blood Safety Legislation development, enactment and adherence
- Capacity Building programme development and implementation
- Collaboration with International Partners

This Programme has been different from other development programmes, not only because of the nature of work, but also in allowing the increasing and full participation of local counterparts in the design and implementation work. The planning strategy adopted was not the top-down approach and so the relationship between the partners that evolved was extremely fruitful and well balanced. The international expertise brought in was compatible with and complementary to existing local structures.

The programme is supported by the German Government through its technical and financial cooperation components. The Technical Cooperation (TC) component is now implemented directly by GIZ (German Agency for International Cooperation) as part of the GIZ Health Sector Support Programme. The TC component works to improve access to safe blood and blood products by providing advisory services concerning organisation and governance of the system including a management information system, voluntary non-remunerative blood donations, clinical use of blood, legal and regulatory framework, quality management and capacity development. The technical outputs since 2010 have strengthened the national blood safety system reforms process including the development of SOP Manual, National Standards, Clinical Use of Blood Guidelines, National QC Guidelines, among others. The Financial Cooperation (FC) component of the project funded by KfW, the German cooperative bank, is responsible for the development of the new infrastructure which consists of constructing and equipping a network of Regional Blood Centres, and renovation and refurbishment of the existing Hospital Blood Banks. Development of 10 Regional Blood Centres and up-gradation of 60 existing hospital based blood banks in the first phase through the FC component was completed in 2016. The regional blood centre (RBC) is a new entity in the blood services system in Pakistan. To obtain blood the RBC must link to the blood donor community, and in order to dispense blood products it has to create links with the HBBs. The RBCs must also co-operate with the blood transfusion authority (BTA) and be linked to the provincial blood transfusion service organisation. As such, a centralised blood banking system is a very new concept in Pakistan with only few people from the private/NGO sector having prior experience with this model.

Now the extended second phase of the TC component is underway. The Agreement of the second phase of the Financial Cooperation component funded by KfW was signed by the Economic Affairs Division in March 2016. The PC-1s of the Phase II have been approved for the provinces of Punjab, KP, Sindh and the federal capital. The PC-1s for the provinces and regions were developed through technical assistance provided by the KfW in collaboration
with the SBTP. Phase II proposes expansion of the scope and coverage of the Phase I concept in the light of the experience gained and lessons learned.

2.3 Update on Key Programme Areas

2.3.1 Voluntary Non-Remunerated Blood Donation

Pakistan’s blood transfusion system has developed without the guidance of an overall regulatory framework, so that competing concepts can be observed in a framework of fragmentation. Voluntary blood donations, mostly collected by the university-based Blood Donor Organizations, account for only 15% of all donations. In order to increase blood safety and to create a donor base for the Regional Blood Centres, SBTP is promoting the concept of VNRBD to gradually replace the traditional concept of ‘family replacement’ donors. Promotion of voluntary, non-remunerated blood donations (VNRBD) is the cornerstone of the system reform of the blood transfusion sector in Pakistan as per the WHO recommendations. Currently the VNRBDs comprise only approximately 12% of the national donations. The national strategy (adopted in National Donor Policy 2011) to promote VNRBD aims to encourage the conversion of the vast population of replacement donors into regular blood donors as many of these regular donors are suitable to become voluntary donors. But in the absence of a properly coordinated blood transfusion system, these donors are not counseled to donate regularly on a voluntary basis and their potential remains untapped. The national strategy proposes availing the opportunity of the onetime visit by the replacement donor to the blood centre for donating blood for his/her relative by providing them counseling and convincing them to return again as a voluntary blood donor. The second strategy to increase reliance on VNRBDs is to strengthen the capacity of the blood centres and engage with voluntary Blood Donor Organizations (BDOs) operating in colleges and universities to yield their true potential.

One of the key strategies towards achieving the overall indicator, in parallel with introducing governance through a well-implemented donor policy, was increasing awareness through a well-designed Public Awareness Campaign. In order to design an appropriate PAC, a nationwide KAP survey, assessing the knowledge, attitudes and practices of a multilayer, randomized sample of 3,000 respondents, was conducted with support from and within the ‘circumscription’ of BDOs. A cross-sectional, descriptive study was conducted over a period of three months (Jan-Mar 2012). Multi-stage random cluster sampling approach was followed and college and university students were targeted through 20 University based Blood Donor Organisations (BDOs) out of a total 56 BDOs identified. The questionnaire (pre-tested) was kept anonymous and each question included multiple options or statements. The results of the study will be used for developing a Public Awareness Campaign (PAC).

In Pakistan, Blood Donor Organizations (BDOs) are mostly university based voluntary organizations managed by students. On the one hand, these organizations form the backbone of (voluntary) donor mobilization and blood collection in Pakistan. On the other hand, they are working independently, without an agreed governance or communication framework. The potential importance of BDOs in the BT system reform process, however, lies in the fact that they are collecting enormous quantities of (voluntary) blood donations through their donor
motivation and mobilization programmes. As an example, around 44 of them have a total annual collection of about 580,000 units, exceeding the planned annual collection of the future 12 RBCs (390,000 units). Though the existence of this kind of support organizations was already known, nobody had gained an overview of the dimensions of their contributions, and as they functioned in isolation within their university environments, even they themselves were mostly unaware of their potential and importance at a national scale. Blood Donor Organizations from all parts of the country were contacted and the relevant data were collected in order to learn more about their existing strategies and potentials. The information gathered is being used for the elaboration of a ‘First National Inventory of Blood Donor Organizations’ to be published under the National Blood Transfusion Programme’. About 80 BDOs have been identified thus far, working independently and with variable functions. The partnership with the BDOs enables the public sector to benefit from quality, innovation and efficiencies. There are many modalities for cooperation such as the private sector BB could act as “regional blood centers” both for public and private HBBs. The BDOs could be linked to RBCs and deliver blood directly to these centres rather than to individual hospitals/patients.

As result of the sustained efforts of the SBTP over the past few years and the support of the WHO, the World Blood Donor Day (WBDD) is now extensively celebrated all over the country in the month of June. The impact of these celebrations has resulted in increasing awareness about voluntary blood donations. The WBDD activities are receiving more and more coverage in the electronic and print media which is a reflection of the sustained and committed efforts of the Safe Blood Transfusion Programme.

In February 2016, Ms. Sharmeen Obaid-Chinoy was appointed as the ‘Honorary Ambassador for Blood Safety’ by the Government of Pakistan. Sharmeen Obaid-Chinoy is the first Pakistani to win two Oscar Awards. She is an internationally acclaimed filmmaker known for highlighting women right issues. She has also produced documentaries on various health issues including blood transfusion and blood safety. As ‘Honorary Ambassador,’ Ms. Chinoy promotes the culture of voluntary blood donation especially among the youth BB sites advocating safe blood transfusions in Pakistan. Recently, the Programme signed an agreement with the renowned international footballer, Cristiano Ronaldo, to promote the culture of voluntary blood donations in Pakistan. The national campaign is planned to start in early 2018.

To strengthen the existing BDOs in the country, the Programme established an association of BDOs; PakBLOOD. The Programme, with the support of the World Health Organization, conducted three 2-day workshops in 2016 titled “National Consultation of PakBLOOD Association” in Islamabad, Karachi and Lahore. The objectives of the workshops were organization and strengthening of the Association, sharing the technical data received from the partners and discussion on the strategies of improvement in data sharing and practices of blood banks and transfusion centres for capacity development of the partners. The workshops were attended by a total of more than 200 participants from more than 100 BDOs, Thalassaemia Centres and Blood Banks throughout the country.
2.3.2 Policy Development
A ‘National Health Vision’ is being developed by the Ministry of National Health Services, Regulation & Coordination, Government of Pakistan with the technical assistance of WHO and USAID. The Programme recommendations for the ‘National Health Vision’ included; Retaining Blood Safety as a priority area as in the National Health Policy 2010 (Zero Draft), Inclusion of Thalassaemia Prevention as a new priority area, and Promotion of Blood Component Therapy by ensuring 100% component preparation from all whole blood collections through availability of component preparation equipment in blood centres and advocacy with prescribers for rationale clinical use of blood sensitization.

Earlier, in 2014 the Programme formulated a National Blood Policy and Strategic Framework endorsed by all provinces and stakeholders. The document provides fundamental principles and identifies clear priority areas that need to be focused on in a coordinated manner so that the strategy can be implemented successfully within a set time frame. The unique challenges posed by the heavy burden of thalassaemia disease and its impact on the blood system have also been taken into account in the future strategy.

At the Regional Level, the WHO has been at the forefront of the movement to improve blood and blood product safety and availability. The WHO Regional Office for Eastern Mediterranean has formulated the strategic framework for blood safety and availability (2016–2025). The SBTP actively participated in the consultation process of development and approval of the regional framework. The document has been endorsed by the 63rd Session of the Regional Committee (EM/RC63/R.6). To help implement this Framework, a WHO EMRO Mission visited Pakistan in April 2017 and reviewed the BT regulatory system in Pakistan. The Mission noted that the prerequisites for a regulatory system are already in place in the form of legislation and notified authorities. In addition, the Mission observed a very keen desire among the political and executive leadership of the health sector and also among the stakeholders for an effective and functional regulation of the blood sector.

2.3.3 Regulation of Blood Transfusion Services
The system reform in the blood transfusion sector of Pakistan is guided and informed by a legislative reform with the introduction of new blood transfusion laws molded on the pattern of the European Union regulations, a process which will lead to a paradigm shift for the entire system. Draft template legislation was developed by the TC component of the GIZ in 2015. The proposed new legislation was based mainly on the recent EU Directives on setting standards of quality and safety for the collection, testing, processing, storage and distribution of human blood and blood components. In this regard a very important development in 2016 has been the approval of the revised blood safety legislations in the provinces of Punjab and Khyber Pakhtunkhwa.

A model ‘Functional Brief’ for BTA has been drafted which provides guidelines and tools for proper functioning of BTA. This document describe BBs the roles and functions, the organizational setup and requisite resources for Blood Transfusion Authorities in Pakistan. While an effort has been made to cover all essential requirements of a Blood Transfusion Authority according to international guidelines, the document has been developed for the context of this country.
Pakistan does not have a single national blood transfusion regulatory authority. Instead, we have blood transfusion regulatory authorities in all the provinces and regions established on the basis of the respective blood safety legislations enacted during the period 1997-2004. Due to weak and fragmented service delivery system and other administrative reasons, the transfusion authorities have not been able to perform their desired role. The only exception is the Islamabad Blood Transfusion Authority which was revived in 2013 and has since demonstrated remarkable progress with very limited resources. The roadmap followed by IBTA was very structured and systematic and had a huge impact on the quality of blood transfusion services in the federal capital. The IBTA is closely coordinating with the provincial BTAs to build their capacity to eventually have uniform standards of regulation throughout the country.

Dr. Yetigeta Abdella, WHO Technical Officer from EMRO region visited Pakistan in February 2016, to assess the situation of blood transfusion services in the public and private sector. The visit focused on studying the organization, regulation and delivery of services. Dr. Abdullah visited several blood banks, hospitals and thalassaemia centres in Islamabad and appreciated the regulation work done by IBTA...... “During my visit to Pakistan, I was pleased to see the progress made by the Islamabad Blood Transfusion Authority (IBTA) by implementing the blood safety legislation in the Islamabad Capital Territory. The IBTA has developed a very practical model of regulation suitable for the needs of developing countries. I appreciate the IBTA team for this endeavor”. The successful IBTA experience has been shared at the Regional WHO meeting in Tunis in 2016. The IBTA performance has also been praised by the national Parliament. A meeting of the Parliamentary Committee on Government Assurances was held in November 2016, in which the performance of the Islamabad Blood Transfusion Authority was also discussed. The Committee was very impressed by the IBTA performance and; “..... showed complete satisfaction over the work of Islamabad Blood Transfusion Authority, IBTA, regarding compliance of the assurance regarding elimination of unmonitored blood banks in Islamabad. The Committee was of unanimous opinion that the assurance had been complied in letter and spirit.”

2.3.4 Management Information System for BTS

Supported by an international short term expert, MIS brief was drafted to achieve consensus by the implementing partners. MIS has a crucial role in BTS as it improves the overall decision making process by making available comprehensive and diverse information in an integrated manner. It also reduces the errors and omissions. Current information solutions do not fully comply with the necessary standards for safe blood transfusion. Therefore solutions need to be improved to better support the future processes in the Regional Blood Centres developed through full utilization and support of bar code automation, enabling full traceability of blood, provision of data quality, etc. To make the MIS brief comprehensive, some additional features were included such as screen charts, rules of data entry, and a feature of traceability for the reliability of the data. The possibility of alternative system models (centralized vs decentralized) and data ownership have been also discussed. However,
all implementing partners agreed on a centralized architecture including centralized data warehouse to be operated jointly by all provinces.

2.3.5 Human Resource Development
Capacity development of human resource to support the new system is a very important component of the Programme. More than 100 short term training activities have been conducted since 2010 by the Programme and its counterparts to gear the technical workforce to take up the new challenge. These activities focused on all key aspects of system reform. Many of the capacity building activities were performed through the WHO support.

2.3.6 Haemovigilance and CUB
In the light of the WHO recommendations, the concept of haemovigilance is being strongly advocated by the Programme especially through the platform of the regulatory authorities. It is now mandatory for the licensed blood banks to share their HV data with the region’s Regulatory Authority. In the Inspection Manual developed by SBTP haemovigilance was made part of the inspector’s training and inspections particularly focus on the documents developed for haemovigilance and traceability. The haemovigilance data collected by the IBTA has been presented at national and international fora and highly appreciated. The Programme has also facilitated the development of the Pakistan Haemovigilance Network (PHN) to promote the culture of haemovigilance in the country. The initiative was launched after extensive consultations with individual key national partners. National Coordinator and Focal Person for the network have been nominated to facilitate the smooth establishment and working of the Network. Pakistan has been granted country membership of the International Haemovigilance Network (IHN) and the Programme regularly participates in the IHN Annual Seminars and shares its data and experiences.

An essential measure towards improving the quality of the transfusion process is the rational clinical use of blood. Effective clinical use of blood requires clinical transfusion guidelines to be in place. In this priority area, the TC team facilitated the formulation of a task force from representatives of the Medical Associations. The task force consisted of a ‘Core Group’ and ‘Corresponding Members’. The core group representing haematologists and one or more members from each of the medical associations of Pakistan dealing with haemotherapy (oncology, anaesthesiology, surgery, gynaecology, paediatrics, orthopaedics, neurosurgery, medicine and cardiac surgery) held several Technical Meetings for this purpose in Lahore. The first edition of the guidelines for the clinical use of blood in Pakistan was developed in 1999 which remained un-implemented. During development of the document, a special emphasis was placed on the applicability of the document to most facilities in Pakistan. An effort has been made to include all of the common clinical situations requiring the use of blood/blood components. These guidelines are, however, not absolutely binding and situations may arise in which deviations based on the clinical judgment may be required. The purpose of this document is to assist clinical decisions about the transfusion of blood and blood components. Many of the conventional and widely taught indications for the transfusion of blood components are not justified, resulting in irrational use of blood and wastage of this scarce resource. The document is intended for all clinical staff dealing with
blood and blood components including nurses, ward and theatre staff. The document is divided into four parts. The first one provides background and the rationale for the development of the guidelines. The second one provides guidelines for the storage, issuance and transport of blood and components. The third section contains guidelines for the transfusion of blood and components. The fourth section provides guidelines for the use of other blood products. In the month of September 2012, a workshop was held in which these guidelines were approved formally and a work plan was formulated for the implementation of these guidelines which included the institution of the hospital transfusion committees (HTCs) and incorporation of these guidelines in the medical curricula.

2.3.7 Development of National QC Guidelines
The Programme through an extensive national consultation developed the National Guidelines on Quality Control in Transfusion Medicine in 2017. The document will encourage blood banks and transfusion services to develop strong quality assurance programmes, organize scheme of management and employ training and competency evaluation programmes. Standardized forms developed by the Programme are also provided which must be routinely used in the blood centres. The guideline draws from the documents of the World Health Organization, European Union, International Haemovigilance Network and Technical Manual of American Association of Blood Banks. The guidelines complement the earlier documents developed by the Programme. The Programme plans to implement these guidelines through capacity building workshops so that by the end of 2017 at least 100 blood centres have adopted these guidelines in earnest.

2.3.8 Research and Development
Until recently there was very little literature published about transfusion medicine in Pakistan. To fill this important scientific gap, the Programme has been promoting the culture of research and development in the transfusion sector in Pakistan. In addition the Programme brings out monthly e-newsletters, employs social media and publishes Annual Reports of SBTP, IBTA and WBDD. The Programme also regularly publishes its research work in reputed international and national research journals. During the past 6-7 years, the SBTP leadership got published more than a 50 research articles in international journals of repute. Some of this research work has also been presented by the SBTP at international forums including the congresses of the International Society of Blood Transfusion (ISBT) and the WHO EMRO forum.

2.3.9 International Partners
The Programme has also interacted proactively with the international blood transfusion community and developed strong linkages with many international partners. These include technical collaborations with the World Health Organization (WHO), International Society of Blood Transfusion (ISBT), Asian Association of Transfusion Medicine (AATM), International Haemovigilance Network (IHN), International Blood Donors Organization (FIODS), Global Blood Foundation (GBF), Arab Transfusion Medicine Course (ATMC) etc. WHO collaboration focus promotion of voluntary blood donations and quality systems and prevention of transfusion transmissible infections. Joint activities conducted include World
Blood Donor Day celebrations, quality management training workshops, development of national screening strategies, conducting national baseline survey on TTI screening system etc. Through WHO facilitation, USAID has sponsored the procurement of TTI screening kits for two years. In addition, there is regular participation from the Programme leadership in international conferences, seminars, etc. Foreign experts also regularly visit Pakistan, through the TC and FC component, and provide inputs in various aspects of the Programme development.

2.4 Provincial Blood Transfusion Programmes

The different states of development of the transfusion structures and organizational cultures in each of the provinces required stepwise approaches in accordance with ground conditions, supporting different stakeholder groups to understand and embrace the reform process and to build up the required institutions and structures. In all provinces, the short term or medium term results achieved are adoption of the national blood policy and strategic framework; establishment of the steering structure; formulation of an updated legal framework, including transfusion laws\(^5\), rules and regulations; human capacity development based on training need assessment; MIS for blood transfusion authority, incl. registration and licensing data and blood safety data; quality management (Quality Manual, SOPs, CUB Guidelines).

2.4.1 Azad Jammu and Kashmir (AJK)
The state of Azad Jammu and Kashmir, having an area of 13,297 square kilometers, lies in the North East of Pakistan and North West of India. The healthcare coverage in the State remains inadequate. The population growth rate is 2.41%, infant mortality rate is 62/1000 (59 in Pakistan), maternal mortality rate is 201/100,000 (260 in Pakistan), population per doctor is 4799 (1,127 in Pakistan) and population per bed is 1,368 (1,786 in Pakistan).
The blood transfusion services are an integral component of the AJK Department of Health’s policy. The services are provided by public sector hospitals and an ever increasing number of NGO sector blood banks mostly catering to the needs of the thalassaemia patients. The Central Blood Transfusion Services (CBTS) provide consumables to the blood banks in the ten DHQ Hospitals and infrequently organize capacity building workshops for the technical staff.

One of the key issues in the AJK BTS is weak regulation and governance of the system. Also there has been lack of coordination of activities with an inevitable impact on the adequacy and sustainability of the blood supply. The Government of AJK passed an Act in 2003 to regulate and strengthen the blood system but the Act has not been enforced in its true spirit yet. Since 2010, the Government of AJK has been implementing the blood safety reforms in the state through the Safe Blood Transfusion Programme co-funded by the Governments of Germany and Pakistan. The Department of Health has invested significant efforts in the pursuit of wide-ranging reforms of their blood sector. These reforms included the construction of a modern Regional Blood Centre in Muzaffarabad and installation of

equipment in six attached hospital blood banks. An important aspect of the systems reforms process is strengthening of the AJK Blood Transfusion Authority (BTA) notified by the AJK Health department under the AJK Safe Blood Act of 2003.

The AJK BTA initiated regulation of blood banks in the state of AJK in December 2013. An announcement was made in the newspapers for registration of blood banks. Unfortunately, very poor response was witnessed and only one blood bank applied for registration. In October 2014, the AJK Authority approached the Islamabad Blood Transfusion Authority for assistance and support in the regulation of blood transfusion services in the state. In response, the IBTA supported in the inspections of blood banks in a few districts and a report was drafted based on the findings.

Overall, the blood transfusion sector in the State is suffering serious shortage of technical personal especially in private blood centres. Due to shortage of qualified Haematologists and Technicians, the gap is filled with non-qualified staff and the whole system is in unsafe hands. Most of the private Non-Governmental Organizations (NGO) BBs do not have any medical staff and the qualifications of most of the technical staff is very dubious. There is a dire need of training of the technical staff and induction of trained personal to improve quality of the services. The BBs in the government sector has the necessary equipment used for blood component processing, screening and storage but the same remains largely un-utilized.

Thalassaemia is highly prevalent in AJK and the facilities for thalassaemia care, management and prevention are extremely limited. Many private/NGO thalassaemia centres are functioning in AJK supported by philanthropy courtesy of Overseas Pakistanis but their systems and standards remain unsatisfactory. There is a need to regulate the funding and quality of services provided by these centres. As a result many patients from AJK seek treatment in Islamabad or other cities in Pakistan incurring huge physical, emotional and financial stress on the affected families.

The total budget of the AJK Blood Transfusion Programme in Phase I was Rs. 147.80 million. Additional budget of Rs. 87.838 million has been committed for Phase II of the project from the government side while 0.98 million euros from the German partners. The RBC Muzaffarabad covering an area of 10,030 sq. ft. has been completed and has a capacity for the collection of 20,000 donations per year. The RBC is supplying blood and blood components to attached hospital blood banks. The RBC is partially operational at the moment.

2.4.2 Balochistan

Balochistan is the largest province of Pakistan, covering 44% of the country’s area (347,190 km²), but with an estimated 17 million inhabitants representing only 5% of the country’s population.

Although health care services in Balochistan are provided by public and private providers, the government is considered by far to be the main provider of preventive care throughout the province and the major provider of curative services in most rural areas. The DOH has recently formulated a vibrant and active Health Policy and Health Sector Strategy with assistance of Technical Resource Facility (TRF). In the public sector, health services are
provided through a tiered referral system of health care facilities; with increasing levels of complexity and coverage from primary, to secondary and tertiary health facilities. Primary care facilities include basic health units (BHUs), rural health centres (RHCs), government rural dispensaries (GRDs), mother and child health (MCH) centres and TB centres. Currently there are 23 district hospitals, 5 divisional hospitals and 5 tertiary care hospitals in the province including Bolan Medical Complex, Sandeman Provincial Hospital, Fatimah Jinnah Chest & General Hospital, Helper’s Eye Hospital, and Sheikh Khalifah bin Zayed Hospital. The primary level health facilities in the province include Civil Dispensary (567), Basic Health Unit (553), TB Clinic (22), MCH Centre (89), Rural Health Centres (89), and Leprosy Centres (13). Total hospital beds of the public sector are 3,415, i.e. 2,354 persons per bed.

The healthcare service delivery in the province is a big challenge due to long distances, rugged difficult terrain, dispersed population, slow social progress, security situations, lack of trained HR, scarce funds, etc. The MMR is 785/100,000 live births while the national figures stands at 272/100,000 live births. The progress on MDGs and SDGs has been disappointing in the province. The same applies to the blood transfusion services which are very unsatisfactory at the moment. There are no surveys in the province; however, a recently conducted survey outlined more than 70 blood banks in Quetta itself. Blood donor services do not exist except for those run by a few community based NGOs. Most donations are collected from replacement donors, while the proportion of voluntary donors is still extremely low.

The Balochistan Government approved a Safe Blood Transfusion Act in 2004, and notified a Blood Transfusion Authority which was only made operational in early 2017. The budget of the provincial PC-1 Phase I was PKR 297 million through which one RBC was constructed in the vicinity of Bolan Medical Complex, Quetta with a capacity of processing 50,000 blood donations per year. The budget for Phase II of the project is PKR 169 million. In Phase II, BBs in Turbat and Loralai DHQ hospitals will be upgraded and sector NGOs in Quetta will also be supported.

2.4.3 Islamabad Capital Territory

The city of Islamabad (1,165.5 km²) is situated between the province of Khyber Pakhtunkhwa and Punjab and estimated population is around 2 million (urban and rural). Islamabad has the lowest rate of infant mortality in the country at 38 deaths per thousand compared to the national average of 78 deaths per thousand. Islamabad has more than 25 public and private hospitals of variable size. In the rural set-up, there are 14 basic healthcare units (BHU) and two rural health-care centres (RHC).

The Ministry of Health drafted a blood safety ordinance in the year 2001, to regulate the transfusion of safe blood and blood products in the Islamabad Capital Territory. The Ordinance was promulgated by the President of Pakistan on 15th October, 2002 as Ordinance LXXIII of 2002. Under Section 5 of the Ordinance, the Islamabad Blood Transfusion Authority was constituted by the Federal Government in 2005, followed by the formulation of ‘IBTA Rules of Business’ through a SRO of the Ministry of Health in April 2005. Following the devolution of the health sector under the 18th constitutional amendment, the
Authority was revived by the Ministry of National Health Services, Regulation & Coordination in 2013. The Authority has demonstrated remarkable progress in the last four years with very limited resources. This has been acknowledged by national and international stakeholders. The roadmap IBTA followed was very structured and systematic and has had a huge impact on the quality of blood transfusion services in the federal capital. A blood regulatory Authority has the responsibility of data collection, management, analysis and reporting for planning and evaluation of services. Accordingly, after its revival in 2013, the IBTA registered blood banks and data collection was streamlined through a standardized data collection tool. The IBTA has, therefore, the data of all 19 licensed blood banks of ICT for the years 2014, 2015, and 2016. The annual data collection exercise proceeds very well in the month of January every year as a result of the harmonious coordination between the IBTA and the licensed BBs.

The IBTA has made plans to generate real time data on the IBTA website. All the licensed blood banks will be provided a link through which they can update their blood inventory status online on the IBTA website. The IBTA is continuously coordinating with the provincial BTAs and the collaboration between IBTA and the provincial BTAs will go a long way in improving the standard of blood safety in Pakistan.

In Phase II of the project, a modern RBC will be constructed and equipped in Islamabad which will be responsible for providing blood and blood components to all the residents of the federal capital through public and private sector hospital blood banks. The Centre is expected to serve as a role model for all the RBCs in the country.

2.4.4 Gilgit Baltistan

Gilgit-Baltistan (G-B) covers an area of over 72,971 km² in the north of Pakistan and has one of the highest mountain peaks in the world. It had an estimated population of 1,800,000 but its distribution is wide and communication difficult. The region has three divisions and ten districts. Only in 200, Gilgit Baltistan, with an estimated population of 1.8 million, was established as an independent province. The province represents one percent of Pakistan’s population.

Blood Transfusion Services in G-B are not well developed. The large public sector hospitals have reasonably well equipped blood banks but due to management and technical issues, the centres are not properly functioning. There is a severe shortage of properly qualified and trained staff in public sector blood centres. Armed forces have well established hospitals and blood banks in the region but no coordination exists between the public sector and armed forces health care systems.

The political leadership is highly committed to improve the transfusion services in the region and gain maximum benefit from the German government funded Safe Blood Transfusion Project. However, the technical capacity remains a constraint. The exact number of blood banks in G-B is 23.

The SBTP regularly invites technical personnel working in blood centres in G-B but more extensive training programmes are required to be conducted in the region. Along with these short term trainings, regular staff exchange training programmes should also be introduced to
make the staff of G-B familiar with the recommended technical procedures and advanced techniques available in the major centres in Pakistan.

The Safe Blood Transfusion Act 2016 has been prepared though the technical assistance from the SBTP. The draft bill is under consideration in the legislature for approval. A Blood Regulatory Authority will be established once the Bill is enacted to regulate the transfusion services in the region.

One RBC has been constructed in Gilgit through Phase I and was inaugurated by the Chief Minister of Gilgit Baltistan and the German Ambassador in May 2016. The RBC is linked with 6 hospital based blood bank located in DHQ Gilgit, DHQ Chilas, DHQ Gakuch, Gilgit medical center, Hunza Nagar and DHQ Astore. The Phase II of the project includes the construction of an RBC in Skardu. The RBC Skardu will be linked with six HBBs namely DHQ Hospital Skardu, DHQ Hospital Khaplu Ghanche, Civil Hospital Thoar, Abdullah Hospital, Civil Hospital Totti and Civil Hospital Keris Khaplu.

2.4.5 Khyber Pakhtunkhwa (KP)

The population of Khyber Pakhtunkhwa is estimated to be 26.8 million with a land area of 74,521 km². Khyber Pakhtunkhwa is divided into 25 districts. There are 20 settled area districts and 5 Provincially Administered Tribal Areas (PATA) districts. Peshawar is the provincial capital. There are 1,607 health facilities in the province with 30,188 personnel. Many hospital-based and standalone blood banks are operating in the province. The public sector blood banks are 35 while 68 private/NGO sector blood banks are functioning in the province. Until recently, the blood transfusion sector operated under the NWFP Transfusion of Safe Blood Act 1999. However, in October 2016, the provincial government of KP passed Blood Transfusion Safety Authority Bill 2016, to regulate the collection, testing, processing and storage of blood and blood components as well as the rational use of safe blood and its products including plasma free from viruses in public and private sectors and to establish regulatory authority for it.

Details of health facilities including Blood Transfusion Services in other divisions are not available. KP is also providing health facilities to the Federally Administered Tribal Areas (FATA). The blood transfusion sector needs more attention of the DoH and mapping of blood centres and surveys on the available facilities are required.

The burden on the blood transfusion services is more due to terrorist attacks, medical tourism from Afghanistan, routine trauma cases, and high prevalence of thalassaemia. An RBC built in Peshawar in Phase-I of SBT Project with German Grant is expected to make a difference.

The budget of the provincial PC-1 was PKR 190.17 million for the SBTP Phase I. In Phase I, one RBC was established in Peshawar at the Hayatabad Medical Complex with a capacity of collecting 50,000 blood donations per year and is linked to 6 existing HBBs of Peshawar. The Phase II budget is PKR 713.368 million. And RBCs are planned for Abbottabad, Swat, and D.I. Khan along with upgradation of the attached existing hospital blood banks.
2.4.6 Punjab

The population of Punjab is approximately 100 million and has 36 administrative districts, comprising over 55% of the population of Pakistan. The literacy rate is 59.6%. The urban population is 40% while 60% is rural. The Government of Punjab has drafted a comprehensive Health Sector Strategy (2012-20) to improve health and life expectancy; and ensure equitable health services for all population groups in Punjab. The strategy entails a series of goals that essentially reconstruct the health system in Punjab. Punjab Health Sector Strategy supports the Department of Health (DoH) to progress further with a sense of direction, purpose and urgency by prioritizing policy related interventions consistent with availability of financial resources. Among the 12 identified strategies of the Punjab Health Sector Strategic Plan, strategy 5 and 6 are relevant to Blood Safety;

Strategy 5: Focus and strengthen MNCH, family planning and nutrition services at all levels as part of EPHS; This strategy focuses on provision of blood transfusion services in all THQ and DHQs of Punjab 24/7.

Strategy 6: Strengthen prevention and management of infectious diseases, as part of EPH; This strategy among others promote the establishment of blood banks in secondary level healthcare facilities lacking such arrangements and ensure safe blood transfusion in all existing public and private blood banks.

The large public sector blood banks in tertiary hospitals are under the administrative control of the Institute of Blood Transfusion Services, Punjab (IBTS) while the other public sector hospital blood banks are managed by the district health organization. In addition, the private sector blood banks also exist in the hospitals; thalassaemia centers and as stand-alone centers. In 1981, the Government of Punjab approved the establishment of blood units at all Districts/Tehsil and Teaching Hospitals of the Province to provide blood and blood components to patients. In order to develop human resources the Directorate of BTS was upgraded to the Institute of BTS in the same year. The total number of structures that are available in Blood Transfusion Service, Punjab are 123.

The structure for Institute of Blood Transfusion Service in Punjab is as follows:

- Institute of Institute of Blood Transfusion Service: 1
- Divisional/ Regional Blood Transfusion Units: 8
- District Headquarter Hospital Blood Units: 34
- Teaching Hospital Blood Units: 20
- Tehsil Headquarter Hospital Blood Units: 60

The public sector blood banks in Punjab are reasonably well equipped except for screening equipment but the ratio of blood components prepared is still very low. Screening is still performed on low quality rapid screening kits purchased and distributed by IBTS. IBTS also purchase Blood Bags for these centres which are mostly single or double bags. Three components cannot be prepared from whole blood donations if single or double bags are used. The storage equipment at the blood centres is thus under-utilized or unutilized.

The consumables for all the public sector BBs are procured through a centralized system but the supplies procured are not commensurate with the needs. For a very long time now, no needs assessment has been done and the number of blood bags and screening kits purchased
by the IBTS is static since the last many years. As a result, there is chronic shortage of blood bags and screening kits in the public sector BBs. The patients are therefore forced to buy consumables from private market which are often of poor quality. In addition, there is a huge workload of patients in these centres and the staff is not sufficient to manage all the three shifts properly due to which the quality of work suffers.

The province hosts a wide variety of blood transfusion services at different levels of development, finances and support. The total number of blood banks in the Punjab province is approximately 1200, most of them in the private and NGO sector. So far, only 181 applications have been received by the Punjab BTA for registration out of which 60 blood banks have been granted licenses. Proper mapping and activation of BTA is required to increase the safety standards in Transfusion Medicine in the province. Strengthening of the Punjab BTA is required to improve the quality of services in the province.

The budget of the Punjab PC-1 for SBTP Phase I was PKR 323.75 million through which two Regional Blood Centres have been constructed, one each in Multan and Bahawalpur, each with an annual processing capacity of 50,000 donations. These RBCs are equipped with a customized MIS and latest expensive equipment. The RBCs have become operational. However, the Punjab government is considering Public Private Partnership model for managing these Centers.

In Phase II, a new RBC will be constructed and equipped in Faisalabad and linked to 6 existing HBBs which will be upgraded and renovated. In addition, some blood banks including Lahore General Hospital and Mayo Hospital in Lahore will be upgraded. The SBTP Phase II budget for Punjab is PKR 492.83 million including the German government grant.

2.4.7 Sindh

The province of Sindh, the second most populous province in Pakistan, comprises a population of over 60 million, with an area of 140,914 sq Km and 23 administrative districts including the mega city of Karachi. Sindh’s capital Karachi is the financial capital of Pakistan with a population of more than 18 million. The province has 49.5% urban population while rest of the 50.5% belongs to the rural population.

Many hospital-based, stand-alone and thalassaemia center blood banks are working in the province. In general the private sector is dominating the transfusion scenario in Sindh. It is estimated that the private sector provides 80% of blood needs with community-based, family replacement donors representing more than 80% of all collected whole blood. Many facilities provide treatment for thalassaemic patients. Regarding the VNRBD, community based NGOs are particularly active. In spite of the motivation and dedication of the personnel running these facilities, most are unaware of the recommended practices.

Sindh took the lead in developing a blood safety Act in 1997. Sindh Blood Transfusion Authority was constituted in 1998, under section 5 (1) of this Act. A revision of the Law was done in 2005 and BTA re-activated. Since then, the BTA has been performing its functions (regular inspections, monitoring, licensing, etc). Details of the individual BE are not available with the SBTA. The total number of BBs is 306 out of which 154 are registered with the Sindh BTA. These 154 blood banks have reported their annual collection of 2014 which is 520,000. 20% of these donations are separated into components while rest is transfused as
whole blood. Out of 154 registered blood banks, 73 are private, 46 are NGO while 35 are public sector. Applications of 32 blood banks are in progress while 148 blood banks are closed.

The budget of the SBTP Phase I for Sindh was PKR 251.97 million through which four RBCs were constructed and equipped, one each in Karachi, Jamshoro, Sukkur and Nawabshah, to supply blood products to the linked 24 existing Hospital Blood Banks which have been upgraded and renovated for this new role. This infrastructure has just been completed and handed over to the Sindh DoH for operationalization. The Sindh government is in the process of finalizing the public private partnership for these RBCs.

In the Phase II of the project, 115.294 million have been earmarked. The plans for the province include upgradation of Jinnah Postgraduate Medical Center, Civil Hospital, Korangi Hospital, Fatimid Foundation, etc. Technical support to strengthening of the Phase I RBCs and other sector will also be provided in Phase II.

3. Methodology

Blood and transfusion safety is a matter of continuing concern and the problem is particularly serious in developing countries like Pakistan. The World Health Organization (WHO) Global Database on Blood Safety (GDBS) was established in 1998 to address global concerns about the availability, safety and accessibility of blood for transfusion. The objective of this activity is to provide an overview of the current status and trends in blood supply, safety, sufficiency and usage globally. The GDBS performa has been specifically designed to include all aspects of data on blood safety and transfusion. With every passing year this performa is being revised and refined to enhance the reliability of responses. Every year WHO sends standardized GDBS performa to all its member states to ensure the representation of global data. This not only aids the process of effective policy making but also boosts the action plan needed to strengthen the blood transfusion services.

The GDBS performa is received every year in Pakistan as it is part of the WHO member states. Initially there was no national data collection system in existence. Therefore, the GDBS performa sent to the Ministry of Health was submitted back by the respective Ministry itself. However, this performa is being forwarded to SBTP by the Ministry of Health since the inception of the Programme in year 2010. Conventionally, the BT managers in all the provinces of the country were requested to share the data of public sector blood banks that falls under their jurisdiction. The quality of data received from the respective provinces revealed that the incoming data was incomplete and unsatisfactory in many aspects. The reliability of this data was largely compromised as most of the blood banks operating in different provinces did not have a proper record keeping of the transfusion services being carried out at their centres. Also, the data received by the provincial BT managers was non-uniform and did not cover most of the aspects of blood safety and transfusion.

Keeping in view the restraints in reliable data collection, the SBTP team developed a uniform tool for data collection which has been in use since 2015. This tools was developed in light of the GDBS performa to ensure coherence with the global data collection trends. The IBTA inspection checklist was also employed in the process of finalizing this data collection form
that can be used countrywide. Initially a lengthy form was developed to cover all aspects of blood safety and transfusion. However, this year the form used to collect data from all the provinces has been made very brief and comprehensive comprising only two pages. This was done in order to maximize the compliance and understanding of the data collection form. A report was compiled, shared with key stakeholders and made available on SBTP website.

Blood transfusion Authorities are existent in all the provinces and regions. However, only the IBTA operating in ICT, SBTA in Sindh and BTA in Punjab are operational to some extent. Out of all these BTAs, only ICT has a proper data collection contrivance. The provincial Blood Transfusion Programmes or/and the EDO Health for the respective province holds the administrative control of provincial departments of health. The public sector blood banks in the province could not share their data with the SBTP directly as they were not authorized to do so. Therefore provinces were to be contacted in this regard. Soft copies and hard copies of blood bank data collection forms were dispatched to all the provinces and follow-ups were conducted through emails and phone calls to confirm the receipt of these forms. The efforts made to collect data from the respective provincial management is discussed in the following sections.

3.1 Islamabad Capital Territory (ICT)

The regulatory body of Islamabad Blood Transfusion Authority (IBTA) is fully functional in ICT. It has a proper data collection mechanism with 100% compliance to the data collection forms. IBTA provided reliable and accurate data of all the blood banks operational in the region. Hence, there was no need to contact the blood banks individually and directly which saved a lot of time and effort. Currently 20 blood banks are operating in the ICT region and their data has been made available to SBTP by IBTA for the purpose of this report.

3.2 Azad Jammu Kashmir (AJK)

In AJK, a list of operational blood banks was prepared in light of the 2015 data collection report and through field and online survey. A total of 63 small and large blood banks were identified in the AJK region. The SBTP coordinated with AJK BTA and shared its developed and tested technical tools. SBTP also assisted in planning and conduction of blood banks inspections in ten districts of AJK in three phases. An informal unplanned mapping was conducted with the assistance of local contacts. In addition, snowball sampling exercise was also applied for this purpose. The number of blood banks found was much higher than the anticipated figure. The data was collected by different means. Some blood banks had proper documentation and therefore duly filled the data collection forms, some blood banks gave their data on phone. Except two blood banks, none of the blood banks are manned by qualified doctors or technicians. The private sector blood banks are run by unqualified technicians who are not even remotely familiar with the basic concepts of blood safety. Blood collected is not processed at all into components, is not properly screened, is not cross-matched before issuance and generally not stored at the recommended temperatures. In most of the blood banks data was maintained manually, however, some of the blood banks used MIS software.
3.3 Balochistan

The data for the province of Balochistan was collected directly by the SBTP team in coordination with Balochistan BTA (recently operationalized). The Secretary Health Balochistan took keen interest in this activity and ensured the facilitation of data collection process by SBTP team in every possible manner. Rapid assessment of data was done by snowball effect. The current data mainly covers the large blood banks in Quetta city. However, mapping of the many small BBs are operational in the province with an estimated number of 1-2 donations per day. The mapping revealed that although the private/commercial blood banks are in abundance, the workload is catered by the two largest public sector hospital blood banks of the city, i.e. Sandeman Provincial Hospital and the Bolan Medical Complex along with the two NGOs, i.e. Pashtoonkhwa BB and the Baloch BB.

3.4 Gilgit Baltistan

In the province of Gilgit Baltistan, the data of the public blood banks operational in the region was not available with the respective Blood Transfusion Programme. Therefore, as a result of mapping of blood banks in the region through the KfW support, 23 blood banks operating in 10 different districts of the province were enlisted. During the mapping activity, it was also revealed the there is no commercial blood banking activity in the entire Gilgit Baltistan region. In the capital city of Gilgit Baltistan, majority of the workload (94%) is borne by Government City Hospital, DHQ Hospital and CMH Gilgit. The G-B province does not have any commercial blood bank activity and it can easily be managed by the blood regulatory authority.

3.4 Khyber Pakhtunkhwa (KPK)

A complete list of public sector blood banks operating in the KP province was not available with the provincial blood Programme (the provincial BTA not yet notified). Therefore, in order to generate a comprehensive list of blood banks operating in the province online tools like Google maps were employed. The list comprised of about 50 public and private operational blood banks. Telephone calls were made and blood bank data collection forms were dispatched to these blood banks in order to ensure compliance. However, the responses received from most of these blood banks were disappointing. Mostly blood banks were relying on the blood banks of DHQs and THQs operating in their vicinity. Rest of them had no record of total number of donations, consumables procured and screenings performed as the documentation standards were very rudimentary. The SBTP team also got threatening calls from few of these blood banks who were afraid that their unethical practices may be reported. During the course of the year with the change in provincial programme leadership data collection improved somewhat. The new management has also recently conducted a mapping exercise in the province and has identified 19 DHQ BBs. Another similar but thorough exercise was also conducted specifically for the Peshawar city recently which revealed 18 identified blood banks including 6 public sector blood banks.
3.5 Punjab

In the province of Punjab, 22 large blood banks are directly managed by IBTS. The data of these 20 blood banks was shared with the SBTP team by IBTS. There are also ~100 medium to small sized blood banks that are under the administrative control of EDO Health, DoH, Punjab. Overall the total number of blood banks from Punjab which are part of this year’s report is 93. Blood bank data collection forms were also sent to a number of private sector blood banks mapped through Google Maps. Some of them submitted their response to SBTP while the majority did not respond.

3.6 Sindh

In the province of Sindh, 159 public and private sector blood banks are licensed with the Sindh Blood Transfusion Authority (SBTA). SBTA claims to collect the statistics from all these blood banks on an annual basis. SBTA was able to provide the TTI screening data of 62 blood banks. However, the complete data of 40 large blood banks were also shared with the SBTP team by SBTA. Most of these submissions were from large blood banks

3.7 Armed Forces:

Armed forces hospitals were also intended to be included in this year’s data collection exercise. It has been estimated that the blood donations in the Armed Forces Hospitals are near one million. The SBTP has contacted and sent formal requests to the Surgeon General of the Armed Forces of Pakistan to share this data for this report. The request was then forwarded to the field through the Medical Directorate of Armed Forces. The data gathered from the field is now available with the security agencies. This data is currently awaited. It is expected that after completing the formal procedure and security clearance requirements, the blood bank data for Armed Forces hospitals will be shared with SBTP.

As per an estimate of the hospitals operating in Pakistan Army setup, there are 45 MH/CMHs, 40 Field Medical Setups and 14 Armed Force Institutes in the country. These hospitals are further classified into different classes on the basis of number of beds in the hospitals setup. The respective classes also have different ranks of commanding officers coming down from Brigadier to colonel to major as we move from class A to class D. Among these 99 hospitals, 20 are Class A, 9 are Class B, 11 are Class C and 15 are Class D. However, there are no class A hospitals in Pakistan Air Force Hospitals and only one in Pakistan Navy Hospitals that is PNS Shifa Karachi. Overall, there are 9 hospitals operating exclusively for Pakistan Air Force and 4 for Pakistan Navy

Overall, The data received from the public sector blood banks was unreliable and poor. The reasons for this compromise on data quality include absence of proper documentation system, absence or lack of cooperation of the focal person of the blood bank, very slow or noncooperation from the provincial representatives or unwillingness to cooperate. The blood bank data collection forms were also sent to the private blood banks. Out of all these blood banks, only few of them responded promptly. However most of them were reluctant to share their data. Many of them did not share their data collection forms until they were repeatedly reminded. Data collection forms received through courier, by-hand or other mediums were
received in a uniform manner. The data entry was done in an organized manner and hence complete documentation of the received forms is available with the SBTP team. The data entry was done in the Microsoft Excel in order to keep the data entry parameters easily comprehensible. The SBTP team tried to minimize the error rate in this data. However, there were some incidences in which the data entry was inevitably compromised. For instance some blood banks submitted multiple copies of their data collection forms and the data in these forms could not match with the respective versions. In some cases, the forms received from the provincial management of different blood banks were all filled in the same handwriting by the same person who distorts the reliability of the provided data.

The direct data collection exercise at the national level was formally started in the year 2016. This enhanced the understanding on the trends of blood safety and transfusion system existent in the provinces. This year the data collection exercise has been further refined and the setback identified in the last year’s exercise were avoided. However, still there is very large scope of improvement in this annual activity. This will not only enable us to improve and strengthen our blood transfusion systems but also to represent the progress made by our country worldwide.
4. Results:

A total of 422 blood banks participated in the Safe Blood Transfusion Programme’s data collection exercise for the year 2016. This total number of blood banks comprises of responses received from 63 BBs of the AJK, 81 BBs of Balochistan, 23 BBs of GB, 20 BBs of ICT, 40 BBs of KPK, 93 BBs of Punjab and 102 BBs of Sindh.

A total of 18,30,468 donations were collected in the country in the year 2016. These donations consist of 30,633 donations from AJK, 1,04,838 donations from Balochistan, 21,829 donations from GB, 68,274 donations from ICT, 2,11,650 donations from KPK, 8,72,303 donations from Punjab and 5,20,941 donations from of Sindh.

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of donations</th>
<th>Number of Blood Banks</th>
<th>Structure-wise</th>
<th>Sector-wise</th>
<th>Total Blood Banks in Province</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stand alone</td>
<td>Hospital based</td>
<td>Thalassemia Center</td>
</tr>
<tr>
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<td>30,633</td>
<td>14</td>
<td>46</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
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<td>1,04,838</td>
<td>36</td>
<td>1</td>
<td>44</td>
<td>16</td>
</tr>
<tr>
<td>GB</td>
<td>21,829</td>
<td>1</td>
<td>22</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>ICT</td>
<td>68,274</td>
<td>1</td>
<td>18</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>KPK</td>
<td>2,11,650</td>
<td>0</td>
<td>31</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Punjab</td>
<td>8,72,303</td>
<td>2</td>
<td>73</td>
<td>18</td>
<td>74</td>
</tr>
<tr>
<td>Sindh</td>
<td>5,20,941</td>
<td>28</td>
<td>65</td>
<td>9</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>18,30,468</td>
<td>85</td>
<td>297</td>
<td>40</td>
<td>199</td>
</tr>
</tbody>
</table>

Table 1: Province and sector wise distribution of blood banks and donations

The data analyzed in this report includes the information collected from summarized data collection form. This form included basic information including contact details, number of total donations, total screening statistics and prevalence of TTIs in blood donors etc. Results of the response to each section of the questionnaire are reflected section-wise below along with a brief analysis. As not all the centers used the original form for data submission so the respective sections contain analysis of only the information received.

Data of a total of 422 BBs was received by the SBTP. Out of which most BBs from different provinces provided incomplete detail.
4.1. Organizational Details:

A total of 422 BBs participated in the data collection study for the year 2016 conducted by the SBTP. 63 BBs belonged to AJK, 81 were from Balochistan, 23 from G-B, 20 from ICT, 40 from KP, 93 from Punjab and 102 from Sindh. Most of the major public and private sector blood banks in Pakistan are covered in this study. Data from the public sector of Punjab and ICT is fully covered in this study. But due to lack of compliance from the public sector blood banks or the concerned focal persons in the other provinces and regions the respective data is deficient in this Report.

This section included the questions about the basic organizational information of the BBs including; name of the BB, name of the head of organization, contact numbers and address. All BBs provided their name and address properly. Most of the participating BBs provided details of their registration also. In Punjab, ICT and Sindh the BBs are mainly registered with BTAs. The private and NGO BBs are also registered with different government departments or authorities under a range of various legislations. In other provinces and regions the BTAs are not properly functional so the BBs in these provinces and regions are registered only with the local government authorities.
4.2. Structure:

In this section information was requested regarding the type of BBs. The first question about the structure type included three possible answers;

1. Hospital Blood Bank (HBB)
2. Thalassaemia Centre Blood Bank
3. Stand Alone Blood Bank

The response to this question was received from all the BBs. The participating BBs were expected to choose only one answer which applied to their structure. However, some organizations provided more than one answer which they thought applied to their structure. Out of a total of 422 BBs, 299 were HBB, 41 TCBB and 82 were SABB (Fig: 2).

Figure 2: Structure of the Blood Banks
Figure 3: Province wise structural distribution of Blood Banks

Fig: 3 represents the province wise distribution of HBBs, TCBBs and SABBs which participated in the study. 46 HBB, three TCBB and 14 SABB were from AJK. 36 SABBs, one TCBB and 44 HBBs were from Balochistan. One SABB and 22 HBBs were from Gilgit Baltistan. One SABB, one TCBB and 18 HBBs were from Islamabad Capital Territory. 29 HBBs, Eight TCBBs and three SABB were from KPK. Two SABBs, 73 HBBs and 18 TCBBs from Punjab and 67 HBBs, nine TCBBs and 28 SABBs from Sindh submitted their data.

Figure 4: Public and Private Sector Blood Banks

The second question of this section was whether the organization is a Public Sector or Private/NGO Sector organization. Data was collected from 199 public sector BBs and 223 private/NGO sector BBs. It is however believed that in Pakistan the number of private sector
BBs is greater than the public sector BBs although their workload is generally lower than the public sector BBs. The public sector blood banks in the provinces are under the overall administrative control of the provincial departments of Health through their respective BT Programmes or the EDO Health or a combination of both. It was difficult to get contact information of the district level public sector blood banks or even their existence or location. In case of Punjab, which has a relatively better system, the data of the provincial public sector BBs was not provided by the respective individual BBs as they were not authorised to share this data with any outside source. But the IBTS, Punjab shared the brief data of its 20 large BBs which are directly managed by it and limited data of 53 BBs managed by the EDO Health. The data of the remaining BBs could not be collected due to poor documentations system and lack of access to the relevant authority.

The IBTA as the regulatory body for the Islamabad Capital Territory has the mandate to collect the data from its licensed BBs. And the IBTA collects the previous year’s data at the start of every year. The Islamabad data for 2016 was thus already available in IBTA and so the need to collect this information directly from the BBs did not arise and at the same time 100% compliance was ensured.

In other provinces and regions, response from the public sector hospital blood banks was poor due to lack of access to the person in charge, not fully functional status of the blood banks, non-cooperation of the concerned individual or lack of response from the DoH and the provincial blood programme. Lack of resources and non-availability of dedicated staff in SBTP was also a constraint.

<table>
<thead>
<tr>
<th></th>
<th>AJK</th>
<th>Balochistan</th>
<th>GB</th>
<th>ICT</th>
<th>KP</th>
<th>Punjab</th>
<th>Sindh</th>
<th>TOTAL</th>
</tr>
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<tbody>
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<td>Public</td>
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<td>16</td>
<td>14</td>
<td>11</td>
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<td>Private</td>
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<td>60</td>
<td>9</td>
<td>9</td>
<td>14</td>
<td>19</td>
<td>62</td>
<td>223</td>
</tr>
</tbody>
</table>

**Table 2: Province wise distribution of Public and Private Blood Establishments**

Table 2 illustrates the province wise number of public and private/NGO sector BBs which participated in the study. Islamabad Capital Territory data was already available with the IBTA from all the 20 public and private sector licensed BBs with 100% compliance due to effective regulation in the federal capital by the IBTA.

Collection of data forms from the other provinces and regions was low and remained a challenge.

In Punjab, public sector data was collected directly from IBTS. They were failed to send complete data of all the 122 registered BBs instead they managed to send data from 20 BBs.

In Sindh, public sector data was collected directly from Sindh BTA in Karachi. The Sindh Blood Transfusion Authority and the Sindh Blood Programme is supposed to have detailed information about all the registered BBs (n=159) in the province but this information was not made completely available for the study.
Little response was received from the public sector blood banks in Balochistan and KPK despite persistent followup. Response from the private sector BBs in Balochistan was much better and 60 BBs shared their data but KPK’s private sector BBs didn’t cooperate fully and only 14 BBs shared their complete data. AJK’s both public and private sector shared their complete data but very poor response was received from the G-B region from the public as well as the private sector.

4.3. Safety and Waste Management:

The question about the disposal of infectious waste was asked in two steps. In the first step it was asked whether the organization employed incineration for infectious waste disposal. The respondents with Yes to the first step were asked whether the incineration facility is in-house or it is out-sourced.

249 organizations didn’t answer this section, 85 BBs out-sourced incineration and 89 perform in-house incineration from a total of 422 BBs who responded to the detailed data collection form as shown in Fig: 5.
In a sub-question to the infectious waste disposal, the frequency of the waste disposal was inquired. Results are shown in the Figure 6. The responses included daily (101), weekly (50), and other (7). Many BBs explained other in the comments as two days, four days or twice monthly. 201 blood banks did not answer this question.

4.4. Donor Management:

In the Donor Management section of the form, information was sought about the total number of blood donors, their type, gender and deferral. The total blood collection in the 422 BBs was 18,30,468 for the year 2016. However, not all BBs keep proper record of the details of the blood donor (age, gender, type of donors etc.) Due to this reason, data on the type of donors was not provided by many BBs. However, based on the available data of 18,30,468 blood donations from 422 BBs, 93% (n=16,93,790) blood donations were collected from male and 7% (n=1,36,678) while 94% (n=17,19,206) from family replacement and 6% (n=1,11,328) from VNRBD. A total of 68,892 blood donors were deferred from 18,30,468 blood donations. These results are further discussed in detail below.
Figure 7 shows the number of total donations and the provincial/regional break-up of this number. Total blood collection from the 422 BBs was 18,30,468. 30,633 donations were collected in AJK from 63 BBs, 1,04,838 donations in Balochistan from 81 BBs, 21,829 in G-B from 23 BBs, 68,274 in ICT from 20 BBs, 2,11,650 in KP from 40 BE, 8,72,303 in Punjab from 93 BBs and 5,20941, in Sindh from 102 BBs. In this study, most of the known and large BBs in addition to many relatively smaller and unknown BBs are covered. But many public sector BBs could not be covered due to lack of cooperation while many private sector BBs were missed out due to lack of knowledge about their existence especially those that operate from miscellaneous settings. An important missing contribution was from the armed forces BBs which is estimated to consume 0.85 million blood donations annually. This estimate is based on the number of blood bags (single, double and triple) procured by the armed forces. If this figure is added to the data of the nearly 1.8 million blood collections that we have documented in this study then the figure comes up to more than 2.2 million blood collections from 45BBs (422 study BBs + 45 army BBs) and with hardly many large or medium private sector BBs missing out. Compliance from public sector of AJK, Balochistan, G-B, KP, and Sindh can improve the data gaps to a large extent.
Gender details of blood donors were asked in a sub-question of the total donations. Answers were not provided by all BBs. This may be due to non-availability of the segregated statistics or poor documentation. A comparison of available data of 18,30,468 blood donations from 422 BBs is shown in Figure 8 where 93% (n=16,93,790) blood donations were collected from male and only 7% (n=1,36,678) from female blood donors. This trend is consistent with many other single centre or geographically limited studies conducted earlier.

![Figure 8: Gender of the Blood Donors](image)

In the next sub-questions, the type of donors was inquired. Only family replacement and voluntary blood donors were reported, the comparison of which is shown in Figure 9. No BB reported collection of blood donations from Professional Donors. From 18,30,468 blood donations collected from 422 BBs, 94% (n=17,19,206) blood donations were collected from family replacement donors and 6% (n=1,11,328) from VNRBD. Number of voluntary blood donation is significantly higher compared to many previous single centre studies reported from different parts of the country.
In the question about deferral of blood donors, the reasons for deferral were not asked in the data collection form. The results shown in Figure 10 are a mix of temporary and permanent deferral because some blood centres perform TTI screening before collection of blood and permanently defer reactive blood donors. 68,892 blood donors were deferred from a total of 18,30,468 blood donors. AJK reported 649 deferred donors, Balochistan reported 5,657 deferred donors, G.B didn’t report any deferred donor, ICT reported 3521 deferred donors, KPK reported 3,680 deferred donors, Punjab reported 46,037 deferred donors and Sindh reported 9,348 deferred donors. A sub-division of permanent and temporary deferrals can be made in the next version of the data collection form.

Figure 9: VNRBD and family Replacement Blood Donors
4.5. Component Preparation

In this section details about the blood processing for components were requested. The BBs were first asked if they process whole blood for components, based on the response they were further required to provide the details of the components prepared and statistics of the respective blood components or move to the next section in case of not preparing components.

In the first question of the section, the BBs were asked if they process whole blood for components or not. The results as shown in Figure 11 shows the comparison of the BBs which prepare with those that do not prepare blood components. From 422 BBs, 150 (36%) prepare components from whole blood while 272 (64%) do not process blood for component preparation. The BBs that prepare components were further asked to provide details of all blood components prepared in 2016. It is pertinent to add here that many BBs which prepare blood components do not do it on 100% donations due to the clinicians’ demand for whole
blood or any other reason. **Figure 12** shows the comparison between amount of donations used to prepare blood components and whole blood.

![Pie Chart](chart.png)

**Figure 12:** Comparison of Whole Blood used and Components prepared in 2016

Comparison of the prepared components is given in **Figure 13**. Ideally, at least the number of RCCs and FFPs should be same if the whole blood is processed for components from double blood collection bags. But due to unknown reasons many BBs provided less number of FFPs as compared to RCC as shown in the figure above.

Compliance in this section was very poor as very few BBs replied that they prepare components from collected blood but many of them did not provided statistics of the prepared components.
components mainly due to poor documentation. Interpretation of this data is thus not very useful. In future compliance on this section of data information should be done carefully and in an interactive manner to get an accurate picture.

4.6. Storage and Issuance:

In this section questions related to storage equipment were asked to evaluate storage capacity of BBs depending on the workload. Most of the BBs have sufficient storage equipment for RCC/Whole Blood and FFPs. Some BBs reported shortage of storage equipment and space especially for storing Platelet Concentrates.

The question asked was; what is the number of issued blood components? The respondents were expected to respond by filling numbers in the respective boxes for the number of RCC, FFPs, SPDA, Cryoprecipitates and Platelets. The results are shown in Figure 14. These results are from all 422 blood banks and show that 4,29,232 RCC, 359658 FFPs, 3,93,242 Platelet Concentrates, 6,106 Cryoprecipitate and 17,701 SPDA were issued to patients in 2016.

There were some discrepancies in data provided for prepared blood components and issued blood components which may be due to blood received from other BBs and issued which caused duplication of the data. More questions can be added about the details of blood received from other BBs to avoid this problem.

Figure 14: Issued Prepared Components
Another question can be added in this section about the number of cross-match performed which will make it possible to calculate cross-match to transfusion ratio. Number of returned blood bags after issuance can also be asked in the next version of the questionnaire.

4.7. Screening:

Screening for TTIs is one of the most critical part of the blood bank work. In Pakistan, with only an incipient culture of voluntary donations, lack of systematic screening and high prevalence of hepatitis, the infection risks are at an upper end. A separate section on screening was added in the data collection form to collect the information about the screening process at individual blood centres.

In this section questions were asked in a table about the parameters screened on each blood bag, number of screening tests performed in 2016 and methodology used for screening. Information about the manufacturer of the instrument/kits was also asked which was not provided by most of the BBs.

<table>
<thead>
<tr>
<th></th>
<th>HBV</th>
<th>HCV</th>
<th>HIV</th>
<th>Malaria</th>
<th>Syphilis</th>
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<td>......</td>
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<td>......</td>
<td>......</td>
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<td>100</td>
</tr>
</tbody>
</table>

Table 3: Technology used in BBs for TTI screening

Table 2 illustrates two types of results; the number of BBs which perform or not perform screening on specific blood borne infectious diseases. As shown in the table, out of 422, only 281 BBs claim to perform screening of HBV, HCV, HIV, Malaria and Syphilis. Only G.B’s BBs do not perform screening of HIV, Malaria and Syphilis.

Information about the technique used by number of BBs for screening against each blood borne disease is also shown in this table. ICT screening methods are used by 128 BBs for HBV and 132 BBs for HCV. 129 BBs used ICT for HIV, 110 for Malaria and 100 for Syphilis. ELISA is the second most widely used technology available in 74 BBs for screening of HBV, HCV, HIV, Malaria and Syphilis. CLIA is used by 40 BBs for HBV, HCV, HIV and 21 BBs for Malaria and Syphilis. 35 BBs use microscopy for Malaria and 5 uses RPR for screening of HBV, HCV, HIV, and Malaria.
NAT is used by 16 blood centres for screening of HBV, HCV and HIV. These blood centres initially screen the blood samples taken from the blood bag on CLIA and process the negative samples for further screening on NAT. Positive samples on CLIA are processed for further screening on NAT and the donor is informed about the results.

Figure 15 represents the prevalence of the TTIs in blood donors. Blue bars represent the amount of blood donations used for screening and red ones represent the amount of blood donations turned out to be positive for HBV, HCV, HIV, Syphilis and Malaria. According to the data the prevalence rate of HBV, HCV, HIV, Syphilis and Malaria is 1.8%, 2.7%, 0.1%, 1.3%, 0.1% respectively.

4.8. Documentation:

The data collection questionnaire developed by the SBTP for 2016 data collection was a detailed form and many BBs reported difficulty in compliance. This was due to unavailability of proper BTIMS in many BBs. The form also included documentation section where the only question asked was the availability of the BTIMS. The responses showed that more than half of the BBs do not have a BTIMS and documentation is done manually which is the main reason for not providing proper data.
From the 422 BBs only 59 (12%) use BTIMS, 222 (46%) use manual methods documentation and 205 (42%) didn’t answer the question as shown in Figure 16. SBTP is planning to develop a mechanism to provide a BTIMS to all BBs throughout the country which will smooth the data collection process.
### Blood Bank Data Collection Form

**Annex I - Data Collection Form**

**Blood Bank Data Collection Form**  
(For the Year 2016)

<table>
<thead>
<tr>
<th>Date:</th>
<th>Sr. No:</th>
</tr>
</thead>
</table>

**Name of Blood Bank/Institution:**

<table>
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<tr>
<th>Address:</th>
</tr>
</thead>
</table>

**Name of Incharge:**

<table>
<thead>
<tr>
<th>Telephone No:</th>
<th>Fax No:</th>
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</table>

**Mobile No:**

<table>
<thead>
<tr>
<th>E-mail:</th>
</tr>
</thead>
</table>

#### Structure

**Your organization is a**

- Hospital Blood Bank
- Thalassaemia Centre Blood Bank
- Standalone Blood Bank

Public sector [ ]  
Private/NGO sector [ ]

#### STAFFING

<table>
<thead>
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<th>Technicians</th>
<th>Assistants</th>
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</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>Support Staff</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Others: ______________________

**Biological waste is disposed by?**

- [ ] Incinerator present: Yes [ ] No [ ]  
- [ ] If Yes; In-house [ ] Outsourced [ ]

**Incineration performed:**

- [ ] Daily  
- [ ] Weekly  
- [ ] Other

**Documentation**

- [ ] Yes  
- [ ] No

**What is the number of donors deferred in 2016?**

**Number of rooms in the blood bank**

**No. of total Blood Donations collected in 2016?**

**Voluntary non-remunerated donors**

**Family/replacement donors**

**How the blood was collected?**

- [ ] Mobile camp collection  
- [ ] Blood Bank collection

**No. of male blood donors**

**No. of female blood donors**

**Is the whole blood processed for component preparation?**

- [ ] Yes  
- [ ] No

**What is the number of blood separated into components in 2016?**
Which components were prepared (give number prepared in 2016)?

- Red Cell Concentrate
- Fresh Frozen Plasma
- Cryoprecipitate
- Platelet Concentrates
- Single Donor Platelet Apheresis

Give the number of blood units issued in 2016;

- Whole Blood
- FFP
- Platelet Concentrates
- Single Donor Platelet Apheresis

**SCREENING**

Is the screening for the following performed?

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Yes</th>
<th>No</th>
<th>No. of tests performed in 2016</th>
<th>No. of Positive Tests</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Technique</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Manufacturer</td>
</tr>
</tbody>
</table>

- HBV
- HCV
- HIV
- Syphilis
- Malaria

Is there a hospital transfusion committee?  
Yes ☐  No ☐

If Yes, When it was established?  
__________________________

Is Blood Transfusion Information Management System (BTIS software) is available?  
Yes ☐  No ☐

**BLOOD COMPONENT CHARGES**

- Whole Blood
- RCC
- FFP
- Platelets
- Cryoprecipitate
- Single Donor Platelet Apheresis
- Others
Annex II: Province-wise list of Blood Banks

Azad Jammu and Kashmir

1. Midland Doctors UK hospital Complex, Muzaffarabad
2. Abbas Institute of Medical Sciences (AIMS), RBC, Muzaffarabad
3. SKBZ, Combined Military Hospital(CMH), Muzaffarabad
4. Kashmir Surgical Hospital Blood Bank, Muzaffarabad
5. Muzaffarabad General Hospital Blood Bank, Muzaffarabad
6. Pakistan International Medical Association Blood Bank, Muzaffarabad
7. Shaheen Hospital Blood Bank, Muzaffarabad
8. DHQ Hospital, Sudhanoti
9. Al-Aqsa/Al Ashraf Blood Bank, Sudhnoti
10. Rehman Children Hospital, Bhimber
11. D.H.Q Hospital, Bhimber
12. Al-Ghafoor Blood Bank, Bhimber
13. Attique Laboratory, Bhimber
14. Al-Shifa Hospital, Kotli
15. Anwar Memorial Hospital, Kotli
16. Jehangir & Shabina Hospital, Kotli
17. Kashmir Qaumi Movement Blood Bank & Thalassaemia Centre, Kotli
18. Mama Care Maternity Home & Surgical Complex, Kotli
19. Manaza Maternity Home & Clinical Lab, Kotli
20. Riffat Maternity Home and Surgical Complex, Kotli
21. DHQ Hospital, Kotli
22. A-Wahab Free Blood Bank and Thalassemia Centre, Kotli
23. Shabnam Maternity Home, Kotli
24. Alam Memorial Hospital, Kotli
25. Tariq Memorial Hospital, Kotli
26. Al-Harmain Hospital, Kotli
27. Zubaida Maternity Hospital, Kotli
28. Family Clinic and Trauma Centre, Kotli
29. Rabia Maternity Home, Kotli
30. S-Jan Surgical Complex, Kotli
31. Kotli Lab, Kotli
32. Saleem Medical Complex & Maryam Maternity Home, Kotli
33. Chinar Lab, Kotli
34. Mushtaq Mohiuddin Hospital and Surgical Complex, Kotli
35. DHQ Hospital Blood Bankd Neelam, Neelam Valley
36. THQ Hospital, Kail/Field Treatment Centre of Pakistan Army, Neelam Valley
37. Army Medical Hospital, Neelam Valley
38. DHQ Hospital Blood Bank, Hattian Bala, Jhelum Valley
39. Rural Health Centre, Jhelum Valley
40. Al- Muhafiz Foundation BDO, Bagh
41. Ammar Hospital Blood Bank, Bagh
42. Qamar Hospital Blood Bank, Bagh
43. D-Bagh Hospital Blood Bank, Bagh
44. Allied Hospital Blood Bank, Bagh
45. Blood Bank DHQ Hospital, Bagh
46. DHQ Hospital, Rawalakot
47. DHQ Hospital, Haveli
48. Pakistan Army Hospital, Haveli
49. Noor Memorial Hospital Blood Bank, Mirpur
50. Jinnah Hospital Blood Bank, Mirpur
51. Mughal Foundation Hospital Blood Bank, Mirpur
52. Rubina Mubashar Hospital Blood Bank, Mirpur
53. Azmat memorial Hospital bank, Mirpur
54. City Hospital Blood Bank, Mirpur
55. Alshifa-Hospital Blood Bank, Mirpur
56. Divisional Headquater Teaching Hospital, Mirpur
57. Kashmir Blood Bank, Mirpur
58. New City Teaching Hospital, Mirpur
59. Al-Shifa Blood Bank, Mirpur
60. Irfan Blood Bank, Mirpur
61. Riaz Hospital Blood Bank, Mirpur
62. Sundas Foundation Blood Transfusion Services, Mirpur
63. Riasat Hospital Blood Bank, Mirpur

**Balochistan**

1. Baloch Blood Bank, Quetta
2. Pashtoonkhwa Blood Bank, Quetta
3. Regional Blood Centre, Quetta
4. Bolan Medical Complex, Quetta
5. Civil Hospital Blood Bank, Quetta
6. A-1 Diagnostic Laboratory and Blood Bank, Quetta
7. Aga Hospital Clinical Laboratory and Blood Bank, Quetta
8. Akram Hospital Blood Bank, Quetta
9. Alamgir Orthopaedic Centre Blood Bank, Quetta
10. Al-Khair Medical Complex Blood Bank, Quetta
11. Al-Khidmat Hospital Blood Bank, Quetta
12. Al-Khidmat Muhajreen Hospital Blood Bank, Quetta
13. Al-Shafa Laboratory and Blood Bank, Quetta
14. Al-Shafi Medical Centre Blood Bank, Quetta
15. Al-Shifa Hospital Blood Bank, Quetta
16. Ayaz Blood Bank, Quetta
17. Ayaz Diagnostic Laboratory, Quetta
18. Balochistan Civil Foundation Blood Bank, Quetta
19. Balochistan Institute of Nephrology Urology Quetta (BINUQ), Quetta
20. Balochistan Lab, Ultrasound and Blood Bank, Quetta
21. Bolan Laboratories, Quetta
22. Children Hospital Blood Bank, Quetta
23. Citi Lab and Blood Bank, Quetta
24. Combined Military Hospital Blood Bank, Quetta
25. Dr. Hospital and Trauma Centre Blood Bank, Quetta
26. Dr. Shafi Hospital Blood Bank, Quetta
27. Dr. Tasnim Laboratory, Saleem Medical Complex, Quetta
28. Fatima Jinnah General and Chest Hospital Blood Bank, Quetta
29. Fatimid Foundation Blood Bank, Quetta
30. Frontier Corps Hospital Blood Bank, Quetta
31. General Hospital Blood Bank, Quetta
32. Gillani Hospital Blood Bank, Quetta
33. Gynae and General Hospital Blood Bank, Quetta
34. Habib Diagnostic Laboratory, Quetta
35. Hamas Blood Bank, Quetta
36. Hamza Blood Bank, Quetta
37. Heart and General Hospital, Quetta
38. Husaini Blood Bank, Quetta
39. Imdad Hospital and Mahnaza Laparoscopic Centre Blood Bank, Quetta
40. Jillani Hospital Blood Bank, Quetta
41. Karachi MRI, X-Ray, Laboratory and Blood Bank, Quetta
42. Kidney Care Centre Blood Bank, Quetta
43. Lady Dufferin Hospital Blood Bank, Quetta
44. Latif Lab and Blood Bank, Quetta
45. M. Khan Laboratory, Saleem Medical Complex, Quetta
46. Medicare Hospital Blood Bank, Quetta
47. Mission Hospital Blood Bank, Quetta
48. Mohtarma Benazir Bhutto Hospital, Quetta
49. Mufti Mahmood Hospital Blood Bank, Quetta
50. Nasir Medical Complex Blood Bank, Quetta
51. Noor ul Amin Medical Centre Blood Bank, Quetta
52. Panjtan Blood Bank, Quetta
53. Pashtoonkhwa Blood Bank, Quetta
54. Prof. Abdul Samad Laboratory, Quetta
55. Quetta Hospital Blood Bank, Quetta
56. Rahat Hospital Blood Bank, Quetta
57. Rahat Medical Complex, Quetta
58. Railway Hospital Blood Bank, Quetta
59. Regional Blood Centre, Quetta
60. Rehan Hospital Blood Bank, Quetta
61. Saeed Hospital Blood Bank, Quetta
62. Sajid Hospital Blood Bank, Quetta
63. Saleem Hospital Laboratory, Quetta
64. Salma Blood Bank, Quetta
65. Sandeman Provincial Hospital Blood Bank, Quetta
66. Sangeen Khan Hospital Blood Bank, Quetta
67. Shaheed Chakir Khan Blood Bank, Quetta
68. Sheikh Khalifa Bin Zayed Hospital Blood Bank, Quetta
69. Sultan Tareen Healthcare and Transplant Centre Blood Bank, Quetta
70. Tariq Hospital Blood Bank, Quetta
71. Thalassaemia Centre Blood Bank Civil Hospital, Quetta
72. Thalassaemia Centre, Bolan Medical Complex Hospital, Quetta
73. Times Laboratory, Saleem Medical Complex, Quetta
74. Yaseen Hospital Blood Bank, Quetta
75. Zoya Hospital Blood Bank, Quetta
76. Pashtoonkhwa Blood Bank, Loralai
77. Pashtoonkhwa Blood Bank, Zhoob
78. Pashtoonkhwa Blood Bank, Pashin
79. Pashtoonkhwa Blood Bank, Muslim Bagh
80. Pashtoonkhwa Blood Bank, Killa Saifullah
81. Al Mehboob Welfare Society, Barkhan

**Gilgit-Baltistan**
1. DHQ Hospital Ghanche Blood Bank, Ghanche
2. Zubeda Khaliq Memorial Trust Hospital Blood Bank, Sermik Shigar
3. Skardu DHQ Hospital Muhammedi Blood Bank, Skardu
4. CMH Blood Bank, Skardu
5. Abdulla Hospital Blood Bank, Skardu
6. Al-Abbas Hospital Blood Bank, Skardu
7. Civil Hospital, Thuar Skardu
8. DHQ Hospital Gilgit Blood Bank, Gilgit
9. Government City Hospital Blood Bank, Gilgit
10. Gilgit Medical Centre Blood Bank (Aga Khan Foundation), Gilgit
11. Regional Blood Centre, Gilgit
12. CMH Blood Bank, Gilgit
13. Sehat Foundation Hospital Blood Bank, Gilgit
14. Ali Medical Centre Blood Bank, Gilgit
15. Al-Hayat Hospital Blood Bank, Gilgit
16. DHQ Hospital Gahkuch, Ghizer
17. Civil Hospital Blood Bank, Hunza
18. Civil Hospital Blood Bank, Hunza
19. Aga Khan Health Services Hospital Blood Bank, Hunza
20. Civil Hospital Chalt Bala Blood Bank, Nagar
21. DHQ Hospital Chilas Blood Bank, Diamer
22. DHQ Hospital Astore Blood Bank, Astore
23. Civil Hospital Gorikote Blood Bank, Astore

**Islamabad Capital Territory**
1. Al-Nafees Medical College Hospital Blood Bank, Islamabad
2. BCL Blood Bank, Ali Medical Centre, Islamabad
3. Blood Donor Centre, Pakistan Red Crescent, Islamabad
4. Medicis Hospital Blood Bank, Islamabad
5. SZABMU-PIMS Hospital Blood Bank, Islamabad
6. Capital Hospital Blood Bank, Islamabad
7. Federal General Hospital Blood Bank, Islamabad
8. Federal Government Polyclinic Hospital Blood Bank, Islamabad
9. Islamabad Medical Complex, NESCO Blood Bank, Islamabad
10. KRL Hospital Blood Bank, Islamabad
11. Kulsum International Hospital Blood Bank, Islamabad
12. Maroof International Hospital Blood Bank, Islamabad
13. PAEC Hospital Blood Bank, Islamabad
14. PAF Hospital Blood Bank, Islamabad
15. Pakistan Thalassaemia Centre Blood Bank, Islamabad
16. PNS Hafeez Naval Hospital Blood Bank, Islamabad
17. Punjab Employes Social Security Hospital Blood Bank, Islamabad
18. Quaid-e-Azam International Hospital Blood Bank, Islamabad
19.Rawal Institute of Health Sciences Blood Bank, Islamabad
20. Shifa International Hospital Blood Bank, Islamabad

Khyber Pakhtunkhawa
1. Hamza Foundation, Peshawar
2. Frontier Foundation welfare hospital & Blood transfusion services, Peshawar
3. Fatimid Foundation, Peshawar
4. Lady Reading Hospital, Peshawar
5. Frontier Foundation Peshawar, Peshawar
6. Northwest General Hospital, Peshawar
7. Institute of Kidney Diseases, Peshawar
8. Hayatabad Medical Complex, Peshawar
9. Rehman Medical Institute, Peshawar
10. Al-Khidmat Foundation, Peshawar
11. Mohsin Foundation, Peshawar
12. Welfare Hand Organization, Peshawar
13. Ehsas welfare organization, Peshawar
14. DHQ Hospital Haripur, Haripur
15. Haripur Thalassaemia Centre Haripur, Haripur
16. DHQ Hospital Lower Dir, Lower Dir
17. Al-Khidmat Hospital Charsadda, Charsadda
18. Pro United foundation & Thalassemia Centre, Kohat
19. Frontier Foundation & blood transfusion Services, Kohat
20. Kids Blood Diseases Organization, Dera Ismail Khan
21. Abbottonians Medical Association, Mansehra
22. Al-Fajar Foundation, Abbottabad
23. United Foundation Kohat, Nowshehra Kalan
24. Al-Khidmat Foundation, Peshawar
25. Ayub Medical Complex, Abbottabad
26. DHQ Bannu, Bannu Teaching Hospital
27. Blood Bank DHQ Hospital, Dir Upper
28. DHQ Hospital, Alpurai, Dist. Shangla
29. DHQ Hospital Batkhela,
30. DHQ Charsada
31. DHQ DIK
32. DHQ Karak
33. DHQ Lakimarwat
34. Kata Mansehra
35. DHQ Mardan
36. DHQ Noshehra
37. DHQ Swabi
38. Saidu Teaching DHQ Hospital, Mingora, Swat
39. DHQ Tank
40. DHQ Timergara
41. MMM Hospital DIK
42. Naseerullah Babar Hospital, Peshawar
43. North West General hospital, Peshawar
44. Mohsin Foundation, Peshawar
45. Kuwait Teaching Hospital, Peshawar
46. Mercy Pak Teaching Hospital, Peshawar
47. Jhwandoon welfare Org., Peshawar
48. Khyber Teaching Hospital (KTH), Peshawar
49. Raaz welfare foundation, Peshawar
50. Jinnah Blood services & Hematology Centre, Peshawar
51. Al Khair, Peshawar
52. Maternity Hospital Hashtnagri, Peshawar

Punjab
1. Sughra Shafi Hospital, Narowal
2. Laeeque Rafique Hospital, Multan
3. Blood Thalassaemia Centre, Multan
4. Shaukat Khanum Cancer Hospital & RES CTR, Lahore
5. Blood Bank, Sir Ganga Ram Hospital, Lahore
6. Blood bank, Service hospital, Lahore
7. Blood unit, Punjab Intitute of Cardiology, Lahore
8. Blood Unit, Government Mian M.Munshi Hospital, Lahore
9. Blood Bank, Mayo Hospital (Main), Lahore
10. Blood Unit, General Hospital, Lahore
11. Blood Unit, Lady Willingdon Hospital, Lahore
12. Blood Bank, Lady Aitchison Hospital, Lahore
13. Blood Bank, Jinnah Hospital, Lahore
14. Government Teaching Hospital, Lahore
15. Blood Bank Government SMT Hospital, Lahore
16. Blood Unit, Mian Muhammad Nawaz Shareef Hospital, Lahore
17. Blood Bank, KE Teaching Hospital, Lahore
18. Blood Bank, Mayo Hospital (Emergency), Lahore
19. Sundus Foundation Blood Bank and Haematological Services, Lahore
20. Al-khidmat Blood Bank, Mayo Hospital, Lahore
21. Fatimid Foundation Blood Bank, Lahore
22. Blood Unit Nishtar Hospital, Multan
23. Blood Bank, children Hospital and Institute of Child Health, Multan
24. Muhammadi Blood Bank, Multan
25. Fatimid Foundation Blood Bank, Multan
26. Amna Haematological Services, Multan
27. Safe Blood Transfusion Services, Multan
28. District Headquarters Hospital, Rawalpindi
29. Holy Family Hospital, Blood Bank and Thalassaemia Centre, Rawalpindi
30. Blood Bank, BBH Hospital, Rawalpindi
31. Pakistan Thalassaemia Welfare Society, Rawalpindi
32. Jamila Sultan Foundation, Rawalpindi
33. Blood Unit, District Headquarters Hospital, Faisalabad
34. Blood Unit, Allied Hospital, Faisalabad
35. Sundus Foundation Blood Bank, Gujranwala
36. Sundus Foundation Blood Bank, Gujrat
37. Sundus Foundation Blood Bank, Sialkot
38. Safe Life Organization, Sargodha
39. Ali Zaib Blood Transfusion Services, Sahiwal
40. Ali Zaib Blood Transfusion Services, Faisalabad
41. League of Human Welfare, Attock
42. District Blood Unit, DHQ Hospital, Kasur
43. District Blood Unit, DHQ Hospital, Sheikhupura
44. District Blood Unit, DHQ Hospital, Okara
45. District Blood Unit, DHQ Hospital, Nankana Sahib
46. District Blood Unit, DHQ Hospital, Gujranwala
47. Blood Unit, THQ, Wazirabad
48. Blood Unit, THQ, Kamoke
49. Blood Unit, THQ, Noshera Virkan
50. District Blood Unit, DHQ Hospital, Sialkot
51. Blood Unit, THQ, Daska
52. Blood Unit, THQ, Pasroor
53. Blood Unit, THQ, Narowal
54. District Blood Unit, DHQ Hospital, Gujrat
55. District Blood Unit, DHQ Hospital, Mandi Baha ud Din
56. District Blood Unit, DHQ Hospital, Hafizabad
57. District Blood Unit, DHQ Hospital, Sargodha
58. Blood Unit, Government Mian Mola Bakhsh Hospital, Sargodha
59. Blood Unit, THQ Hospital, Balwal
60. Blood Unit, THQ Hospital, Shahpur
61. District Blood Unit, DHQ Hospital, Mianwali
62. District Blood Unit, DHQ Hospital, Bakkhar
63. District Blood Unit, DHQ Hospital, Khushab
64. Blood Unit, THQ Hospital, Kabirwala
65. District Blood Unit, DHQ Hospital, Sahiwal
66. Blood Unit, THQ Hospital, Chicha Watni
67. District Blood Unit, DHQ Hospital, Pakpatan
68. District Blood Unit, DHQ Hospital, Khanewal
69. District Blood Unit, DHQ Hospital, Vehari
70. Blood Bank, THQ Hospital, Depalpur
71. District Blood Unit, DHQ Hospital, D.G Khan
72. District Blood Unit, DHQ Hospital, Layyah
73. District Blood Unit, DHQ Hospital, Muzaffargarh
74. Blood Unit, THQ Hospital, Kot Addu
75. Blood Unit, THQ Hospital, Alipur
76. District Blood Unit, DHQ Hospital, Bahawal Nagar
77. District Blood Unit, DHQ Hospital, Attock
78. District Blood Unit, DHQ Hospital, Jhelum
79. District Blood Unit, DHQ Hospital, Chakwal
80. District Blood Unit, DHQ Hospital, Kamalia
81. District Blood Unit, DHQ Hospital, Gojra
82. District Blood Unit, DHQ Hospital, Chiniot
83. District Blood Unit, DHQ Hospital, Tobataik
84. District Blood Unit, DHQ Hospital, Hasilpur
85. District Blood Unit, DHQ Hospital, Sadiqabad
86. District Blood Unit, DHQ Hospital, Liaquatpur
87. District Blood Unit, DHQ Hospital, Khanpur
88. Blood Unit, THQ Hospital, Chishtian
89. Kulsoom Society of Haematology & Blood Bank, Sialkot
90. Benazir Bhutto Hospital, Rawalpindi
91. Blood Unit, Kot Khawaja Saeed Hospital, Lahore
92. Blood Unit, Yarri Gate Hospital, Lahore
93. Bahawal Victoria Hospital, Bahawalpur

**Sindh**

1. Liaquat National Hospital, Karachi
2. A.O. Clinic Blood Bank Nazimabad, Karachi
3. Al-Khidmat Blood Bank Nazimabad, Karachi
4. Blood Bank JPMC, Karachi
5. Blood Transfusion Services Lyari G. Hospital, Karachi
6. Chiniot Blood Bank Korangi, Karachi
7. Darual Sehat Hospital & Blood Bank Johar Chowrangi, Karachi
8. Hussaini Blood Bank, Karachi
9. Korangi Landhi Blood Bank, Karachi
10. Memon Medical & Blood Bank Sofora Goth, Karachi
11. Murshid Hospital Blood Bank, Karachi
12. OMI Blood Bank Opp Cost Guard, Karachi
13. PWC Blood Bank S. Govt Hospital, Karachi
14. Red Crescent Blood Bank, Karachi
15. Sindh Govt Hospital Blood Bank, Karachi
16. Sindh Institute of Urology and Transplantation Blood Bank, Karachi
17. KPT Hospital & Blood Bank Kamari, Karachi
18. Mid City Blood Bank, Karachi
20. Fatimid Foundation Blood Bank, Karachi
21. Muhammadi Blood Bank NICVD, Karachi
23. National Haematology Centre and Blood Bank (Kamal Hospital Branch), Karachi
24. Sindh Govt: Qater Hospital Blood Bank, Karachi
25. Agha Khan Hospital & Blood Bank, Karachi
26. Al-Mustafa Blood Bank, Karachi
27. Baqai Blood Bank, Karachi
28. Blood Bank Diagnostic N.M.C Centre, Karachi
29. NICVD Blood Bank, Karachi
30. Burhani Blood Bank & Transfusion Centre, Karachi
31. NICH Blood Bank, Karachi
32. Saba Foundation Blood Bank, Karachi
33. Zia-Uddin Hospital Blood Bank Nazimabad, Karachi
34. Zia-Uddin Hospital Blood Bank Clifton, Karachi
35. Khidmat-e-khaliq Foundation, Karachi
36. Sindh Govt: Liaquatabad Blood Bank, Karachi
37. Adventist(Seven day) Blood Bank, Karachi
38. Social Security Blood Bank, Karachi
39. Abbasi Shaheed Hospital Blood Bank, Karachi
40. Dow Diagnostic Research Blood Bank Supparco, Karachi
41. Sindh Lab:Blood Bank, Karachi
42. Lab Test Blood Bank, Karachi
43. PWA Blood Bank Civil Hospital, Karachi
44. Dr. Tahir Lab: Blood Bank(Taj Medical Complex), Karachi
46. Hussaini Blood Bank, Karachi
47. Hussaini Blood Bank imam hospital, Karachi
48. Hussaini Blood Bank Kala Board, Karachi
49. Hussaini Blood Bank Leady Different, Karachi
50. Hussaini Blood Bank near Abbasi Shaheed hospital, Karachi
51. Hussaini Blood Bank Shan Hospital, Karachi
52. Hussaini Blood Bank South city, Karachi
53. Indus Hospital Blood Bank, Karachi
54. K.K.F Blood Bank N.Hussain Hospital, Karachi
56. Kashif Iqbal Blood Bank, Karachi
57. Kutiyana Memon Blood Bank, Karachi
58. Lone Life Blood Bank, Karachi
59. Muhammadi Blood Bank PSGH Area, Karachi
60. Muhammadi Blood Bank Korangi, Karachi
61. National Haematology Centre Hill park, Karachi
62. National Institute of Blood Bank, Karachi
63. Omair Sana Blood Bank, Karachi
64. Patel Blood Bank, Karachi
65. Sahara Blood Bank, Karachi
66. Sindh Govt: Hospital New Karachi, Karachi
67. Syeedi Voluntary Blood Bank, Karachi
68. Tabba Blood Bank, Karachi
69. Afzal Memorial Thalassaemia Foundation Blood Bank, Karachi
70. The IRADDA Blood Centre Voluntary Blood Bank, Karachi
71. K.K.F Blood Bank Sobraj Hospital, Karachi
72. K.K.F Blood Bank KHID, Karachi
73. Ar-Rehman Blood Bank, Karachi
74. Agha Khan Blood Bank, Hyderabad
75. Al-Qaim Blood Bank, Hyderabad
76. Bin Tayab Hospital Blood Bank, Hyderabad
77. Blood Bank Civil Hospital (LMUH), Hyderabad
78. Blood Bank Shah Bhitai Hospital, Hyderabad
79. Bone Care Hospital & Blood Bank, Hyderabad
80. Dr.Essa Lab & Blood Bank, Hyderabad
81. Fatimid Blood Bank, Hyderabad
82. Hussaini Blood Bank, Hyderabad
83. Isra University & Blood Bank, Hyderabad
84. Jahangir Blood Bank, Hyderabad
85. Khidmat-e-khalqi Foundation, Hyderabad
86. Maajee Hospital Blood Bank, Hyderabad
87. Memon Charitable Hospital & Blood Bank, Hyderabad
88. Wali Bahi Rajpatana Hospital Blood Bank, Hyderabad
89. ST: Elizabeth Hospital Blood Bank, Hyderabad
90. Vital Blood Bank, Hyderabad
91. Waleed Blood Bank, Hyderabad
92. Zainabia Blood Bank and Thalassaemia Centre, Hyderabad
93. Sindh Government Hospital, Hyderabad
94. Preen Rasool Thalassaemia Care Trust(PRTCT), Hyderabad
95. Civil Hospital Blood Bank, Jamshoro
96. Institute of Chest Diseases Blood Bank, Jamshoro
97. Liaquate University Hospital & Blood Bank, Jamshoro
98. Taluka Hospital Blood Bank, Jamshoro
99. Taluka Hospital Schwan Blood Bank, Jamshoro
100. Al-Ghazi Blood Bank, Mirpurkhas
101. Civil Hospital, Mirpurkhas
102. Mohammad Medical College Blood Bank, Mirpurkhas
103. Paras Blood Bank Digri, Mirpurkhas
104. Sindh Blood bank Digri, Mirpurkhas
105. Civil Hospital Blood Bank, Sukkur
106. Hira Blood Bank, Sukkur
107. Mehran Blood Bank Al-Faisal Medical Centre Military, Sukkur
108. Sukkur Blood bank, Sukkur
109. Ali Lab & Blood bank Mehrabpur Dist, Nousheroferoze
110. Civil Hospital, Nousheroferoze
111. Hussaini Blood Bank at Civil Hospital, Nousheroferoze
112. City Pathologist Laboratory Blood Bank, Sanghar
113. Civil Hospital Sanghar, Sanghar
114. Haji Roshandin Blood Bank, Sanghar
115. Indus Pathological Lab & Blood, Sanghar
116. Nisar Pathological Lab & Blood Bank, Sanghar
117. Shahab Pathological lab & Blood Bank Shahdapur, Sanghar
118. Taluka Hospital Blood Bank, Sanghar
119. Al-Sadaat Voluntary Blood Bank, Khairpur
120. Civil Hospital, Khairpur
121. Fatimid Foundation Blood Bank, Khairpur
122. Taluka Hospital Gambat Distt, Khairpur
123. Bukhari Blood Bank Civil Hospital, Larkana
124. Bukhari Blood Bank Shaikh Zad Hospital, Larkana
125. C.M.C Centre Lab and Blood Bank, Larkana
126. CMC Teaching Hospital, Larkana
127. Larkana Blood Bank, Larkana
128. Murtaza Blood Bank & Thalassaemia Centre, Larkana
129. Z.A. Bhutto Blood Bank, Larkana
130. Paramount Blood Bank, Larkana
131. Civil Hospital Badin, Badin
132. Hussaini Blood Bank, Badin
133. Shahbaz Pathology Laboratory and Blood Bank, Badin
134. Sindh Blood Bank, Badin
135. Thalassaemia Centre Blood Bank, Badin
136. Mehran Blood Bank, Jacobabad
137. Civil Hospital, Jacobabad
138. Hussaini Blood Bank, Jacobabad
139. Al-Hussaini Blood Bank, Nawabshah
140. Arif Laboratory & Blood Bank, Nawabshah
141. Jhoolay Lal Blood Bank, Nawabshah
142. P.W.C Care Center Blood Bank, Nawabshah
143. Peoples Medical College Hospital & Blood Bank, Nawabshah
144. Rasheed Blood Bank, Nawabshah
145. Civil Hospital, Shikarpur
146. Ali Pathology Laboratory and Blood Bank, Dadu
147. Civil Hospital, Dadu
148. Daniyal Pathology Laboratory and Blood Bank, Dadu
149. Shifa Pathology Laboratory Blood Bank, Dadu
150. Civil Hospital, Thatta
151. City Blood Bank Shah Kamal, Thatta, Tharparkar
152. Civil Hospital, Tando Allahyar
153. Fatimid Foundation Blood Bank Rashid bad Centre, Tando Allahyar
154. Civil Hospital Blood Bank, Ghotki
155. Engro Blood Bank, Ghotki
156. Civil Hospital, Umerkot
157. Memon Charitable Hospital Blood Bank, Tando Mohammad Khan
158. Thalassaemia Centre C.H,Kotri, Jamshoro
159. Ghulam Muhammad Mahar Medical College Hospital, Sukkur
160. Sakhi Baba Hospital, Pano Akil
161. Thalassaemia Patients Welfare Society, Nawabshah
162. Patient's Welfare Association Voluntary Blood Bank, Karachi
163. Nishtar Park Karachi, Karachi
164. Thalassaemia Care B.B, Nawabshah
165. Dr.Tahir Lab & Blood Bank, Karachi
166. Mohammadi Blood Bank, Mirpurkhas
167. Danuyal Blood Bank Shahdadpur Sanghar, Sanghar
168. Sahare Blood Bank, Karachi
169. Karachi Adveant Blood Bank, Karachi
170. Bukhari Blood Bank Ladies Jail Larkana, Larkana
171. National Blood Bank Kalapul, Karachi
Safe Blood Transfusion Programme
Government of Pakistan