

**A Report on the
“Assessment of Blood Banks in
Madhya Pradesh, India”**

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Abbreviations

BB	- Blood Bank
BCSU	- Blood Component Separation Units
BTS	- Blood Transfusion Service
CDSCO	- Central Drug Standard Control Organisation
CHEMI	- Chemiluminescence
DAT	- Direct Antiglobulin Test
DCT	- Direct Coombs Test
ELISA	- Enzyme Linked Immuno Sorbent Assay
EQAS	- External Quality Assessment Scheme
FFP	- Fresh Frozen Plasma
HIV	- Human Immunodeficiency Virus
HBV	- Hepatitis B virus
HCV	- Hepatitis C virus
HVPI	- Haemovigilance Program of India
IAT	- Indirect Antiglobulin Test
ICT	- Indirect Coombs Test
IH	- Immunohematology
IQC	- Internal Quality Control
IQR	- Interquartile Range
MoHFW	- Ministry of Health and Family Welfare
NACO	- National AIDS Control Organisation
NAT	- Nucleic Acid Testing
NBTC	- National Blood Transfusion Council
NGO	- Non Governmental Organisation
NHP	- National Health Portal
PSU	- Public Sector Undertaking
QC	- Quality Control
QM	- Quality Manager
QMS	- Quality Management Systems
RPR	- Rapid Plasma Reagin
SACS	- State AIDS Control Societies
SBTC	- State Blood Transfusion Council
SD	- Standard Deviation
SIMS	- Strategic Information Management System
SOPs	- Standard Operating Procedures
TTI	- Transfusion Transmitted Infection
TM	- Technical Manager
TPHA	- Treponema Pallidum Hemagglutination Assay
VNRBD	- Voluntary, Non-Remunerated Blood Donation
VBD	- Voluntary Blood Donor/Donation
WHO	- World Health Organization

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Executive Summary

Blood Banks in Madhya Pradesh

According to Central Drugs Standard Control Organization (CDSCO), there were 144 blood banks in Madhya Pradesh in 2015. The assessment exercise identified 133 functional blood banks across the state. Of the 133 blood banks, 62 (46.6%) were supported by National AIDS Control Organization, Ministry of Health and Family Welfare, Government of India and the remaining 71 (53.4%) were Non-NACO blood banks.

The highest number of blood banks was in Indore district (25) followed by Bhopal (19), Gwalior (9), Jabalpur (7), Hoshangabad (5) and Ujjain (5). There is no blood bank in Aggarmalwa district.

There are 51 districts in the state of Madhya Pradesh. Around 52.6% (70) of all the blood banks (n=133) in the state were in 6 districts that are, Indore (18.8%), Bhopal (14.3%), Gwalior (6.8%), Jabalpur (5.3%), Hoshangabad (3.8%) and Ujjain (3.8%). Considering the number of blood banks per one million population, districts such as, thirty eight districts recorded less than the state average of 1.8 blood banks per 1,000,000 (one million) population.

In this assessment 131 blood banks (62 NACO supported- 47.3 % and 69 Non –NACO- 52.7%) that submitted the assessment forms in complete were included in the analysis.

Description of blood banks

- Around 28% (36) of the blood banks in the state had component separation facility.
- The public sector owned 45% of the blood banks in the state followed by private sector (28.2) and not-for-profit sector owned 26.7% of the blood banks.
- The majority (57; 91.9%) of NACO supported blood banks were owned by the public sector and the remaining (5; 8.1%) were owned by non-profit/not-for-profit sector such as NGOs, charitable trusts, societies, foundations etc.
- The majority of the blood banks (105; 80.2%) were attached to hospitals, (3; 2.3%) were attached to laboratories and the remaining (23; 17.6%) were standalone blood banks.
- The majority of the blood banks (85; 64.9%) had applied for renewal of license and the remaining (46; 35.1%) had a valid and current license. Around (17; 27.4%) of NACO supported and (29; 42%) of Non-NACO blood banks had a valid and active license.

Annual Collection and Voluntary Blood Donation

- During January to December 2015, the annual blood collection from all the blood banks that reported was 509,721 of which 74.3% (378,885) units were through voluntary blood donations and the remaining was from replacement donations.
- The average annual collection of blood units of all the blood banks in the state was 4077.8 units. The average annual collection of NACO supported blood banks was found to be higher than (5,139 units) the Non-NACO blood banks (3,034 units).
- The blood banks with component separation units recorded a higher average annual collection of 6680 units compared to blood banks without component separation units which was 3065.
- The NACO supported Blood banks collected 62.5% (318,595 units) of the total collection, of which 94.1% (299,781) units were through voluntary blood donation. The Non-NACO blood banks collected 37.4% (191,126) units of which 41.4% (79,104) units were through voluntary blood donation.

Transfusion Transmitted Infections

- HIV seroreactivity among blood donors was found to be 0.08%, Hepatitis-C 0.10%, Hepatitis-B 1.14%, Syphilis 0.36% and Malaria 0.03%. However, there is a huge variation between districts.

Component Separation

- Around 67.9% of blood units collected by blood banks with component separation facilities were used for component separation in Madhya Pradesh.
- The percentage component separation was higher (69.1%) in NACO supported blood banks compared to Non NACO blood banks (67%).

Quality Management Systems

- 93.1% of the blood banks reported that they adhered to the NBTC guidelines.
- Availability of document control system was reported by 44.3% of the blood banks in the state. Around 43.5% of NACO supported blood banks and 44.9% of Non-NACO blood banks reported they had a document control system.
- More than 90% of blood banks reported to have standard operating procedures (SOPs) for technical processes.
- Practice of internal quality control (IQC) for Immunohematology was reported by 72.5% of the blood banks and IQC for TTIs was reported by 58.8% of all the blood banks.
- Around 80.2% of the blood banks reported carrying out quality control for kits, reagents and blood bags.

- Only 4.6% and 3.1% of the blood banks in state have enrolled themselves in External Quality Control Systems (EQAS) by recognized providers for immunohematology and TTIs respectively.
- None of the blood banks that participated in the assessment were accredited by National Accreditation Board for Hospitals & Healthcare Providers (NABH).
- Designated and trained Quality Managers and Trained Technical managers were available only in 32.1% and 39.7% of the blood banks respectively.
- Around 80% of the blood banks reported that they had a regular equipment maintenance programme and around 83% reported that they calibrate the equipment as per requirement.

The current status of blood banks based on the assessment

- The mean assessment score of blood banks in the state was 59.6 (SD: 10.2). There was no significant difference between NACO supported and Non-NACO blood banks.
- Around 91.9% of all the blood banks under NACO supported were in public sector and present across sub-divisional and divisional/district hospitals catering all segments of the population including rural areas. Whereas, the majority (53.6%) of the Non-NACO blood banks were in private sector and 43% were in not for profit sector.
- At the state level, the majority of blood banks (85%) scored between 35 to 70 and 13% scored above 70. Two blood banks scored less than or equal to 35.
- Around 84% of NACO supported and 87% of Non-NACO blood banks scored between 35 to 70. Around, 14% of NACO supported blood banks and 12% of Non-NACO blood banks scored more than 70%.
- Among the districts, Neemuch (78) scored the highest and Annupur (36) scored the least. Nineteen districts scored above the state average
- Of the 17 blood banks that scored more than 70 score, 9 were NACO supported blood banks. The majority of blood banks that scored above 70 were from Bhopal (5) followed by Hoshangabad (2) and Jabalpur (2).
- The mean score of blood banks with component facilities (62.50; SD: 10.90) was found to be higher than the mean score of those without component facilities (58.45; SD: 9.71).
- The mean assessment score of not-for-profit (NGO/Trust/Charitable) owned blood banks (61.0; SD: 9.01) was found to be higher than the public sector blood banks (58.15; SD: 10.47).
- However, NACO supported blood banks run by not-for-profit sector had scored higher (70.60; SD: 4.93) compared to Non-NACO NGO/Trust/Charitable blood banks (59.40; SD: 8.56).
- The mean assessment score of blood banks that collected more than 5000 blood units (63.28; SD: 9.32) was found to be higher than those which collected between 3001 to

5000 (61.71; SD: 11.09). Blood banks which collected less than 3000 blood units scored the least (57.40; SD: 9.57).

- The mean score was found to be higher among the blood banks that were part of EQAS for immunohematology (71.67; SD: 6.24) as compared to those who were not enrolled (58.98; SD: 9.97). Similar situation was found among those blood banks that were part of EQAS for Transfusion-Transmitted Infections (77.25; SD: 5.12) as compared to those who were not enrolled (59.01; SD: 9.79).

It is evident from the assessment that blood banks that focussed on quality improvement systems performed better than others. Considering the deleterious effect of poor quality practices on patient care, it is imperative that specific programmes and strategies to improve quality systems in blood transfusion services are developed and implemented across the state.

Assessment of Blood Banks in Madhya Pradesh

1. Background

Blood Transfusion Service (BTS) is an essential part of modern health care system without which medical care is impossible (Pal, Kar, Zaman, & Pal, 2011). Adequate measures to ensure blood safety play a major role in preventing the transmission of HIV, Hepatitis and other bloodborne pathogens in health care settings. The blood and its products must not only be safe but must be clinically effective, and of appropriate and consistent quality (WHO, 2012). Ensuring the safety and availability of blood and blood products is an essential public health responsibility which is primarily the responsibility of the government or the appropriate national health authority of each country (Ramani, Mavalankar, & Govil, 2007). Therefore, it is important to establish a sustainable national blood system that should be supported by a national blood policy, strategic plan, and appropriate legal instruments (WHO, 2011). The Twenty-eighth World Health Assembly resolution number WHA 28.72 of 1975 urged member countries to promote the development of national blood services based on voluntary non-remunerated blood donation (VNRBD); to enact effective legislation governing the operation of blood services and to take other actions necessary to protect and promote the health of blood donors and of recipients of blood and blood products (WHO, 1975).

However, provision of safe and quality blood for a country like India involves a highly complex operation involving various stakeholders, and the magnitude and complexity of issues raise several challenges (GOI, 2003). This requires a holistic and comprehensive approach to planning, designing and operationalizing the BTS. It is important to ensure coordination between blood transfusion services, health services and hospitals, educational institutes, religious, social and industrial organizations, mass media, and other stakeholders including the general public. The system should ensure adequate resources and inputs into the legislative, regulatory, technical, social, and cultural aspects of making this life-saving product accessible and safe.

The need for blood is paramount and universal. However, millions of patients requiring transfusion do not have timely access to safe blood, and there is a major imbalance between developing and industrialized countries in access to safe blood (WHO, 2009). There is a huge inequity in the availability of blood within countries, with the urban areas having more access to the majority of blood available. Even if sufficient blood is available, many are exposed to avoidable, life-threatening risks through the transfusion of unsafe blood. In order to ensure universal access to safe and quality blood, achieve 100% voluntary blood donation and quality-assured testing of donated blood, strengthening the blood transfusion services with evidence-based, innovative and result-oriented strategies are essential. It is also imperative to optimize blood usage, develop quality systems in the transfusion chain, strengthen the workforce, adopt new developments, and build effective partnerships (WHO, 2008).

The National AIDS Control Organization(NACO), under the Ministry of Health and Family Welfare, and the National Blood Transfusion Council (NBTC), which is the apex policy making body, are the prime bodies responsible for the functioning of blood transfusion services and blood safety in India at the national level. At the state level, the respective state AIDS Control societies(SACS) and State Blood Transfusion Councils(SBTCs) are responsible for the smooth functioning of blood transfusion services. As blood and blood products are considered as drugs, the Central Drug Standard Control Organisation(CDSCO) and State Drug Control Organisations play a vital role in key aspects such as, approval of licenses, and enforcement of standard transfusion practices to ensure safe, quality and efficacious blood and blood components in clinical practices.

Several directions, guidelines, and legal measures during the last two decades facilitated the significant improvement of blood transfusion services in the country. The Supreme Court verdict in 1996 directed the government to improve the blood transfusion services that resulted in establishing the National and State Blood Transfusion Councils. The Drugs and Cosmetics Rules, 1945, framed under the Drugs and Cosmetics Act, 1940 were amended in 1993, as a result of which the licensing of blood banks was brought under the dual authority of the state and central government (MoHFW, 2013). The state licensing authority issues the license, while the Drug Controller General (India) is the central license approving authority. In 2002, the WHO Guidelines on the Clinical Use of Blood was adopted by NACO. In the same year, the Government of India framed and adopted the National Blood Policy (NBP) (NACO, 2007a).

In 2007, the National AIDS Control Organization developed standards for blood banks and blood transfusion services. This clearly spelled out the need for mandatory licensing and compliance to all regulatory norms; compliance to policies/ guidelines of NBTC; donor selection/ recruitment/ retention/ counseling based on voluntary non-remunerated regular repeat blood donors; appropriate blood collection procedures; mandatory testing of all donated Blood units for HIV, HBV, HCV, Syphilis and Malaria; transportation of blood and blood components ensuring cold chain maintenance; manpower requirements; maintenance of quality assurance system; regular maintenance and calibration of equipment; biosafety; waste disposal mechanisms; documentation, record keeping and regular reporting under the national programme(NACO, 2007b).

Since the inception of the National AIDS Control programme in 1992, the blood safety programme in India under the National AIDS Control Organization has been making significant strides towards ensuring access to safe, and quality blood and blood products to all those who are in need of a transfusion. The goals and objectives of the programme are to ensure provision of safe and quality blood even to the most remote areas of the country. NACO has been taking continuous steps to strengthen the blood banks across the country by providing equipment, consumables, manpower and capacity building. The efforts to modernizing blood-banks, establishing model blood banks, and setting up blood storage centres in rural areas have improved the quality of blood transfusion services in the country.

The current phase of the NACP IV (2012 -2017) focuses on blood safety that aims to support 1,300 blood banks, and achieve 90,00,000 blood units from NACO supported Blood Banks and 95% Voluntary Blood Donation in 2016-17. The key strategies under NACP IV are strengthening management structures of blood transfusion services, streamlining the coordination and management of blood banks and blood transfusion services, and developing new initiatives such as the establishment of Metro Blood Banks and Plasma Fractionation Centre (NACO, 2014).

Due to the continuous efforts in India, the availability of safe blood increased from 44 lakh units in 2007 to 100 lakh units by 2014-15; during this time HIV seroreactivity also declined from 1.2% to 0.2%, and Voluntary Blood Donation increased substantially (NACO, 2016). NACO has been providing technical and operational support to improve the efficiency and effectiveness of these blood banks, thereby, increasing the availability and accessibility of safe and quality blood and blood products to those who are in need. Though there has been a substantial improvement in BTS in India over a period of time, there are still gaps in ensuring access to quality blood and blood products that needs to be addressed at the district, state and regional levels through an evidence-based approach.

In order to have evidence-based programmes, and policies, accurate and updated information at the district, state and national level is an essential prerequisite. Lack of updated information is one of the key barriers affecting the planning and implementation of blood transfusion services across the country. Though current programmes emphasize Quality Management Systems (QMS) including EQAS and accreditation in blood banks, not much information is available related to this area. In particular, information on the existing practices of blood banks, their potential, and willingness to get involved in the programmes on QMS are critical factors that will facilitate developing appropriate strategies and programmes related to QMS at the National level.

Therefore, facility-wise updated information on structural and programmatic components, the gaps, and challenges are required which will not only facilitate in developing better programmes and policies in BTS, but also serve as a baseline for specific programmes that are being, and will be implemented at the district, state, regional, and national levels. Considering the above factors, a nationwide assessment of all the Blood Banks was conducted.

2. Objectives

The overall purpose of this assessment was to understand the current situation of blood banks, in terms of facilities, services, practices, performance, gaps, and challenges.

The specific objectives were:

- To review the existing situation in blood banks in terms of collection of blood, voluntary blood donation, quality management systems, and other programme areas.
- To categorize and grade the blood banks using a scoring system, for implementation of phased quality improvement systems.
- To provide evidence for the formulation of evidence-based policies and programs for blood transfusion services in India.
- To develop an updated database with basic essential details of blood banks in the country.

3. Methodology

This assessment was a cross-sectional survey that captured the current situation of all the blood banks that are owned by the government, private, non-profit and not-for-profit organizations in the state during the reporting period - January to December 2015. In order to create a comprehensive and accurate list of functional blood banks in the state, data (list of blood banks) from multiple sources were obtained which included NACO, NBTC, CDSCO, state drugs control organizations, SACS, and SBTCs. These were further reviewed for duplication, errors in name and other necessary details, and triangulated to arrive at a comprehensive list of district wise functional blood banks.

Following this, an assessment tool was designed as a web-based survey tool in REDCap Software - Version 6.11.2 which was developed by an informatics core at Vanderbilt University with support from National Center for Research Resources (NCRR) and National Institute of Health (NIH) grants. An exclusive online survey link for each blood bank, generated from REDCap, was sent to all the blood banks. This online link was linked to the email ID of the blood bank and Unique IDs created for each blood bank. Since many blood banks did not have adequate internet facility, a paper format was also developed which was sent to all the blood banks by post with a pre-stamped and self-addressed envelope. The data from the completed paper forms were then entered into REDCap.

Tool: A self-assessment questionnaire that included all the below-mentioned components was developed in consultation with programme officials and experts from the areas of public health, epidemiology, bio-statistics, and transfusion medicine.

The review focused on the following components:

Table 1- Details of technical areas included in the assessment

S No	Component	Description
1	General	Basic details, Ownership, Category, License, etc.
2	Collection and VBD	Annual Collection, VNRBD and donor management
3	Technical – IH, TTIs, components	Methods, Performances
4	Quality Management System	Check for compliance to guidelines and standards
5	HR, Training, and Equipment	Availability and Participation

Data Management and Analysis: The database for this study was developed and maintained by Clinical Data Management Centre (CDMC), Department of Biostatistics, Christian Medical College, and Vellore, India. In-built validation checks were incorporated in the system to confirm that all study related parameters are captured completely and accurately.

Data were analyzed using SPSS Version 21 for Windows. The data were screened for outliers and extreme values using histograms, frequency distribution and Box plots. To summarize the whole data, frequency distributions and bar/pie charts were done for qualitative (categorical) variables such as ownership, type of blood banks etc., and descriptive statistics like mean, standard deviation (SD), median, minimum, and maximum were done for quantitative variables such as annual collection, voluntary blood donation, etc.

Categorisation of blood banks and scoring: In order to study variables that impact quality, the blood banks have been categorized into two groups based on the availability of component separation facility. The first category comprises of blood banks with component separation facility that includes Model Blood Banks and Blood Component Separation Units (BCSU) in NACO supported blood banks. Model blood banks collect more than 10,000 units and BCSUs collect between 5,000 to 10,000 units of blood annually. The second category includes blood banks without component separation facility that covers major blood banks and District Level blood banks (DLBB) in NACO supported blood banks. Major blood banks collect between 3,000 to 5,000 units and district level blood banks collect up to 3,000 units annually.

Each component of the tool was given a weight based on the programmatic and quality priorities. The maximum achievable sum of all weighted scores under each component totaled 100 marks.

Table 2- Scoring details and weight

Details	With Components	Without Components
Licence	3	3
Annual Collection, VBD, Repeat donation and Counselling	11	16
Technical - IH, TTI and Component separation	43	38
Quality Management Systems	35	35
Reporting	8	8
TOTAL	100	100

The scoring pattern was different based on the category of blood banks that are: 1. Blood banks with component separation facility (n=36) and 2. Blood banks without component separation facility (n=95). Scores were allocated to each indicator under specific components based on the expected level of performance by these two categories of blood banks.

The blood banks were categorized based on the scores obtained by each blood bank that are, less than and equal to 35 (Red); 36 to 70 (Yellow) and above 70 (Green).

4. Key Findings

According to CDSCO, there were 144 blood banks in the state of Madhya Pradesh in 2015 (CDSCO, 2015). However, the assessment exercise identified 133 functional blood banks across the state. Of the total functional blood banks, 131 blood banks (62 NACO supported – 47.3% and 69 Non-NACO- 52.7%) which have submitted the assessment forms in complete were included in the analysis.

Table 3-District Wise Description of Blood Banks

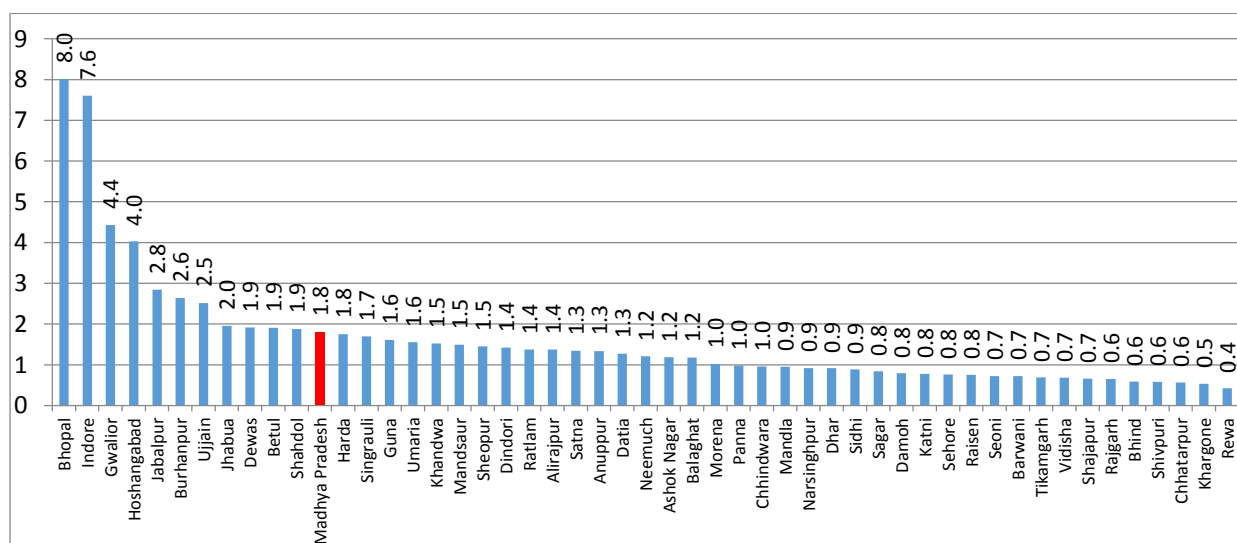
District	NACO Supported	Non-NACO	Total
Alirajpur	1	-	1
Anuppur	-	1	1
Ashok Nagar	-	1	1
Balaghat	1	1	2
Barwani	1	-	1
Betul	2	1	3
Bhind	1	-	1
Bhopal	5	14	19
Burhanpur	1	1	2
Chhatarpur	1	-	1
Chhindwara	2	-	2
Damoh	1	-	1
Datia	1	-	1
Dewas	1	2	3
Dhar	1	1	2
Dindori	1	-	1
Guna	1	1	2
Gwalior	4	5	9
Harda	1	-	1
Hoshangabad	2	3	5
Indore	1	24	25
Jabalpur	3	4	7
Jhabua	1	1	2
Katni	1	-	1
Khandwa	1	1	2
Khargone	1	-	1
Mandla	1	-	1
Mandsaur	1	1	2
Morena	1	1	2
Narsinghpur	1	-	1
Neemuch	1	-	1
Panna	1	-	1
Raisen	1	-	1

Rajgarh	1	-	1
Ratlam	1	1	2
Rewa	1	-	1
Sagar	1	1	2
Satna	2	1	3
Sehore	1	-	1
Seoni	1	-	1
Shahdol	2	-	2
Shajapur	1	-	1
Sheopur	1	-	1
Shivpuri	1	-	1
Sidhi	1	-	1
Singrauli	1	1	2
Tikamgarh	1	-	1
Ujjain	1	4	5
Umaria	1	-	1
Vidisha	1	-	1
Madhya Pradesh	62	71	133

Table - 3 indicates the district wise details of all the blood banks in the state, including the description of NACO supported and Non-NACO blood banks. Indore (25) had the highest number of blood banks followed by Bhopal (19), Gwalior (9), Jabalpur (7), Hoshangabad (5) and Ujjain (5). There is no blood bank in Aggarmalwa district.

In terms of NACO supported blood banks, Bhopal (5) had the highest number of blood banks, followed by Gwalior (4) and Jabalpur (3). Around 53% (70) of all the blood banks (n=133) in the state were in 6 districts that are, Indore (18.8%), Bhopal (14.3%), Gwalior (6.8%), Jabalpur (5.3%), Hoshangabad (3.8%) and Ujjain (3.8%).

Figure 1 Availability of BBs per 1,000,000 (1 million) Population



Considering the number of blood banks per one million population, only 11 out of 51 districts such as, Bhopal (8.0 blood banks), Indore (7.6), Gwalior (4.4), Hoshangabad (4.0), Jabalpur (2.8), Burhanpur (2.6), Ujjain (2.5), Jhabua (2), Dewas (1.9), Betul (1.9) and Shahdol (1.9) recorded more than the State average of 1.8 blood banks per 1,000,000 (one million) population. All other 40 districts were less than the state average.

4.1 Basic details of blood banks (n=131)

As indicated earlier, 131 blood banks (62 NACO supported and 69 Non-NACO) that submitted the assessment forms were included in the analysis.

4.1.1 Category of Blood Banks: Out of 62 NACO supported blood banks 16.1% (10) of the blood banks had component separation facility. Out of 69 Non-NACO blood banks 37.7% (26) were with component separation facility.

Table 4 Basic details of blood banks

Specifics	Description	NACO Supported	Non-NACO	Total
Type of BB	With components	10(16.1%)	26(37.7%)	36(27.5%)
	Without components	52(83.9%)	43(62.3%)	95(72.5%)
Ownership	NGO/Trust/Charitable	5(8.1%)	30(43.5%)	35(26.7%)
	Private	-	37(53.6%)	37(28.2%)
	Public	57(91.9%)	2(2.9%)	59(45%)
Licence	Valid	17(27.4%)	29(42%)	46(35.1%)
	Under Renewal	45(72.6%)	40(58%)	85(64.9%)
Attachment	Attached to Hospital	61(98.4%)	44(63.8%)	105(80.2%)
	Attached to lab	-	3(4.3%)	3(2.3%)
	Stand alone	1(1.6%)	22(31.9%)	23(17.6%)

At the district level, Bhopal had the highest percentage of blood component separation units (12, 33.3%), followed by Indore (10, 27.8%) and Jabalpur (4, 11.1%).

4.1.2 Ownership: As depicted in Table:-4, the majority of Blood banks (59, 45%) are owned by public sector followed by private (37, 28.2%) and not-for-profit sector (35, 26.7%). The majority (57, 91.9%) of NACO supported blood banks were owned by the public sector and the remaining (5, 8.1%) were owned by non-profit/not-for-profit sector such as NGOs, charitable trusts, societies, foundations etc. The not-for-profit sector had a higher proportion (41.7%) of blood component separation facility than the private (33.3%) and public sector

(25%). Among the NACO supported blood banks, the public sector had a higher (91.9%) proportion of component separation facilities compared to the not-for-profit sector (8.1%). Around 57% of all the not-for-profit blood banks (n=35) were clustered in three districts which are Bhopal (25.7%), Indore (20%) and Gwalior (11.4%). Around 8% of all the public owned blood banks are in Bhopal. All Districts have at least one public sector owned blood bank except Neemuch and Ashok Nagar districts. Similarly, 70.3% of all the private owned blood banks were in four districts which are Indore (40.5%), Bhopal (13.5%), Gwalior (8.1%) and Jabalpur (8.1%). (Refer Table - 5)

Table 5 District wise list of blood banks by Ownership

District	Public	%	Not-for-profit	%	Private	%	Total
Alirajpur	1	100	-	-	-	-	1
Anuppur	1	100	-	-	-	-	1
Ashok Nagar	-	-	1	100	-	-	1
Balaghat	1	50	-	-	1	50	2
Barwani	1	100	-	-	-	-	1
Betul	2	66.7	1	33.3	-	-	3
Bhind	1	100	-	-	-	-	1
Bhopal	5	26.3	9	47.4	5	26.3	19
Burhanpur	1	50	1	50.0	-	-	2
Chhatarpur	1	100	-	-	-	-	1
Chhindwara	2	100	-	-	-	-	2
Damoh	1	100	-	-	-	-	1
Datia	1	100	-	-	-	-	1
Dewas	1	33.3	1	33.3	1	33.3	3
Dhar	1	50	-	-	1	50	2
Dindori	1	100	-	-	-	-	1
Guna	1	50	-	-	1	50	2
Gwalior	2	22.2	4	44.4	3	33.3	9
Harda	1	100	-	-	-	-	1
Hoshangabad	2	40	1	20.0	2	40	5
Indore	1	4.3	7	30.4	15	65.2	23
Jabalpur	3	42.9	1	14.3	3	42.9	7
Jhabua	1	50	-	-	1	50.0	2
Katni	1	100	-	-	-	-	1
Khandwa	1	50	-	-	1	50.0	2
Khargone	1	100	-	-	-	-	1
Mandla	1	100	-	-	-	-	1
Mandsaur	1	50	-	-	1	50.0	2
Morena	1	50	-	-	1	50.0	2
Narsinghpur	1	100	-	-	-	-	1

Neemuch	-	-	1	100	-	-	1
Panna	1	100	-	-	-	-	1
Raisen	1	100	-	-	-	-	1
Rajgarh	1	100	-	-	-	-	1
Ratlam	1	50	1	50	-	-	2
Rewa	1	100	-	-	-	-	1
Sagar	1	50	1	50	-	-	2
Satna	1	33.3	2	66.7	-	-	3
Sehore	1	100	-	-	-	-	1
Seoni	1	100	-	-	-	-	1
Shahdol	2	100	-	-	-	-	2
Shajapur	1	100	-	-	-	-	1
Sheopur	1	100	-	-	-	-	1
Shivpuri	1	100	-	-	-	-	1
Sidhi	1	100	-	-	-	-	1
Singrauli	1	50	1	50	-	-	2
Tikamgarh	1	100	-	-	-	-	1
Ujjain	1	20	3	60	1	20	5
Umaria	1	100	-	-	-	-	1
Vidisha	1	100	-	-	-	-	1
Madhya Pradesh	59	45	35	27	37	28	131

4.1.3 Organizational Attachment: The majority of the blood banks (105; 80.2%) were attached to hospitals, 2.3% (3) were attached to laboratories and the remaining 17.6% (23) were standalone blood banks.

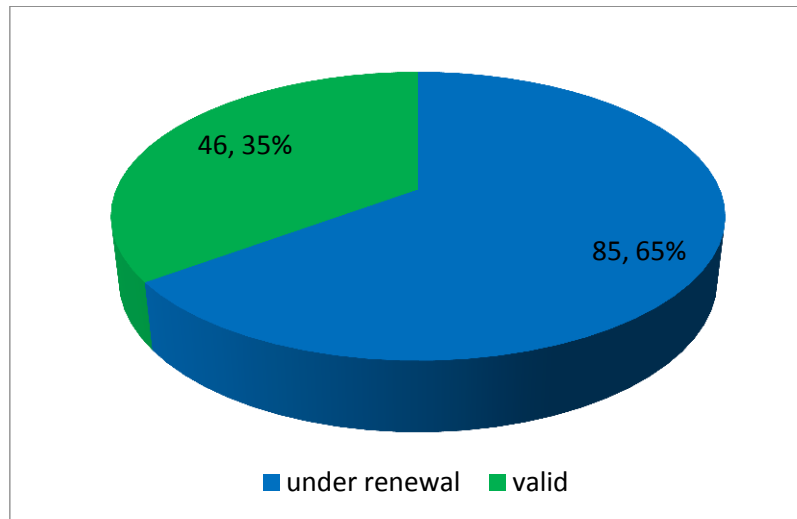
The majority of the NACO supported blood banks (61; 98.4%) were attached to hospitals and only one blood bank was standalone blood bank. Though 63.8% (44) of the Non-NACO supported blood banks were attached to hospitals, a significant number (22; 31.9%) of Non-NACO blood banks were standalone and 4.3% (3) were attached to laboratories. Further analysis indicated that 100% (59) of the blood banks in the public sector; 68.6% (24) of the blood banks in the not-for-profit sector, and 59.5% (22) of the blood banks in the private sector were attached to hospitals. In the not-for-profit sector 28.6% (10) of the blood banks are standalone.

4.1.4 License details of blood banks: The license status was categorized as “valid” which means that the blood bank has current and active license; and “deemed renewal” which means that the blood bank had applied for renewal which is pending.

The majority of the blood banks in Madhya Pradesh (85; 65%) had applied for renewal and the remaining 35% (46) had a valid and current license. Around 27% (17) of NACO

supported and 42% (19) of Non-NACO blood banks had a valid and active license. Similarly, 48.6% (18) of the private blood banks, 28.6% (10) of the not-for-profit blood banks, and 30.5% (18) of the public blood banks had a valid and active license.

Figure 2 License Status (n=131)



The majority of those blood banks (41; 48.2%) which have reported as “deemed renewal” had their last inspection by licencing authority during the last one year; (18; 21.2%) had their inspection between the last 1 to 2 years, (11; 12.9%) had between 2 to 3 years, 4.7% had their inspection between 3- 4 years.

4.2 Annual Blood Collection and Voluntary Blood Donation

According to WHO, it is estimated that blood donation by 1% of the population can meet a nation's most basic requirements for blood (WHO, 2016b), which means that the state with a population of 72,626,809, currently needs around 726,268.1 units of blood. As Madhya Pradesh is producing 509,721 units of blood so it still needs 30% more annual blood collection to fulfill the basic requirement.

4.2.1 Annual Collection of Blood: During January 2015 to December 2015, the annual blood collection from all the blood banks that reported was 509,721 of which 74.3% units were through voluntary blood donations and the remaining were from replacement donations.

Figure 3 Annual Collections and Voluntary Donation

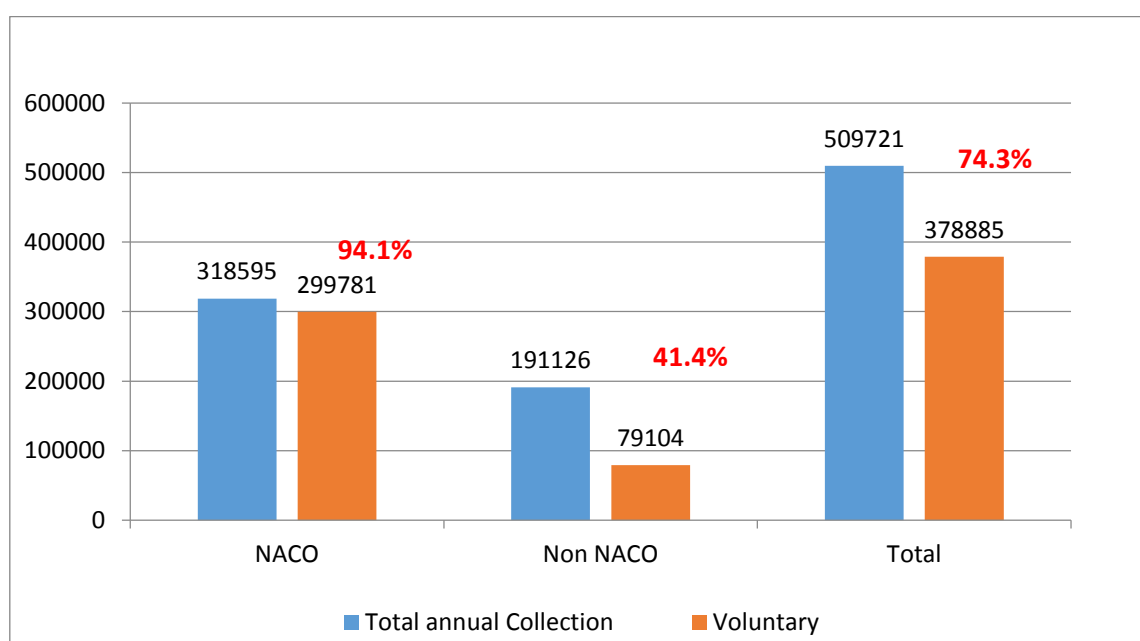
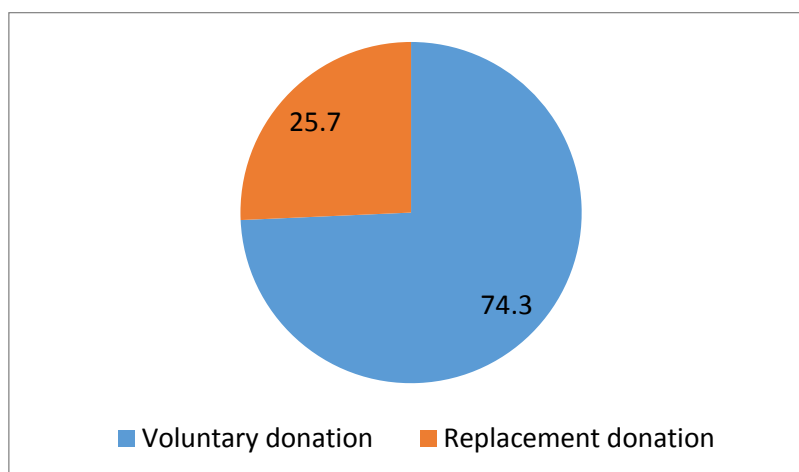


Figure 4 Type of Blood Donation (Voluntary vs Replacement Donation %)



The average annual collection of blood units of all the blood banks in the state was 4,078 units. The average annual collection of NACO supported blood banks was found to be higher (5,139 units) than the Non-NACO blood banks (3,034 units).

Table 6 Average Annual collection

District	NACO supported	Non-NACO	All BBs
Alirajpur	651	-	651
Anuppur	-	-	-
Ashok Nagar	-	1038	1038
Balaghat	4976	2533	3755
Barwani	9490	-	9490
Betul	1945	1205	1698
Bhind	789		789
Bhopal	4848	3228	3704
Burhanpur	4259	2462	3361
Chhatarpur	5181	-	5181
Chhindwara	6145	-	6145
Damoh	1954	-	1954
Datia	1523	-	1523
Dewas	2819	3151	2985
Dhar	3968	3155	3562
Dindori	453	-	453
Guna	5326	1105	3216
Gwalior	5935	3142	4738
Harda	2142	-	2142
Hoshangabad	2033	1095	1470
Indore	21246	2987	3781
Jabalpur	6410	5597	5945
Jhabua	1891	97	994
Katni	3277	-	3277
Khandwa	5828	5333	5581
Khargone	8612	-	8612
Mandla	2758	-	2758
Mandsaur	9966	1635	5801
Morena	4082	720	2401
Narsinghpur	4128	-	4128
Neemuch	8642	-	8642
Panna	2742	-	2742
Raisen	939	-	939
Rajgarh	5578	-	5578
Ratlam	9216	5877	7547
Rewa	6721	-	6721
Sagar	7881	2344	5113
Satna	6036	775	4282

Sehore	4207	-	4207
Seoni	3633	-	3633
Shahdol	3818	-	3818
Shajapur	33850	-	33850
Sheopur	1528	-	1528
Shivpuri	4088	-	4088
Sidhi	2057	-	2057
Singrauli	1955	1054	1505
Tikamgarh	1748	-	1748
Ujjain	6432	4776	5107
Umaria	794	-	794
Vidisha	4105	-	4105
Madhya Pradesh	5139	3034	4078

Similarly, the blood banks with component separation units recorded a average higher collection of 6,680 units compared to blood banks without blood component separation units which was 3,065 units. However, the variation in the collection was found to be very high across and within districts.

The NACO supported blood banks collected 62.5% (318,595units) of the total collection, of which 94.1% (299,781) units were through voluntary blood donation. The Non-NACO blood banks collected 191,126 (37.5%) units of which 41.4% (79,104) units were through voluntary blood donation. Blood banks without the component facility collected more amount of blood units (54.1%) as compared to blood banks with component separation facility (45.9%). Similarly, blood banks owned by public sector collected 58.7% (299,097) of the total collection followed by the not-for-profit sector 22% (112,358) and private sector blood banks (19.3%, 98,266).

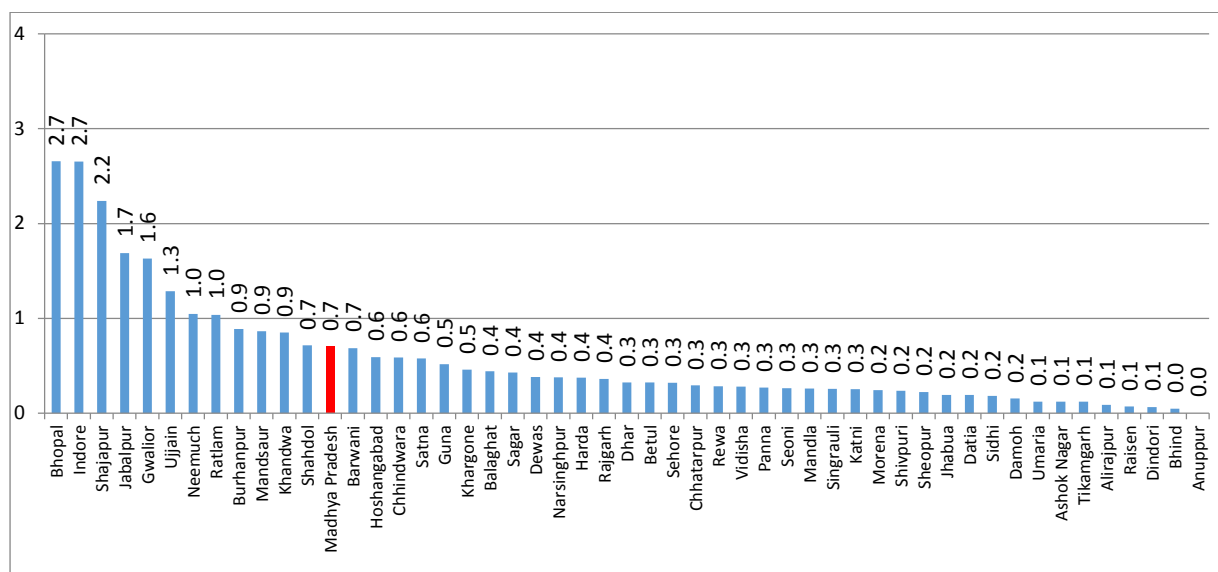
Table-7 indicates the district-wise details of the total annual collection, voluntary and replacement donation in the state of Madhya Pradesh. Blood banks reported a varying proportion of VNRBD ranging from 3.7% to 100%.

Table 7 Annual blood collection and percentage of VBD

District	Voluntary Donation	Replacement Donation	Annual Collection	VBD %
Alirajpur	651	-	651	100
Anuppur	-	-	-	-
Ashok Nagar	38	1000	1038	3.7
Balaghat	6712	797	7509	89.4
Barwani	9463	27	9490	99.7
Betul	5066	28	5094	99.5
Bhind	761	28	789	96.5
Bhopal	38242	24729	62971	60.7
Burhanpur	3914	2807	6721	58.2
Chhatarpur	4880	301	5181	94.2

Chhindwara	10985	1304	12289	89.4
Damoh	1499	455	1954	76.7
Datia	1523	-	1523	100
Dewas	4371	1599	5970	73.2
Dhar	6017	1106	7123	84.5
Dindori	378	75	453	83.4
Guna	5607	824	6431	87.2
Gwalior	24005	9161	33166	72.4
Harda	1813	329	2142	84.6
Hoshangabad	4979	2372	7351	67.7
Indore	44416	42539	86955	51.1
Jabalpur	31525	10092	41617	75.8
Jhabua	1305	683	1988	65.6
Katni	3202	75	3277	97.7
Khandwa	8100	3061	11161	72.6
Khargone	8612	-	8612	100
Mandla	2758	-	2758	100
Mandsaur	10725	876	11601	92.4
Morena	4618	184	4802	96.2
Narsinghpur	3480	648	4128	84.3
Neemuch	8642	-	8642	100
Panna	2192	550	2742	79.9
Raisen	350	589	939	37.3
Rajgarh	2789	2789	5578	50
Ratlam	14195	898	15093	94.1
Rewa	6378	343	6721	94.9
Sagar	8019	2206	10225	78.4
Satna	12070	776	12846	94
Sehore	3606	601	4207	85.7
Seoni	3475	158	3633	95.7
Shahdol	7335	300	7635	96.1
Shajapur	33679	171	33850	99.5
Sheopur	1400	128	1528	91.6
Shivpuri	3864	224	4088	94.5
Sidhi	2057	-	2057	100
Singrauli	888	2121	3009	29.5
Tikamgarh	1667	81	1748	95.4
Ujjain	11923	13613	25536	46.7
Umaria	606	188	794	76.3
Vidisha	4105	-	4105	100
Madhya Pradesh	378,885	130,836	509,721	74.3

Figure 5 Annual Collection per 100 population- District wise



The annual collection of blood units per 100 individuals was found to be around 0.7% in the state, which is less than the WHO suggested requirement that 1% of the population can meet a nation's most basic requirements for blood. However, there is a huge disparity in the collection of blood between districts. Thirteen districts in the state recorded an annual collection of more than and equal to the state average of 0.7 units per 100 population. 6 districts (Umaria, Ashok Nagar, Tikamgarh, Alirajpur, Raisen, Dindori) collected only 0.1 units of blood per 100 population. (Refer Fig-5)

Figure 6 Annual Collection per 100 population Vs BBs per 1 million- District wise

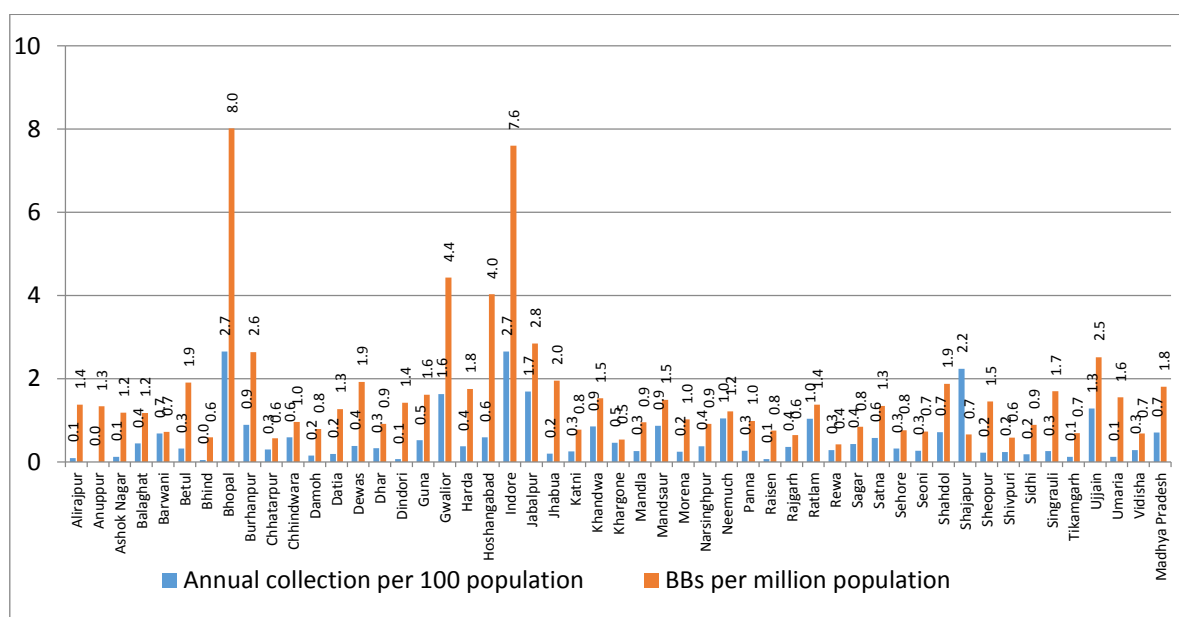
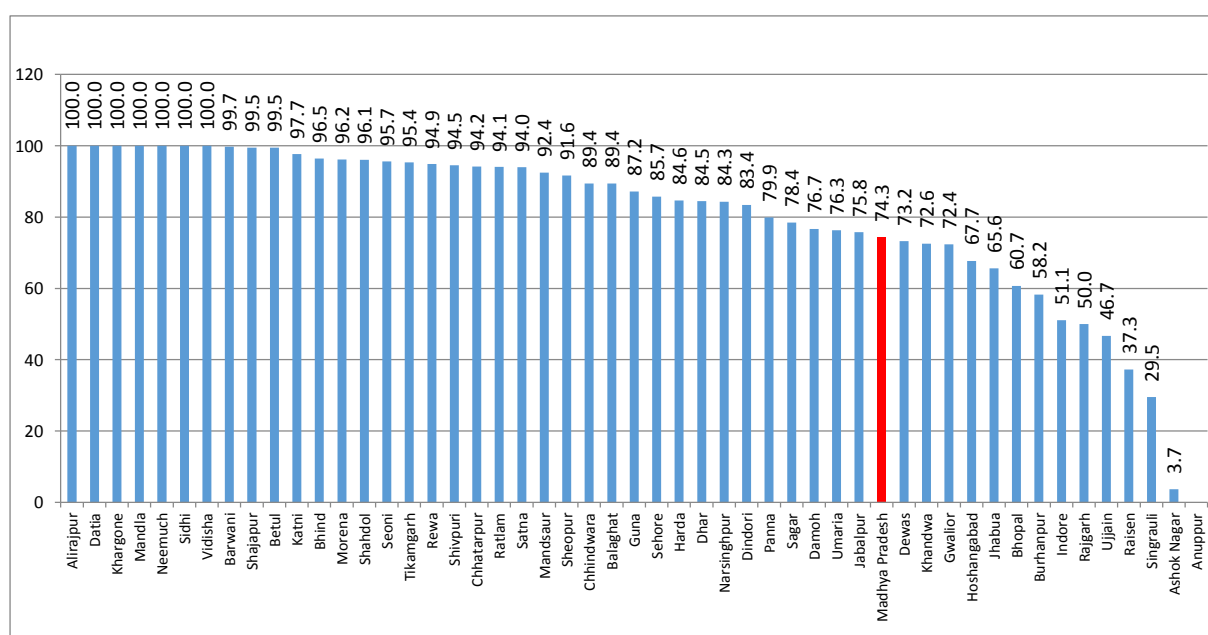


Figure 6 illustrates the district wise comparative information of annual collection per 100 population and number of blood banks per one million populations. This indicates that the

state had around 1.8 blood banks per million populations that collected around 0.7 units per 100 population at the ratio of 1.8 BB: 0.7 blood unit. The ratio is equal in Barwani district which was 0.7:0.7. The ratios in Bhopal, Indore and Gwalior districts were 8.0:2.7, 7.6:2.7 and 4.4:1.6 respectively which indicate that district collects relatively less blood with more number of blood banks proportionate to population.

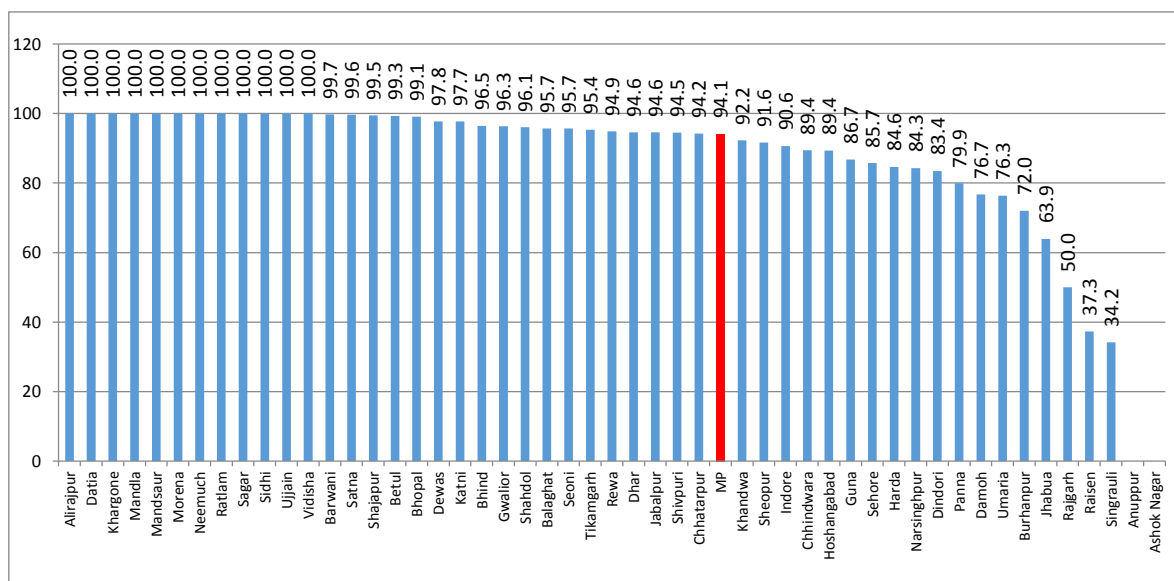
4.2.2 Voluntary blood donation: As depicted in Figure-7, thirty six districts have recorded more than the state average of 74.3%. Districts such as Alirajpur, Datia, Khargone, Mandla, Neemuch, Sidhi and Vidisha reported 100% voluntary blood donation. Eight districts collected less than 60% of voluntary blood donation during January to December 2015.

Figure 7 Percentage of Voluntary Blood Donation by District (Overall)



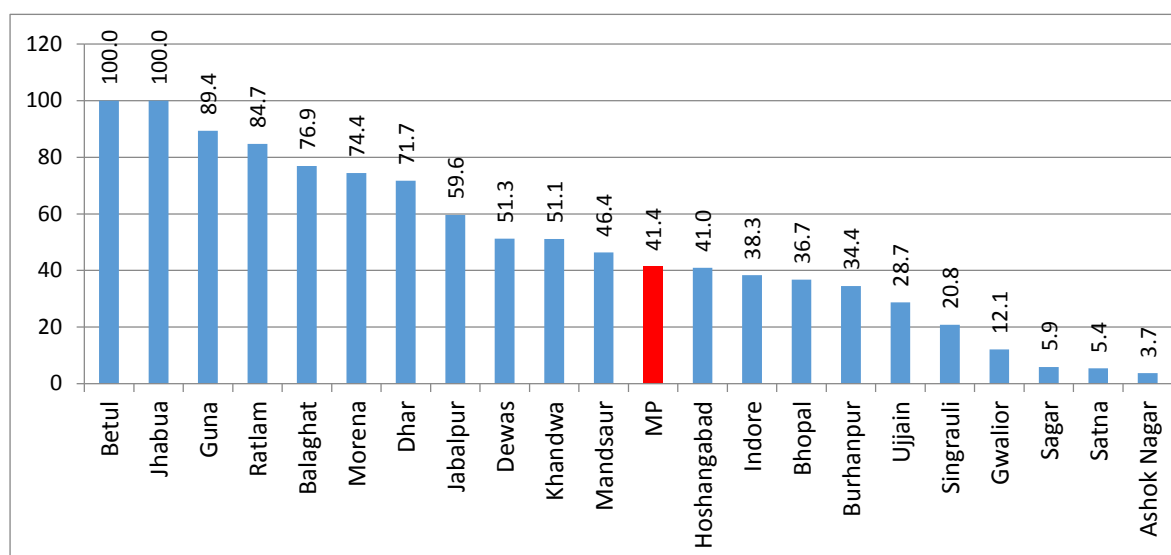
In terms of NACO supported blood banks, thirty districts have recorded a higher proportion of voluntary donation which is above the state average of 94.1%. Alirajpur, Datia, Hargone, Mandla, Neemuch, Sidhi, Mandsaur, Morena, Ratlam, Sagar, Ujjain and Vidisha reported 100% voluntary blood donation. Seven districts reported less than 75% of voluntary donation during January to December 2015.

Figure 8 Percentage of Voluntary Blood Donation by District (NACO Supported)



Among Non-NACO blood banks, state average is quite low i.e. 41.4%. Eleven districts recorded more than state average of 41.4%. Betul and Jhabua districts recorded 100% of voluntary donation. Thirty eight districts recorded less than 40% of voluntary donation during January to December 2015.

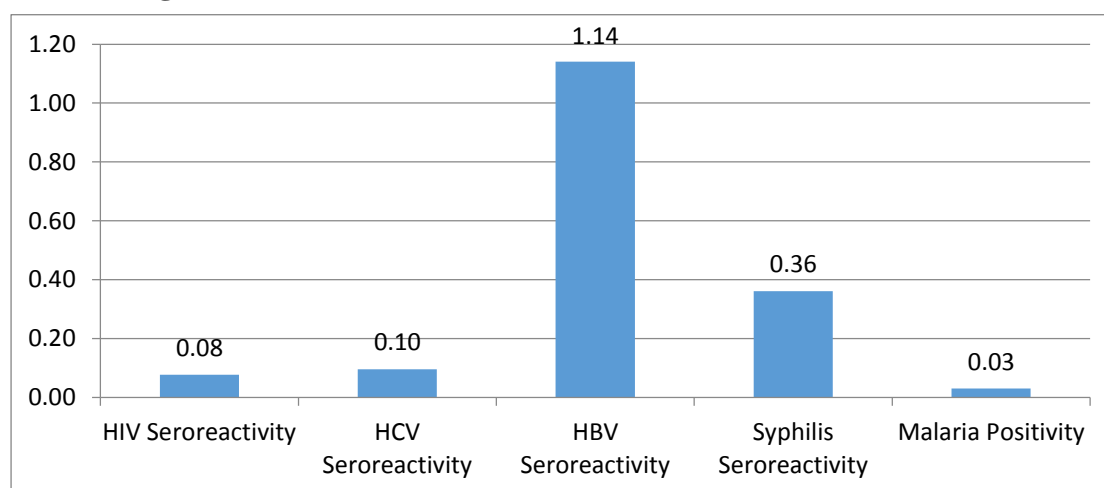
Figure 9 Percentage of Voluntary Blood Donation by District (Non-NACO)



4.3 Transfusion Transmitted Infections(TTIs)

Transfusion-Transmitted Infections (TTIs) are major problems associated with blood transfusion (Chandra, Rizvi, & Agarwal, 2014; Gupta, Singh, Singh, & Chugh, 2011). Screening for TTIs such as HIV 1, HIV 2, Hepatitis B, Hepatitis C, Malaria, and Syphilis is mandatory in India. Due to the concerted and active efforts, the seroreactivity percentage of TTIs has come down significantly over the years.

Figure 10 Transfusion Transmitted Infection (%) -Jan-Dec 2015



The seroreactivity of TTI among blood donors in the year 2015 is depicted in Fig-10. HIV reactivity was found to be 0.08%, Hepatitis-C was 0.10%, Hepatitis-B 1.14%, Syphilis 0.36% and Malaria 0.03%. However, there is a huge variation between districts.

HIV, HBV and Syphilis reactivity rates were recorded higher in NACO supported blood banks. The HCV and Malaria reactivity was found to be higher in Non NACO blood banks.

Table 8 Transfusion Transmitted Infections (%)

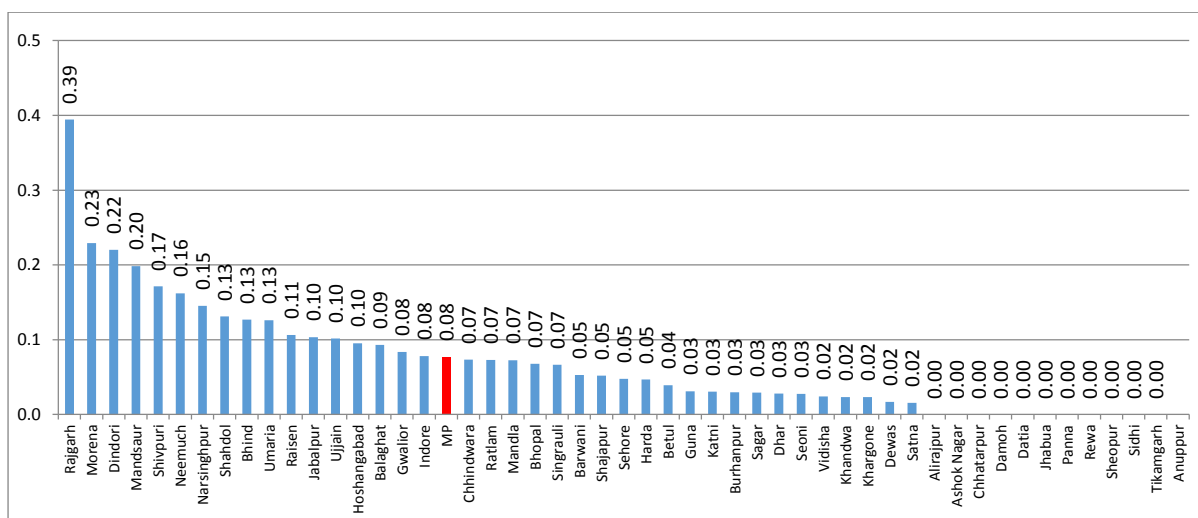
Category of BB	Transfusion Transmitted Infections %				
	HIV	HCV	HBV	Syphilis	Malaria
NACO Supported	0.08	0.08	1.26	0.39	0.04
Non-NACO	0.07	0.12	0.96	0.32	0.02
Overall	0.08	0.10	1.14	0.36	0.03

4.3.1 Transfusion Transmitted Infections by Category of blood banks: HIV, HBV and HCV reactivity rates were higher in blood banks with component separation facility while blood banks without component facility indicated a higher reactivity of Syphilis (0.49%) and Malaria (0.05%).

Table 9 Transfusion Transmitted Infections by category of blood banks

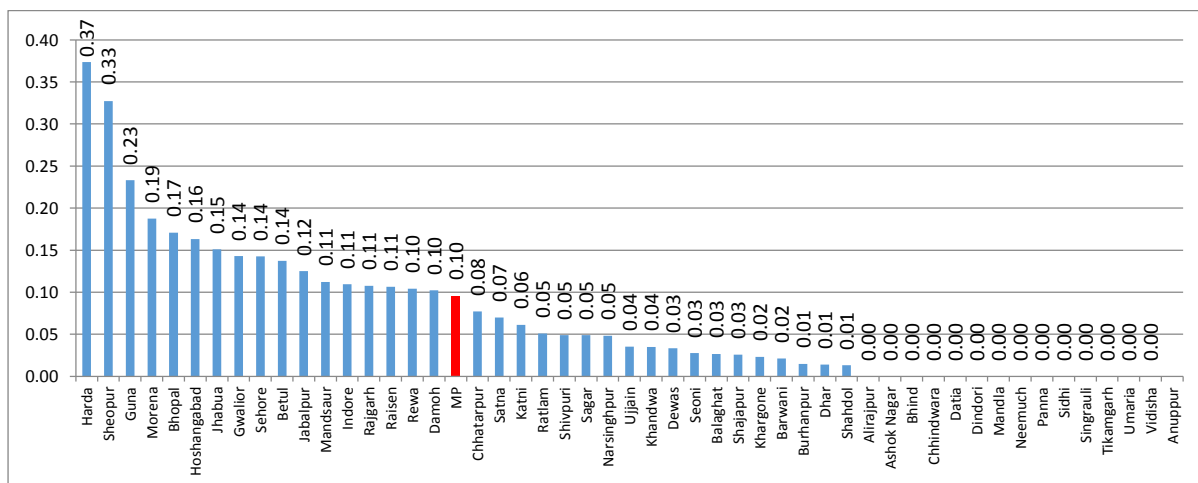
Category of BB	Transfusion Transmitted Infections %				
	HIV	HCV	HBV	Syphilis	Malaria
BBs with component facility	0.09	0.12	1.20	0.23	0.01
BBs without component facility	0.07	0.07	1.08	0.49	0.05
Overall	0.08	0.10	1.14	0.36	0.03

Figure 11 HIV Seroreactivity- By District (%)



The majority of districts indicated lower HIV reactivity than the state HIV reactivity level of 0.08%. However, Rajgarh (0.39%), Morena (0.23%), Dindori (0.22%), Mandsaur (0.20%), Shivpuri (0.17%), Neemuch (0.16%), Narsinghpur (0.15%), Shahdol, Bhind, Umaria (0.13%) each, Raisen (0.11%), Jabalpur, Ujjain, Hoshangabad (0.10%) each and Balaghat (0.09%) recorded a higher reactivity than state average. Thirty six districts recorded less than 0.1% HIV reactivity.

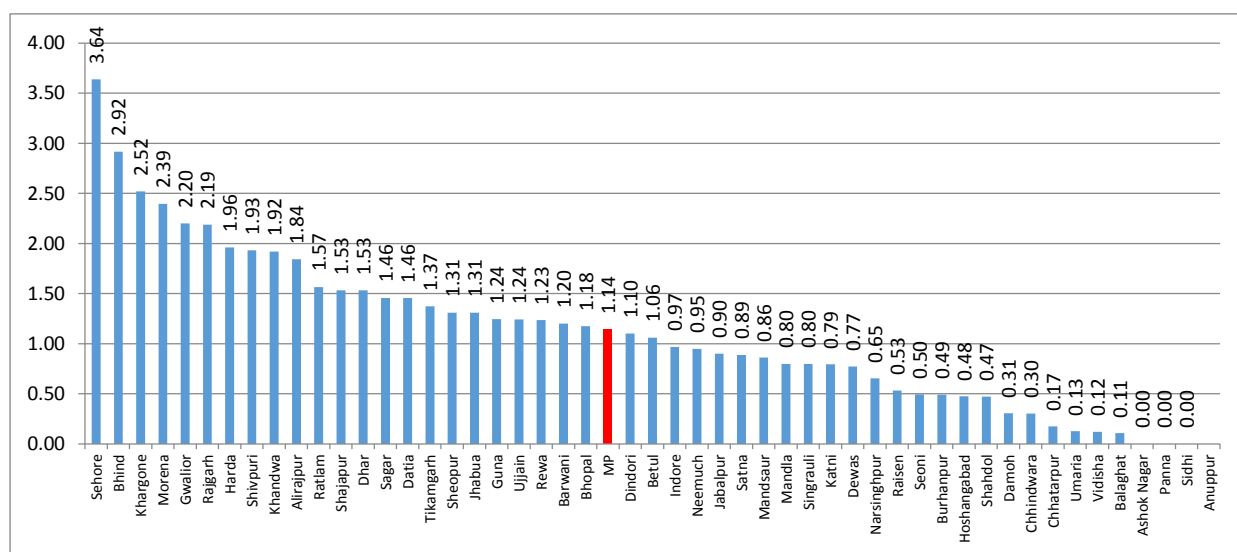
Figure 12 HCV Seroreactivity- By District (%)



When considering Hepatitis C infection, 15 districts like Harda (0.37%), Sheopur (0.33%), Guna (0.23%), Morena (0.19%), Bhopal (0.17%), Hoshangabad (0.16%), Jhabua (0.15%), Gwalior, Sehore, Betul 0.14% each, Jabalpur(0.12%), Mandasaur, Indore, Raigarh and Raisen (0.11%) each recorded a reactivity level higher than the state average of 0.10%.

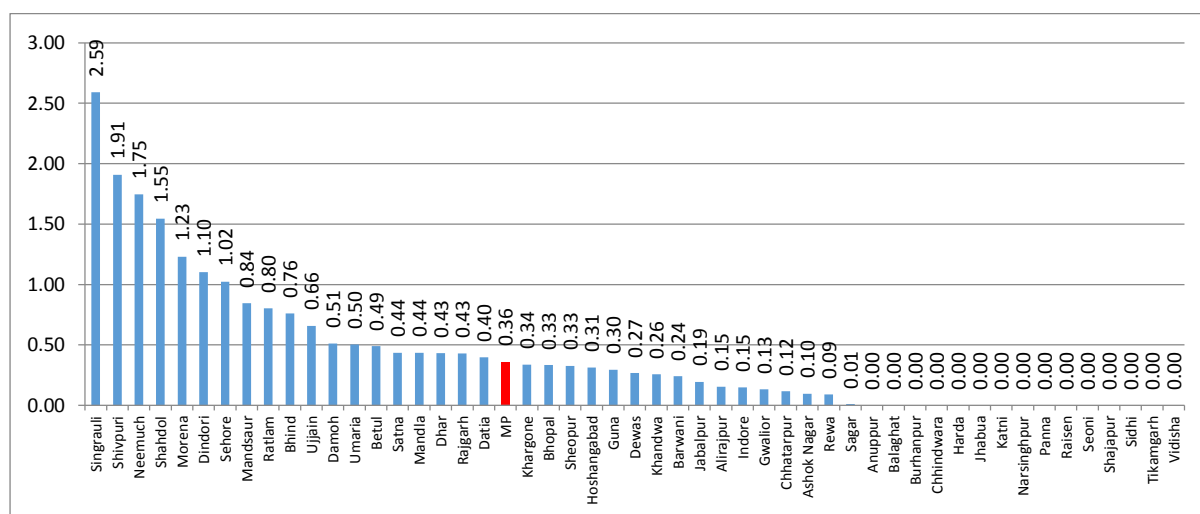
Hepatitis B seroreactivity was found to be higher than the state average of 1.14% in twenty three districts. Twenty seven districts recorded a reactivity level less than state average. While in Ashoknagar, Panna, and Sidhi districts Hepatitis B seroreactivity was 0.00%.

Figure 13 HBV Seroreactivity- By District (%)



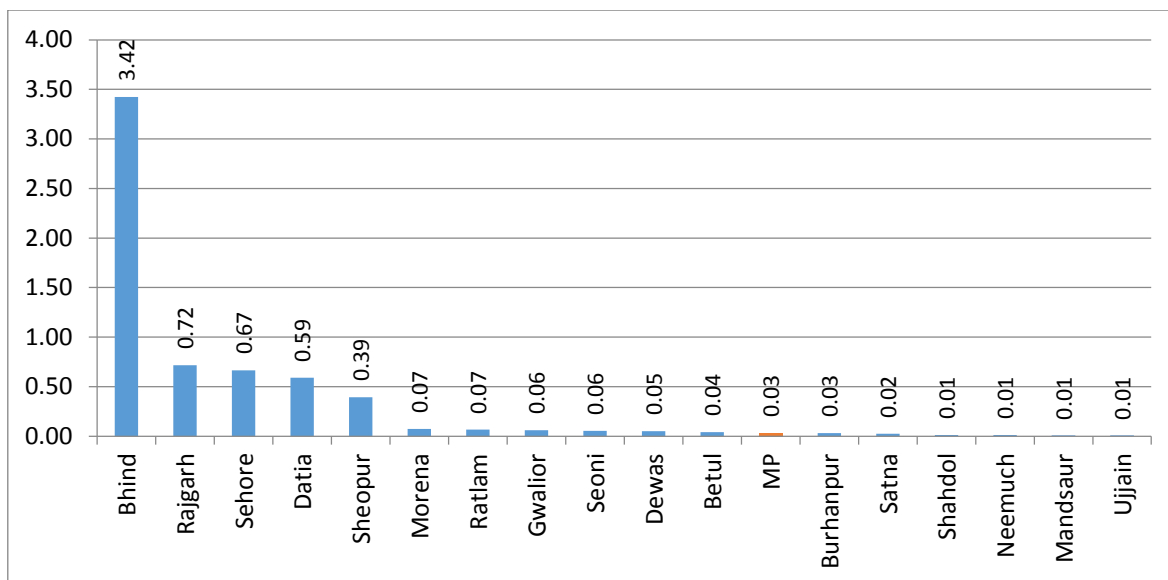
Syphilis seroreactivity was found to be very high in Singrauli District (2.59%) in comparison to state average of 0.36%. In total nineteen districts recorded higher Syphilis seroreactivity than the state average of 0.36% while thirty one districts recorded less than the state average.

Figure 14 Syphilis Seroreactivity- By District (%)



The majority of the districts indicated a lower positivity of Malaria than the state positivity of 0.56%. There were 33 districts in Madhya Pradesh that did not report malaria reactivity among blood donors whereas districts like, Bhind, Rajgarh, Sehore, Datia, Sheopur, Morena, Ratlam, Gwalior, Seoni, Dewas and Betul recorded a higher positivity than the state average..

Figure 15 Malaria Positivity- By District (%)



4.4 Component Separation

As depicted in Figure-16, around 68% of blood units collected by blood banks with component separation facilities, were used for component separation in state. The percentage of component separation was higher (69.1%) in NACO blood banks compared to Non NACO supported blood banks (67%).

Figure 16 Total Blood Collection and Component Separation

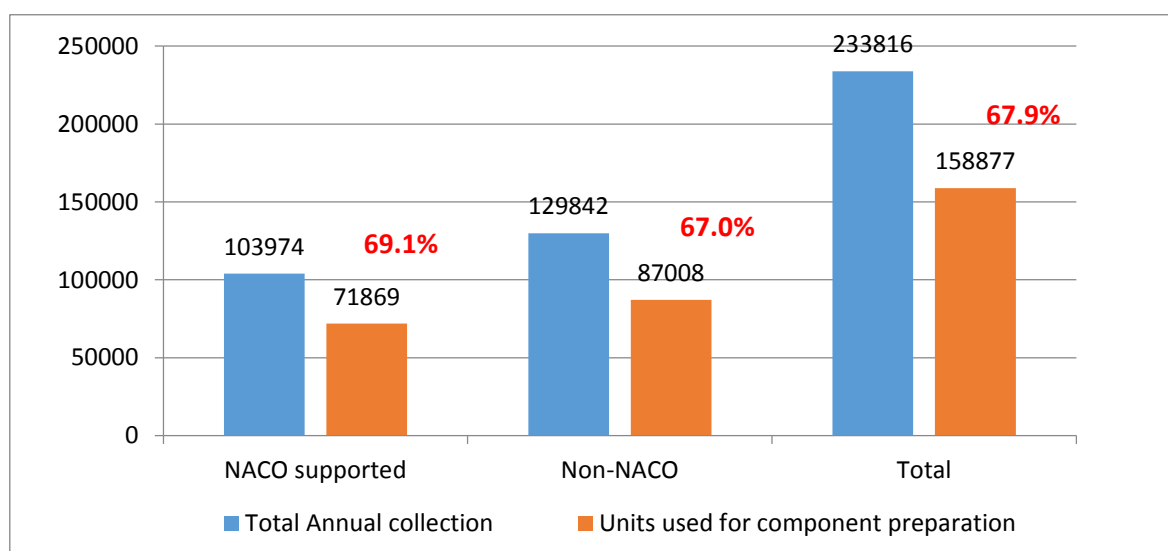


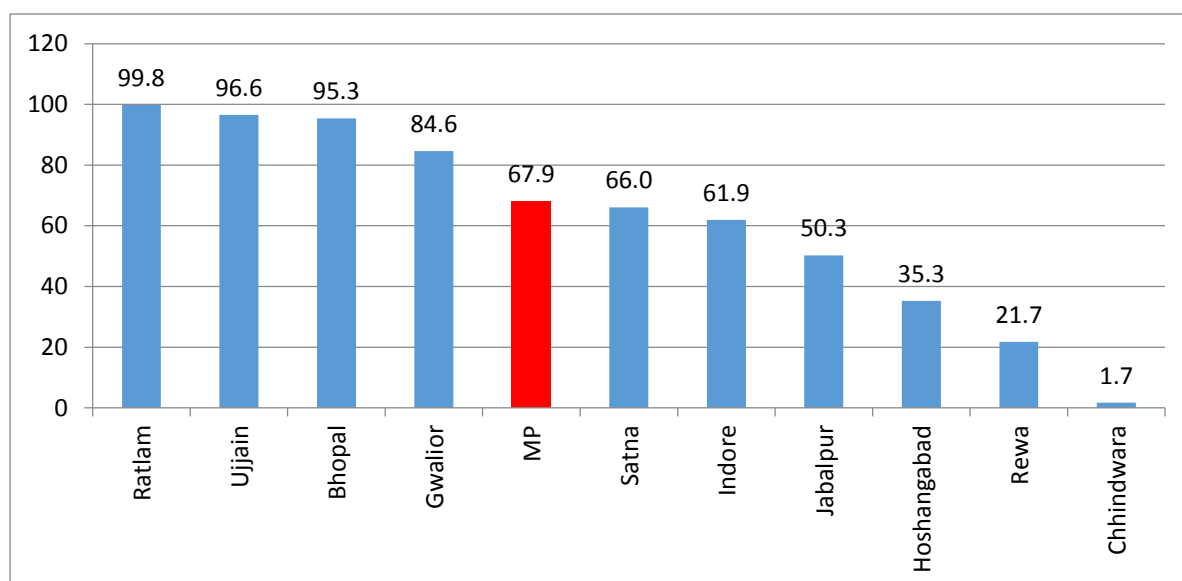
Table 10 Total Annual Collection by BCSUs and Percentage of Component Separation

District	Total Annual Collection	Total Collection by BCSUs	Percentage of component separation
Alirajpur	651	-	-
Anuppur	-	-	-
Ashok Nagar	1038	-	-
Balaghat	7509	-	-
Barwani	9490	-	-
Betul	5094	-	-
Bhind	789	-	-
Bhopal	62971	48125	95.3
Burhanpur	6721	-	-
Chhatarpur	5181	-	-
Chhindwara	12289	12199	1.7
Damoh	1954	-	-
Datia	1523	-	-
Dewas	5970	-	-
Dhar	7123	-	-

Dindori	453	-	-
Guna	6431	-	-
Gwalior	33166	25937	84.6
Harda	2142	-	-
Hoshangabad	7351	2294	35.3
Indore	86955	77373	61.9
Jabalpur	41617	32842	50.3
Jhabua	1988	-	-
Katni	3277	-	-
Khandwa	11161	-	-
Khargone	8612	-	-
Mandla	2758	-	-
Mandsaur	11601	-	-
Morena	4802	-	-
Narsinghpur	4128	-	-
Neemuch	8642	-	-
Panna	2742	-	-
Raisen	939	-	-
Rajgarh	5578	-	-
Ratlam	15093	5877	99.8
Rewa	6721	6721	21.7
Sagar	10225	-	-
Satna	12846	11170	66.0
Sehore	4207	-	-
Seoni	3633	-	-
Shahdol	7635	-	-
Shajapur	33850	-	-
Sheopur	1528	-	-
Shivpuri	4088	-	-
Sidhi	2057	-	-
Singrauli	3009	-	-
Tikamgarh	1748	-	-
Ujjain	25536	11278	96.6
Umaria	794	-	-
Vidisha	4105	-	-
Madhya Pradesh	509721	233816	67.9

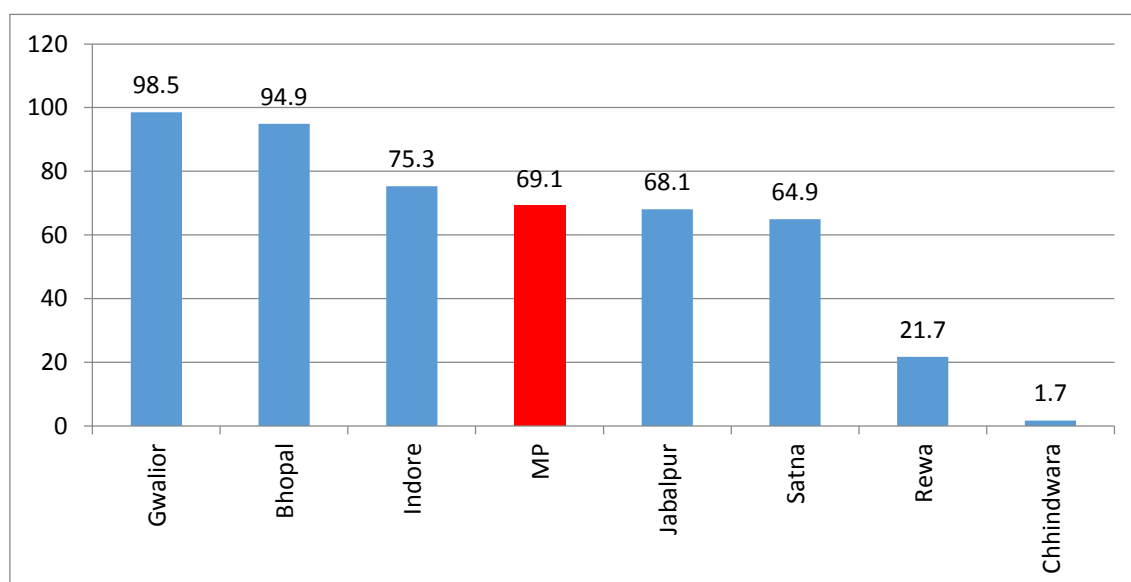
The percentage of component separation out of the total collection was more than 80% in Bhopal, Gwalior, Ratlam and Ujjain.

Figure 17 Percentage of Component Separation- By District (All BBs)



The percentage of component separation in NACO supported blood banks is illustrated in Figure-18 which indicates 3 districts recording more than State average and 2 districts reporting less than 50% of component separation.

Figure 18 Percentage of Component Separation- By District (NACO)



4.5 Quality Management Systems

Quality is defined as the totality of characteristics of an entity that bears on its ability to satisfy the stated and implied needs (Schlickman, 1998). It is a spectrum of activities and processes that shape the characteristics of a product or service. Quality systems are defined as the organizational structure, resources, processes, and procedures needed to implement quality management (ISO-8402, 1994) and Quality Management System is the sum total of all business policies, processes and procedures required for the execution of production, development or service of an organization.

Blood transfusion is a multi-step process with the risk of error in each process from selecting donors, collecting and processing donations, testing of donor and patient samples, issue of compatible blood, to transfusing the patient (WHO, 2016a). An effectively planned and implemented quality system that includes internal quality assessment, external quality assessment, and education and training of staff can significantly reduce the risk associated with blood transfusion.

The assessment captured several parameters that influence the quality of service provision. Some of the key parameters are mentioned in Table -11. The majority of blood banks (93.1%) reported that they adhered to the NBTC guidelines. Availability of document control system was reported by less than 50% of the blood banks in the state. Around 43.5% of NACO supported blood banks and 44.9% of Non-NACO blood banks reported they had a document control system. In terms of Standard Operating Procedures (SOPs) for technical processes, more than 90% reported that they had SOPs.

Table 11 Availability of Quality Parameters in Blood Banks

Quality Parameters	NACO/NON-NACO		All Blood Banks (n=131)
	NACO supported (n=62)	Non-NACO (n=69)	
Compliance with NBTC guidelines	60	62	122
	96.8%	89.9%	93.1%
Availability of Documental Control System (DCS)	27	31	58
	43.5%	44.9%	44.3%
SOPs for Technical Processes	52	68	120
	83.9%	98.6%	91.6%
IQC for IH	39	56	95
	62.9%	81.2%	72.5%
IQC for TTI	39	38	77
	62.9%	55.1%	58.8%
QC for kits, reagents and blood bags	45	60	105
	72.6%	87.0%	80.2%

EQAS for IH	-	6	6
	-	8.7%	4.6%
EQAS for TTI	1	3	4
	1.6%	4.3%	3.1%
NABH accreditation for blood banks	0	0	0
	0.0%	0.0%	0.0%
Availability of designated and trained Quality Manager	8	34	42
	12.9%	49.3%	32.1%
Availability of designated and trained Technical Manager	8	44	52
	12.9%	63.8%	39.7%
Programme for regular Equipment maintenance	39	66	105
	62.9%	95.7%	80.2%
Equipment calibration as per regulatory requirement	41	68	109
	66.1%	98.6%	83.2%

At the state level, Internal Quality Control (IQC) for Immunohematology was reported by 72.5% of the blood banks and IQC for TTIs was reported by 58.8% of the blood banks, with almost no variation between NACO supported and Non-NACO blood banks. Around 80.2% of the blood banks reported carrying out quality control for kits, reagents and blood bags. The percentage of blood banks enrolled in EQAS by recognized providers was found to be only 4.6% for immunohematology and 3.1% for TTIs. None of the blood banks out of the total 131 blood banks that participated in the assessment were accredited by National Accreditation Board for Hospitals & Healthcare Providers (NABH).

Designated and trained Quality Managers and Technical managers were available only in 32.1% and 39.7% of the blood banks respectively.

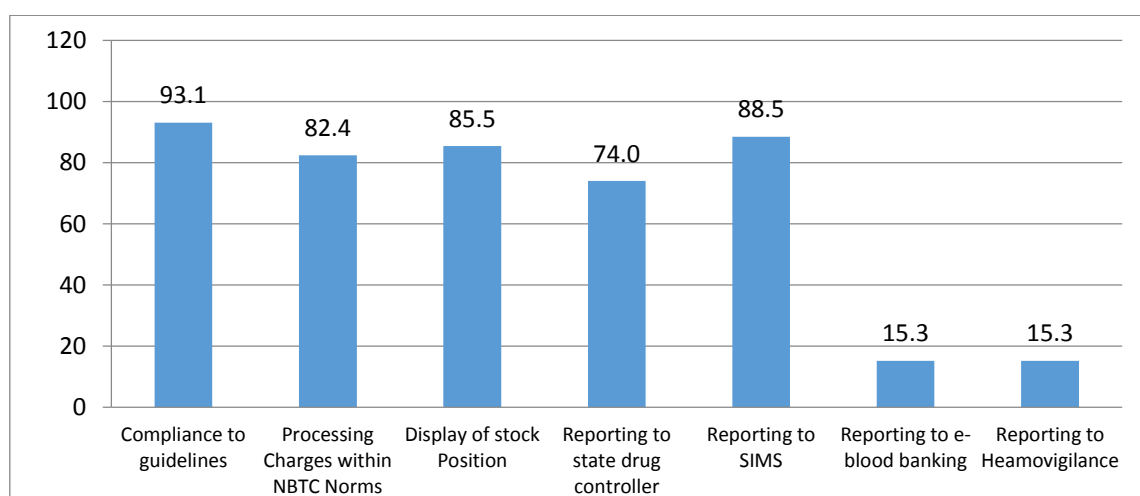
Around 80% of the blood banks reported that they had a regular equipment maintenance programme and around 83% reported that they calibrate the equipment as per requirement.

4.6. Reporting and Documentation

4.6.1. Compliance to NBTC guidelines

Majority of the blood banks (93.1%) reported to be compliant with NBTC guidelines. Around, 82.4% of Blood Banks reported that they were recovering processing charges within NBTC/SBTC norms. Most of the blood banks (85.5%) reported that they were displaying stock position in their Blood bank Premise

Figure 19 Reporting and Documentation



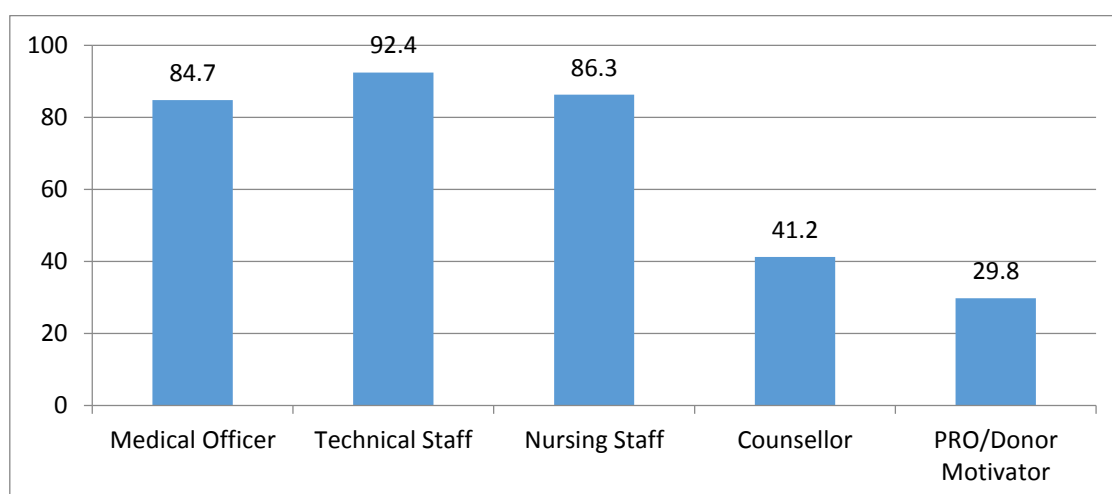
Reporting requirements: In terms of reporting requirement, 74% of the blood banks submitted regular reports to state drug controller, 88.5 % of blood banks regularly reported in national strategic information management systems (SIMS). However, only 15.3 % regularly reported in E-blood banking either national or state e-blood banking. Only 15.3 % of the Blood banks were members of National Haemovigilance Program.

4.7. Human Resources

4.7.1. Availability of staff

The mean number of employees in the blood bank was 10.69 (SD 7.45). It ranges from one employee to 41 employees.

Figure 20 Percentage of BB Manpower (At least one)

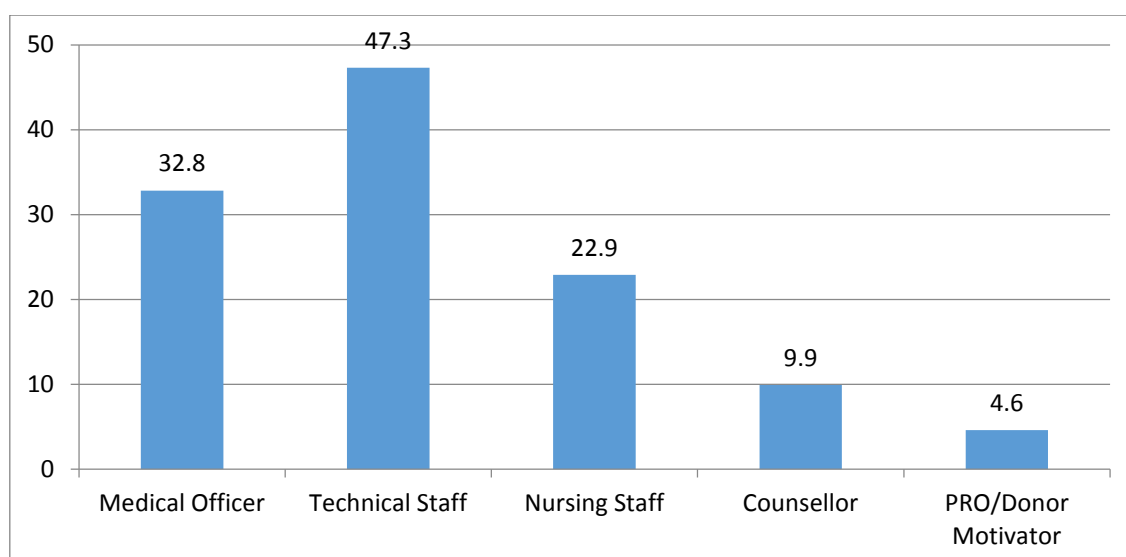


The above graph depicts that majority of the blood banks 92.4% and 84.7 % had at least one technical staff and one medical officer respectively. Only 41.2 % of the blood banks had at least one counsellor and 29.8% had one PRO/Donor Motivator.

4.8. Training of Blood Bank Personnel

47.3 % of blood banks had at least one trained technical staff followed by 32.8 % of the blood banks with trained medical officer. Only 4.6 % of blood banks had at least one trained donor motivator.

Figure 21 Percentage of At least one trained

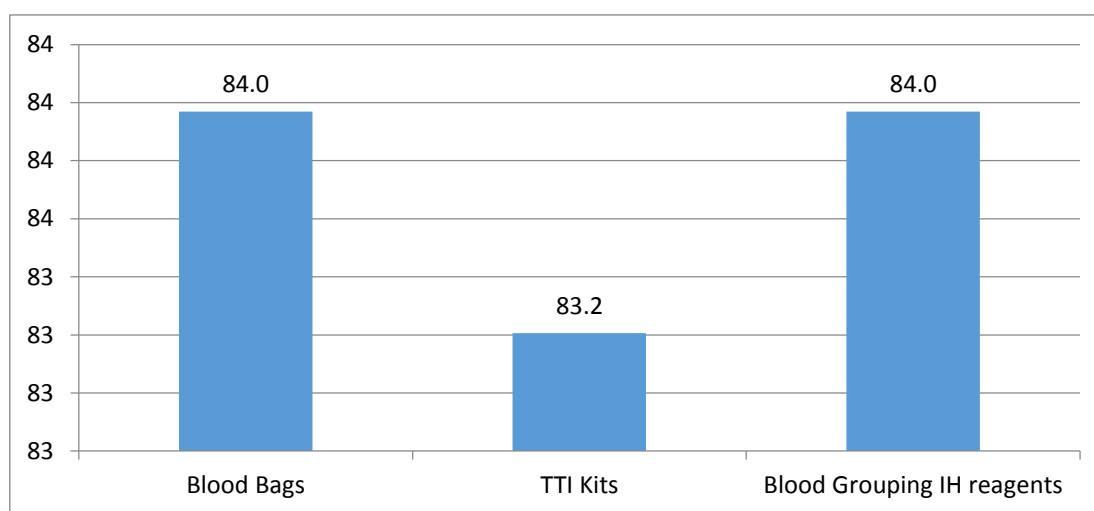


4.9. Equipment and Supplies

4.9.1. Regular supply kits/supplies

Majority of blood banks (84%) reported that they had regular supply of blood bags, 83.2% reported that they had regular supply of kits and 84% reported to have regular supply of blood grouping reagents.

Figure 22 Regular Supply of Kits



4.9.2. Equipment Availability (working condition)

Table 12 indicates the availability of the different equipment in blood banks. 94.7% of blood banks in the state reported that they had donor couches, 84.7% reported that they had instrument for haemoglobin estimation. Only 29.8% of blood banks had refrigerated centrifuge in working condition.

Table 12 BBs having Equipment in working condition

BBs having Equipment in Working Condition		
S No	Equipment	% BB
1	Donor Couches	94.7
2	Instrument for Hb Estimation	84.7
3	Blood collection monitor	87.8
4	Quarantine Blood Bank Refrigerator to store untested blood	96.2
5	container for safe disposal of sharps	93.1
6	Oxygen supply equipment	93.9
7	computers with accessories and software	60.3
8	General lab centrifuge for samples	93.9
9	Bench top centrifuge for serological testing (Immunohaematology)	80.9
10	Blood transportation box (No. in inventory)	87.0
11	Emergency drugs box / Crash cart	96.9
12	Autoclave machine	87.0
13	Water bath	86.3
14	Blood bank refrigerator (storage of tested blood) with temperature recorder	96.2
15	Automated pipettes	89.3
16	Refrigerated centrifuge	29.8
17	Blood container weighting device	65.6
18	Serology rotator	63.4

4.10. The current status of blood banks based on the assessment

As mentioned in the methodology section, the blood banks were assessed and categorized based on the scores obtained. Though the assessment captured all the aspects of blood transfusion services in blood banks, adequate importance and weightage were given to the technical aspects and adherence to quality management systems.

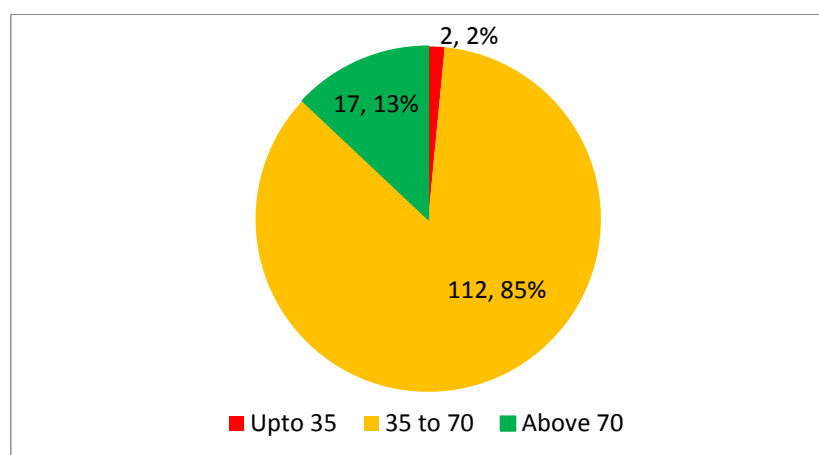
The mean assessment score of blood banks in the state was 59.6 (SD: 10.2). There was no significant difference in the mean score of NACO supported blood banks and Non-NACO blood banks.

Table 13 Mean Assessment score

Type of BB	N	Mean	SD
NACO supported	62	59.5	10.4
Non-NACO	69	59.7	10.0
Total	131	59.6	10.2

At the state level, the majority of blood banks (112; 85%) scored between 35 to 70, followed by (17; 13%) which scored above 70, and only two blood banks scored less than or equal to 35.

Figure 23 Categorisation of Blood banks (n=131)



Around 84% of NACO supported and 87% Non-NACO blood banks scored between 35 and 70. Around, 14% of NACO supported blood banks and 12% of Non-NACO blood banks scored more than 70%. (Refer Figure 24; Figure 25)

Figure 24 Categorisation of NACO Supported BBs (n=62)

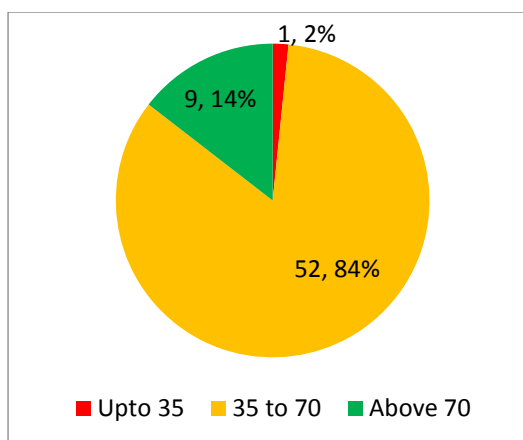
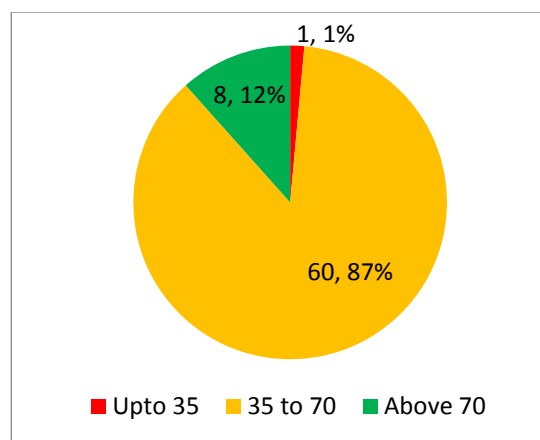
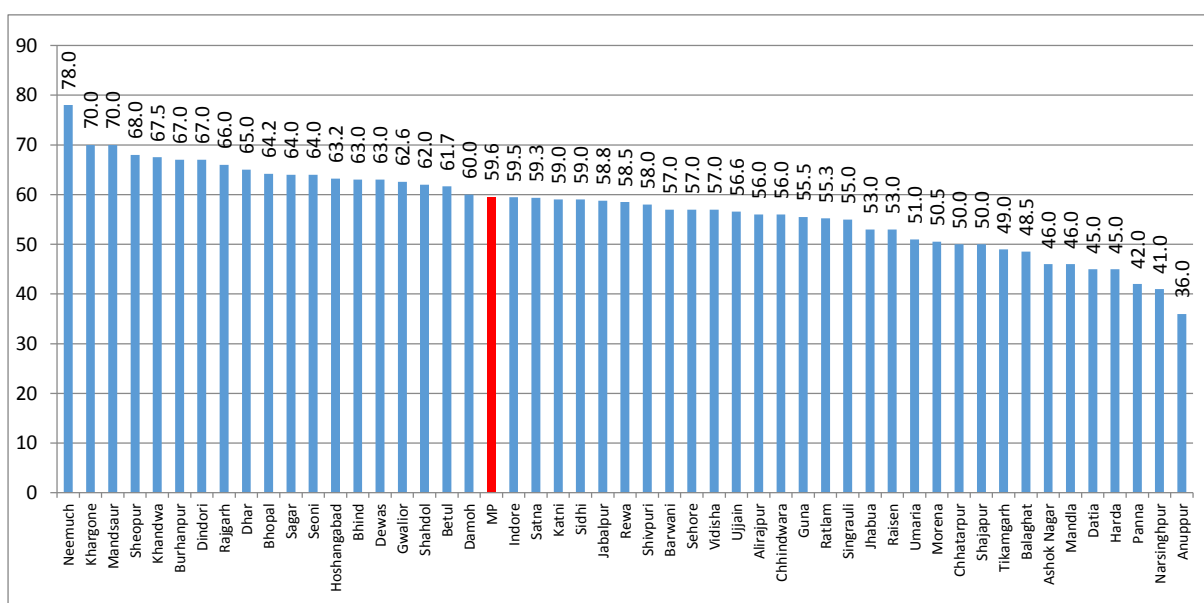


Figure 25 Categorisation of Non-NACO BBs (n=69)



Among the districts, Neemuch (78) scored the highest and Annapur (36) scored the least. Nineteen districts scored above the state average. 45% of the total blood banks were located in these districts

Figure 26 Mean Assessment Score – By Districts (All BBs)



Though the difference in the mean score at the state level was only 0.2 between NACO and Non-NACO blood banks, the mean scores of NACO supported blood banks were higher than the Non-NACO blood banks in 10 districts.

The difference in the score was more than 5 in NACO supported blood banks in 6 districts.

Table 14 Mean assessment score - By District (NACO supported Vs. Non-NACO)

District	NACO supported	Non-NACO	Total
Alirajpur	56.0	-	56.0
Anuppur	-	36.0	36.0
Ashok Nagar	-	46.0	46.0
Balaghat	53.0	44.0	48.5
Barwani	57.0	-	57.0
Betul	61.0	63.0	61.7
Bhind	63.0	-	63.0
Bhopal	69.0	62.5	64.2
Burhanpur	60.0	74.0	67.0
Chhatarpur	50.0	-	50.0
Chhindwara	56.0	-	56.0
Damoh	60.0	-	60.0
Datia	45.0	-	45.0
Dewas	61.0	64.0	63.0
Dhar	62.0	68.0	65.0
Dindori	67.0	-	67.0
Guna	52.0	59.0	55.5
Gwalior	68.8	57.6	62.6
Harda	45.0	-	45.0
Hoshangabad	62.0	64.0	63.2
Indore	60.0	59.4	59.5
Jabalpur	54.8	61.8	58.8
Jhabua	50.0	56.0	53.0
Katni	59.0	-	59.0
Khandwa	56.0	79.0	67.5
Khargone	70.0	-	70.0
Mandla	46.0	-	46.0
Mandsaur	74.0	66.0	70.0
Morena	57.0	44.0	50.5
Narsinghpur	41.0	-	41.0
Neemuch	78.0	-	78.0
Panna	42.0	-	42.0
Raisen	53.0	-	53.0
Rajgarh	66.0	-	66.0
Ratlam	46.0	64.5	55.3
Rewa	58.5	-	58.5
Sagar	76.0	52.0	64.0
Satna	63.5	51.0	59.3
Sehore	57.0	-	57.0
Seoni	64.0	-	64.0

Shahdol	62.0	-	62.0
Shajapur	50.0	-	50.0
Sheopur	68.0	-	68.0
Shivpuri	58.0	-	58.0
Sidhi	59.0	-	59.0
Singrauli	56.0	54.0	55.0
Tikamgarh	49.0	-	49.0
Ujjain	61.0	55.5	56.6
Umaria	51.0	-	51.0
Vidisha	57.0	-	57.0
Madhya Pradesh	59.5	59.7	59.6

Only two blood banks from Indore and Jabalpur district scored less than or equal to 35. The number of blood banks (by district) that scored more than 70 is mentioned in Table-15. Of the 17 blood banks that scored more than 70 score, 9 were NACO supported blood banks. The majority of blood banks that scored above 70 were from Bhopal (5) followed by Hoshangabad (2) and Jabalpur (2).

Table 15 Number of Blood Banks Scored above 70- by District

District	NACO supported	Non-NACO	TOTAL
Bhopal	2	3	5
Burhanpur	-	1	1
Gwalior	1	-	1
Hoshangabad	1	1	2
Indore	-	1	1
Jabalpur	1	1	2
Khandwa	-	1	1
Mandsaur	1	-	1
Neemuch	1	-	1
Sagar	1	-	1
Satna	1	-	1
Madhya Pradesh	9	8	17

4.10.1 Assessment score by Category of blood banks: The mean score of blood banks with component facilities (62.50; SD: 10.90) was found to be higher than the mean score of those without component facilities (58.45; SD: 9.71).

Table 16 Mean assessment score by category of blood banks

Type of BBs	NACO supported			Non-NACO			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
BCSUs	10	63.50	15.64	26	62.12	8.82	36	62.50	10.90
Without BCSUs	52	58.69	9.11	43	58.16	10.49	95	58.45	9.71

Among the blood banks that scored ≤ 35 , there was only one blood bank with component separation facility. (Refer figure 27 and 28). There were 12% of Blood banks with component preparation facility that scored more than 70, as compared to 17% of blood banks without component facility.

Figure 27 BBs with Component-Score (n=36)

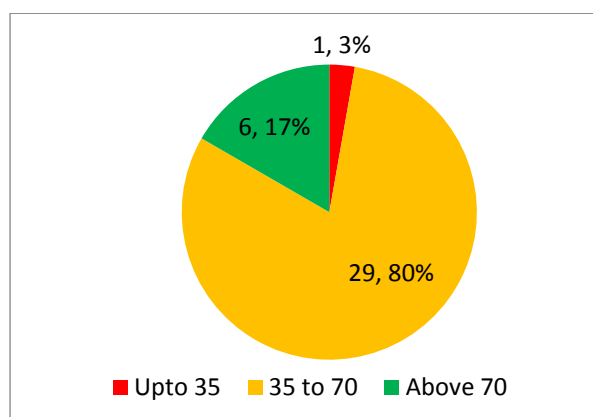
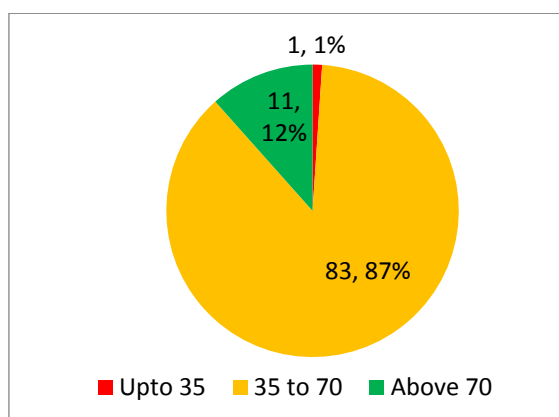


Figure 28 BBs without Component-Score (n=95)



4.10.2 Assessment score by Ownership: The mean assessment score of not-for-profit (NGO/Trust/Charitable) owned blood banks (61.0; SD: 9.01) was found to be higher than the public sector blood banks (58.15; SD: 10.47). It was also found that there were more public owned blood banks (7 blood banks) in the more than 70 category compared to only 5 blood banks from not for profit sector owned blood banks.

However, NACO supported blood banks run by not-for-profit sector had scored higher (70.60; SD: 4.93) compared to Non-NACO NGO/Trust/Charitable blood banks (59.40; SD: 8.56).

Table 17 Mean assessment score by Ownership

Ownership	NACO supported			Non-NACO			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
NGO/Trust/charitable	5	70.60	4.93	30	59.40	8.56	35	61.0	9.01
Private	0			37	60.46	10.67	37	60.46	10.67
Public	57	58.49	10.22	2	48.50	17.68	59	58.15	10.47

Table 18 Mean assessment scores categories by Ownership

Ownership	<=35	36 to 70	Above 70	Total
Public	1	51	7	59
	1.7%	86.4%	11.9%	100%
NGO/Trust/Charitable	0	30	5	35
	0.0%	85.7%	14.3%	100%
Private	1	31	5	37
	2.7%	83.8%	13.5%	100%
Overall	2	112	17	131
	1.5%	85.5%	13.0%	100%

4.10.3 Assessment score of Private Sector Blood Banks: Irrespective of the NACO support status, 55% (72) blood banks were owned by private sector, of which, 35 (49%) were owned by not-for-profit sector such as, NGO, Trust, and charitable organizations. The mean score of private sector owned blood banks including not-for-profit sector was 60.72 (SD: 9.84) the mean score of public owned blood banks was 58.15 (10.47). Among the private sector, not-for-profit sector (61; SD: 9.01) scored slightly higher than the other private blood banks (60.46; SD: 10.47).

Nevertheless, it is also important to note that the average annual collection was higher (5156 units) in public owned blood banks compared to private blood banks (3143 Units). Similarly, the percentage of voluntary blood donation was higher in public owned blood banks (75%) compared to the private blood banks (25%). Of the total private blood banks, 27(38%) had component separation facility whereas only 9 (15%) of public blood banks had component separation facility.

4.10.4 Assessment score by Annual Collection: The mean assessment score of blood banks that collected more than 5000 blood units (63.28; SD: 9.32) was found to be higher than those

which collected between 3001 to 5000 (61.71; SD: 11.09). Blood banks which collected less than 3000 blood units scored the least (57.40; SD: 9.57).

Table 19 Mean assessment score by annual collection

Annual Collection	NACO supported		Non-NACO		Total	
	Mean	SD	Mean	SD	Mean	SD
Up to 3000	57.42	9.40	57.38	9.81	57.40	9.57
3001 to 5000	58.07	11.98	65.92	8.56	61.71	11.09
Above 5000	63.0	10.01	63.82	8.25	63.28	9.32

4.10.5 Assessment score by Voluntary Blood Donation: Table -20 provides the mean assessment score of blood banks that have been categorized by percentage voluntary blood donation. Non-NACO blood banks have scored higher than the NACO supported blood banks in all categories except for the category 75 to 90.

Table 20 Mean assessment score by voluntary blood donation

% VBD	NACO supported		Non-NACO		Total	
	Mean	SD	Mean	SD	Mean	SD
Less than 25	-	-	57.17	9.00	57.17	9.00
25 to 49	54.50	2.12	63.06	7.32	61.50	7.44
50 to 74	58.67	8.08	66.15	11.29	64.42	10.83
75 to 90	54.67	14.28	52.70	11.63	54.09	13.23
Above 90	61.02	9.30	64.65	7.72	61.68	9.08

4.10.6 Assessment score by participation in External Quality Assessment Scheme (EQAS) for Immunohematology and Transfusion Transmitted Infections (TTI): The mean score was found to be higher among the blood banks that were part of EQAS for immunohematology (71.67; SD: 6.24) as compared to those who were not enrolled (58.98; SD: 9.97). Similar situation was found among those blood banks that were part of EQAS for Transfusion-Transmitted Infections (77.25; SD: 5.12) as compared to those who were not enrolled (59.01; SD: 9.79).

In the state very few (10) blood banks were enrolled for EQAS. In comparison to NACO supported blood banks more number of Non-NACO blood banks was enrolled in IH and TTI-EQAS.

Table 21 Mean assessment score by EQAS enrolment

IH-EQAS	NACO supported			Non-NACO			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
YES	0	-	-	6	71.67	6.24	6	71.67	6.24
NO	62	59.47	10.42	63	58.51	9.56	125	58.98	9.97
TTI-EQAS									
YES	1	82.0		3	75.67	4.93	4	77.25	5.12
NO	61	59.10	10.09	66	58.92	9.58	127	59.01	9.79

4.10.7 Assessment score by Accreditation status: None of the blood banks in MP is accredited by NABH.

Table 22 Mean assessment score by Accreditation

NABH Accreditation	NACO supported			Non-NACO			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
YES	-	-	-	-	-	-	-	-	-
NO	62	59.47	10.42	69	59.65	10.01	131	59.56	10.17

The list of blood banks under different categories of score is given in Table-23 and Table-24

Table 23 Distribution of Blood banks by Districts and mean assessment score categories

District	Score Category			
	Upto 35	35 to 70	Above 70	Total
Alirajpur	-	1	-	1
Anuppur	-	1	-	1
Ashok Nagar	-	1	-	1
Balaghat	-	2	-	2
Barwani	-	1	-	1
Betul	-	3	-	3
Bhind	-	1	-	1
Bhopal	-	14	5	19
Burhanpur	-	1	1	2
Chhatarpur	-	1	-	1
Chhindwara	-	2	-	2

Damoh	-	1	-	1
Datia	-	1	-	1
Dewas	-	3	-	3
Dhar	-	2	-	2
Dindori	-	1	-	1
Guna	-	2	-	2
Gwalior	-	8	1	9
Harda	-	1	-	1
Hoshangabad	-	3	2	5
Indore	1	21	1	23
Jabalpur	1	4	2	7
Jhabua	-	2	-	2
Katni	-	1	-	1
Khandwa	-	1	1	2
Khargone	-	1	-	1
Mandla	-	1	-	1
Mandsaur	-	1	1	2
Morena	-	2	-	2
Narsinghpur	-	1	-	1
Neemuch	-	0	1	1
Panna	-	1	-	1
Raisen	-	1	-	1
Rajgarh	-	1	-	1
Ratlam	-	2	-	2
Rewa	-	1	-	1
Sagar	-	1	1	2
Satna	-	2	1	3
Sehore	-	1	-	1
Seoni	-	1	-	1
Shahdol	-	2	-	2
Shajapur	-	1	-	1
Sheopur		1	-	1
Shivpuri	-	1	-	1
Sidhi	-	1	-	1
Singrauli	-	2	-	2
Tikamgarh	-	1	-	1
Ujjain	-	5	-	5
Umaria	-	1	-	1
Vidisha	-	1	-	1
Madhya Pradesh	2	112	17	131

Table 24 Distribution of Blood banks by Districts and mean assessment score categories

District	Score Category					
	NACO supported			Non-NACO		
	Up to 35	35 to 70	Above 70	Up to 35	35 to 70	Above 70
Alirajpur	-	1	-	-	0	0
Anuppur	-	-	-	-	1	0
Ashok Nagar		-	-	-	1	0
Balaghat	-	1	-	-	1	0
Barwani	-	1	-	-	0	0
Betul	-	2	-	-	1	0
Bhind	-	1	-	-	0	0
Bhopal	-	3	2	-	11	3
Burhanpur	-	1	-	-	0	1
Chhatarpur	-	1	-	-	0	0
Chhindwara	-	2	-	-	0	0
Damoh	-	1	-	-	0	0
Datia		1	-	-	0	0
Dewas	-	1	-	-	2	0
Dhar	-	1	-	-	1	0
Dindori	-	1	-	-	0	0
Guna	-	1	-	-	1	0
Gwalior	-	3	1	-	5	0
Harda	-	1	-	-	0	0
Hoshangabad	-	1	1	-	2	1
Indore	-	1	-	1	20	1
Jabalpur	1	1	1	0	3	1
Jhabua	-	1	-	0	1	0
Katni	-	1	-	0	0	0
Khandwa	-	1	-	0	0	1
Khargone	-	1	-	0	0	0
Mandla	-	1	-	0	0	0
Mandsaur	-	-	1	0	1	0
Morena		1	-	0	1	0
Narsinghpur	-	1	-	0	0	0
Neemuch	-	-	1	0	0	0
Panna	-	1	-	0	0	0
Raisen	-	1	-	0	0	0
Rajgarh	-	1	-	0	0	0
Ratlam	-	1	-	0	1	0
Rewa	-	1	-	0	0	0
Sagar	-	-	1	0	1	0
Satna	-	1	1	0	1	0
Sehore	-	1	-	0	0	0

Seoni	-	1	-	0	0	0
Shahdol	-	2	-	0	0	0
Shajapur	-	1	-	0	0	0
Sheopur	-	1	-	0	0	0
Shivpuri	-	1	-	0	0	0
Sidhi	-	1	-	0	0	0
Singrauli	-	1	-	0	1	0
Tikamgarh	-	1	-	0	0	0
Ujjain	-	1	-	0	4	0
Umaria	-	1	-	0	0	0
Vidisha	-	1	-	0	0	0
Madhya Pradesh	1	52	9	1	60	8

5. Conclusion

Considering the importance of blood transfusion services in the provision of medical care, ensuring quality systems and standards in blood banks are vital, as the blood and its products must not only be safe but also clinically effective and of appropriate and consistent quality. From the programmatic perspective, adequate, accurate and updated information at the district, state and national level is essential for planning and implementation of quality management systems in blood transfusion services across the country. Generation of accurate and essential data from blood banks at regular intervals is imperative to effectively monitor the progress, gaps and challenges in the service provision which would not only facilitate appropriate corrective measures but also facilitate the development of evidence-based policies and programmes.

This state-wide assessment captured most of the required information related to the structure, services, facilities, availability of human resources, equipment, quality management system and practices in blood banks across the state. All blood banks in Madhya Pradesh function subject to obtaining and maintaining a license for operations from the FDA which means compliance to basic quality standards mentioned in the Drugs and Cosmetic Act 1940 and Rules 1945 there upon. However, this assessment brings out specific gaps and possible opportunities to improve quality standards in Transfusion Services at the state.

The 62 NACO and 69 Non-NACO blood banks which were included in the review are approximately 98% of the total blood banks existing in the state. The annual collection of these blood banks was five lakh units which is approximately 30% less than the total blood requirement for MP, based on WHO's estimation that blood donation by 1% of the population can meet a nation's most basic requirements for blood (WHO, 2010). However, there is a huge variation between districts that ranges from 0.1 units to 2.7 units per 100 population. Clinical demand for blood and blood products can happen only when there is a health care facility with adequate infrastructure in proximity to a blood bank. The relatively lower collection of blood in the few districts could be due to the fact that there is lower demand for blood because of the gaps in availability, accessibility, and affordability of health care services.

The review also revealed that blood banks without the component facility collected more amount of blood units (54.1%) as compared to blood banks with component separation facility (45.87%). Though there has been an increase in the percentage of voluntary blood donation over the years (around 74.3% in 2015), there is still a huge variation between districts that ranges from 3.7% to 100%. A targeted program to increase the non-remunerated voluntary blood donors will go a long way towards ensuring a safer option for our patients.

It is also evident that the distribution of blood banks is skewed with 52.6% of the all the blood banks in the state relegated to only 6 districts. More than half of the districts (39) have less than the state average of 1.8 blood banks per million population. The potential impact of

this distribution of blood banks and collection of blood on other health indices may be further studied.

More than half (64.9%) of the blood banks having their licensing status in pendency may be an indication of an opportunity to strengthen the regulatory system by modern technological modalities to ensure a standardized, timely and transparent licensing process. It is also essential to review and update the regulatory framework to keep up with recent scientific developments and modernize the transfusion practice in the state.

The provision of a blood component separation unit in the blood bank and the volume of collection apparently have a positive influence on the quality. The inequity in the distribution of component separation facilities across districts and region is very evident. However, it is important to note that in the absence of reliable laboratory support, it will not be possible to ensure rational use of blood and its components. It is difficult to sustain cost-effective component production when the volume of operations is low without compromising the quality of the blood provided to the patients who access this service. Given that the provision of safe and high-quality blood in areas where access is a challenge is still the remit of the state, it is essential to explore new cost effective innovative methods in partnership with non-governmental agencies.

For the first time, a quality score system has been created and applied to the blood banks. This review indicated a mean score of 59.6 with significant variations across the category of blood banks, ownership, voluntary blood donation, participation in proficiency testing (EQAS) and accreditation status. It is important to understand that there is a huge variation between districts on several parameters included in the assessment. This suggests the need for targeted and customized approach to address the gaps and challenges faced by the blood banks in the state. This assessment suggests that blood banks owned by trusts/charities in the private sector seemed to have performed slightly better in the quality parameters. This may be partly due to access to resources, both financial and technical, to enhance capacity and modern technology to overcome potential barriers to quality.

It is evident from the assessment that blood banks that focussed on quality improvement systems performed better than others. Considering the deleterious effect of poor quality practices on patient care, it is imperative that specific programmes and strategies to improve quality systems in blood transfusion services are developed and implemented across the state.

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7. Annexures

7.1 Individual Blood Banks Summary

District	Name of the Blood Bank	Type	Ownership	Annual Collection	Score (Out of 100)
Alirajpur	District Hospital Alirajpur	Non BCSU	Public	651	56
Anuppur	District. Hospital Anuppur	Non BCSU	Public	-	36
Ashok Nagar	Ashok Nagar Sewa Samiti Blood Bank	Non BCSU	NGO/Trust/Charitable	1038	46
Balaghat	District Hospital Balaghat M.P	Non BCSU	Public	4976	53
	Agrawal Blood Bank	Non BCSU	Private	2533	44
Barwani	District Hospital Blood Bank Barwani	Non BCSU	Public	9490	57
Betul	Blood Bank Betul	Non BCSU	Public	3859	64
	Padhar Hospital Blood Bank	Non BCSU	NGO/Trust/Charitable	1205	63
	WCL Blood Bank Pathakhhera	Non BCSU	Public	30	58
Bhind	Blood bank D.H. Bhind	Non BCSU	Public	789	63
Bhopal	M.P Thallasemia Kid Care Society, Bhopal Blood bank	BCSU	NGO/Trust/Charitable	-	55
	City Blood Bank of Bhojpal Charitable Trust	Non BCSU	NGO/Trust/Charitable	-	55
	Hamidia Hospital Blood Bank, Bhopal	BCSU	Public	15189	63
	Arpan Blood Bank of Maity Charitable Trust	Non BCSU	NGO/Trust/Charitable	6905	60
	Manas Blood Bank and Component Centre	BCSU	NGO/Trust/Charitable	5399	49
	Bansal Hospital (a unit of Ayushman	BCSU	Private	4258	78

	medical diagnostic pvt ltd.)				
	Indian Red Cross Society ,Bhopal	BCSU	NGO/Trust/Charitable	4000	69
	Tatpar Blood Bank and Component Centre	BCSU	NGO/Trust/Charitable	3662	65
	New Bhopal Blood Bank	Non BCSU	Private	3417	79
	Chirayu Medical College and Hospital	BCSU	NGO/Trust/Charitable	3397	79
	Bhopal Memorial Hospital & Research Centre	BCSU	Public	3316	82
	J.K Hospital and Medical Research Centre Blood Bank	BCSU	Private	2738	65
	Jawaharlal Nehru Cancer Hospital	BCSU	NGO/Trust/Charitable	2467	57
	People's Hospital Blood Bank of Sarvajanik Jankalyan Trust	BCSU	NGO/Trust/Charitable	2122	59
	Chirayu Health & Medicare Pvt Blood Bank	BCSU	Private	1577	66
	Kasturba Hospital of Bharat Heavy Electricals Ltd BHEL Township Habibganj Bhopal	Non BCSU	Public	1431	61
	RKDFMCH and RC	Non BCSU	Private	1357	48
	J.P. Hospital Blood Bank,Bhopal	Non BCSU	Public	1232	77
	Blood Bank,Bhopal	Non BCSU	Public	504	54
Burhanpur	Raktkosh Jila Chikitsalaya,Burhanpur	Non BCSU	Public	4259	60
	Chandubhai Somabhai Patel	Non BCSU	NGO/Trust/Charitable	2462	74

	Blood Bank				
Chhatarpur	District Hospital Chattarpur	Non BCSU	Public	5181	50
Chhindwara	Blood Bank,D.H. Chhindwara	BCSU	Public	12199	64
	Barkuhi Hospital Blood Bank,Chhindwara	Non BCSU	Public	90	48
Damoh	Blood Bank , District Hospital, Damoh	Non BCSU	Public	1954	60
Datia	Blood Bank District Hospital, Datia	Non BCSU	Public	1523	45
Dewas	Amaltas Institute of Medical Science	Non BCSU	Private	-	65
	Vishnuprabha Charitable Trust Blood Bank	Non BCSU	NGO/Trust/ Charitable	3151	63
	M.G Distt. Hospital,Dewas	Non BCSU	Public	2819	61
Dhar	Whole Blood,Dhar	Non BCSU	Public	3968	62
	Mittal Hospital Blood Bank	Non BCSU	Private	3155	68
Dindori	Distt. Hospital Dindori	Non BCSU	Public	453	67
Guna	Blood Bank, Distt. Hospital, Guna	Non BCSU	Public	5326	52
	Kanchan Medicare & Research Centre Pvt.Ltd.	Non BCSU	Private	1105	59
Gwalior	Shri Radha Swami Blood Bank	Non BCSU	Private	#NULL!	55
	Radhaswami Blood Bank	Non BCSU	Private	#NULL!	53
	Blood Bank,G.R. Medical College,Gwalior	BCSU	Public	16630	80
	Red Cross Blood Bank, Gwalior	Non BCSU	NGO/Trust/ Charitable	6308	66
	Emergency Blood Bank	BCSU	Private	4806	65
	BIMR Hospital Blood Bank	BCSU	NGO/Trust/ Charitable	4501	56

Gwalior	District Hospital, Morar, Gwalior	Non BCSU	Public	499	62
	Indian Red Cross Society Blood Bank, Gwalior	Non BCSU	NGO/Trust/Charitable	303	67
	Cancer Hospital & Research Centre	Non BCSU	NGO/Trust/Charitable	119	59
Harda	District Hospital Harda Blood Bank	Non BCSU	Public	2142	45
Hoshangabad	Whole Human Blood IP, Hoshangabad	Non BCSU	Public	2324	72
	Shreya Blood Bank	BCSU	Private	2294	66
	Blood Bank JanSeva Rughalaya, Hoshangabad	Non BCSU	Public	1742	52
	Harit Blood Bank Hoshangabad	Non BCSU	Private	521	53
	Society of St. Joseph Hospital	Non BCSU	NGO/Trust/Charitable	470	73
Indore	Blood Bank, M.Y Hospital	BCSU	Public	21246	60
	Aurobindo Blood Bank	BCSU	NGO/Trust/Charitable	13974	63
	Varna Union Hospital Blood bank	BCSU	Private	8172	61
	Greater Kailash Hospital Pvt Ltd Blood Bank	BCSU	Private	7923	73
	Index Medical College Hospital and Research Centre run by Mayank Welfare Society	BCSU	Private	7351	56
	Choitram Hospital and Research Centre	BCSU	Private	6239	63
	Bombay Hospital Trust	BCSU	NGO/Trust/Charitable	3849	63
	Mohit Blood ,Service Bhandari Hospital & Research Centre	BCSU	Private	3702	64
	CHL Charitable Trust	BCSU	NGO/Trust/Charitable	3619	68

Indore	Shri Satya Sai Blood Bank	Non BCSU	NGO/Trust/Charitable	2023	62
	Shri Indore Cloth Market Hospital	Non BCSU	NGO/Trust/Charitable	1847	55
	Modern Blood Bank	Non BCSU	Private	1757	66
	Suyash Hospital Pvt. Ltd.	BCSU	Private	1298	59
	Shubham Pathological Diagnostics Centre Blood Bank	Non BCSU	Private	953	62
	Vishnuprabha Charitable Trust Blood Bank	Non BCSU	NGO/Trust/Charitable	622	60
	SNG Hospital Blood Bank run by Balbhadra Ratni Devi Goyal Charitable Trust	Non BCSU	Private	501	41
	Life Line Hospital Blood Bank	Non BCSU	Private	430	55
	Vishesh Hospital Blood Bank	Non BCSU	Private	331	33
	Arihant Hospital & Research Centre Blood Bank Indore	Non BCSU	NGO/Trust/Charitable	316	65
	Singhvi Blood Bank	Non BCSU	Private	235	55
	Gurjar Hospital and Endoscopy Centre Pvt. Ltd. Blood Bank, Indore	Non BCSU	Private	198	70
	Lahoti Medicare Pvt Ltd	Non BCSU	Private	189	53
	Qurewell Blood Bank	Non BCSU	Private	180	63
Jabalpur	Bansal Blood Bank & Transfusion Service	BCSU	Private	18507	70
	NSCB Medical College Blood Bank Jabalpur	BCSU	Public	9420	77

Jabalpur	Seth Govind Das Hospital Blood Bank,Jabalpur	Non BCSU	Public	4951	60
	Rotary Blood Bank,Jabalpur	BCSU	Public	4858	28
	Khanna Pathology Lab & Blood Bank	Non BCSU	Private	2508	73
	JabalpurThalessemia Welfare Society Blood Bank	Non BCSU	Private	1316	67
	Blood Bank Sukh Sagar Medical college and Hospital	BCSU	NGO/Trust/Charitable	57	37
Jhabua	D.H.Jhabua	Non BCSU	Public	1891	50
	Jeevan Jyothi Hospital Blood Bank	Non BCSU	Private	97	56
Katni	Civil Surgeon & Supdt Distt. Hospital and Blood Bank District Katni	Non BCSU	Public	3277	59
Khandwa	Blood Bank , District Hospital, Kharda	Non BCSU	Public	5828	56
	Deep Blood Bank Khandwa	Non BCSU	Private	5333	79
Khargone	Blood Bank District Hospital Khargone	Non BCSU	Public	8612	70
Mandla	District Hospital Mandla	Non BCSU	Public	2758	46
Mandsaur	District Hospital Mandsaur	Non BCSU	Public	9966	74
	Jain Pathology Laboratory & Blood Bank	Non BCSU	Private	1635	66
Morena	Blood Bank,Distt Hospital Morena	Non BCSU	Public	4082	57
	Jindal Blood Bank	Non BCSU	Private	720	44
Narsinghpur	Distt. Hospital Narsinghpur	Non BCSU	Public	4128	41
Neemuch	Blood bank,Neemuch	Non BCSU	NGO/Trust/Charitable -	8642	78
	Blood Bank Panna	Non	Public	2742	42

Panna		BCSU			
Raisen	Blood Bank Distt. Hospital Raisen	Non BCSU	Public	939	53
Rajgarh	District Hospital Rajgarh	Non BCSU	Public	5578	66
Ratlam	Blood Bank, District Hospital, Ratlam	Non BCSU	Public	9216	46
	Manav Seva Samiti Blood Bank	BCSU	NGO/Trust/Charitable	5877	65
Rewa	SGM Hospital Blood Bank Rewa SS Medical College, Rewa	BCSU	Public	6721	59
Sagar	Distt. Hospital Tilli Sagar	Non BCSU	Public	7881	76
	Bhagyoday Tirth Chikitsalaya Blood Bank, Sagar	Non BCSU	NGO/Trust/Charitable	2344	52
Satna	Blood Bank District Hospital, Satna	BCSU	Public	10395	54
	The Sadguru Blood Bank, Satna	Non BCSU	NGO/Trust/Charitable - NACO supported	1676	73
	M.P. Birla Hospital And Priyanbda Birla Cancer Research Institute, Satna	BCSU	NGO/Trust/Charitable	775	51
Sehore	Blood Bank District Hospital Sehore, MP	Non BCSU	Public	4207	57
Seoni	Indira Gandhi District Hospital Seoni	Non BCSU	Public	3633	64
Shahdol	District Hospital Shahdol	Non BCSU	Public	7422	65
	Blood Bank, Shahdol	Non BCSU	Public	213	59
Shajapur	Distt. Hospital Shajapur	Non BCSU	Public	33850	50
Sheopur	Blood Bank DH Sheopur	Non BCSU	Public	1528	68
Shivpuri	Whole Human Blood ,Shivpuri	Non BCSU	Public	4088	58

Sidhi	Govt District Hospital Sidhi	Non BCSU	Public	2057	59
Singrauli	Nehru Shatabdi Chikitsalya ,Singrauli	Non BCSU	Public	1955	56
	Red Cross Blood Bank	Non BCSU	NGO/Trust/Charitable	1054	54
Tikamgarh	District Hospital, Tikamgarh	Non BCSU	Public	1748	49
Ujjain	C.R Gardi Hospital and R.D. Gardi Medical College Blood Bank	BCSU	NGO/Trust/Charitable	11278	66
	District Hospital Blood Bank,Ujjain	Non BCSU	Public	6432	61
	Ujjain Charitable Trust Hospital and Research Centre Blood Bank	Non BCSU	NGO/Trust/Charitable	3635	54
	M/S Pushpa Mission Hospital & Maternity Home Blood bank	Non BCSU	NGO/Trust/Charitable	3261	55
	Grasim Hospital Blood Bank	Non BCSU	Private	930	47
Umaria	District Hospital Umaria	Non BCSU	Public	794	51
Vidisha	District Hospital Blood Bank, Vidisha-Krishi	Non BCSU	Public	4105	57

7.2 NACO/NBTC – Questionnaire for Blood Banks

NACO/NBTC - Questionnaire for Blood Banks						
Data Filled by						
Mobile Phone Number (Person filled the data)						
Section A – GENERAL						
A1	Basic Information					
1	Name of the Blood Bank (as mentioned in the licence)					
2	Address 1 (Institution name)					
3	Address 2 (Door number & Street name – if applicable)					
4	Address 3 (Important land mark - if applicable)					
5	City/Town					
6	District					
7	State					
8	Pin code					
9	Blood Bank Phone number (Land line including area code)					
10	Blood bank Email ID					
11	Do you have internet facility?				Yes	
					No	
12	Name of the Blood Bank In-charge (This should be the name of the current Medical Officer in charge)					
13	Is the name of the Medical officer mentioned in the Licence, the current medical officer?				Yes	
					No	
14	Designation (Please enter designation of the Medical Officer in the blood bank (e.g. Civil surgeon, or academic like Asst. Prof etc.)					
15	Highest Qualification (Tick only one)	MBBS				
		MD				
		MS				
		Diploma				
16	Specify branch/Broad speciality					
17	Email ID: (Official/Personal Email where					

	<i>the medical officer can be directly contacted). This is apart from the blood bank email ID provided above.</i>		
18	Fax number		
19	Telephone number 1 – Medical Officer (Mobile)		
20	Telephone number 2 – Medical Officer (Landline including STD code)		
21	Type of blood bank as per NACO category	Model blood Bank	
		Blood Component Separation Units	
		Major Blood Bank	
		District level blood bank	
		Others	
22	Who is the blood bank owned by?	Public (Central/State/Local government)	
		Public (Other than ministry of health e.g. PSU, Army etc.)	
		NGO/Trust/Charitable – NACO Supported	
		NGO/Trust/Charitable	
		Private - Others	
23	Is the Blood Bank attached to any of the following?	Hospital	
		Lab	
		Stand alone	
24	If attached to Private Hospital, specify level of hospital	Medical College Hospital	
		Tertiary care hospital (other than medical college)	
		Secondary care hospital	
25	If attached to public/govt. hospital, specify the level of the hospital	Sub-District hospital	
		District level hospital	
		Medical College hospital	
		Tertiary care hospital (other than Medical College)	
26	If the blood bank is attached to a hospital, please specify the number of inpatient beds available		
27	Are you permitted to conduct Blood donation camp?	Yes	
		No	
28	How many Blood storage centres are linked to your blood bank?		
29	BB working hours (Specify hours per day)		
A2	License Information		
1.	BB License Number (Enter your license number. This should be exactly as is displayed in your license issued by the Drugs Controller Office and will be used for verification purposes. This is a mandatory field and should be entered regardless of the status of license - under-		

	<i>renewal etc. (You will have to submit a self-attested photocopy of the currently displayed license along with this form.)</i>			
2	Status of Current License	Valid		
		Under renewal		
3	Date of issue of current licence DD/MM/YYYY			
4	Last Inspection by licensing authority	< 1 year		
		1-2 years		
		2-3 years		
		3-4 years		
		>4 years		
A3	Basic Statistics (Date of reporting from Jan-2015- Dec-2015)			
1	Number of voluntary donations			
2	Number of replacement donations			
3	Number of autologous deposits			
4	Total Annual collection for reporting period (Jan - Dec 2015) Total Annual collections (sum of A3.1+A3.2+A3.3)			
5. Transfusion Transmissible Infections - Annual statistics		Number tested	Number positive	
	HIV (Anti-HIV I & II)			
	HCV (Anti-HCV)			
	HBV (HBs Ag)			
	Syphilis (RPR/TPHA/ELISA)			
	Positive for Malaria (Any method)			
A4.	Reporting Summary			
1	Are you in compliance with NBTC guidelines?	Yes		
		No		
2	Are you recovering processing charges for blood/components within NBTC/SBTC norms?	Yes		
		No		
3	Are you displaying stock position in the blood bank premises?	Yes		
		No		
4	Are you submitting statistics to the State Drugs controller?	Regular		
		Occasional		
		No		
5	Are you reporting in SIMS (strategic Information Management System- NACO)?	Regular		
		Occasional		
		No		
6	If yes to Q5, please provide your SIMS ID			

7	If you are not reporting to SIMS, would you be willing to report in the future?	Yes	
		No	
8	Are you reporting in the E-blood banking?	Regular	
		Occasional	
		No	
9	If Regular/ Occasional to 8, specify (<i>more than one can be selected</i>)	State	
		National (NHP)	
		Other(Specify	
10	Please provide E Blood banking user ID (<i>State</i>)		
11	Please provide E Blood banking user ID (<i>National</i>)		
12	If not part of e-blood banking, would you be willing to participate in future?	Yes	
		No	

SECTION B			
B1	Blood Donor(Reporting from Jan 2015- Dec 2015)		
Definition of VBD = Close relatives should NOT be counted as VBD			
1	Are you recruiting voluntary blood donors?	Yes	
		No	
2	Is donor selection performed as per regulatory norms?	Yes	
		No	
3	Do you maintain records of donor deferral?	Yes	
		No	
4	Is pre-donation counselling being performed for blood donors?	Regular	
		Occasional	
		No	
5	Is post donation counselling being performed for blood donors?	Regular	
		Occasional	
		No	
6	Are you conducting Blood donor drives/Blood collection camps?	Regular	
		Occasional	
		No	
7	If you conduct camps, how many have been conducted in the reporting period? (<i>Provide numbers of VBD camps conducted during the period January - December 2015.</i>)		
8	Does the blood bank have dedicated staff for the promotion of Voluntary blood donors? (<i>If your blood bank has dedicated staff for camps, answer yes.</i>)	Yes	
		No	
8 a.	if Yes to 8, select as applicable (<i>More than one may be selected</i>)	Donor Motivator	
		Public relations officer (PRO)	
		Social Worker	
9	Is there a specific budget for donor program?	Yes	
		No	
10	If Yes, Specify budget source	Central	

		State		
		Others (Specify)		
11	Is there a donor database in the blood bank (<i>Donor database is essential to contact donors to remind them or to call during an emergency?</i>)	Yes		
		No		
12	If yes to Q 11, is it in electronic format or paper based?	Electronic		
		Paper		
		Both		
13	What percentage of the voluntary blood donors are repeat blood donors? (%)			
14	Does your blood bank have a mobile blood collection facility? (<i>Answer yes if your Blood bank has a mobile facility (bus or van with donor couches)</i>)	Yes		
		No		
15	Source of funds for the mobile blood collection (<i>Indicate the source of funding for the purchase of the mobile blood donor van.</i>)	State		
		Central		
		Donor		
		Others		
16	Specify, other source of funds			
17	Is there a record for donor adverse reactions?	Yes		
		No		
18	Is there a referral system for HIV sero-reactive blood donors?	Yes		
		No		
19	If yes to Q 18, please specify what is the process adopted.			
Section C				
Technical – Immunohematology				
C1.	Which of the following tests are performed for determination of ABO and Rh (D) groups and what techniques are followed?	Blood Group (Tick as applicable)		Rh Type (Tick as applicable)
		Forward	Reverse	
C1.1.	Slide			
C1.2	Tube			
C1.3	Micro plate			
C1.4	Column agglutination Gel/Microparticle)			
C1.5	Solid phase			
C1.6	Other Specify			
1	How do you perform RhD typing?	Monoclonal reagent		
		Polyclonal reagent		
		Both		

2	Do you perform irregular antibodies screening on blood donations and patient sample?	Yes	
		No	
3	Do you perform direct antiglobulin test (DAT/DCT)? (If you are performing Direct Antiglobulin test (DAT) - earlier called as Direct Coombs Test (DCT), answer yes.)	Yes	
		No	
4	If yes to previous question, please specify method	Tube	
		Column agglutination	
		Solid phase	
5	Do you perform indirect antiglobulin test (IAT/ICT)?	Yes	
		No	
6	If yes, to previous question please specify method	Tube	
		Column agglutination	
		Solid phase	
7	Number of group and type tests performed in reporting period (Jan - Dec 2015) (Specify the number of group and type tests performed - Total of all patient and donor tests in the reporting period - January to December 2015.)		
8	Number of compatibility testing performed in reporting period. (Specify number of compatibility tests performed in the reporting period January to December 2015)		
9	Total Number of DAT/DCT tests performed in the reporting period (Specify number of DAT/DCT tests performed in the reporting period (January to December 2015)		
10	Total Number of IAT/ICT tests performed in the reporting period (Specify number of DAT/DCT tests performed in the reporting period (January to December 2015)		
11	Total Number of antibody screening performed in reporting period (If you answered YES to Q2, Specify number of antibody screening tests performed in the reporting period (January to December 2015).		
12	Do you have automation for Immunohematology testing? (If you have implemented any kind of automation, please indicate so.)	Yes	
		No	
13	Do you perform Internal QC for all immunohematology tests (blood group/DAT/IAT etc.)? (Please answer yes if you are performing internal quality control (IQC) for the immunohematology tests listed above. They include daily QC on reagents and cells.)	Yes	
		No	
14	Do you participate in an external quality assessment program or scheme (EQAS) for Immunohematology tests usually performed in your laboratory?	Yes	
		No	
15	If yes to 14, Specify name of program/provider		
16	If yes to 14, EQAS Membership ID number/ PIN#.		
17	If yes 14, specify Highest level of EQAS program participant in	Inter-lab	
		National	
		International	

18	If you are not participating in EQAS for immunohematology, will you be willing to do so in the future?	Yes	
		No	
19	If Yes to above question, will your blood bank be able to allocate financial resources (about Rs.2500 per year)?	Yes	
		No	
20	If your answer to Q 19 is NO, when do you think you will be ready for EQAS participation? (immunohematology)	Next 6 months	
		Later than 6 month	
21	Are you a member of National Haemovigilance Program of India (HVPI)?	Yes	
		No	
22	If yes, provide HVPI ID Number		
23	If not, would you be willing to participate in HVPI in the near future?	Yes	
		No	
24	Are you reporting all adverse events to the National Haemovigilance Program of India?	Yes	
		No	
25	Number of adverse reactions recorded in the reporting period		
26	Does your hospital have regular transfusion committee meetings?	Yes	
		No	
27	What is the frequency of Transfusion committee meetings?	Annual	
		Half-yearly	
		Quarterly	
		Occasional	

Section D					
Technical - Screening For Transfusion Transmissible Infections (TTI)					
Does the blood bank screen the following TTIs?					
Type of Test		Platform (please tick appropriate)		Method (please tick appropriate)	
1	HIV I & II	Rapid			
		ELISA		Manual	<input type="checkbox"/>
				Automated	<input type="checkbox"/>
		CHEMI		Manual	<input type="checkbox"/>
				Automated	<input type="checkbox"/>
		NAT		Manual	<input type="checkbox"/>
				Automated	<input type="checkbox"/>
1.1	Specify % of donors tested by Rapid Test?				
2	Hepatitis B	Rapid			
		ELISA		Manual	<input type="checkbox"/>
				Automated	<input type="checkbox"/>
		EM		Manual	<input type="checkbox"/>
				Automated	<input type="checkbox"/>
		NAT		Manual	<input type="checkbox"/>
				Automated	<input type="checkbox"/>
2.1	Specify % of donors tested by Rapid Test?				
3	Hepatitis C	Rapid			

		ELISA		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
		CHEM		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
		NAT		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
3.1	Specify % of donors tested by Rapid Test?					
4	Syphilis	RPR		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
		TPHA		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
		ELISA		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
5	Malaria	Rapid				
		Fluorescent		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
		Slide microscopy				
		ELISA		Manual	<input type="text"/>	
				Automated	<input type="text"/>	
6	Does the blood bank have an algorithm for units that test POSITIVE in initial screening? <i>(If you have a method of verifying a sample that has tested positive on the screening test please answer yes.)</i>			Yes		
				No		
7	If yes to Q6 , Repeat testing with same test/ technique			Yes		
				No		
8	If Yes to Q6, Repeat testing with different test/technique			Yes		
				No		
9	If yes to Q6, Recalling donor for repeat sample			Yes		
				No		
10	Do you perform independent internal QC (Third party controls) with TTI testing?			Yes		
				No		
11	Do you participate in an external quality assessment program or scheme (EQAS) for TTI (<i>Viral Markers, Malaria, and Syphilis</i>) testing?			Yes		
				No		
12	If yes, Specify program/provider					
13	Membership ID number (PIN)					
14	Level of EQAS		Inter-lab			
			National			
			International			
15	If you are not participating in EQAS for TTI screening, will you be willing to participate in future?			Yes		
				No		

16	If Yes to Q15, will your blood bank be able to provide financial support (about Rs. 2500 per year)	Yes	
		No	
17	If your answer to Q 15 is NO, when do you think you will be ready for EQAS (TTI screening) participation?	Next 6 months	
		Later than 6 months	
Section E			
Technical - Component Preparation (Applicable only to BCSU)			
1	Does your blood bank prepare components?	Yes	
		No	
If your answer to Q1 is NO, SKIP TO SECTION F			
If Yes, List the components and number prepared and issued in the period Jan to December 2015			
2	Number of donated blood that was used for component preparation during the period Jan- December 2015.		
		Number prepared	No. issued (utilized)
3	Packed red cells IP (With or without Additive)		
4	Platelet concentrate IP		
5	Fresh frozen plasma (FFP)		
6	Cryoprecipitated antithrombophilic factor IP		
7	Human plasma IP		
8	Other (specify)		
9	Do you perform apheresis for components?	Yes	
		No	
	If yes to above question, Specify the following details		
		Number prepared	No. issued (utilized)
10	Platelet concentrate IP		
11	Fresh frozen plasma (FFP)		
12	Granulocytes concentrates		
13	Other (specify)		
14	Do you perform QC for the components prepared? (If you perform quality control for all components, answer yes.)	Yes	
		No	
15	If yes to above, Are the Factor assays on Fresh Frozen plasma/Cryoprecipitate performed at your Blood Bank?	Yes	
		No	
16	If yes for above question, do you participate in external quality assessment scheme (EQAS)?	Yes	
		No	
17	If yes, to above question, Specify agency		

SECTION F					
Quality Management Systems					
F 1	Are you aware of quality management systems for Blood bank			Yes	
				No	
1	Is the blood bank accredited?			Yes	
				No	
2	If yes, provide Name of Accrediting Body				
3	Do you have a document control system - other than mandatory registers as D&C act?			Yes	
				No	
4	Do you have Standard Operating Procedures (SOPs) for all technical processes?			Yes	
				No	
5	Do you have written responsibilities for all levels of staff?			Yes	
				No	
How many staff are currently employed in each of the following categories and how many of them have been trained during the reporting period Jan 2015 - Dec 2015? (Questions 6 - 15)					
Staff Details		Total number of staff	Number on contract	NACO/NBTC Supported in-service training	Other National Training
6	Professor				
7	Associate Professor				
8	Assistant Professor				
9	Senior Resident/Tutor				
10	Medical Officer (<i>include senior/Junior</i>)				
11	Technical Staff				
12	Nursing staff				
13	Counsellor				
14	PRO/Donor motivator				
15	Administrative staff				
16	Support staff				
	If other staff, please specify				
Total number of staff					
17	In your opinion, does the BB have adequate staff to function optimally (24x7)? This may be decided based on the volume and duration of work hours.			Yes	
				No	
18	Do you monitor Quality indicators or Key Performance indicators?			Yes	
				No	
19	If yes to above question, please specify names of indicators				
20	Do you have a designated and trained Quality manager?			Yes	
				No	
21	Do you have a designated and trained Technical Manager?			Yes	
				No	

22	If you do not have either a trained Quality manager or Technical Manager please state reasons?	
23	Please specify if you have a plan for recruitment in the future?	

F2. EQUIPMENT AND SUPPLIES

1	Does the blood bank have adequate equipment to meet regulatory requirements? <i>(If your blood bank has adequate equipment in working condition to meet expected workload, please answer yes.)</i>	Yes	
		No	
2	How is equipment purchase funded?	Local bodies	
		Central or upper (state) level agencies	
		Donors	
		Others (specify)	
3	Does the blood bank have a program for regular equipment maintenance?	Yes	
		No	
4	Are all the equipment calibrated regularly as per regulatory requirement?	Yes	
		No	
5	How are consumables purchased?	Local bodies	
		Central or state level agencies	
		Donors	
		Others (specify)	
6	Do you evaluate kits at your facility prior to procurement? <i>(Are kits evaluated locally (at your blood bank) prior to purchase (e.g. Titre and avidity for blood group Anti Sera?))</i>	Yes	
		No	
7	Is quality control for kits, reagents and blood bags carried out at your blood bank? <i>(Is quality control for kits performed locally (at your blood bank) Prior to use (e.g. Titre and avidity for blood group Anti Sera?))</i>	Yes	
		No	
8	Did you have a regular supply of the following items? (Jan to Dec 2015)		
8.1	Blood Bags	Yes	
		No	
8.2	TTI Screening Kits	Yes	
		No	
8.3	Blood grouping / IH reagents	Yes	
		No	
9	Number of staff vaccinated for Hepatitis B?		

EQUIPMENT LIST (Below is a summary equipment list (a subset of D&C list). Please specify the number in inventory and number in working condition? If you are using shared resources of hospital, you can mention that as well)

		Number in inventory	Number in working condition
--	--	---------------------	-----------------------------

10	Donor beds/couches		
11	Any instrument for Hb Estimation (<i>other than CuSO4 method</i>)		
12	Blood collection monitor (Blood agitator)		
13	Quarantine Blood bank refrigerator to store untested units with temperature recorder		
14	Container for safe disposal of sharps		
15	Oxygen supply equipment		
16	Computer with accessories and software		
17	General lab centrifuge for samples		
18	Bench top centrifuge for serological testing		
19	Blood transportation box		
20	Emergency drugs box/Crash card		
21	Autoclave machine (shared resource should be specified)		
22	Water bath		
23	Blood bank refrigerator (storage of tested blood) with temperature recorder		
24	Automated pipettes		
25	Refrigerated centrifuge (BCSU)		
26	Blood container weighting device		
27	Serology rotator		

7.3 Scoring sheet

Individual Scoring Sheet - Blood Component Separation Units			
GENERAL	GENERAL SUMMARY	WEIGHTAGE	TOTAL
Licence	Under renewal	1	
	Valid	3	
Subtotal			3
Annual collection	Below 1000	0	
	1000 to 2000	0.5	
	2000 to 5000	1	
	5000 to 10000	1.5	
	Above 10,000	2	
Subtotal			2
VNRBD	BB by VNRBD (%)	0	
	<25%	0	
	25-49%	1	
	50 - 74%	3	
	75-90%	4	
	Above 90	5	
Repeat DON	Repeat donation >25%	2	
Counselling	Pre and post donation counselling - Regular	2	
Subtotal			9
TECH-IH	BB performing only slide grouping (forward typing)	0	
	BB using tube method for forward typing	2	
	BB performing reverse grouping (Serum group)	2	
	BB performing tube method for compatibility testing	3	
	BB performing IQC for IH	3	
	BB Participating in EQAS for IH	3	
	Direct antiglobulin test (DAT/DCT)- Direct Coombs Test (DCT)	2	
	Indirect antiglobulin test (IAT/ICT)	2	
	Automation for Immunohematology testing	1	
Subtotal			18
TECH - TTI	BB performing IQC for TTI	3	
	BB Participating in EQAS for TTI	3	
	BB with follow up program for HIV Sero-positive donors	3	
HIV Testing	Rapid	1	
	Elisa	2	
	Advanced	3	
Hep B	Rapid	1	
	Elisa	2	
	Advanced	3	
Hep C	Rapid	1	

	Elisa	2	
	Advanced	3	
Syphilis	RPR	1	
Malaria	Slide/Rapid	1	
Subtotal			20
COMP			
	Component separation < 25	0	
	Component separation < 25-50%	1	
	Component separation 51 to 80%	2	
	Component separation > 80%	3	
	BB that performs component QC	2	
Subtotal			5
QMS	BB MO with relevant PG Qualification	3	
	Staff Nurse with NACO/NBTC Training	3	
	Technician with NACO/NBTC training	3	
	BB with designated and trained QM	2	
	BB with designated and trained TM	2	
	BB with Document control system	4	
	BB with calibration of equipment	4	
	BB with AMC for equipment	4	
	Quality control for kits, reagents and blood bags carried out at blood bank with regular bags supply	2	
	Quarantine Blood bank refrigerator to store untested units with temperature recorder	3	
	Blood bank accredited	5	
Subtotal			35
GEN	BB reporting regularly on SIMS under National AIDS Control Programme	3	
	BB Participating in Haemovigilance Program of India	1	
	E blood banking participation NBTC/NHP	1	
	E blood banking participation – State level	1	
	More than 50% of the staff are vaccinated for Hep B	1	
	Compliance with NBTC norms	1	
Subtotal			8
SCORES	TOTAL		100

Individual Scoring Sheet - Without Blood Component Separation Units			
GENERAL	GENERAL SUMMARY	WEIGHTAGE	TOTAL
Licence	Under renewal	2	
	Valid	3	
Subtotal			3
Annual collection			
	500 - 1000	1	
	1001 to 2000	2	
	2001 to 3000	3	
	3001 - 5000	4	
	>5000	5	
Subtotal			5
VNRBD	BB by VNRBD (%)		
	25-49%	1	
	50 - 74%	3	
	75-90%	4	
	Above 90	5	
Repeat DON	Repeat donation >25%	2	
	pre donation counselling - regular	2	
Counselling	post donation counselling - regular	2	
Subtotal			11
TECH-IH	BB performing slide ONLY for forward grouping	1	
	BB performing TUBE for forward grouping	2	
	BB performing reverse grouping (Serum group)	2	
	Compatibility testing with tube	3	
	BB performing IQC for IH	3	
	BB Participating in EQAS for IH	3	
	Direct antiglobulin test (DAT/DCT)- Direct Coombs Test (DCT)	2	
	Indirect antiglobulin test (IAT/ICT)	2	
	Automation for Immunohematology testing	1	
Subtotal			18
TECH - TTI	BB performing IQC for TTI	3	
	BB Participating in EQAS for TTI	3	
	BB with follow up program for HIV Sero-positive donors	3	
HIV Testing	Rapid	1	
	ELISA	3	
Hep B	Rapid	1	

	ELISA	3	
Hep C	Rapid	1	
	ELISA	3	
Syphilis	RPR	1	
Malaria	Slide/Rapid	1	
Subtotal			20
COMP	<i>Not applicable</i>		
QMS	BB MO with relevant PG Qualification	3	
	Staff Nurse with NACO/NBTC Training	3	
	Lab technician with NACO/NBTC training	3	
	BB with designated TM/QM	2	
	BB with SOPs	2	
	BB with Document control system	2	
	BB with more than 75% equipment functional	2	
	BB with calibration of equipment	4	
	BB with AMC for equipment	4	
	Quality control for kits, reagents and blood bags carried out at blood bank with regular supply	2	
	Quarantine Blood bank refrigerator to store untested units with temperature recorder	3	
	Blood bank accredited by NABH	5	
Subtotal			35
GEN	BB reporting regularly on SIMS under National AIDS Control Programme	3	
	BB Participating in Haemovigilance Program of India	1	
	E blood banking participation NBTC/NHP	1	
	E blood banking participation – State level	1	
	Compliance with NBTC norms	1	
	More than 50% of the staff are vaccinated for Hep B	1	
Subtotal			8
SCORES	TOTAL		100