

9.0 Blood Bank

9.1 Introduction

9.1.1 General

The Blood Bank provides licensed facilities for the collection, storage, processing and distribution of human blood and blood components, in accordance with the National Blood Policy, 2002, under the administration of the Central Drugs Standard Control Organisation (CDSCO) India.

The range of services provided in the Blood Bank include:

- Collection from donors and donor management; this may include
 - autologous blood – collection from a patient for transfusion to themselves at a later date
 - apheresis which involves donation of plasma only or blood elements such as platelets only while the other blood elements are transfused back into the patient at the time of collection
- Blood storage
- Blood grouping and compatibility testing or cross-matching
- Testing for transmissible diseases.

9.2 Planning

9.2.1 Operational Models

Blood Bank services may be provided according to the following models and will be dependent on the Role Delineation and the Operational Policy of the facility:

- A dedicated Unit within a hospital
- A Unit collocated with a Pathology Laboratory Unit
- A stand-alone facility, providing services to regional facilities and hospitals.

This FPU addressed the stand-alone facility, either provided within a hospital or free standing.

HOURS OF OPERATION

The Blood Bank generally operates during business hours for collection and routine laboratory services, but offers a 24 hour service for deliveries.

9.2.2 Functional Areas

Blood Bank will consist of the following Functional Areas:

- Reception area with donor waiting and access to public toilets.
- Patient/ Donor areas including:
 - Patient screening room for medical examination of patients prior to donor procedures
 - Blood collection; the collection area shall have a staff work bench, chairs and couches for donors and hand washing facilities
 - Rest and recovery area for patients following blood donation procedures with provision for patient refreshments prior to the patient departure
- Preparation/ Processing area including:
 - Blood Storage including refrigerators and freezers
 - Processing laboratory areas which may include preparation, serology, infectious serology and apheresis
 - Support areas, including clean-up, sterilising, storage areas for reagents and supplies used in the process, general supplies and disposal facilities for contaminated waste
- Staff Areas including:
 - Office for the Manager



- Secure Records storage, which may be collocated with Reception
- Access to Staff Room and Change Rooms with lockers and Toilets.

RECEPTION/ WAITING

Patients will be received and registered at the Reception desk. Waiting areas provided should be suitable for a range of occupants including space for wheelchairs and prams. Waiting areas will require good access to public amenities.

PATIENT/ DONOR AREAS

Patient/ Donor areas will include a patient consult room with an examination couch for patient assessment and interview. Collection areas will require comfortable blood collection chairs or couches, staff handwashing facilities and a staff work area. Refreshments will be served to donors after phlebotomy procedures and the patient will be under staff observation before leaving the Unit. Patient/ donor areas will require access to emergency and resuscitation equipment including suction and oxygen.

PREPARATION AND PROCESSING AREA

Blood processing laboratories will require the following considerations:

- Laboratories must be secure with restricted access for dedicated staff only
- Laboratory workbenches with space for equipment such as microscopes, appropriate chemical analysers and centrifuge/s
- Access to services at the workbench including power and sinks with hot and cold water; which may be used for the disposal of non-toxic fluids
- Hand basins with paper towel and soap fittings for staff hand-washing.

Refer to Non-Standard Components, Preparation and Processing Laboratory Areas in this FPU for specific requirements related to the Processing and Preparation Areas.

SUPPORT AREAS

Laboratory areas will require a Clean-up Room for washing of laboratory glassware. Sterilising facilities will be dependent on the provision of single use sterile stock and the alternative arrangements for sterilisation of articles in a Sterile Supply Unit.

Storage will be required for blood, blood components, reagents, consumable and disposable stock, general stock and equipment used in the Unit and should be sized according to the amount of stock to be accommodated.

STAFF AREAS

Records storage will be required for blood bank activities involved in the collection, storage testing and distribution of blood and blood products. An Office will be required for the Medical Officer managing the Unit. A write-up and recording area should be available for medical and technical staff.

Staff will require access to a Staff room for meals and recreation. Change Rooms with toilets and handbasins should be available for staff in Laboratory areas that are provided with overalls and protective clothing.

9.2.3 *Functional Relationships*

The Blood Bank located within a hospital facility will require good functional relationships to Units that need frequent deliveries of blood such as the Operating Unit and Intensive Care Units.

The stand-alone Blood Bank will require good access for donors and rapid access to transport services for blood deliveries to hospital facilities.



9.3 Design

9.3.1 General

LOCATION:

The Blood Bank must not be located close to open drains, sewage, public toilets, animal houses or any unhygienic surroundings. The facility must prevent the entry of flies, insects and rodents; mesh screens may be provided as necessary.

9.3.2 Space Standards and Components

SIZE OF UNIT

The Blood Bank Unit shall have a minimum floor area of 100m² and an additional 50m² for preparation of blood products. The Unit should be sized according to the level of service provided.

9.3.3 Finishes

All floors and walls in processing areas must be smooth, impervious to fluids and easily cleaned.

9.3.4 Fixtures & Fittings

The Blood Bank laboratory areas will include special equipment with installation and services provided including power, data, water according to comply with authority regulations and manufacturer's specifications. Refer to Guidelines for Blood Banks, CDSCO, for further information, in References and Further reading at the end of this FPU.

Blood refrigerators and freezers will require continuous temperature monitoring to maintain desired temperatures and alarms when temperature is not reached or exceeded. Alarms should be automatically recorded.

9.3.5 Building Services

AIR CONDITIONING

Blood Collection, Preparation and Laboratory areas should be air-conditioned with the ability to maintain air temperature between 20^o Centigrade to 25^o Centigrade. Sterile manufacturing areas will require HEPA filtered, positive pressure air supply in accordance with licensing regulations. Refer to Guidelines for Blood Banks, CDSCO, India.

HYDRAULIC SERVICES

Drains must be sized appropriately and where connected to a sewer, must have traps installed to prevent back flow.

ELECTRICAL SERVICES

Blood storage equipment must be provided with a 24 hour essential power supply. A back-up generator will be required.

Laboratory areas will require effective lighting to work areas.

9.3.6 Infection Control

Infection Control is important in this Unit. Strict infection control measures are required within the unit to protect laboratory staff from potentially contaminated body fluids (blood, plasma) and to ensure aseptic environment for manufacture and packaging of blood products, preventing cross infection. Measures will include:

- Handbasins for staff handwashing in patient donor areas and processing laboratories
- Use of laboratory clothing in laboratories



- Use of laminar flow biosafety cabinets in laboratories; processing and filling areas must be separate
- Separate area for handling of contaminated samples
- Proper handling of contaminated waste
- Sharps containers and clinical waste collection and removal.

9.4 Components of the Unit

9.4.1 Introduction

The Blood Bank will consist of a combination of Standard Components and Non-Standard Components. Standard Components must comply with details in Standard Components described in these Guidelines. Refer to the Standard Components Room Data Sheets and Room Layout Sheets.

9.4.2 Standard Components

Provide the Standard Components as identified in the Schedule of Accommodation. Provide the Non-Standard Components as identified in this section and in the Schedule of Accommodation, according to the Operational Policy and Functional Brief.

9.4.3 Non-Standard Components

PREPARATION AND PROCESSING LABORATORY AREAS

Description and Function

Processing and Laboratory areas include Serology, Infectious Serology, Plasma Apheresis. In these areas the following procedures are undertaken:

- Pre-transfusion testing of samples for general serology and infectious diseases such as hepatitis B and C, HIV and malarial parasites
- Blood grouping
- Cross matching or compatibility testing
- Apheresis, Plasmapheresis, Platelet pheresis, Leucapheresis procedures, according to the operational policies and scope of service of the Unit; prior to pheresis procedures haemoglobin, haematocrit and blood count testing is undertaken
- Quality control testing procedures

Manufacturing of blood products requires separate enclosed areas with air locks at the entry, in accordance with licensing regulations. A separate testing area is required for infectious samples. Manufacturing Laboratories will be HEPA filtered and positively pressured clean environments.

Location and Relationships

Preparation, processing and manufacturing areas should be located with ready access to blood storage and wash up areas.

Considerations

Separate storage refrigerators are required for tested and untested blood within the Preparation and Laboratory areas.

Processing, manufacturing and packaging of blood will require a laminar air flow bench or unit in a clean environment.

Laboratory areas should have restricted access for authorised staff only.



BLOOD STORAGE

Description and Function

The Blood Store provides for the secure, temperature controlled storage of blood and blood components in refrigerators or freezers for access by authorised staff only.

Location and Relationships

Within the Blood Bank, the Blood Store should be located with ready access to the blood collection and processing areas. Externally, ready access is required to Pathology Unit, Emergency Unit, Operating Unit and Critical Care areas. Consideration shall be given to blood storage location in relation to external after-hours access and security.

Considerations

The blood storage refrigerators shall be secured, accessed by authorised staff only, and equipped with temperature monitoring and alarm signals. Alarms and controls should be located to ensure easy staff control. The blood refrigerators / freezers will require an essential power supply.



9.5 Schedule of Accommodation

9.5.1 Blood Bank Generic Schedule of Accommodation

Schedule of Accommodation for a Stand-alone Blood Bank suitable for Level 4 and 5/6 facilities

RECEPTION/ PATIENT/DONOR AREAS

ROOM/ SPACE	Standard Component				Level 4 Qty x m2	Level 5/6 Qty x m2	Remarks
RECEPTION/CLERICAL	RECL-10-IN RECL-12-IN				1 x 10	1 x 12	
WAITING	WAIT-10-IN WAIT-15-IN				1 x 10	1 x 15	For 5 persons (Level 4); 10 persons (Levels 5/6)
CONSULT / SCREENING	CONS-IN				1 x 14	1 x 14	
BLOOD COLLECTION BAY/S	BLDC-5-IN				2 x 9	4 x 9	For couch or collection chair
REST/ RECOVERY BAY/S	BLDC-5-IN similar				2 x 5	4 x 5	With comfortable chairs
BAY - BEVERAGE	BBEV-OP-IN				1 x 4	1 x 4	For patient/ donor refreshments
BAY – HANDWASHING TYPE B	BHWS-B-IN				2 x 1	2 x 1	Collection and Rest areas
PATIENT TOILET – ACCESSIBLE	WCAC-IN				1 x 5	1 x 5	May share adjacent facilities if close
STORE – FILES	STFS-8-IN STFS-10-IN				1 x 8	1 x 10	For statutory records

PREPARATION/ PROCESSING AREAS

ROOM/ SPACE	Standard Component				Level 4 Qty x m2	Level 5/6 Qty x m2	Remarks
PREPARATION/ PROCESSING LABORATORY	PTHLB-MOD-IN similar				1 x 15	1 x 25	
SEROLOGY LABORATORY	PTHLB-MOD-IN similar				1 x 10	1 x 20	
INFECTIOUS SEROLOGY LABORATORY	PTHLB-MOD-IN similar				1 x 15	1 x 20	Separate, enclosed Negative pressure
PLASMA APHERESIS	PTHLB-MOD-IN similar				1 x 10	1 x 20	
BLOOD STORAGE / DESPATCH	BLST-IN similar				1 x 10	1 x 15	
CLEAN-UP/STERILISATION	CLUP-P-IN				1 x 12	1 x 15	Sterilisation area may be Separate if required
CLEANER'S ROOM	CLRM-5-IN				1 x 5	1 x 5	
DISPOSAL ROOM	DISP-8-IN DISP-10-IN				1 x 8	1 x 10	Waste holding
STORE – GENERAL	STGN-9-IN STGN-16-IN				1 x 9	1 x 16	Consumable and general stock



STAFF AREAS

ROOM/ SPACE	Standard Component			Level 4 Qty x m2	Level 5/6 Qty x m2	Remarks
OFFICE – SINGLE PERSON MANAGER	yes			1 x 12	1 x 12	
OFFICE – 2 PERSON SHARED	yes				1 x 12	Write-up, for medical/ Technical staff, as required
CHANGE – STAFF (MALE/ FEMALE)	CHST-10-I CHST-14-I			1 x 10	1 x 14	Includes shower, toilet, basin and lockers
STAFF ROOM	SRM-15-I SRM-20-I			1 x 15	1 x 20	May be shared Includes beverage facilities
CIRCULATION				25%	25%	

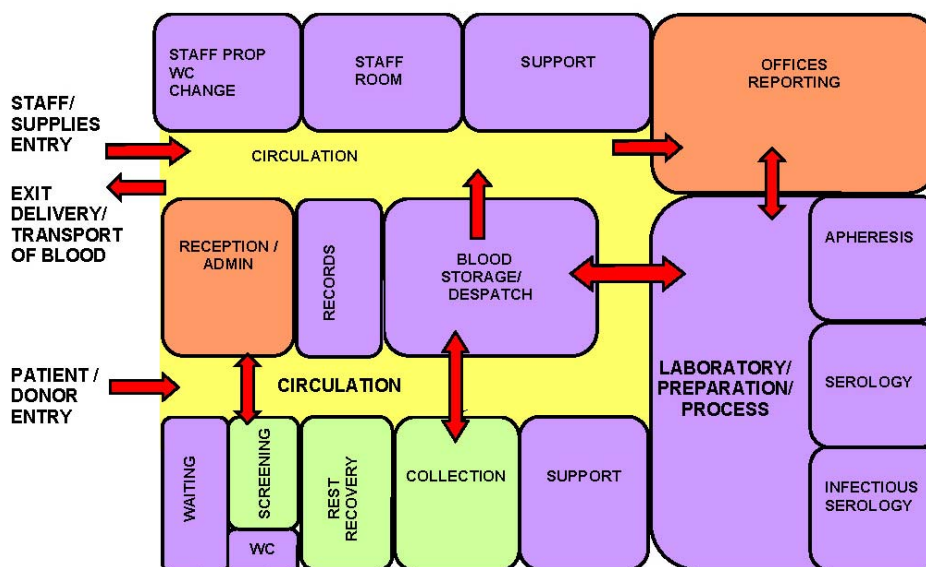
Please note the following:

- Areas noted in Schedules of Accommodation take precedence over all other areas noted in the FPU.
- Rooms indicated in the schedule reflect the typical arrangement according to the Role Delineation.
- Exact requirements for room quantities and sizes will reflect Key Planning Units identified in the service plan and the policies of the Unit.
- Room sizes indicated should be viewed as a minimum requirement; variations are acceptable to reflect the needs of individual Unit.
- Office areas are to be provided according to the Unit role delineation and staffing establishment.
- Staff and support rooms may be shared between Functional Planning Units dependant on location and accessibility to each unit and may provide scope to reduce duplication of facilities.

9.6 Functional Relationship Diagram

9.6.1 Blood Bank Functional Relationship Diagram

The Functional relationships diagram below demonstrates the optimum internal relationships between functional areas within the unit.



9.7 References and Further Reading

- Part A5 – Guidelines for District Hospital, Indian Public Health Standards, 2012 refer to http://www.healthdesign.com.au/ihfg/india-v1.1U/part_a5_district_hospital.pdf
- Central Drug Standard Control Organisation, Director General of Health Services, Ministry of Health and Family Welfare, Government of India, Guidelines for Blood Banks; 2012, refer to <http://www.cdsco.nic.in/forms/list.aspx?lid=1642&ld=1>
- Guidelines for Design and Construction of Health Care Facilities; The Facility Guidelines Institute, 2014 Edition.
- Laboratory Design Guide, 3rd Edition; Brian Griffin, Architectural Press, Elsevier UK, 2005
- Building Type Basics for Research Laboratories, Daniel Watch. New York, NY: John Wiley & Sons, Inc., 2001.
- CRC Handbook of Laboratory Safety, 5th Edition, A. K. Furr. Boca Raton, FL: CRC Press, 2000.



The Indian Health Facility Guidelines recommends the use of **HFBS** “**Health Facility Briefing System**” to edit all room data sheet information for your project.

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To learn more about the HFBS web-based Healthcare Briefing and Design Software and to obtain editable versions of the “Standard Components” including Room Data Sheets (RDS) and Room Layout Sheets (RLS) offered on the HFG website, signup for HFBS using the link below.

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