A Scientific Design Approach for Blood Transfusion Service in Hospitals

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Abstract

In all the hospitals Blood Transfusion Service (BTS) design has been always a very challenging task for the architects and hospitals administrative as minuscule faulty design may lead to a slow disastrous outcome. These faults may affect overall efficiency and working environment in hospitals in negative perception therefore a scientific and systemic approach of design needs to be implemented during design process by keeping all relevant considerations at conceptual stage. In this paper an easy and comprehensive study will help the readers to frame out and evolve a basic guiding factors to set up a well designed and functional BTS unit in hospital building that can further be advanced by following these fundamentals albeit this study also brings an advanced and contemporary parts of the practical field by means of graphs, tables and drawings etc.

Keywords: Blood transfusion system; Blood bank; Donor; Serology; Issue counter

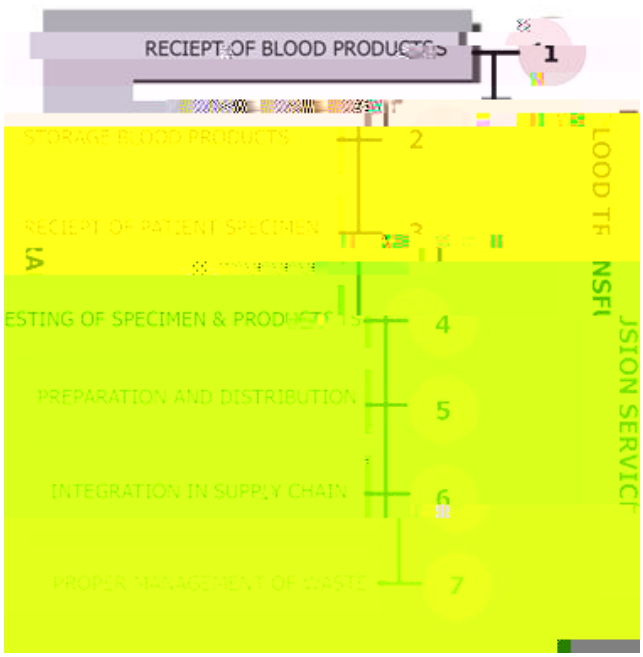

Figure1: Services in BTS.

Transfusion service flow

In hospital there are two types of samples that are received one is of blood sample and second is specimen sample both are received in blood transfusion service unit where detailed study is done in the form of test in order to match the required level. The correct service flow should be adopted by the architects and planners in designing of BTS in any hospital. A detail service flow is described below in Figure 2. Patient blood sample and specimen arrive in laboratory preferably in common place where these samples are tested, analyzed and resulted [3]. Laboratory should have automated and non automated task performing spaces that enhance the efficiency of working environment. Specimen and blood sample are crosshatched and then distributed as shown in Figure 2 below.

Design Developing Methodology and Deriving Spaces

Architects and planner should understand the connectivity of spaces with respect to staff and related functioning in order to derive the spaces before their hands get dirt on designing. Once the architects understand fundamental functions of the department it becomes easy for them to draw a concept on pre-design stage. In BTS analysis of spaces all related study have been suggested four main activities are carried out-

Receiving

In BTS there should be spaces for receiving blood and blood products that are brought here by using pneumatic tube system or couriers. Proper facility should be provided to dispose waste safely without affecting internal functions of the space. As for its location can be adjacent to product storage area for smooth function.

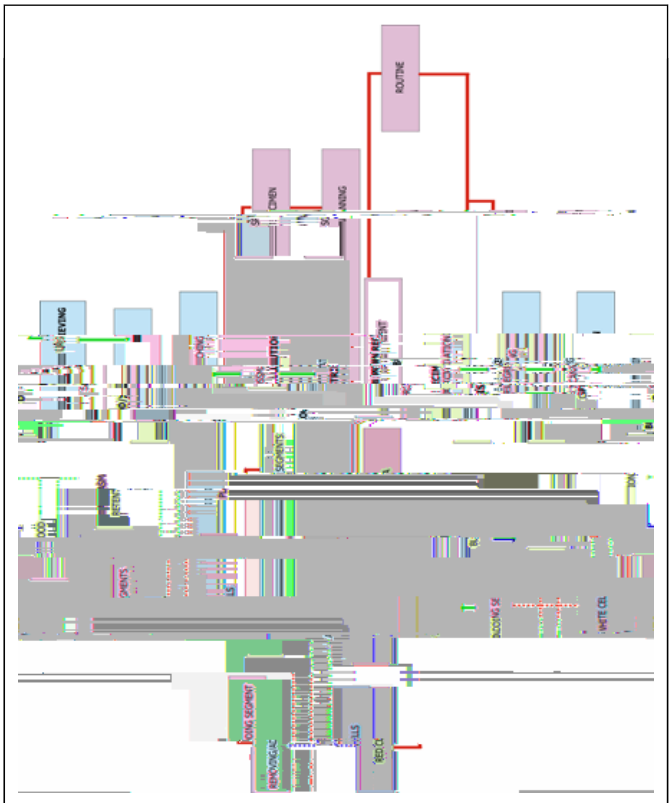

Figure2: Transfusion service flow.

Storage area

Once the products are received they are stored in refrigerator, freezers, incubators immediately under suitable environmental conditions.

Testing area

In this zone blood samples are tested by means of automated or non-automated systems with additional testing facility if required. All testing spaces should be merged in a systematic way that can be accessed easily in a flow without breaking a flow of circulation if possible [4].

Distribution area

This is one the most important area in BTS where tested and crosshatched blood samples are distributed to the customers by using pneumatic tube system, service window or any other methods. Here the working staff should pay an attention to dispensing of products so that no haphazard condition should be created and proper area for accommodating refrigerator, incubators etc. should be fended. After having a profound insight of spaces and their relevant positioning with others spaces hospital planners can start off the process to evolve basic zoning and concept as shown below in Figure 3.

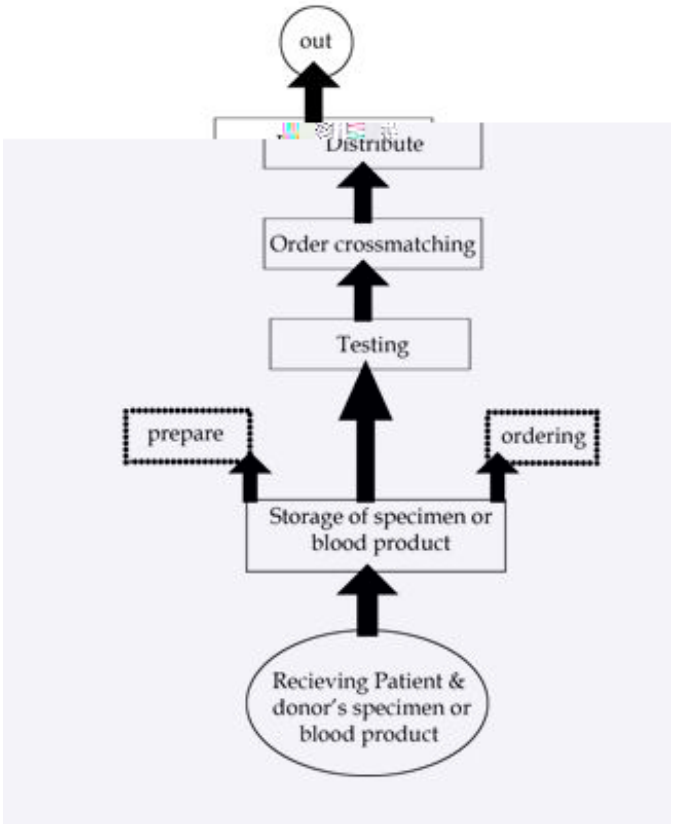

Figure3: Activity flow chart in BTS.

Apart from evolving spaces and circulation flow of staff and information architects need to segregate waste from BTS unit in safe manner. The working staff should be well conversant with the position of pneumatic tube and others relevant services for dispensing the facility to needful department of patient directly. Following are the points that should on architects' finger tips to design a BTS in hospital buildings.

- Blood products receiving point.
- Location of pneumatic tube system.
- Locations of spaces where blood products are to be supplied.
- Correct and efficient movement of staff.

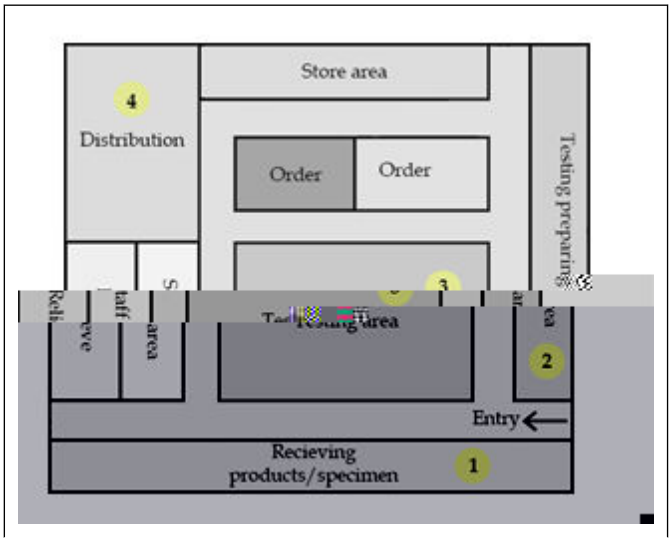

Figure4: Space division plan in BTS on conceptual stage.

Physical Areas Breakup

Following are the spaces in BTS in any hospital

Public access areas

Below the table describes the common public areas used in BTS with appropriate size as per professional practice in medical architecture. It may include other supporting spaces that requires a scope for future expandability if possible by giving 40% extra circulation space in any side by means of providing wall (Table 1).

S. No	Public Access Areas	Area(m2)	Tentative area
1	Reception	1.5 per person	40-50
2	Toilet	-	1.44 as per toilet norms(NBC)
3	Waiting area	1.85 per person	-
4	Donor bleeding room	-	20-25
5	Medical exam room	-	10-12
6	Refreshment	-	12
7	Kitchen/pantry		8-10
8	Aphaeresis(Machine used for blood donating)		30
9	Daycare or therapeutic		40-42
10	Counseling room		10-12

Laboratory areas

Laboratory areas in BTS can be separated with basic primary areas with sufficient space shall be provided for minor addition or subtraction in future if needed. Many additional areas can be added or subtracted as per the requirements of the BTS.

S. No	Public access areas	Area(m2)	Tentative area
1	Blood and specimen product receiving area	-	18-20
2	Donor blood storage area		18-20
3	Transfusion-transmissible infection lab area		30
4	Component separation area		30
5	Washroom and disinfection area		18-20
6	Emergency lab storage area		12-15
7	Specialized lab area		25-30
8	Issue counter		10-12

Table2: Laboratory areas in BTS.

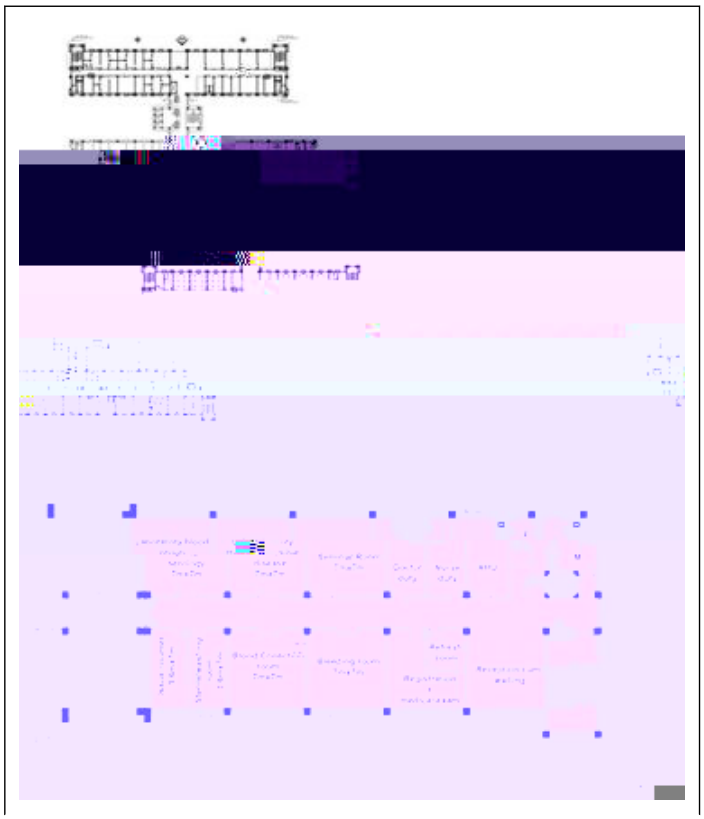

Figure6:

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