

**Part B – Health Facility Briefing & Design**  
**23 Bone Marrow Transplant Unit**



iHFG

**International Health Facility Guidelines**  
**2024**

# Table of Contents

1	INTRODUCTION.....	3
2	BONE MARROW .....	3
3	BONE MARROW TRANSPLANT UNIT .....	3
4	FUNCTIONAL AND PLANNING CONSIDERATIONS .....	3
5	FUNCTIONAL RELATIONSHIPS.....	7
6	DESIGN CONSIDERATIONS.....	9
7	COMPONENTS OF THE UNIT .....	16
8	SCHEDULE OF EQUIPMENT (SOE) .....	18
9	SCHEDULE OF ACCOMMODATION (SOA).....	18
10	FURTHER READING.....	22

## 23 Bone Marrow Transplant Unit

### 1 Introduction

This Functional Planning Unit (FPU) covers the requirements of the Bone Marrow Transplant (BMT) Unit. The purpose of the BMT unit is to accommodate patients who undergo bone marrow transplants to replace unhealthy bone marrow cells with healthy cells.

The BMT process involves collecting the replacement cells (also referred to as hematopoietic stem cells), preparing the patient to receive the transplant and administering the cells to the patient. The replacement cells can either come for the patient's own body or from a donor.

BMT has been used successfully to treat disease such as:

- Blood cancers, such as leukemia and Hodgkin's lymphoma
- Bone marrow diseases such as severe aplastic anaemia
- Bona cancers such as multiple myeloma
- Immune system or genetic diseases such as sickle cell disease or severe combined immunodeficiency

### 2 Bone Marrow

Bone Marrow is a spongy, fatty tissue inside bones that holds the cells responsible for creating blood cells. The transplanted healthy stem cells helps to produce new blood cells (red blood cells, white blood cells and platelets) and also promote the growth of new bone marrow.

### 3 Bone Marrow Transplant Unit

The Bone Marrow Transplant (BMT) Unit combines the necessary procedural facilities with a specialised type of Intensive Care Unit (ICU) with all-positive pressure rooms. The design aspects of this Unit need to accommodate a number of special factors for patients of all ages, levels of acuity and disability.

The BMT process does not involve major surgery; rather, it's performed similarly to a blood transfusion, where the replacement cells are infused into the patient's body through a central line.

After the transplant, patients typically remain in the hospital for three to four weeks as the stem cells move through the blood stream into the bone marrow and start to grow and make healthy blood cells.

### 4 Functional and Planning Considerations

#### Operational Models

The Bone Marrow Transplant Unit is a speciality Intensive Care Unit dedicated to patients undergoing a bone marrow transplant. It involves a multidisciplinary care team, including but not limited to:

- Healthcare providers – providers who specialise in oncology, hematology, immunology and bone marrow transplantation
- Bone Marrow Transplant Nurse Coordinator - nurses who organize all aspects of care provided before and after the transplant, including patient education, diagnostic testing and follow-up care.
- ICU nurses – who will provide care to the patients in the period after the transplant procedure
- Social Workers and Psychologists – to help the patient and family deal with many issues that may arise during the hospitalization.
- Dietetic – professionals who will help meet the patient's nutritional needs before and after the transplant.

- Physical therapists – to help with movement and endurance after the transplant
- Respiratory therapist
- Infectious disease specialist
- Dermatologists

### **Models Of Care**

Bone Marrow extraction is either performed in the Operating Room or via apheresis, depending on the clinical requirement of the patient. The Bone Marrow Transplant Unit must have access to at least one operating theatre. This can be carried out in the same type of environment as Inpatient Surgery, Day Surgery or DOSA. Refer to the separate Operating Unit FPU for further information and requirements. It is possible for larger BMT Units to have their own operating theatres attached. If so, there can be no exemptions and all the requirements of an Operating Unit must be met in accordance with these Guidelines.

Apheresis collection to extract the bone marrow stem cells may be provided as part of the Unit or within the Laboratory Unit. The designated area for collection shall be in an appropriate location of adequate space and design to minimize the risk of airborne microbial contamination.

Most BMT patients must undergo high dosage chemotherapy prior to receiving the healthy stem cells. The chemotherapy can be provided within the BMT unit or within a dedicated Chemotherapy Unit. If it is done within the BMT Unit all the required support rooms must be provided. Refer to the Oncology Unit – Medical Chemotherapy Unit FPU for further requirements.

The transplantation (transfusion) is usually done in the patient's room, which are similar to positive pressure isolation ICU rooms, or in the Unit's Procedure room. Procedure rooms should follow the requirements in Part E of these Guidelines.

Other procedures are also performed in the Procedure Room within the unit. Patients will recover in their individual positive pressure Intensive Care rooms with ante-rooms and ensuite bathrooms.

It is also possible to create a BMT Unit as part of an Oncology Centre of Excellence with easy access to the Chemotherapy and Radiation Therapy Departments.

### **Unit Planning Models**

#### **Location**

A Bone Marrow Transplant Unit may only be provided as part of a RDL 5 or 6 facility. It may be provided as part of:

- A Specialised Oncology Hospital at RDL 5 or 6
- A General Hospital at RDL 5 or 6

The Unit benefits from:

- Access to the Operating Unit
- Access to the Medical Imaging Unit
- Access to Echocardiogram and Pulmonary Function Testing
- Access to the Laboratory
- Access to the Pharmacy
- Access to the Chemotherapy unit, in the case of a Specialized Oncology Hospital
- All the typical supporting departments of the hospital

### **Functional Zones**

The Bone Marrow Transplant Unit should have the following standard rooms/areas:

- Entry/ Reception area including:

## Part B: Health Facility Briefing & Design

### Bone Marrow Transplant Unit

- Reception
- Waiting areas, sized to accommodate family members, with access to public amenities
- Relatives Lounge
- Gown-up/ Gown-down areas for visitors
- Patient Consultation area:
  - Consult room(s)
  - Interview/ Meeting Room
- Patient Areas – areas where patients are accommodated, and facilities specifically intended for the patient including:
  - Positive pressure ICU rooms
  - Ante-rooms to the ICU rooms
  - Ensuites for the ICU rooms
  - Procedure Room
- Support Areas including:
  - Bays for Handwashing/PPE, Linen, Resuscitation trolley, meal trolleys, of mobile equipment and wheelchairs
  - Clean and Dirty Utility rooms
  - Medication Room
  - Laboratory facilities
  - Cleaners Room
  - Staff Station, write-up and handover areas
  - Store rooms for equipment and consumables
- Staff Areas:
  - Offices and workstations for a range of clinical staff according to the approved service plan
  - Meeting room
  - Staff Amenities with Staff Room, toilets and Locker areas
  - Staff Change
  - Overnight Stay Bedrooms

The above zones are briefly described below.

#### Entry/ Reception Area

The unit should have convenient access for patients and visitors via the building's main entrance. The typical arrangement will be similar to the visitor access to an Intensive Care Unit.

The waiting area should be able to accommodate a range of patients and visitors with varying degrees of ability. The main waiting room can include a play area for kids. Toilets and baby change rooms should be provided in reasonable proximity.

Access to the unit from the waiting area should be via visitor Gown-up/ Gown-down rooms.

#### Consult Rooms

The Unit may include consultation rooms for patient and donor consultation, follow-up and case review. Throughout the course of their treatment patients will be referred to other specialists and allied health personnel as required including Haematologists, Oncologists, Dieticians, Physiotherapists, Occupational Therapists and others.

Interview and conference rooms may be required for patient and family education which may include computers for review of treatment programs. The Consult Rooms should be located with easy access for outpatient areas and shall protect the patient from transmission of infectious agents and allows for patient isolation, confidential examination and evaluation.

The Consult Rooms provided within a BMT Unit may be minimal if the patients are mostly referred from other dedicated Oncology Outpatient Units.

### Procedure Room

Procedure room is highly recommended for a catheter (central venous catheter) insertion. This will provide access to major veins for receiving the bone marrow stem cells, chemotherapy, medications and intravenous nutrition that are needed throughout the transplant process. This catheter may also be used for drawing blood most of the time. Ideally this room should also be HEPA filtered considering the vulnerabilities of the immunocompromised patients.

### Patient Bedrooms

The bed areas should follow the same design directions and requirements as an Intensive Care unit. However, in the BMT Unit, all ICU rooms will be similar to the Positive Pressure Isolation ICU room with ante-room and attached ensuite. See the Intensive Care FPU within these Guidelines for more information.

Direct observation of the bedrooms from the Staff or Reporting Bays is optional. However, it is recommended that a small number of beds (e.g. 10%) should have direct observation in the same manner as an ICU. The balance of the rooms will have only observation windows within the entrance doors. Refer to the Intensive Care Unit Guidelines for further information.

### Support Areas

Support Areas Include:

- Staff Station
- Handwashing, PPE, Linen and Equipment Bays
- Clean Utility, dirty utility and Disposal Rooms
- Medication Room
- Store Room
- Beverage Bays and Pantries
- Emergency support, including resuscitation equipment, should be located close to centrally located staff stations.
- Lab facility - The Unit must have available 24-hour clinical laboratory services. When this service cannot be provided by the central hospital Laboratory, a satellite laboratory within or immediately adjacent to the Unit must serve this function. The Satellite facilities must be able to provide minimum chemistry and haematology testing, including arterial blood gas analysis.

### Staff Areas

Adequate office accommodation should be provided for the Clinical Director of the Unit, Therapy Managers, Nursing Managers, Allied Health professionals, Treatment Coordinators and Specialist Nurses.

Ideally administrative areas should be located close to the clinical areas so that staff always remain close to patients.

There should be

Staff Areas may be shared with adjacent Units if convenient and will consist of:

- Meeting rooms
- Staff Room
- Toilets, Shower and Lockers
- Overnight Stay Bedrooms

## 5 Functional Relationships

A Functional Relationship can be defined as the correlation between various areas of activity whose services work together closely to promote the delivery of services that are efficient in terms of management, cost and human resources. In the Bone Marrow Transplant Unit, due to its makeup of several components and the need for patients to utilise more than one service, efficient functional relationships are imperative.

### External

It is desirable that the BMT Unit has ready access to the:

- Operating Unit
- Oncology Unit – Chemotherapy. Alternatively, the BMT unit can have an optional Chemotherapy Preparation Area. Refer to the related Functional Planning Unit Guideline for more information on the requirements of this area.
- Apheresis collection facility. This must be a secured and controlled access area for the stem cell collection procedure and include a suitable space for donor examination and evaluation. Should the unit not have access to this facility then one must be included within the department.
- Clinical support departments such as the Pharmacy and Laboratory (also possible via pneumatic tube). It is essential that the unit has access to stem cell lab services with international accreditation and an HLA testing Laboratory.
- Access to 24-hour transfusion service to provide irradiated blood products
- Material Management, Housekeeping and Catering Units
- A Radiation Therapy Service should be available within the vicinity of the hospital.

As the facility must be part of an RDL 5/6 facility, it is assumed that all other FPU's required for such a facility will be provided.

### Internal

The Internal planning of the BMT should be planned by considering the unit's functional areas/zones.

Some of the critical relationships to be considered include:

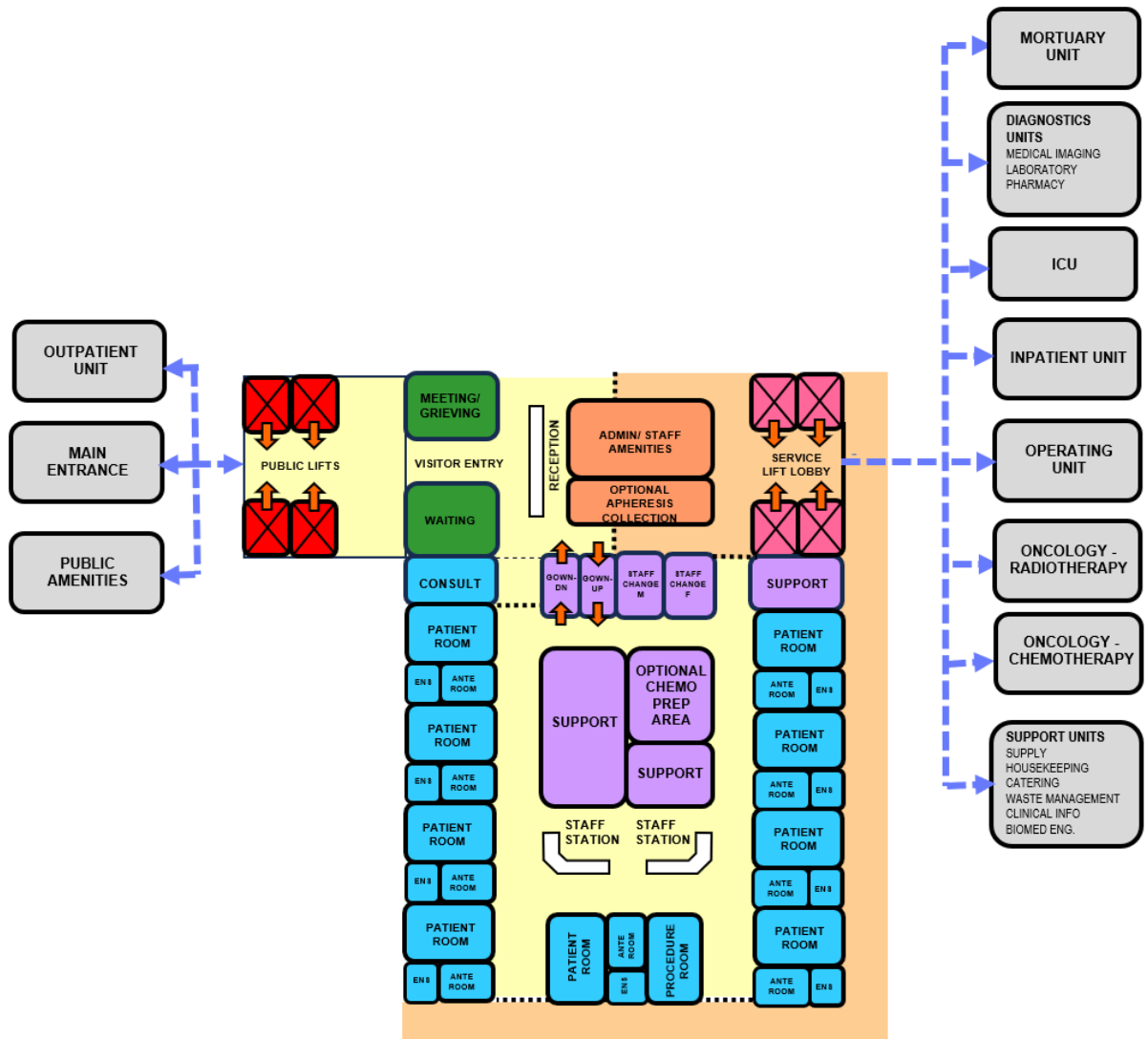
- Visitor waiting areas and access to the unit via Gown-up/ Gown-down rooms
- Staff Station strategically located for unobtrusive view of all patient room corridors
- The inclusion of additional decentralised staff stations may be considered in larger units depending on the planning geometry
- Inclusion of working spaces for visiting multidisciplinary team members
- Clinical Support Areas such as Utility and storage areas that need to be readily accessible to both patient and staff work areas
- Location of the Reception to provide a clear view of entry and exit/ egress points of the Unit
- Easy but controlled access from the visitor Waiting area to the patient area

It should be noted that although the design of the rooms and the overall unit is very similar to the Intensive Care Unit, the provision of reporting stations (observation bays) between each two rooms is not mandatory.

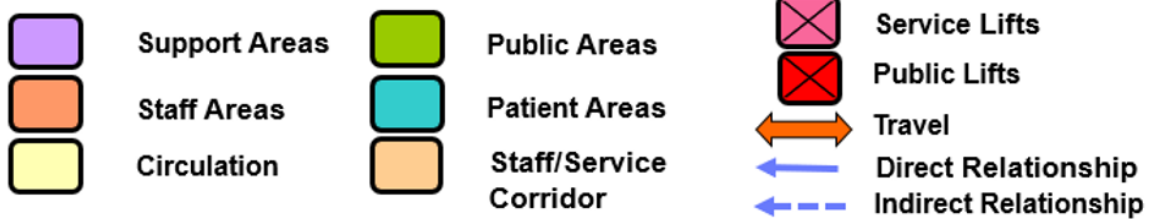
### Functional Relationship Diagram

The Functional Relationship of a typical Bone Marrow Transplant Unit integrated within a hospital is best demonstrated in the diagram below.

**Part B: Health Facility Briefing & Design  
Bone Marrow Transplant Unit**



**LEGEND**



Note:

The External and Internal Functional Relationship are demonstrated in the diagram above including the following:

- Separate entry for arriving patients and visitors
- Separate staff access entrance for bed and goods transfers
- Access to key clinical units associated with patient treatment, including the Operating Unit via separate service access door

The optimum Internal Relationships include the following:



- Visitor waiting outside the Unit
- Administration and office areas located close to unit entrance and at the unit perimeter in a staff accessible area as shown in the support zones
- Patient rooms spaces arranged in a racetrack model with Staff Station(s) and Clinical support facilities in the centre to allow clear visual access to all patient corridors

## **6 Design Considerations**

Refer to Part C – Access, Mobility and OH&S of these Guidelines for Ergonomic issues and Part D for Infection Control.

### **General**

Design of the Unit should consider the following:

- Ease of access for patients and their families, who may arrive either walking, using mobility equipment, by ambulance stretcher or patient transport trolley;
- Convenient access to public parking for frail patients, particularly those undergoing a scheduled period of follow-up on a regular basis;
- Service access for delivery of large amounts of intravenous fluids to the unit on a regular basis and suitably sized storage areas to hold supplies;
- Appropriate floor finishes for constant staff movement to/ from and between patients during the treatments such as monolithic coating.

### **Patient Treatment Areas**

Patients should be situated so that healthcare providers have a good visual access to ensure safety and quality care. This approach enhances staff monitoring of patient condition during treatment.

The optimal design is to allow a direct line of vision between the patient and staff.

Provision for dedicated BMT areas for children and young people is recommended, where facilities are shared but patient pathway should be kept as separate as possible.

If Paediatric BMT is provided, it should be zonally separated from the adult section. The space includes a procedure room, patient rooms, day clinic, support spaces, and office spaces for clinicians.

### **Environmental Considerations**

#### **Acoustics**

Acoustic privacy is required for many functions in the Unit including:

- Family/ case conference/ interview rooms
- Isolation of noisy areas such as waiting rooms from clinical areas e.g. clean and dirty utilities
- Staff discussion regarding confidential matters in meeting rooms
- Noise sources arising both within and from outside the Unit such as:
  - Sanitary Facilities
  - Equipment
  - Patients/ Clients
  - Staff Activities, and
  - Traffic through the unit e.g. visitors, food, linen, or other trolleys.

Solutions to be considered include:

- Location of the unit away from noisy areas
- Minimise the ambient noise level within the unit and transmission of sound between patient

areas, staff areas and public areas

- Use of sound isolating construction and selection of sound absorbing materials and finishes
- Planning to separate quiet areas from noisy areas
- Review of operational management and patient/client flows; this may include separate areas for patients with special needs
- Provision of television systems with headphones to reduce ambient noise levels.

### **Natural Light/ Lighting**

Natural light and views should be available from the Unit for the benefit of staff and patients. Windows are an important aspect of sensory orientation, and as many rooms as possible should have windows to reinforce day/ night orientation. As a minimum 50% of patient rooms should have direct access to external windows. The balance of patient rooms may have access to borrowed natural light via a glazed corridor or the light filtering through the other rooms with a glazed front.

Natural light and views to the staff and support rooms is desirable but not mandatory.

High quality task lighting is essential to ensure complex medical and pharmacological tasks can be safely achieved.

Colour corrected lightning is also essential to ensure patient assessment can be conducted effectively.

### **Privacy**

The design of the Unit needs to consider the contradictory requirement for staff visibility of patients while maintaining patient privacy.

Each bedroom shall be provided with bed screens to ensure privacy of patients undergoing treatment in the room. Screens can be provided directly behind the glazed front to the corridor. Refer to the Standard Components for examples.

Confidentiality and privacy when requested for persons receiving treatment and the area design should be considered as a critical element during the design process.

External gardens, courtyards or atrium facing bedrooms should be designed in such a way as to prevent others from looking into bedrooms.

The Unit should be designed to:

- Ensure confidentiality of personal discussion and medical records
- Provide an adequate number of rooms for discreet discussions and treatments to occur when required
- Provide suitable sized treatment spaces that permit screen curtains to be easily closed whenever required
- Appropriately locate windows and doors to enhance visual and acoustic privacy

### **Interior Décor**

Interior décor includes furnishings, style, colour, textures and ambiance, and is influenced by perception and culture. The décor of the Unit should provide an inviting and comfortable space with a non-institutional atmosphere. Cleaning, infection control, fire safety, patient care requirements and the patient's perception of a professional environment should always be considered.

Suggestions to achieve this balance include the following:

- Use of design features such as colours and artworks to distract the sight from clinical areas.
- Inclusion of soft corridors at the required widths for patient access and services deliveries
- Provision of a beverage bay for people to use while waiting.

- Maintaining a sterile environment within the patient rooms is crucial for BMT patients, and thus, design features need to be implemented to reduce infection risks
- Some colours, particularly the bold primaries and green, should be avoided in areas where clinical observation occurs such as bedrooms, treatment areas and corridor. Such colours may prevent the accurate assessment of skin tones e.g. yellow/ jaundice, blue/ cyanosis, red/ flushing

## **Space Standards and Components**

### **Bed Spacing/ Clearances**

Bed dimensions become a critical consideration in ascertaining final room sizes. The dimensions noted in these Guidelines are intended as minimums and do not prohibit the use of larger rooms where required.

All patient beds must comply with standard components for fittings, furniture, mechanical and electrical services and staff call systems including the clearances that they imply.

The BMT patient rooms can be identical in design to ICU rooms with the mandatory ensuite bathrooms. A minimum of 1200 mm clearance around both sides and the foot of the bed is recommended. At the head of the bed, a minimum of 300 mm clearance should be allowed between the bed and any fixed obstruction or wall.

Where possible the bed should float in the centre of the room rather than pushed against a side wall. This is to allow the staff to move around the bed and get access to the head of the patient without any interference from obstructions.

### **Accessibility**

The Bedroom and Ensuite should comply with accessibility requirements in accordance with these Guidelines. Accessible bedrooms and ensuites should enable normal activity for wheelchair dependent patients, as opposed to patients who are in a wheelchair as a result of their hospitalisation.

### **Doors**

Door openings to bedrooms shall have a minimum of 1400 mm clear opening to allow for easy movement of beds and equipment.

### **Ergonomics/ OH&S**

Ergonomics must be considered in the internal design of the Unit for patient and staff health and safety. Heights and depths of benches and Staff Stations in the procedure area need to allow staff to efficiently work from standing and seated positions. Consideration must be given to storage of supplies at suitable working heights including cartons of intravenous fluids in constant use.

Refer also to Part C – Access, Mobility and OH&S of these Guidelines for additional information.

### **Size of the Unit**

Nothing in these Guidelines dictates the number of beds in a BMT Unit. The number of beds shall be determined by the facility's service plan. The recommended maximum number of beds per unit (or pod) is 12 beds ( $\pm 2$ ). If more than 14 beds are required, the design should consider additional units (or pods). Each Unit (or pod) is defined by the requirement to have one set of the supporting rooms such as the Staff Station, Utility Rooms and Medication Room. However, according to these guidelines a number of facilities can be shared between the units (or pods) such as staff amenities, meeting rooms, administration areas and visitor areas.

### **Drug Storage**

Drugs prescribed at the hospital should not be stored in the patient bedroom. Each patient's medication shall have a dedicated Medication Room with restricted staff access. Optionally, this room could either be a Clean Utility room. The use of a Medication Management System is encouraged but is not mandatory.

In both scenarios, the room must contain:

- Benches and shelving
- Medications may be manually stored and managed, or alternatively automated Medication Management systems may be utilised
- Lockable cupboards for the manual storage of restricted substances or provision of an automated Medication Management Systems
- Controlled, semi-controlled or narcotic drugs must be kept in a secure cabinet within the Medication Room with alarm. The room requires controlled staff only access and may include CCTV surveillance
- A refrigerator is required to store restricted substances and must be lockable or housed within a lockable storage area
- The Medication Room must have space for parking a medication trolley

Note: Storage for dangerous and controlled drugs must be in accordance with the relevant legislation and not stored in a patient bedroom.

### **Safety and Security**

The BMT Unit shall provide a safe and secure environment for patients, staff and visitors, while remaining a non-threatening and supportive atmosphere conducive to recovery.

The facility, furniture, fittings and equipment must be designed and constructed in such a way that all users of the facility are not exposed to any possible risks of injury.

Fittings, surfaces, and furniture should have rounded edges and no small/ removable elements. All cupboards should be provided with locks.

Security issues are important due to the increasing prevalence of violence and threat in health care facilities.

The arrangement of spaces and zones shall offer a high standard of security through the grouping of like functions, control over access and egress from the Unit and the provision of optimum observation for staff. The level of observation and visibility has security implications.

Refer also to Part C – Access, Mobility, OH&S in these Guidelines.

### **Finishes**

Finishes including building fabric, floor, wall and ceiling finishes, should be aesthetic, relaxing and non-institutional as far as possible. The following additional factors should be considered in the selection of finishes:

- Acoustic properties
- Durability
- Ease of cleaning
- Infection control
- Fire safety
- Movement of equipment; floor finishes should be resistant to marrying and shearing by wheeled equipment

In areas where clinical observation is critical, such as bedrooms and treatment areas, lighting and colours shall be chosen that do not alter the observer's perception of skin colour.

Walls shall be painted with lead free paint.

Wall protection shall be provided where bed or trolley movement occurs such as corridors, patient's bedrooms, equipment and linen storage and treatment areas.

## Fixtures, Fittings and Equipment

### Equipment

Bedside monitoring equipment should be located to permit easy access and viewing, and should not interfere with the visualization of, or access to the patient. The bedside nurse and/or monitor technician must be able to observe the monitored status of each patient at a glance. This goal can be achieved either by a central monitoring station, or by bedside monitors that permit the observation of more than one patient simultaneously. Neither of these methods are intended to replace direct bedside observation.

Weight-bearing surfaces that support the monitoring equipment should be sturdy enough to withstand high levels of strain over time. Therefore, space and electrical facilities should be designed accordingly.

### Bed Screens

In bed rooms, visual privacy (bed screens) from casual observation by other patients and visitors shall be provided for each patient. The design for privacy shall not restrict patient access to the entrance, toilet or shower. Bed screens must be cleaned and washed regularly. Select fabric that is waterproof, fireproof and with antimicrobial properties. Disposable bed screens are another option if it aligns with the Infection Control Policy of the facility. In isolation rooms or patient rooms used for quarantine, disposable bed screens could be a more appropriate option than regular bed screens.

### Curtains / Blinds

Each room shall have partial blackout facilities (blinds or lined curtains) to allow rest during the daytime. Similar to bed screens, window curtains shall be fireproof, waterproof and be cleaned often.

Compliance with the Health Authority for the required level of fire resistance should be ensured.

If blinds are to be used instead of curtains, the following will apply:

- Vertical or roller blinds are better alternatives than horizontal blinds as horizontal blinds have more surfaces for collecting dust
- Horizontal blinds can be fitted within a double-glazed window assembly with a knob control on the one side (commonly the bedroom side) or with a dual control (both sides) depending on the location of the window. This option is preferable in rooms used for isolation.

### Window Treatments

Window treatments should be durable and easy to clean. Consideration may be given to use of double glazing with integral blinds, tinted glass, reflective glass, exterior overhangs or louvers to control the level of lighting.

### Clocks

An analogue clock/s with a second sweep hand shall be provided and conveniently located for easy reference from all bed positions and the Staff Station.

## Building Services Requirements

### Mechanical Services

The unit shall have appropriate air conditioning that allows control of temperature, humidity and air change. This section identifies unit specific services briefing requirements only and must be read in conjunction with Part E – Engineering Services for the detailed parameters and standards applicable.

### Information and Communication Technology

It is vital to provide reliable and effective Information Technology/ Communications service. The following items should be considered during planning and will contribute to the operation of the unit:

## Part B: Health Facility Briefing & Design

### Bone Marrow Transplant Unit

- Electronic Health Records (EHR) which may form part of the Health Information System (HIS)
- Hand-held tablets and other smart devices
- Picture Archiving Communications Systems (PACS)
- Paging and personal telephones replacing some aspects of call systems/ DECT
- Data entry including scripts and investigation requests
- Bar coding for supplies and X-rays/ Records
- Data and communication outlets, servers and communication room requirements
- Wireless network requirements
- Videoconferencing requirements
- Communications rooms and server requirements
- Closed Circuit Television (CCTV) may be required to ensure staff can oversee entry and egress points

#### Staff Call

Patient and Emergency Call facilities shall be provided in all patient areas such as bed/ chair spaces, toilets, bathrooms, consult rooms and procedure rooms for patients and staff to request urgent attention. The individual call buttons shall activate the annunciators and central module situated at or adjacent to the Staff Stations in a discreet manner.

The individual call buttons should be registered and shall alert to an annunciator system. Annunciator panels should be located in strategic points visible from Staff Stations and audible in Staff Rooms, Meeting Rooms, and should be of the “non-scrolling” type, allowing all calls to be displayed at the same time.

#### Patient Entertainment Systems

Patients may be provided with entertainment/ communications systems according to the Operational Policy of the facility including:

- Television
- Telephone
- Internet (Wi-Fi) access

#### Pneumatic Tube Systems

The BMT Unit may include a pneumatic tube station, as determined by the facility Operational Policy. If provided the station should be located in close proximity to the Staff Station or under direct staff supervision. When required, a second PTS station may be provided within the medication storage area.

Requirements include:

- The bay should not impede access within staff station areas
- Racks should be provided for pneumatic tube canisters
- Wall protection should be installed to prevent wall damage from canisters

#### Hydraulics

Warm water supplied to all areas accessed by patients within the Unit should be maintained at 38°C and shall not exceed 43°C. This requirement applies to all staff handwash basins and sinks in patient accessible areas.

Refer to Part E - Engineering Services for details.

#### Safety shower/ eyewash

A safety shower and eyewash should be provided close to procedure areas for cytotoxic spills.

### Heating Ventilation and Air-conditioning (HVAC)

The air temperature in areas should be capable of being maintained along with relative humidity. A local thermostat in the patient room should be provided from which room temperature can be adjusted by the occupant.

All HVAC units and systems are to comply with services identified in Standard Components and Part E – Engineering Services in these Guidelines.

### Medical Gases

Medical gas is intended for administration to a patient in anaesthesia, therapy, diagnosis or resuscitation.

Medical gases shall be installed, readily available and dedicated for each patient and they must not be shared between two patients even in a shared inpatient room.

Oxygen, medical air and suction must be provided to all beds. Medical gases will be provided for each bed according to the quantities noted in the Standard Components - Room Data Sheets.

### Infection Control

BMT patients are at increased infection risk due to immunosuppression and frequent exposure to healthcare settings. Flooring, walls, furniture and fittings should be carefully selected to ensure effective infection control measures.

The design of all aspects for the Unit should take into consideration the need to ensure a high level of infection control in all aspects of clinical and non-clinical practice.

### Hand Basins

Handwashing facilities shall be required in the corridors, patient bedrooms and other rooms as specified by the Standard Components. Where a handwash basin is provided, there shall also be liquid soap, disposable towel and waste bin provided, in addition to PPE equipment due to the nature of treatment and risk or exposure to bodily fluids.

Hand-washing facilities shall not impact on minimum corridor widths.

At least one handwashing bay is to be conveniently accessible to the Staff Station.

Handbasins are to comply with Standard Components – “Bay – Handwashing” and Part D – Infection Control.

Hand basins in patient bedrooms should be used solely for infection control purposes and utilised only by staff. Patients should use hand basins provided in bathrooms for personal use purposes. Staff may not use the patient ensuite hand wash basins.

### Antiseptic Hand Rubs

Antiseptic hand rubs should be located so they are readily available for use at points of care, at the end of patient beds and in high traffic areas.

The placement of antiseptic hand rubs should be consistent and reliable throughout facilities. Antiseptic based hand rubs are to comply with **Part D – Infection Control**, in these guidelines

Antiseptic Hand Rubs, although very useful and welcome, cannot fully replace Hand Wash Bays.

### Isolation Rooms/s

Standard Single (1 bed) patient rooms area regarded as one Class P- Positive Pressure Room shall be provided for each room as determined by the Clinical Service Plan. It is a special room that provides a positive pressure environment in which only highly purified (HEPA-filtered) air is allowed to enter. The room is cleaned every day and everyone who enters the room must follow specific procedures to minimize complications associated with the transplant process.

For further information on Isolation Rooms refer to Part D – Infection Control in these Guidelines.



### Antineoplastic Waste Disposal

They are highly toxic and designated as dangerous waste. Waste containing chemotherapeutic agents should be managed as either hazardous chemical or must be disposed of at a dedicated waste facility.

Waste disposals include:

- Expired drugs and aborted dosages
- All equipment used in preparing and delivering chemotherapy drugs to patients
- Contaminated Personal Protective Equipment (PPE) and other materials

### Cytotoxic Preparation

In full self-sufficient facilities, provision should be made for the preparation of Cytotoxic compound used for Chemotherapy. The following should be considered:

- Delivery of bulk products
- Preparation areas
- Clean room requirements
- Biohazard Cabinets
- Waste disposal
- Storage
- MEP provisions

## 7 Components of the Unit

### Standard Components

Standard Components are typical rooms within a health facility, each represented by a Room Data Sheet (RDS) and a Room Layout Sheet (RLS). Sometimes, there are more than one configuration possible and therefore, more than one room layout sheet can be found in the Standard Components for a room with same function. They may differ in room size and/or the requirement of FF & FE items.

The Room Data Sheets are presented in a written format, describing the minimum briefing requirements of each room type divided into the following categories:

- Room Primary Information; includes Briefed Area, Occupancy, Room Description and relationships, and special room requirements.
- Building Fabric and Finishes; identifies the fabric and finish required for the room ceiling, floor, walls, doors, and glazing requirements.
- Furniture and Fittings; lists all the fittings and furniture typically located in the room; Furniture and Fittings are identified with a group number indicating who is responsible for providing the item according to a widely accepted description as follows:

Group	Description
1	Provided and installed by the builder
2	Provided by the Client and installed by the builder
3	Provided and installed by the Client

- Fixtures and Equipment; includes all the serviced equipment typically located in the room along with the services required such as power, data and hydraulics; Fixtures and Equipment are also identified with a group number as above indicating who is responsible for provision.



- Building Services; indicates the requirement for communications, power, Heating, Ventilation and Air conditioning (HVAC), medical gases, nurse/ emergency call and lighting along with quantities and types where appropriate. Provision of all services items listed is mandatory.

The Room Layout Sheets (RLS's) are indicative plan layouts and elevations illustrating an example of good design. The RLS indicated are deemed to satisfy these Guidelines. Alternative layouts and innovative planning shall be deemed to comply with these Guidelines provided that the following criteria are met:

- Compliance with the text of these Guidelines
- Minimum floor areas as shown in the Schedule of Accommodation
- Clearances and accessibility around various objects shown or implied
- Inclusion of all mandatory items identified in the RDS

Standard Components have considered the required design parameters described in these Guidelines. Each FPU should be designed with compliance to Standard Components – Room Data Sheets and Room Layout Sheets, nominated in the Schedules of Accommodation in Appendices of this FPU.

### **Non-Standard Components**

Non-standard rooms are those rooms which have not yet been standardised within these guidelines. As such there are very few Non-Standard rooms. These are identified in the schedules of accommodation as NS.

#### **Cytotoxic Clean Room**

The Cytotoxic Clean Room provides workstations for pharmacists to prepare, assemble and label patient cytotoxic medications in a specialized environment. This room must comply with appropriate international standards. Easy and adequate access for pharmacists, having room surfaces and structures which minimize particle shedding, prevent the accumulation of particulate matter and facilitate effective cleaning, smooth and durable walls and recessed lights into the ceiling are the design requirements for clean room. Airlock must be provided between the cytotoxic suite and the external environment. Hand wash basin must be located at the vicinity of the entrance into the clean room. Chairs and stools for the clean room should be designed in such a way that they will not shed particles. Equipment used in the cytotoxic room must not be used elsewhere.

#### **Apheresis Room**

A Patient Bay used for the collection of blood components from patients. Bay will have close access to a staff handwashing basin.

## 8 Schedule of Equipment (SOE)

This Schedule of Equipment (SOE) below lists the major equipment required for the key rooms in this FPU.

Room Name		
<b>Patient Bay - Critical, Class P Isolation, Room Code (pbce-25-i)</b>		
Air flowmeter	Infusion pump: single channel	Monitor: physiologic, critical care
Bed: ICU, electric	Infusion pump: syringe	Oxygen flowmeter
Chair: recliner, electric	Light: procedure, single, ceiling mounted	Sequential compression device
Infusion pump: enteral feeding	Linen carrier: dirty, single	Suction adapter
Supply unit: ceiling	Mattress: powered, low air loss, pressure redistribution with turn assist	Ventilator: adult/ paediatric
Table: overbed	IV pole: mobile	
<b>Procedure Room, Room Code (proc-25-i)</b>		
Air flowmeter	Light: procedure, single, ceiling mounted	Refrigerator: drugs
Infusion pump: single channel	Monitor: physiologic, critical care	Stretcher: procedure/ recovery
IV pole: mobile	Oxygen flowmeter	Suction adapter
Table: mayo	Infusion pump: syringe	Linen carrier: dirty, single

## 9 Schedule of Accommodation (SOA)

The Schedule of Accommodation (SOA) identifies the rooms required in the Unit along with the quantity and the recommended room area. The sum of these room areas is the Sub Total and Total Departmental areas with a recommended circulation percentage. The circulation percentage represents the area required for internal corridors and is a target for efficient planning. SOAs and room sizes are developed for typical units and are organised into the functional zones applicable to the Unit. Not all rooms identified are mandatory requirements and optional rooms are indicated. Quantities of rooms may need to be proportionally adjusted to suit the desired unit size and service needs.

The Schedules of Accommodation are developed for particular levels of service known as Role Delineation Level (RDL) and numbered from 2 to 6 (including in-between numbers such as 4-5). Level 2 represents uncomplicated health facilities, ascending to level 6 representing complex specialist services and hospitals. Refer to the full Role Delineation Framework in these guidelines for a full description of the RDL's identified. RDL Levels not listed are not applicable for this service.

Part B: Health Facility Briefing & Design  
Bone Marrow Transplant Unit

Bone Marrow Unit

ROOM/ SPACE	Standard Component Room Codes	RDL 2/3 Qty x m <sup>2</sup>			RDL 4 Qty x m <sup>2</sup>			RDL 5 Qty x m <sup>2</sup> 12 Beds			RDL 6 Qty x m <sup>2</sup> 24 Beds			Remarks
<b>Entry / Reception</b>														
Reception/ Clerical	recl-10-i recl-12-i							1	x	12	1	x	12	
Waiting	wait-15-i wait-20-i wait-30-i							1	x	20	1	x	30	1.2 m <sup>2</sup> per person; 1.5 m <sup>2</sup> per wheelchair
Waiting - Family	wait-20-i wait-25-i wait-50-i							1	x	25	1	x	50	
Meeting Room	meet-12-i meet-l-15-i							1	x	15	1	x	15	
Toilet - Public	wcpu-3-i							2	x	3	2	x	3	May share public amenities if located close
Gowning Up	gwup-i							1	x	12	1	x	12	
Gowning down	gwdw-i							1	x	12	1	x	12	
<b>Patient Areas</b>														
1 BR Isolation Positive Pressure (Enclosed); Class P Isolation	pbce-28-i							12	x	28	24	x	28	Group of not more than 12, within observation of Staff Station. Similar to pbce-28-i but with frosted glass for privacy.
Procedure Room	proc-25-i							2	x	25	3	x	25	
Anteroom	anrm-i							12	x	6	24	x	6	For Class P Isolation Rooms
Ensuite - Super	ens-sp-i							12	x	6	24	x	6	Size for 'full assistance', i.e. 2 staff plus equipment
Consult/ Exam Room	cons-i							1	x	14	2	x	14	
<b>Chemotherapy Preparation Area (Optional)</b>														Required if not located elsewhere in the facility. Refer to Medical Oncology FPU for further requirements
Anteroom	anrm-i similar							1	x	8	1	x	8	For scrubbing and gowning
Cytotoxic Clean Room	NS							1	x	15	1	x	15	Negative Pressure. Comply with international clean room standards; comply to Part E – Engineering Services
Store – Sterile Stock	stss-12-i							1	x	12	1	x	12	
<b>Apheresis Collection Area (Optional)</b>														Required if not located elsewhere in the facility.
Apheresis	NS							1	x	10	1	x	10	
Post Donation Room	lnpt-10-i similar							1	x	10	1	x	10	
Collection Work Area	blcdw-i							1	x	12	1	x	12	
Refrigerator/ Freezer	strf-6-i							1	x	6	1	x	6	
Store General	stgn-6-i							1	x	6	1	x	6	



**Part B: Health Facility Briefing & Design**  
**Bone Marrow Transplant Unit**

ROOM/ SPACE	Standard Component Room Codes	RDL 2/3 Qty x m <sup>2</sup>			RDL 4 Qty x m <sup>2</sup>			RDL 5 Qty x m <sup>2</sup> 12 Beds			RDL 6 Qty x m <sup>2</sup> 24 Beds			Remarks
<b>Support Areas</b>														
Bay - Beverage	bbev-op-i bbev-enc-i							1	x	5	1	x	5	
Bay - Blanket Warmer	bbw-i							1	x	1	1	x	1	Optional
Bay - Handwashing, Type A	bhws-a-i							3	x	1	4	x	1	At entry to the Unit and in Corridors
Bay - Linen	blin-i							2	x	2	2	x	2	
Bay - Mobile Equipment	bmeq-4-i							2	x	4	2	x	4	
Bay - Pathology	bpath-i similar							1	x	4	1	x	4	
Bay - PPE	bppe-i							1	x	1.5	4	x	1.5	As required, may be combined with Bay-Handwashing
Bay- PTS (Pneumatic Tube System)	bpts-i							1	x	1	1	x	1	
Bay - Resuscitation Trolley	bres-i							1	x	1.5	1	x	1.5	
Cleaners Room	clrm-6-i							1	x	6	1	x	6	Smaller units may share with a collocated unit
Clean Utility/ Medication	clur-12-i clum-14-i							1	x	14	2	x	14	Medication room may be separate
Dirty Utility	dtur-10-i dtur-12-i dtur-14-i							1	x	14	2	x	14	
Disposal Room	disp-8-i disp-10-i							1	x	10	1	x	10	Inclusion depends on unit size & waste operational policies
Equipment Clean-up	ecl-8-i							1	x	8	1	x	8	Room size according to service requirements
Office - Clinical Workroom	off-clw-i similar							1	x	15	1	x	20	Locate near staff station
Office - Write-up Bay	off-wi-1-i							12	x	1	24	x	1	1 per each enclosed bedroom
Communications Room	comm-i							1	x	35	1	x	35	
Respiratory/ Biomedical Workroom	rewm-i similar							1	x	20	1	x	20	Inclusion depends on operational policy of unit
Staff Station	sstn-12-i sstn-18-i sstn-20-i							1	x	20	2	x	20	
Store - Drugs	stdr-5-i stdr-10-i							1	x	10	1	x	10	Optional
Store - Equipment	steq-10-i steq-15-i steq-30-i							1	x	15	1	x	30	May be subdivided
Store - General	stgn-12-i stgn-16-i stgn-30-i							1	x	16	1	x	30	
Store - Respiratory	steq-20-i										1	x	20	Inclusion depends on operational policy of unit
Store - Sterile Stock	stss-12-i similar stss-24-i							1	x	24	2	x	24	

**Part B: Health Facility Briefing & Design**  
**Bone Marrow Transplant Unit**

ROOM/ SPACE	Standard Component Room Codes	RDL 2/3 Qty x m <sup>2</sup>			RDL 4 Qty x m <sup>2</sup>			RDL 5 Qty x m <sup>2</sup> 12 Beds			RDL 6 Qty x m <sup>2</sup> 24 Beds			Remarks
<b>Staff Areas</b>														
Bay - Beverage	bbev-op-i bbev-enc-i							1	x	5	1	x	5	Optional, near Meeting Room/s
Change - Staff (Male/Female)	chst-10-i chst-20-i chst-25-i							2	x	20	2	x	25	Toilets, Shower and Lockers; size dependent on staffing numbers
Meeting Room	meet-l-15-i meet-l-25-i							1	x	25	2	x	25	Quantity and size dependent on Service Plan
Office - Single Person, 12 m <sup>2</sup>	off-s12-i							1	x	12	1	x	12	Note 1; Director/ Service Manager
Office - Single Person, 9 m <sup>2</sup>	off-s9-i							1	x	9	2	x	9	Note 1; Unit Manager
Office - Single Person, 9 m <sup>2</sup>	off-s9-i							1	x	9	2	x	9	Note 1; Staff Specialists
Office - 2 Person, Shared	off-2p-i							1	x	12	1	x	12	Note 1; Nurse Educators, Staff Specialists, Clinicians
Office - Workstation/s	off-ws-i							4	x	5.5	8	x	5.5	Note 1; Registrars, Nursing, Secretarial
Overnight Stay - Bedroom	ovbr-i							1	x	10	1	x	10	
Overnight Stay - Ensuite	oves-i							1	x	4	1	x	4	
Staff Room	sr-15-i sr-20-i sr-35-i							1	x	20	1	x	35	May be shared
Store - Files	stfs-10-i										1	x	10	Optional, depends on record storage operational policy
Store - Photocopy/ Stationery	stps-8-i stps-10-i							1	x	10	1	x	10	
<b>Sub Total</b>										<b>1151</b>			<b>1948.5</b>	
<b>Circulation %</b>										<b>40</b>			<b>40</b>	
<b>Area Total</b>										<b>1611.5</b>			<b>2728</b>	

Note 1: Offices to be provided according to the number of approved full time positions within the Unit

- 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 Operational 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 the number of endorsed full time positions within the Unit
- 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.

## **10 Further Reading**

Planning and design should consider the following developments in Cancer Care:

- Survival of Cancer continues to improve due to improved screening, diagnostic methods and treatment options leads to increased long-term care demands.
- Leukemia, Lymphoma, Germs Cell Tumours and early-stage solid tumour once incurable have become curable malignancies and there is an increasing trend towards combination therapies involving surgery, chemotherapy and radiotherapy.
- Targeted therapies, aimed at specific pathways blocking tumour cells leading to fewer side effects and complications.
- Research and Development into active chemotherapy combinations leading to new treatment options.
- Developing International trends for Cancer services to be concentrated in centres that treat high volumes of patients and offer a full range of Cancer services including surgery, oncology, radiotherapy, and specialised nursing and allied health services.
- Safe design and maintenance of bone marrow transplant units: a narrative review, *Clinical Microbiology and Infection*, April 01, 2022
- FACT-JACIE International Standards for Hematopoietic Cellular Therapy, Eighth Edition 8.1
- DOH Standard for Center of Excellent in Hematopoietic Stem Cell Transplantation (HSCT) Services for Adults and Pediatrics, November 2019