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DUBAI HEALTH AUTHORITY

DHA Health Facility Guidelines 2019

Part B – Health Facility Briefing & Design

340 – Oncology Unit - Radiation

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Executive Summary

This Functional Planning Unit (FPU) covers the requirements of a Radiation Oncology Unit. The purpose of the Radiation Oncology Unit is to provide facilities and equipment for radiotherapy treatment. Mainly used for the treatment of cancer, radiotherapy is often used in conjunction with other treatments, including chemotherapy and surgery. Radiation therapy, also referred to as radiation can be administered to patients externally and internally External beam radiation therapy is delivered through an external machine and lasts for approximately 15 minutes. Internal radiation therapy, also referred to as brachytherapy involves the insertion of radioactive sources to the patient's tumour site.

The management and administration of oncology treatment is complex and can have severely detrimental health benefits for patients including immunosuppression and infection. Design aspects the Unit will need to accommodate these factors accordingly as well as the fact that the Unit will cater to adult patients that may be of all ages, acuity and levels of disability.

More specialised units including Oncology Unit – Chemotherapy, Inpatient Unit, Medical Imaging Unit and Nuclear Medicine and PET Unit have separate FPU's which are also included in these Guidelines.

The typical unit Schedule of Accommodation is provided using Standard Components (typical room templates) and quantities for a Unit with 2 and 4 Bunkers at Role Delineation Levels (RDL) 4, 5 and 6.

Further reading material is suggested at the end of this FPU but none are mandatory.

Users who wish to propose minor deviations from these guidelines should use the **Non-Compliance Report** (**Appendix 4 in Part A**) to briefly describe and record their reasoning based on models of care and unique circumstances.

The details of this FPU follow overleaf.

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340. Oncology Unit - Radiation

1 Introduction

1.1 Description

The purpose of the Radiation Oncology Unit is to provide facilities and equipment for radiotherapy treatment. Mainly used for the treatment of cancer, radiotherapy is often used in conjunction with other treatments, including chemotherapy and surgery. The Radiation Oncology Unit contains spaces to support patient consultation, treatment simulation and planning, and the administration of treatment. The Radiation Oncology Unit may contain both external and internal radiotherapy (brachytherapy) treatment areas. Although not recommended, a Simulation Room may be omitted in small linear accelerator facilities where other positioning geometry is provided.

Room sizes and specifications for a Radiation Oncology Unit should accommodate the equipment manufacturer's recommendations, as space requirements may vary from one machine to another and one manufacturer to another.

2 Functional and Planning Considerations

2.1 Operational Models

2.1.1 Hours of Operation

The Radiation Oncology Unit will typically operate from 8am to 6pm daily, week days; however, extended hours of operation may occur according to the unit operational policy. 24-hour a day operation is allowed.

2.1.2 Models of Care

The preferred model of care for Radiation Oncology is where cancer services; such as oncology OPD, Chemotherapy and Cancer Surgery, are collocated and provided in a purpose-built facility. The

benefits of this model are improved communications between all members of the team, resulting in optimal clinical management, efficiency and best outcomes for patients. Separation of planning and therapy is not recommended.

30 to 50% of patients will have two modes of treatment at the same time; namely, both Radiotherapy and Chemotherapy. The same 30 to 50% applies to cancer surgery followed by Radiotherapy.

3 Unit Planning Models

3.1.1 Location

Generally, the Radiation Oncology Unit should ideally be located on ground level due to the weight of the equipment and shielding, for ease of installation/ replacement of specialised equipment. Howeverm depending on the circumstances, radiation oncology may be located on any level of the facility including the basement. The Unit should be located with ready access for outpatients, including people with disabilities, people arriving by patient transfer services and ambulances, and for inpatients in wheelchairs and on beds or trolleys. If the Unit is located in a free-standing building on a hospital campus, careful consideration must be given to covered links between the Unit and the main hospital particularly for inpatients on beds/ trolleys, the delivery of goods and supplies, and access to other departments such as Medical Imaging or Pathology.

Radiation Oncology facilities may be stand-alone or intefrated with hospitals or Day Surgery centres.

3.2 Functional Zones

The Radiation Oncology Unit may include the following Functional Zones:

- Entry/ Reception including:

  - Interview Room
  - Waiting areas with access to refreshments
  - Public amenities
  - Reception with storage for files and stationery
- Patient Consult Area:
  - Consult rooms
  - Interview room
  - Specimen collection and access to patient toilets
- Treatment Planning and Appliance areas:
  - Simulator rooms with Control and Equipment rooms
  - Mould Room; which includes a fitting room and a workshop
  - Patient holding bay for patients on a bed or trolley
  - Support rooms including Change cubicles, stores for consumables and equipment, patient toilets and sub-waiting areas
- Medical Physics:
  - Offices and workstations for Physicists
  - Physics laboratory and storage for technical equipment
- Radiation Therapy Treatment Areas:
  - Radiation bunkers with Control rooms
  - Change cubicles
  - Patient sub-waiting, locker area and access to toilets
  - Ready access to Interview rooms
- Support Areas including:
  - Bays for Handwashing/PPE, Linen, Resuscitation trolley, holding of mobile equipment and wheelchairs
  - Clean and Dirty Utilities with waste holding areas
  - Cleaners Room
  - Staff Station
  - Store rooms for equipment and consumables
- Administration / Office Areas:
  - Offices and workstations for key personnel according to the approved service plan

  - Meeting room
- Staff Areas:
  - Staff Room
  - Locker area
  - Toilets and Showers, gender separated

The Unit may incorporate the following Optional areas depending on the Service Plan:

- Brachytherapy Suite:
  - Brachytherapy bunker with Control room
  - Anaesthetic room
  - Operating/ Procedure room (optional)
  - Scrub up room
  - Patient Bays for holding and recovery with access to patient toilets
  - Patient Waiting area
  - Support areas including Bays for handwashing basins/PPE, Linen and resuscitation trolley
  - Radioactive seed and loading room
  - Store room for sterile stock and equipment
  - Shared utility rooms

3.2.1 Entry/ Reception

Sufficient parking should be made available for ambulances, staff and patients. Ideally, patients should be allocated parking closest to the department, and it is important to take into account the fact that, although there would be a limited number of patients being actively attended to in the Unit at any given point in time, patients nevertheless spend many hours inside the department when undergoing imaging or planning, consulting with doctors or receiving brachytherapy.

The Reception area will provide for administrative tasks, such as booking appointments and record keeping, as well as receiving and directing patients to the appropriate zone for consulting, treatment planning or radiotherapy treatment. The waiting area should accommodate a range of

patients and visitors with varied levels of ability and provide clear access to conveniently located public and patient amenities.

Waiting areas, where appropriate, may be designed with separation to meet cultural requirements. A child play area can be incorporated into the main waiting area. Facilities for volunteers and transport staff may also be provided in this area.

3.2.2 Patient Consult Areas

The Consult Area should include individual consultation rooms as well as accommodating multidisciplinary teams for patient consultation, follow-up and case review. Patients are generally assessed weekly by a Radiation Oncologist throughout the course of their treatment and will be referred to other specialists and allied health personnel as required including Dieticians, Physiotherapists, Occupational Therapists and Social Workers. Interview and conference rooms are required for patient and family education which may include computers for review of treatment programs.

The Consult Area should be located with easy access for outpatients without entering radiation treatment zones. The Consult Area should have access to blood collection rooms and patient toilets for specimen collection and the area may include Procedure rooms for minor procedures including endoscopic examinations, pleural taps and peritoneal drains.

It should be noted that according to best practice, it is recommended that 'on treatment visits' should occur at least once every week. This should be carried out in either a consultation or examination room.

3.2.3 Treatment Planning and Appliance Areas

Treatment planning requirements include:

- Treatment planning rooms with computer workstations which may include including planning

room for Brachytherapy where required by the service plan

- Simulator / MRI or PET CT suite. Note that the machines in the main Medical Imaging Unit may also be used to simulation
- Patient and visitor amenities (change cubicles, toilets, sub-waiting, patient holding, etc.)
- Offices and workstations for radiation therapists, trainees and students;
- Offices for data checking and transfer in a quiet and discreet area

The Appliance area allows for the selection of pre-made moulds and customisation as required. The mould room should have adequate storage space for moulds and equipment

3.2.4 Medical Physics/ Biomedical Engineering

Medical Physicists supervise the physical aspects of radiation treatment and radiation safety of staff, patients and visitors. They provide scientific support for all treatment machines, simulators, CT, MRI and PET imaging, computer planning systems, brachytherapy sources and equipment as well as dosimetry, quality assurance and radiation safety.

Biomedical Engineering services may be provided in-house or by external contractors. The service provides maintenance and service support to an extensive range of treatment and non-treatment equipment in Radiation Oncology. Biomedical engineers work closely with Medical Physicists to provide regular calibration and compliance checks of all treatment delivery and diagnostic machines.

Biomedical facilities may be central (serving the whole facility) or dedicated to the unit.

Facility requirements include:

- Offices and workstations for physicists, physics assistants and biomedical engineers
- Physics laboratory to manufacture equipment not available commercially for patient treatment such as installation of rigid attachments for patient hoists, calibration jigs for

physics, mask creation appliances

- Storage for Medical Physics equipment including bulky water tanks and phantoms
- Technical support (IT office and work area / equipment storage)
- Electronic / biomedical engineering workshop
- Dark room x-ray processor as required for machine commissioning and imaging of special procedures

3.2.5 Radiation Therapy Treatment Area

The radiation treatment zone includes:

- Bunkers with optional entry/ exit maze. Depending on the radiation assessment, shielding is required and should be approved by the Federal Authority for Nuclear Regulation (FANR)
- Control rooms
- Change cubicles and patient toilets immediately adjacent to radiation treatment areas.
- Sub-Waiting areas located conveniently to each bunker and access to Interview rooms
- Support areas including patient bays, utilities, staff station, preparation and storage areas

3.2.6 Support Areas

Support Areas include clean and dirty utilities, storage, disposal rooms, linen bays and handwashing facilities.

The following optional Support Areas may be required:

- Quality control area with illuminated X-ray viewing screens
- Dosimetry equipment area
- Optional; Hypothermia Room (may be combined with an Examination Room)

3.2.7 Administration / Offices

Offices should be provided for the clinical director of the unit, radiation oncologists, and radiation therapy managers, nursing managers, allied health professionals, cancer care co-ordinators and specialist nurses. In a stand-alone facility, additional offices/ workstations may be required for human resources, finance, legal services, public relations and information technology professionals. Quantities and configuration of offices is according to needs analysis.

Adequate access to meeting rooms should be provided to facilitate education, training and research activities within the Unit.

3.2.8 Staff Areas

Staff Areas will consist of:

- Staff Room
- Toilets and Lockers

Staff Areas may be shared with adjacent Units as far as possible.

3.2.9 Optional Areas

3.2.9.1 Brachytherapy Treatment Areas

The Brachytherapy treatment room is used for delivery of a radiation source through a tube or applicator, implanted during surgery and/or other procedures. The Brachytherapy room is similar to a radiation bunker and is equipped as an operating room with services to provide for anaesthesia. Support facilities include an anaesthetic induction room, scrub-up area, patient recovery bay, and sterile stock areas.

As an alternative, a separation procedure room or minor Operation Room may be provided adjacent to the Brachytherapy room for applicator placement before radiation in the Brachytherapy room.

Patient recovery may be in separate bays or within the Brachytherapy room based on the operational model.

3.2.9.2 Medical Imaging

Computed tomography (CT), magnetic resonance imaging (MRI), ultrasound (US), positron emission tomography (PET) and general x-ray imaging may be used for the visualization of bone or soft-tissues during planning and review of radiotherapy treatment.

If a facility is a distinct entity or does not have an efficient functional relationship with a medical imaging department it may need to accommodate medical imaging facilities.

CT and MRI are the most commonly used imaging facilities for treatment planning. However, there are certain conditions under which ultrasound and PET may be used. The types of imaging facilities required will be determined by the service plan.

4 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. Oncology Units, due to its makeup of several components and the need for patients to utilise more than one service per visit efficient functional relationships in the Unit is imperative.

The Radiation Oncology Unit should be located with ready access for ambulant outpatients as well as inpatients arriving by wheelchairs and beds. The Unit may be co-located with Medical Imaging Units, Chemotherapy Units and related Inpatient Units to increase efficiency. If intra-operative therapy is proposed, the Radiation Oncology Unit should be located close to the Operating Unit or with a direct link.

A ground level location is preferred due to the weight of the equipment and shielding requirements, and for ease of installation and replacement. There will also be a restriction on the type of departments located above the Radiation Oncology bunkers.

4.1 External Relationships

Principal relationships with other Units include ready access to:

- Diagnostic facilities such as Medical Imaging
- Emergency and Critical Care Units
- Clinical Laboratories
- Pharmacy
- Outpatient Rehabilitation and Complementary Medicine facilities
- Material Management and Housekeeping
- Operating/ Day Procedures Units
- Public amenities and cafeteria
- Parking

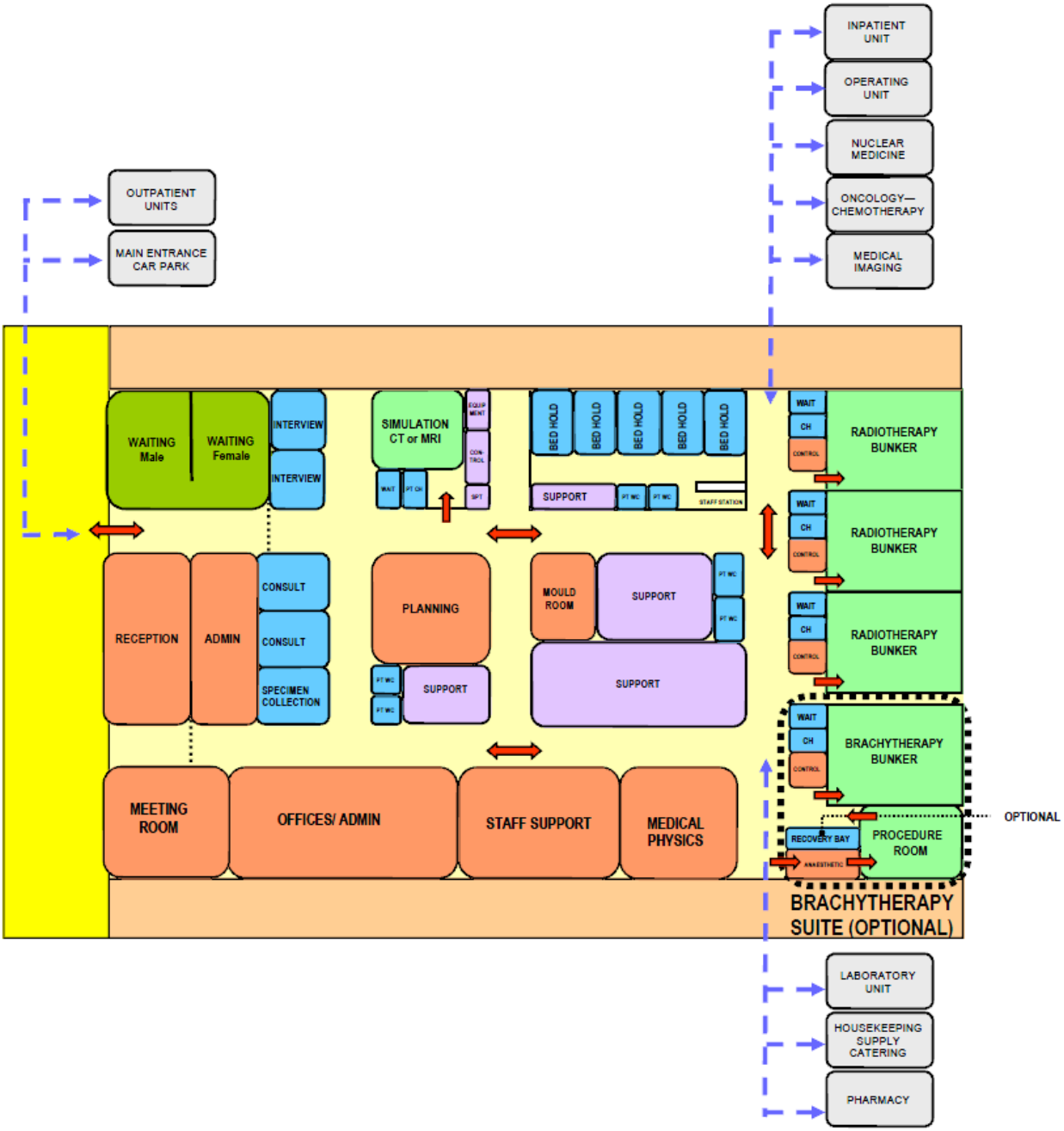
4.2 Internal Relationships

Optimum internal relationships include:

- The Staff Station and associated areas need direct access and observation to patient holding areas
- Utility and storage areas need ready access to both patient and staff work area

4.3 Functional Relationship Diagram

The Functional Relationship of a typical Radiation Oncology Unit either as a stand-alone unit or integrated with a hospital or other healthcare facility from RDL 2 to 6. This is demonstrated in the diagram below.



External relationships outlined in the diagram include:

- Clear staff, goods and service entrance:
  - Access to/from Housekeeping, Supply and Catering Units via service corridor.
  - Access to Offices and staff areas via service corridor
  - Access to/ from key clinical units associated with patient arrivals and transfers via a service corridor
  - Entry for staff via the public or service corridor
- Separate public entrance
  - Access to/ from key public areas, such as the main entrance, Outpatients Units and parking from the public corridor
  - Entry for ambulant patients and visitors directly from public corridor
  - Access to/ from related treatment facilities via a public corridor

Optimum internal relationships outlined in the diagram include:

- Reception located with control of access for public and patients
- Waiting area at the Unit entry and sub-waiting within the Unit for patients
- Patient flow from Reception, to Consult, to Simulation and Planning then Radiotherapy Treatment areas
- Convenient access to Mould Fitting and Workshop from Planning areas
- Access to Medical Imaging from Consult, Planning and Radiotherapy Treatment stages
- Shared patient holding for both Simulation and Treatment stages
- Staff Station located with direct observation of patient bed holding
- Support areas decentralised, located close to treatment areas for staff convenience

- Staff Offices and Support areas located on a perimeter in a staff accessible zone

5 Design Considerations

5.1 Construction Standards

The flooring for a Radiation Oncology Unit shall be adequate to meet the load requirements for equipment, patients and personnel. Provision for cable ducts or conduits should be made in the floors and ceilings as required. Ceiling mounted equipment should have properly designed rigid support structures located above the finished ceiling. The minimum recommended ceiling height is 3 metres. A lay-in type of ceiling should be considered for ease of installation and service.

The linear accelerator installation may require an opening in a wall and co-ordination of the entry door size to also allow for future servicing of the equipment.

5.2 Patient Treatment Areas

Radiation Oncology Units should be designed to avoid exposing patients, staff and visitors to risks such as injury or radiation hazard.

5.3 Environmental Considerations

5.3.1 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 discussions 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
- Traffic through the unit e.g. visitors, food, linen or other trolleys

Solutions to be considered include:

- Location of the unit away from noisy hospital 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

5.3.2 Natural Light/ Lighting

Natural light and views are desirable but not required from the Unit for the benefit of staff and patients. Every effort should be made to provide a view to all treatment areas either by locating treatment bays/ cubicles/ bedrooms adjacent to a window or by locating chairs and beds to have an external view from each patient space.

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

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

5.3.3 Privacy

The design of the Unit needs to consider the contradictory requirement for staff visibility of patients while maintaining patient privacy. Unit design and location of staff stations should offer varying degrees of visibility and privacy.

Each Treatment Bay shall be provided with privacy screens to ensure privacy of patients undergoing treatment in both private and shared patient areas. Refer to the Standard Components for examples.

Confidentiality for patients receiving treatment is a highly important consideration to be addressed. The Unit should be designed to:

- Ensure confidentiality of personal discussions and medical records
- Provide an adequate number of rooms for discreet discussions and treatments to occur whenever required
- Enable sufficient space within each Treatment Bay to permit curtains to be easily drawn whenever required

5.4 Accessibility

Design should provide ease of access for wheelchair bound patients in all patient areas including Reception desk, Consult, Interview, Mould fittings rooms and Radiation Treatment bunkers. Waiting areas should include spaces for wheelchairs and suitable seating for patients with disabilities or mobility aids.

5.5 Doors

All entry points, doors or openings requiring bed/trolley access including Radiation Therapy and Procedure Rooms are recommended to be a minimum of 1400mm wide, unobstructed. Larger openings may be required for special equipment, as determined by the Operational Policy, to allow the manoeuvring of equipment without manual handling risks and risk of damage.

Within workshop and appliance room areas, the number of doors should be kept to a minimum to facilitate the movement of equipment; double doors should be provided to all workshop areas.

Also refer to **Part C – Access, Mobility, OH&S** of these Guidelines.

5.6 Ergonomics/ OH&S

Heights and depths of benches and workstations in the radiation treatment area need to allow staff to efficiently work from standing and seated positions.

Refer to **Part C – Access, Mobility, OH&S** of these Guidelines for more information.

5.7 Size of the Unit

The size of the Radiation Oncology Unit will be determined by the Clinical Services Plan establishing the intended services scope and complexity. In a satellite facility, where cancer services are collocated, two Radiotherapy Treatment rooms (bunkers) is the minimum viable number.

Schedules of Accommodation have been provided for typical units with 2 and 4 Radiotherapy Bunkers.

5.8 Safety and Security

A high standard of safety and security can be achieved by careful configuration of spaces and zones to include:

- Controlled access/ egress to and from the unit
- Optimal visual observation for staff to access points and patient/ visitor areas
- Use of CCTV to entry and communication systems to enable contact after normal work hours
- Colocation of similar functions for ease of staff management

Access to public areas shall be considered with care so that the safety and security of staff areas within the Unit are not compromised.

Refer to the Federal Authority for Nuclear Regualtion (FANR) for Radiation Shielding requirements and Radiation Monitoring systems.

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

5.9 Finishes

Internal finishes including floor, walls, joinery, and ceilings should be suitable for the function of the unit while promoting a pleasant environment for patients, family, carers, visitors and staff.

The following factors shall be considered:

- Aesthetic appearance
- Acoustic properties
- Durability
- Ease of cleaning and compliant with infection control standards
- Suitable floor finishes with respect to slip resistance and movement of equipment.

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

5.10 Fixtures, Fittings & Equipment

Equipment such as the linear accelerator and control equipment must be installed to the manufacturer's specifications and recommendations, in particular:

- Space requirements may vary according to equipment selection
- Doors will need to be sized to allow passage of equipment
- Structural assessment will be required for equipment weight loads
- Adequate space will be required for maintenance of major equipment ensuring adequate access to cabinets and control units.

Equipment, furniture, fittings and the facility itself shall be designed and constructed to be safe, robust and meet the needs of a range of users. All furniture, fittings and equipment selections for

the Unit should be made with consideration to ergonomic and Occupational Health and Safety (OH& S) aspects.

Refer to **Part C – Access, Mobility, OH&S** of these Guidelines, the **Room Layout Sheets (RLS)** and **Room Data Sheets (RDS)** for more information.

5.11 Curtains / Blinds

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

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

- Vertical blinds and Holland blinds are preferred over horizontal blinds as they do not provide numerous surfaces for collecting dust.
- Horizontal blinds may be used within a double-glazed window assembly with a knob control on the bedroom side.

Privacy bed screens must be washable, fireproof and cleanly maintained at all times. Disposable bed screens may also be considered.

5.12 Building Service Requirements

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.

5.12.1 Information and Communication Technology

Communications and information systems installed in the unit may include:

- Voice / data outlets and wireless networks

- Telephone and video conferencing capacity for meeting rooms
- PACS imaging system, electronic records and radiotherapy information management systems
- CCTV for patient viewing, treatment delivery computers and intercoms to allow the radiation therapist to monitor and communicate with the patient from the control area during treatment

5.12.2 Staff Call/ Duress Alarm

Patient and Emergency Call facilities shall be provided in all patient areas (e.g. Consult Room/s, Holding/ Recovery bays, Change Cubicles and Toilets) in order for patients and staff to request for urgent assistance.

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

5.12.3 Heating, Ventilation and Air conditioning (HVAC)

The Unit should be air conditioned with adjustable temperature and humidity for patient comfort. Air conditioning systems should be designed with consideration to provision of appropriate air exchanges and exhaust. General air conditioning outlets should not be placed directly over patients on chairs, beds or trolleys.

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

Air conditioning systems should be designed with consideration to the following:

- Appropriate air exchanges and exhaust for chemicals and dust in the appliance workshop

- Sufficient cooling for heat generating equipment in radiotherapy treatment and computer equipment rooms.
- Smoke detectors in radiation treatment and simulator rooms must be of the type not sensitive to radiation (i.e. photoelectric) and require special consideration.

5.12.4 Medical Gases

The Unit will require:

- Oxygen and suction in all patient bays and procedure rooms, including bunkers
- Provision of medical air to patient recovery bays is optional as long as oxygen is provided

Full anaesthetic capability is required within the Brachytherapy Room or adjacent Procedure Room, including systems for the delivery of nitrous oxide and the 'scavenging' of gases that have been exhaled by the patient that should not be breathed in by any medical personnel.

Refer to Part E of these guidelines and to the Standard Components, RDS and RLS.

5.12.5 Radiation Shielding and Radiation Safety

Radiation Shielding and Safety will be subject to apprival by the FANR. Linear accelerator bunkers require radiation protection that may include lead shielding and concrete walls, floors and ceilings to specified thicknesses. Design of the bunker rooms may incorporate a maze entry to assist with radiation protection; a neutron door may also be required depending on the type of linear accelerator used.

It should be noted that the Dubai Hospital Radiation Safety committee needs to approve the radiation safety.

If there are any accessible spaces below the bunker, the floor also needs to be shielded; however, the provision of facilities below the bunkers is not recommended.

The radiation protection needs of the Unit shall be assessed by a certified physicist or appropriate agency. This assessment is to specify the type, location, and amount of protection to be installed in accordance with final approved department layout and equipment selection. The radiation protection requirements shall be incorporated into the final plans and specifications. Early consultation with the manufacturers of radiotherapy equipment is recommended.

The lifespan of the facility and the need to upgrade technology should be considered when specifying the radiation shielding required. It is likely that the machines will be upgraded, and newer machines may or may not emit stronger radiation. Therefore, it is sensible to allow for the highest energy machine and widest beam that is likely to be used in the future.

Radiation safety monitoring devices such as radiation area monitors should be utilised in rooms with radiation safety. FANR shall be responsible for the verification of the radiation shielding.

5.12.6 Hydraulics

Warm water shall be supplied to all areas accessed by patients within the Unit. This requirement includes all staff handwash basins and sinks located within patient accessible areas. Sinks in staff areas shall be provided with hot and cold water services.

For cold, warm & hot water technical details, refer to **Part E – Engineering Services** in these Guidelines.

5.13 Infection Control

Infectious and immune-suppressed patients may be sharing the same treatment space at the different times of the same day. 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.

5.13.1 Hand Basins

Hand washing facilities for staff within the Unit will be required in all patient treatment areas including bed bays for holding and recovery, Consult Rooms, Procedure Rooms and Radiation Therapy Bunkers, Imaging rooms, and located conveniently to Simulator Rooms and Staff Stations. Where a hand wash basin is provided, there shall also be liquid soap and disposable paper towels provided and PPE equipment.

Hand hygiene is important, and it is recommended that in addition to hand basins, medicated hand gel dispensers be located strategically in staff circulation corridors.

For further information refer to **Part D – Infection Control** in these Guidelines.

5.13.2 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 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.

6 Standard Components of the Unit

Standard Components are typical rooms within a health facility, each represented by a Room Data Sheet (RDS) and a Room Layout Sheet (RLS).

The Room Data Sheets are written descriptions representing the minimum briefing requirements of each room type, described under various 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

The Health Centre consists of Standard Components to comply with details described in these Guidelines. Refer to Standard Components Room Data Sheets (RDS) and Room Layout Sheets (RLS) separately provided.

7 Schedule of Accommodation

The Schedule of Accommodation (SOA) provided below represents generic requirements for this Unit. It identifies the rooms required along with the room quantities and the recommended room areas. The sum of theroom areas is shown as the Sub Total as the Net Area. The Total area is the Sub Total plus the circulation percentage. The circulation percentage represents the minimum recommended target area for corridors within the Unit in an efficient and appropriate design.

Within the SOA, room sizes are indicated for typical units and are organised into the functional zones. Not all rooms identified are mandatory therefore, optional rooms are indicated in the Remarks. These guidelines do not dictate the size of the facilities, therefore, the SOA provided represents a limited sample based on assumed unit sizes. The actual size of the facilities is determined by Service Planning or Feasibility Studies. Quantities of rooms need to be proportionally adjusted to suit the desired unit size and service needs.

The Schedule of Accommodation are developed for particular levels of services known as Role Delineation Level (RDL) and numbered from 1 to 6. Refer to the full **Role Delineation Framwork** (**Part A - Appendix 6**) in these gduielines for a full description of RDL's.

The table below shows the SOA for a typical Oncology – Radiation Unit at RDL levels 2 to 6 with 2 bunkers and 4 bunkers respectively.

For stand-alone facilities, designers may add any other FPU's required such as Main Entrance Unit, Medical Imaging Unit etc. based on the business model.

Any proposed deviations from the mandatory requirements, justified by innovative and alternative operational models may be proposed and record in the **Non-Compliance Report** (refer to **Part A - Appendix 4**) with any departure from the Guidelines for consideration by the DHA for approval.

7.1 Oncology Unit – Radiation (with 2 & 4 bunkers)

ROOM/ SPACE	Standard Component Room Codes						RDL 2-6 Qty x m^2			RDL 2-6 Qty x m^2			Remarks
Entry/ Reception							**2 Bunkers**			**4 Bunkers**			
Airlock	airl-6-d airle-10-d						1	x	6	1	x	10	For standalone facilities or units with direct access from outside
Bay - Beverage, Open Plan	bbev-op-d						1	x	5	1	x	5	Optional. May share with a collocated unit
Bay - Mobile Equipment	bmeq-4-d similar						1	x	4	1	x	10	Optional. May share with a collocated unit
Bay - Vending Machines	bvm-3-d similar						1	x	3	1	x	5	Optional. May share with a collocated unit
Reception/ Clerical	recl-10-d recl-15-d similar						1	x	10	1	x	20	
Store - Files	stfs-10-d similar						1	x	8	1	x	10	
Store - Photocopy/ Stationery	stps-8-d						1	x	8	1	x	8	
Toilet - Public	wcpu-3-d						2	x	3	2	x	3	Separate Male/ Female. May be shared
Toilet - Accessible	wcac-d						1	x	6	1	x	6	May be shared
Waiting	wait-20-d wait-30-d						1	x	20	1	x	30	Gender segregated; 1.2m^2 per chair, 1.5m^2 for wheelchairs.
Consult Area													
Consult/ Exam Room	cons-d						2	x	13	4	x	13	Quantity according to service plan
Interview Room - Family/ Large	intf-d						1	x	12	1	x	12	For up to 8 persons
Procedure Room	proc-20-d						1	x	20	1	x	20	
Specimen Collection Bay	specc-d						1	x	9	1	x	9	As required
Toilet - Accessible							shared			shared			Access to patient toilets
Waiting							shared			shared			Shared with Entry/Reception
Treatment Planning, Appliance Areas													
Bay - Resuscitation Trolley	bres-d						1	x	1.5	1	x	1.5	
Change Cubicle - Accessible	chpt-d-d						1	x	4	2	x	4	1 per simulation room

ROOM/ SPACE	Standard Component Room Codes							RDL 2-6 Qty x m^2			RDL 2-6 Qty x m^2			Remarks
Clean-up Room	clup-7-d							1	x	7	1	x	7	Mould fitting/workshop clean up
Computer Equipment Room	coeq-d							1	x	8	1	x	8	To simulator room. Size and requirements as per manufacturers specifications
Mould Room – Fitting	mld-ft-d similar							1	x	10	1	x	15	
Mould Room –Workshop	mld-ws-d							1	x	20	1	x	20	Noise reduction required
Radiotherapy Simulator Room	rad-sim-d							1	x	40	2	x	40	Sized to suit equipment
Radiotherapy Simulator Control Room	rad-bctr-d							1	x	15	1	x	15	1 control room can be shared between 2 simulation rooms
Radiotherapy Treatment Planning	rad-trp-d similar							1	x	35	1	x	55	Workstations for 6 & 10 staff respectively
Patient Bay – Holding	pbtr-h-10-d							1	x	10	2	x	10	1 per simulation room
Store – Equipment	steq-20-d similar							1	x	20	1	x	30	
Store – General	stgn-8-d similar stgn-14-d similar							1	x	9	1	x	12	Patient mould storage during treatment program
Toilet - Accessible	wcac-d							1	x	6	1	x	6	
Waiting – Sub	wait-10-d similar							1	x	5	1	x	5	May be shared between 2 simulation rooms
Medical Physics														
Office - Single Person	off-s12-d							1	x	12	1	x	12	Chief Physicist.
Office - Workstation	off-ws-d							1	x	5.5	2	x	5.5	Physicists. Quantity as per service plan
Office - Workstation	off-ws-d							1	x	5.5	1	x	5.5	Biomedical Engineer
Physics Laboratory	phlab-d similar							1	x	24	1	x	40	Required for larger facilities, Optional for smaller facilities
Store - Equipment	steq-10-d steq-20-d							1	x	10	1	x	20	Physics equipment
Workshop - Biomedical	ws-bm-d similar							1	x	40	1	x	50	Can be centrally located and shared
Radiation Therapy Treatment Areas														
Change Cubicle - Accessible	chpt-d-d							2	x	4	4	x	4	1 per bunker
Clean up Room	clup-7-d similar							1	x	15	2	x	15	1 per 2 bunkers
Interview Room – Family / Large	intf-d							2	x	12	2	x	12	Optional. May be shared
Patient Bay – Holding / Recovery	pbtr-h-10-d							2	x	10	4	x	10	1 per bunker.
Property Bay	prop-3-d similar							1	x	2	2	x	2	Optional; Patient property. 1 per 2 bunkers

ROOM/ SPACE	Standard Component Room Codes							RDL 2-6 Qty x m^2			RDL 2-6 Qty x m^2			Remarks
Radiotherapy Bunker Room	rad-bunk-d							2	x	128	4	x	128	See Note 1. Size and requirements as per manufacturers specifications. This size is regarded as optimum for a generic bunker for the maximum flexibility for equipment selection
Radiotherapy Bunker Control Room	rad-bctr-d							2	x	15	4	x	15	Size and requirements as per manufacturers specifications
Toilet - Patient	wcpt-d							2	x	4	2	x	4	Separate male / female
Waiting - Sub	wait-10-d similar							2	x	5	4	x	5	1 per bunker
Support Areas														
Bay - Handwashing, PPE, Type B	bhws-ppe-d							1	x	1.5	2	x	1.5	To patient holding bays
Bay - Linen	blin-d							1	x	2	2	x	2	1 per 2 bunkers
Bay - Mobile Equipment	bmeq-4-d							1	x	4	2	x	4	1 per 2 bunkers, mobile equipment & wheelchairs
Bay - Resuscitation Trolley	bres-d							1	x	1.5	2	x	1.5	1 per 2 bunkers
Clean Utility/ Medication	clum-14-d similar							1	x	12	1	x	14	
Cleaner's Room	clrm-6-d							1	x	6	1	x	6	
Dirty Utility	dtur-12-d dtum-14-d							1	x	12	1	x	14	
Disposal Room	disp-8-d							1	x	8	1	x	8	
Staff Station	sstn-5-d sstn-14-d similar							1	x	5	1	x	10	
Store - Equipment	steq-10-d steq-14-d							1	x	10	1	x	14	
Administration / Offices														**Note 2**
Office - Single Person	off-s12-d							1	x	12	1	x	12	Clinical Director
Office - Single Person	off-s12-d							1	x	9	1	x	12	Radiation Oncologist.
Office - Single Person	off-s12-d							1	x	9	1	x	12	Manager - Radiation Therapy.
Office - Single Person	off-s9-d							1	x	9	2	x	9	Radiation Therapist - Head of Planning
Office - Single Person	off-s9-d							1	x	9	1	x	9	Radiation Therapist - Head of
Office - Single Person	off-s9-d							2	x	9	4	x	9	Educator, Teaching Fellow, Quality Assurance manager, IT manager, etc.
Office - Single Person	off-s9-d							1	x	9	1	x	9	Nurse Manager. Located close to patient areas

ROOM/ SPACE	Standard Component Room Codes							RDL 2-6 Qty x m²			RDL 2-6 Qty x m²			Remarks
Office - 2 Person Shared	off-2p-d							1	x	12	1	x	12	Clinical trials monitor, nurse coordinator.
Office - 2 Person Shared	off-2p-d							1	x	12	1	x	12	Biostatistician, data manager
Office - 3 Person Shared	off-3p-d							1	x	16	1	x	16	Allied health
Office - Workstation	off-ws-d							1	x	5.5	1	x	5.5	Nurse coordinator
Office - Workstation	off-ws-d							2	x	5.5	4	x	5.5	Cancer care coordinators, specialist cancer nurses and palliative care nurses.
Office - Workstation	off-ws-d							2	x	5.5	4	x	5.5	Administration staff
Office - Write up (Shared)	off-wis-d							1	x	12	2	x	12	Clinical reviews. Located close to patient areas.
Meeting Room - Medium / Large	meet-l-15-d meet-l-30-d similar							1	x	15	1	x	20	
Staff Areas														
Property Bay - Staff	prop-3-d similar							1	x	3	1	x	6	
Staff Room	srm-25-d similar							1	x	20	1	x	30	
Shower - Staff	shst-d							2	x	3	4	x	3	Separate Male / Female
Toilet - Staff	wcst-d							2	x	3	4	x	3	Separate Male / Female
Sub Total										**1069**			**1722.5**	
Circulation %										**40**			**40**	
Area Total										**1469.6**			**2411.5**	

Note 1: Spatial allocation for one Linear Accelerator Bunker includes maze and radiation shielding wall. Bunker size depends on equipment selected and radiation shielding recommendation from radiation safety specialist

Note 2: Offices to be provided according to the number of approved full-time positions within the Unit

7.2 Brachytherapy Suite (Optional)

ROOM/ SPACE	Standard Component Room Codes													RDL 5/6 Qty x m²			Remarks
Brachytherapy Suite																	
Anaesthetic Induction Room	anin-d													1	x	15	

ROOM/ SPACE	Standard Component Room Codes												RDL 5/6 Qty x m^2			Remarks
Brachytherapy Bunker	rad-bunk-d similar												1	x	66	Size and requirements as per manufacturers specifications
Brachytherapy Bunker Control Room	rad-bctr-d similar												1	x	12	Size and requirements as per manufacturers specifications
Change Cubicle – Accessible	chpt-d-d												1	x	4	
Clean up Room	clup-7-d similar												1	x	10	
Procedure Room	proc-20-d												1	x	20	Optional. Provide if Brachytherapy Bunker is not equipped for surgical procedures
Patient Bay – Holding/ Recovery	pbtr-h-10-d												2	x	10	
Scrub up / Gowning	scrb-6-d												1	x	6	
Store / Prep - Seed and Loading	stgn-8-d similar												1	x	9	Radiation shielding as per specialist advice
Toilet – Accessible, Patient	wcac-d												1	x	6	
Waiting - Sub	wait-10-d similar												2	x	5	Separate Male/ Female
Brachytherapy Support																
Bay - Handwashing, PPE, Type B	bhws-ppe-d												1	x	1.5	Patient holding bay, combined with PPE storage
Bay - Linen	blin-d												1	x	2	
Bay - Resuscitation Trolley	bres-d												1	x	1.5	
Bay - Recovery	pbtr-rs1-12-d similar												1	x	10	Optional
Clean Utility	clur-8-d												shared			Shared with main treatment/planning support
Cleaner's Room	clrm-6-d												shared			Shared with main treatment/planning support
Dirty Utility	dtur-s-d												shared			Shared with main treatment/planning support
Disposal Room	disp-8-d												shared			Shared with main treatment/planning support
Property Bay	prop-3-d similar												1	x	2	Optional, Patient property
Store - Equipment	steq-16-d similar												1	x	15	Sterile stock and consumables
Sub Total															**210**	
Circulation %															**40**	
Area Total															**294**	

7.3 Proton Beam Therapy (Optional)

The following SOA is provided based on a single proton therapy bunker.

ROOM/ SPACE	Standard Component Room Codes												RDL 5/6 Qty x m^2			Remarks
Reception/ Patient Intake													**1 bunker**			
Airlock - Entry	airle-10-d												1	x	10	Optional; if separate entrance from the rest of Unit
Waiting	wait-30-d												1	x	30	Gender segregated; 1.2m^2 per chair, 1.5m^2 for wheelchairs.
Reception	recl-10-d similar												1	x	8	
Consult/ Exam Room	cons-d												2	x	13	
Change - Patient	chpt-2-d similar												2	x	4	Separate Male/ Female; include lockers
Bay - Beverage	bbev-op-d												1	x	5	May be shared.
Toilet - Public (Accessible)	wcac-d												2	x	6	May be shared.
Bay - Wheelchair	Bwc-d												1	x	4	Optional; if separate entrance from the rest of Unit
Treatment Planning																
Change - Patient (Accessible)	chpt-d-d similar												2	x	5	Enclosed room
Toilet - Patient (Accessible)	wcac-d												2	x	6	
MRI Simulator	mri-42-d												1	x	42	Optional; depending on service plan
MRI Control Room	NS												1	x	6	If MRI Simulator is provided
MRI Equipment Room	coeq-d												1	x	8	If MRI Simulator is provided; size to Manufacturer's requirement
CT Simulator	Ctpr-d												1	x	45	Optional; depending on service plan
CT Control Room	ctcr-d similar												1	x	6	If CT Simulator is provided
CT Equipment Room	coeq-d												1	x	8	If CT Simulator is provided; size to Manufacturer's requirement
Treatment Planning Room													1	x	40	
Bay - Handwashing, Type B	bhws-b-d												1	x	1	At patient holding bay

ROOM/ SPACE	Standard Component Room Codes												RDL 5/6 Qty x m^2			Remarks
Proton Therapy Treatment Areas																
Change - Patient	chpt-d												1	x	3	1 per bunker
Change - Patient (Accessible)	chpt-d-d												1	x	6	1 per bunker
Proton Therapy Bunker	NS												1	x	280	Size of bunker determined by equipment size
Proton Therapy Bunker Control Room	NS												1	x	15	Size and Requirements as per manufacturers specifications
Store	stgn-8-d similar												1	x	4	1 per bunker; for patient positioning devices
Cyclotron	NS															Room size depending on cyclotron size
Toilet - Patient (Accessible)	wcac-d												2	x	6	Separate for M/F
Patient Bay - Holding	Pbtr-h-10-d												1	x	10	1 per bunker
Mould Room - Fitting	Mld-ft-d												1	x	10	
Store - Moulds	stgn-8-d												1	x	8	Adjacent to the Mould Room - Fitting
Bay - Handwashing, Type B	bhws-b-d												1	x	1	At patient holding bay
Staff Station	sstn-5-d												1	x	5	
Support Areas																
Bay - Beverage	bbev-op-d												1	x	5	
Bay - Handwashing, PPE, Type B	bhws-ppe-d												1	x	1.5	Patient holding bay, combined with PPE storage
Bay - Linen	blin-d												1	x	2	
Bay - Blanket Warmer	bbw-1-d												1	x	1	
Bay - Resuscitation Trolley	bres-d												1	x	1.5	
Cleaner's Room	clrm-6-d												1	x	6	
Dirty Utility	Dtur-s-d												1	x	8	
Store - Equipment	steq-14-d similar												1	x	14	
Workroom - Proton Beam Therapy	NS												1	x	40	
Administration/ Staff Areas																
Office - Proton Beam Specialist	off-s9-d												1	x	9	
Office - Radiophysicists	off-s9-d												1	x	9	Radiophysicists & Medical Staff
Office - Physician	off-s9-d												1	x	9	

ROOM/ SPACE	Standard Component Room Codes												RDL 5/6 Qty x m^2			Remarks
Office - Operations & Maintenance	off-2p-d												1	x	12	
Meeting Room	meet-l-30-d												1	x	30	Size may vary according to operational policy
Store - Equipment (Parts & Maintenance)	steq-14-d												1	x	14	
Toilet - Staff	wcst-d												2	x	3	Separate Male/ Female
Property Bay - Staff	Prop-3-d												1	x	3	
Sub Total																
Circulation %															**40**	
Area Total																

Please note the following:

- Areas noted in Schedules of Accommodation take precedence over all other areas noted in the Standard Components
- Rooms indicated in the schedule reflect the typical arrangement according to RDL and by KPU
- All the areas shown in the SOA follow the No-Gap system described elsewhere in these Guidelines
- Exact requirements for room quantities and sizes shall reflect Key Planning Units (KPU) identified in the Clinical 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
- Offices are to be provided according to the number of approved full-time positions within the Unit

8 Further Reading

In addition to Sections referenced in this FPU, i.e. **Part C- Access, Mobility, OH&S** and **Part D - Infection Control** and **Part E - Engineering Services**, readers may find the following helpful:

- American Institute of Architects, The Facility Guidelines Institute, Guidelines for Design and Construction of Hospitals and Outpatient Facilities; Available from: http://www.fgiguidelines.org/
- Federal Authority for Nuclear Regulation (FANR): https://fanr.gov.ae/en/operations/radiation-safety
- Gov.UK Health Building Note 02-01: Cancer Treatment Facilities (2013) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/147860/HBN_02-01_Final.pdf
- International Health Facility Guideline (iHFG) www.healthdesign.com.au/ihfg
- International Atomic Energy Agency (IAEA) Radiotherapy Facilities: Master planning & Concept Design Consideration (2014) http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1645web-46536742.pdf
- The Kings Fund; 'Future Trends and Challenges for Cancer Services in England, a Review of Literature & Policy' https://www.kingsfund.org.uk/publications/future-trends-and-challenges-cancer-services-england
- The Royal Australian and New Zealand College of Radiologists http://www.ranzcr.edu.au/