

# **Part B – Health Facility Briefing & Design**

## **55 Coronary Care Unit**



iHFG

# **International Health Facility Guidelines**

Version 4 May 2014

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## 55 Coronary Care Unit

### 1 Introduction

#### *Description*

A Coronary Care Unit (CCU) is a specially staffed and equipped section of a healthcare facility for the support, monitoring and treatment of highly dependent patients with medical or surgical cardiac conditions which are life threatening or potentially life-threatening.

Patients in CCU will include adults of all ages, acuity, frailty and all levels of disability. CCU is also increasingly dealing with patients with co-morbidities such as obesity, diabetes and renal dysfunctions. Most patients will be fully aware of their surroundings but may be agitated, restless and distressed but others may have decreased level of consciousness.

### 2 Planning

#### *Operational Models*

The CCU will provide services 24 hours a day, seven days a week.

The level of Coronary Care available should support the delineated role of the particular hospital. The role of a particular CCU will vary, depending on staffing, facilities and support services as well as the type and number of patients it has to manage.

There are a number of operational models applicable to Coronary Care units including:

#### **Secondary Operational Model of Care**

In smaller healthcare facilities, the CCU may be combined with other critical care units such as HDU and ICU for purposes of optimally utilising staff skills and equipment.

All secondary units will provide:

- invasive and non-invasive monitoring
- resuscitation and stabilisation of emergencies until transfer or retrieval to a higher level facility can be arranged
- telemetry for patients who do not require transfer / retrieval to a higher level facility
- inpatient and outpatient counselling, information, education, prevention, rehabilitation services and programmes
- access to a range of cardiac investigations including low risk cardiac catheterisation

#### **Tertiary Operational Model of Care**

A comprehensive service is assumed possibly with a “Hub and Spoke” arrangement linking major cardiac centres with secondary units and primary care providers ensuring a continuum of patient care. Facilities may or may not be collocated depending on the overall size of the service.

The Coronary Care Unit component would:

- be a discrete unit usually associated with a designated Cardiac Ward with step-down and telemetry beds for monitoring of patients with acute coronary disease, heart failure or life-threatening arrhythmias
- provide the full range of invasive and non-invasive monitoring for cardiac patients, with access to the full range of cardiac investigations and 24 hour on call echocardiography, angiography, angioplasty, permanent pacemaker services
- have an inpatient and outpatient cardiac rehabilitation programme
- provide Hospital in the Home, outreach and remote monitoring services

Depending on the model of care, cardiac surgery inpatient beds may be collocated with acute cardiac beds with which it may share facilities.

### Bed Numbers

Coronary care bed numbers may vary from 4 to 8 in small facilities to 20 or more in large centres. These numbers will need to be determined at the service planning stage of the project.

In smaller units there may be a need to provide swing beds (for example with adjacent ICU or HDU) to allow for expansion as the need arises.

### Bed Mix

Beds may be a mix of single and 2 bed rooms. The latter may be particularly appropriate for patients only in the unit for short periods for post-procedure recovery.

All single bedrooms can accommodate patients requiring standard contact isolation, but in large centres, at least one negative pressure single bedroom with anteroom should be considered for isolation purposes.

Acute cardiac and cardiac surgery beds may be a mix of single, two and/or four-bed rooms and may also include a cardiac surgery high dependency unit. Refer to FPU – Inpatient Accommodation Unit in Part B of these guidelines.

### Planning Models

The CCU should be in a quiet location that avoids or minimises:

- disturbing sounds (ambulances, traffic, sirens)
- disturbing sights (morgue, cemeteries etc.)
- problems associated with prevailing weather conditions (excessive wind, sun exposure etc.)
- location should enable expansion if additional beds are required in the future

In the ideal configuration of a Coronary Care Unit, all coronary care beds should be visible from the Staff Station. In larger units where this cannot be achieved, consideration may be given to providing decentralised staff / work stations with computer support.

If CCU adjoins another unit, appropriate sharing of facilities should be maximised.

### Functional Areas

The Coronary Care Unit will consist of the following Functional Areas:

- Inpatient areas and dedicated clinical support areas
- Staff offices and amenities.

Some of the Functional Areas will be CCU-specific and some may be shared with adjoining or co-located Unit.

### Inpatient and Clinical Support Areas

Inpatient accommodation in CCU will comprise the following rooms:

- a mix of single and 2 bed rooms
- nominated bariatric room(s) with ceiling mounted patient lifter as required by the Service Plan
- showers and toilets
- staff station
- clean utility room
- medication room - a secure, alarmed room with visibility into the unit
- equipment bay
- linen trolley bay/s
- storage
- visitor lounge and / or distressed relatives room

### CCU Bedroom

Refer to Standard Components.

Provide cardiac protection and electrical installations to comply with local standards.

### Ensuite Showers and Toilets

Provision of individual ensuite showers / toilets to patient bedrooms should be carefully considered for the following reasons;

- Many patients are transferred out of the unit as soon as they are past the critical phase and are ambulant.
- Patients may only be in the unit for a few hours recovering from a procedure but may require access to a toilet and shower before discharge.
- En suites increase the overall size of the unit and subsequent capital costs.

### Shared Areas

The extent of room/s spaces that may be shared between CCU and an adjoining Inpatient Unit or ICU will be determined by the size of the overall CCU itself. Large units may be entirely self-contained with regard to clinical spaces but may still share some staff amenities and teaching spaces.

However, the following should be considered with regard to potential for sharing:

- Clean and dirty utility rooms
- Central equipment storage
- Beverage pantry / kitchen
- Reception / ward clerk
- Cleaner's room
- Disposal room
- Visitor waiting
- Public toilets
- Staff education / training room
- Staff amenities (shower, toilets, locker room and rest area)

### Acute Cardiac and Cardiac Surgery Inpatient Unit

In most respects, an acute cardiac and cardiac surgery inpatient unit will be the same as a general medical or surgical inpatient unit with the following additions:

- Procedure Room with access for a bed and image intensifier if required; this room is optional.
- Telemetry equipment and antenna with monitoring at a Staff Station that may be in the CCU or in the main ward staff station.
- Patient education facilities.

### Day Procedure Holding / Recovery Beds

Unless beds in the Catheter laboratory or a Day Procedure or 23 hour unit are utilised, the CCU or the acute ward may cater for the recovery of patients following cardiac procedures such as echocardiography, cardiac angiography, transoesophageal echo (TOE), percutaneous coronary intervention and temporary and permanent pacemaker insertion.

### Staff Offices and Amenities

Staff offices and amenities will be dictated by staff establishment and may include:

- Offices
- Workstations
- Meeting / teaching room/s
- Staff room with beverage bay
- Showers and toilets
- Property storage

In large centres, there should be access to adequate facilities for staff education and meetings. Teaching facilities should allow staff to access simulation training and competency assessment within the unit. This room may be used by the multidisciplinary team.

### Teaching and Clinical Research

Central monitor connected to patient cardiac monitors is usually located at the central staff station. Easy viewing of cardiac rhythms of all patients will encourage discussion between staff and assist with in-house education. In larger Units, simulation training and competency assessment facilities may also be provided.

Associated with the provision of all cardiac services for CCU and cardiac inpatient unit, research may be undertaken. Spatial provision for research may be justified by service needs and role delineation.

The following facilities may be required for clinical trials:

- shared offices for senior coordinator/s and research fellow/s
- shared offices / workstations for other clinical trial research staff
- shared offices / workstations for registrars and research assistants
- patient consulting room/s (if the unit is accessed by patient)
- drug monitors room
- drugs and research files storage
- research laboratories

### **Functional Relationships**

#### **External**

The CCU will have working relationships with many other units & services including:

- Cardiac investigation and cardiac catheterisation unit
- Cardiac rehabilitation services
- Emergency Unit
- Nuclear Medicine / PET
- Intensive Care Unit
- Operating Suite Unit
- Medical Imaging
- Pathology
- Biomedical Engineering
- Cardiac Surgery:
  - Linkages occur at several levels including clinical decision making about patients requiring cardiac surgery, joint research projects and joint management of patients in the post-operative phase including rehabilitation. The Units need to be well-linked, but not necessarily co-located.
  - Hospital in the Home services for chronic cardiac disease such as heart failure.

#### **Internal**

Optimal internal relationships to be achieved include those between:

- patient occupied areas forming the core of the unit
- staff station(s) and associated areas that need direct access and observation of patient areas
- utility and storage areas that need to be readily accessible to both patient and staff work areas
- public areas located on the perimeter of the unit
- shared areas that should be easily accessible from the units served

## **3 Design**

### **Access**

#### **External**

The Unit should be located where emergency medical team can respond rapidly and efficiently to emergency calls with minimum travel time. Through traffic to other parts of the healthcare facility should be avoided for efficient access of emergency team and equipment and to maintain patient privacy.

Ideally there should be a separate and discrete entry or entries for staff, goods and supplies with swipe card or similar electronic access to authorised personnel. Discrete entry for patients on beds or trolleys may also be considered as this should provide:

- Easy access from lifts from Emergency Unit and Chest Pain Assessment Unit
- Ready access to and from Cardiac Catheter Laboratory

### Internal

There should be one only point of public entry overseen by a ward clerk / receptionist during extended daytime hours to:

- monitor and / or prevent access by visitors depending on the patients' condition
- advise visitors if patients have been moved or are out of the unit for any reason
- monitor visiting staff and direct them to the appropriate staff member or patient
- monitor patient movements in and out of the unit

### **Patient Treatment Areas**

Patients should be situated so that healthcare providers have direct or indirect visualisation, with cardiac monitoring at all times. This approach permits the monitoring of patient status under both routine and emergency circumstances. The preferred design is to allow a direct line of vision between the patient and the central Staff Station. In CCUs with a modular design, patients should be visible from their respective nursing substations.

Sliding glass doors and partitions facilitate this arrangement and provide speedy access to the room in emergency situations.

### Renal Dialysis

Planning considerations for the provision of dialysis outlets which would include water and drainage to a specific number of CCU beds should be considered as part of the planning for this unit.

### Bedside Monitoring

Each coronary care bed should have the capacity for individual monitoring. Bedside monitoring equipment should be located to permit ease of access and viewing, but should not interfere with the visualisation of, or access to the patient. The bedside nurse and/or monitor technician should be able to observe the monitored status of each patient at a glance. This goal can be achieved either by a central monitoring at staff stations, or by bedside monitors that permit the observation of more than one patient simultaneously. Neither of these methods is intended to replace bedside observation.

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

### **Environmental Considerations**

#### Acoustics

Signals from patient call systems, alarms from monitoring equipment, and telephones add to the sensory overload in critical care units. Without reducing their importance or sense of urgency, such signals should be modulated to a level that will alert staff members, yet be rendered less intrusive.

For these reasons, floor coverings that absorb sound should be used while keeping infection control, maintenance, and equipment movement needs under consideration. Walls and ceilings should be constructed of materials with high sound absorption capabilities. Ceiling soffits and baffles help reduce echoed sounds. Doorways should be offset, rather than being placed in symmetrically opposed positions, to reduce sound transmission. Counters, partitions, and glass doors are also effective in reducing noise levels.

### Natural Light

Natural light and views should be available from the Unit for the benefit of staff and patients. Natural light to all bedrooms by means of a window is essential and desirable in patient lounge areas and staff rooms. Windows are an important aspect of sensory orientation and psychological well-being of patients.

### Privacy

Visual and acoustic privacy is required but high staff visibility is essential. Each patient bed and toilet/shower area should have provisions for visual privacy from casual observation by other patients and visitors.

### Interior Decor

Interior decor includes furnishings, style, colour, textures and ambience, influenced by perception and culture. This can help prevent an institutional atmosphere. However, cleaning, infection control, fire safety, patient care and the patients' perceptions of a professional environment should always be considered.

Some colours, particularly the bold primaries and green should be avoided in areas where clinical observation occurs such as bedrooms, treatment areas and corridors. Such colours may prevent the accurate assessment of skin tones e.g. yellow / jaundice, blue / cyanosis, red / flushing.

### Space Standards and Components

Where an open plan arrangement is provided, bed spaces shall be arranged so that there is a clearance of at least 1200 mm from the side of the bed to the nearest fixed obstruction (including bed screens) or wall. At the head of the bed, at least 900 mm clearance shall be allowed between the bed and any fixed obstruction or wall.

Single Patient Bedrooms including Isolation Rooms, shall have minimum dimensions of 3900 mm x 3900 mm.

### Finishes

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

Floor finishes should provide qualities such as acoustic performance, slip resistance, infection control, ease of cleaning and resistance to marring and shearing by wheeled equipment.

In all areas where patient observation is critical, colours shall be chosen that do not alter the observer's perception of skin colour.

### Fixtures and Fittings

#### Clocks

A clock shall be provided and conveniently located for easy reference from all bed positions and the Staff Station.

#### Bedside Storage

Each patient bed space shall include storage and writing provision for staff use.

#### 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. Rooms may require complete darkness to enable cardiac ultrasound being undertaken.

#### Patient Lifting Hoist

Allowance for ceiling mounted patient lifters should be provided to a nominated number of beds for lifting bariatric CCU patients who have to be kept in supine position or complete bed rest. The

hoist is also beneficial for repositioning bariatric patients who are connected to multiple medical equipment including balloon pump and haemodialysis machine.

### ***Infection Control***

The infectious status of many patients accessing or admitted to the CCU may be unknown. All body fluids should be treated as potentially infectious and standard precautions should be taken as a minimum.

Refer to Part D of these Guidelines – Infection Prevention and Control - for further information.

#### **Hand Basins**

Hand basins should be located in all clinical areas – bedrooms, treatment rooms, procedure rooms (unless a scrub bay), clean and dirty utility rooms, entry to the ward, medication room and Staff Station if used for any medication preparation purposes.

#### **Isolation Rooms**

The need for a negative pressure isolation room should be determined on a project by project basis. However depending on the size of the unit and its location (regional setting) an isolation room for large (tertiary) and special needs units should be provided.

All entry points, doors or openings, shall be a minimum of 1200 mm wide, unobstructed. Larger openings may be required for special equipment, as determined by the Operational Policy.

### ***Safety and Security***

Aspects of safety and security within CCU to be considered include:

- Emergency call in all patient areas
- Monitoring of patient's movement
- Staff access control
- Control and monitoring of visitors
- Duress call provision as required
- Emergency escape pathways during threats which may necessitate evacuation of the facility

### ***Building Service Requirements***

#### **Mechanical Services**

The unit shall have appropriate air conditioning that allows control of temperature, humidity and air change.

Refer to Part E of these Guidelines for the specific requirements for Mechanical and Electrical provision.

#### **Communications**

The following communication systems should be provided in the Unit;

- Telephone, facsimile and computer access
- Intranet and internet access
- Access to all ordering and recording systems utilised by the Health Facility to supply and collect data Health Facility Briefing and Planning
- Teleconferencing and videoconferencing amenities
- Closed Circuit Television (CCTV) may be required to ensure staff can oversee entry and egress points
- Patient, staff and emergency call systems to comply with standards.
- Telemetry
- Central cardiac monitoring

A ceiling mounted TV should be provided in patient bedrooms for education, therapy and relaxation purposes.

A decision about the need for other Telehealth technology (these would normally be standard provision/service provided e.g. just a computer is required) such as access to digital radiology or pathology systems) should be made early in the planning process.

### 4 Components of the Unit

The Coronary Care Unit will consist of Standard Components to comply with details described in these Guidelines. Refer to Standard Components Room Data Sheets and Room Layout Sheets.

**5 Schedule of Accommodation – Coronary Care Unit**

The Coronary Care Unit may be co-located with an Inpatient Unit or ICU in order to efficiently share facilities

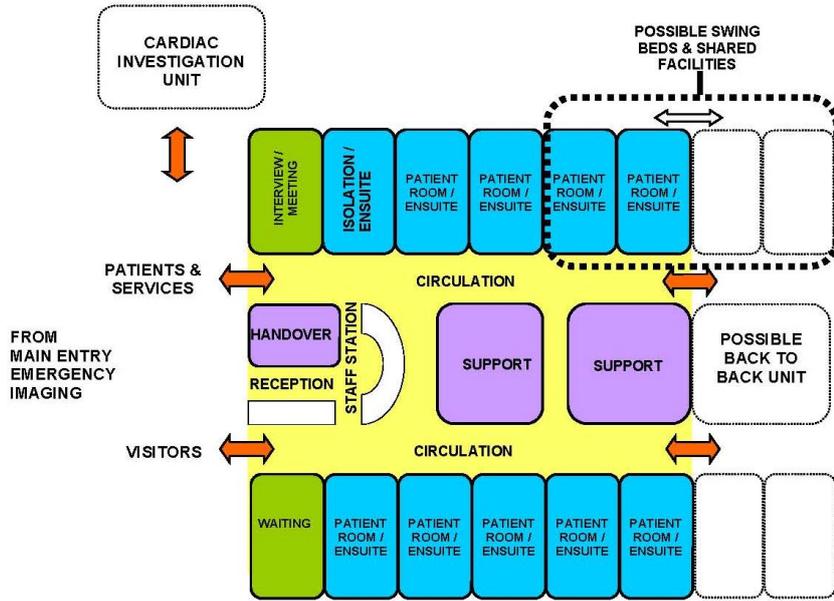
ROOM/ SPACE	Standard Component Room Codes	RDL 2 & 3 N/A			RDL 4 Qty x m <sup>2</sup>			RDL 5 Qty x m <sup>2</sup>			RDL 6 Qty x m <sup>2</sup>			Remarks
<b>Patient Areas</b>														
1 Bedroom - Special, CCU, 20 m <sup>2</sup>	1 BR-SP-20-I				6	x	20	7	x	20	11	x	20	Provide ceiling mounted lifter in designated bariatric room(s)
1 Bedroom - Special, CCU (Negative Pressure)	1 BR-SP-20-I							1	x	20	1	x	20	Optional dependent on Service Demand
Anteroom	ANRM-I							1	x	6	1	x	6	To negative pressure isolation room if provided
Ensuite - Standard	ENS-ST-I				6	x	5	8	x	5	12	x	5	6 m <sup>2</sup> for designated bariatric ensuite(s)
<b>Sub Total</b>							<b>150.0</b>			<b>206.0</b>			<b>306.0</b>	
<b>Circulation %</b>							<b>35</b>			<b>35</b>			<b>35</b>	
<b>Area Total</b>							<b>202.5</b>			<b>278.1</b>			<b>413.1</b>	
<b>Support Areas</b>														
Bay - Beverage, Enclosed	BBEV-ENC-I				1	x	5	1	x	5	1	x	5	
Bay - Meal Trolley	BMT-4-I							1	x	4	1	x	4	
Bay - Handwashing, Type B	BHWS-B-I				2	x	1	2	x	1	3	x	1	
Bay - Linen	BLIN-I				1	x	2	1	x	2	1	x	2	
Bay - Mobile Equipment	BMEQ-4-I				1	x	4	1	x	4	2	x	4	For mobile patient lifter, ECG machine, mobile X-ray, etc.
Bay - Resuscitation Trolley	BRES-I				1	x	2	1	x	2	1	x	2	
Clean Utility	CLUR-12-I				1	x	12	1	x	12	1	x	12	
Cleaner's Room	CLRM-5-I				1	x	5	1	x	5	1	x	5	May be shared with an adjacent unit in smaller CCUs
Communications Room	COMM-I				1	x	0	1	x	0	1	x	0	
Dirty Utility	DTUR-10-I				1	x	10	1	x	10	1	x	10	May be co-located with Disposal Room
Disposal Room	DISP-8-I DISP-10-I				1	x	8	1	x	10	1	x	10	
Office - Clinical/ Handover	OFF-CLN-I				1	x	15	1	x	15	1	x	15	
Staff Station	SSTN-10-I SSTN-14-I SSTN-20-I				1	x	10	1	x	14	1	x	20	
Store - General	STGN-9-I STGN-12-I STGN-15-I				1	x	9	1	x	12	1	x	15	
Waiting	WAIT-10-I WAIT-15-I				1	x	10	1	x	15	1	x	15	Optional. Maybe shared with an adjacent Unit
<b>Sub Total</b>							<b>94.0</b>			<b>112.0</b>			<b>124.0</b>	
<b>Circulation %</b>							<b>35</b>			<b>35</b>			<b>35</b>	
<b>Area Total</b>							<b>126.9</b>			<b>151.2</b>			<b>167.4</b>	
<b>Staff Areas</b>														
Meeting Room	MEET-12-I MEET-L-15-I				1	x	12	1	x	15	1	x	15	For Meetings, Tutorials

ROOM/ SPACE	Standard Component Room Codes	RDL 2 & 3 N/A			RDL 4 Qty x m <sup>2</sup>			RDL 5 Qty x m <sup>2</sup>			RDL 6 Qty x m <sup>2</sup>			Remarks
Office - Single Person, 9 m <sup>2</sup>	OFF-S9-I				1	x	9	1	x	9	1	x	9	Unit Manager
Office - Single Person, 12 m <sup>2</sup>	OFF-S12-I										1	x	12	Optional for Cardiologist
Office - 2 Person Shared	OFF-2P-I							1	x	12	1	x	12	Optional for Registrars
Property Bay - Staff	PROP-2-I PROP-3-I				1	x	2	1	x	3	1	x	3	May be shared with an adjacent unit in smaller CCUs
Staff Room	SRM-15-I				1	x	15	1	x	15	1	x	15	May be shared with an adjacent unit in smaller CCUs
Toilet - Staff	WCST-I				1	x	3	1	x	3	2	x	3	
<b>Sub Total</b>							<b>41.0</b>			<b>57.0</b>			<b>72.0</b>	
<b>Circulation %</b>							<b>25</b>			<b>25</b>			<b>25</b>	
<b>Area Total</b>							<b>51.3</b>			<b>71.3</b>			<b>90.0</b>	
<b>Grand Total</b>							<b>380.7</b>			<b>500.6</b>			<b>670.5</b>	

Please note the following:

- Areas noted in Schedules of Accommodation take precedence over all other areas noted in the FPU.
- Rooms indicated in the schedule reflect the typical arrangement according to the Role Delineation.
- Exact requirements for room quantities and sizes will reflect Key Planning Units identified in the service plan and the policies of the Unit.
- Room sizes indicated should be viewed as a minimum requirement; variations are acceptable to reflect the needs of individual Unit.
- Office areas are to be provided according to the Unit role delineation and number of endorsed full-time positions in 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.

6 Functional Relationship Diagram – Coronary Care Unit



## 7 References and Further Reading

- Australasian Health Facility Guidelines. (AusHFG Version 4.0), 2012; refer to website [www.healthfacilitydesign.com.au](http://www.healthfacilitydesign.com.au)
- Guidelines for Design and Construction of Health Care Facilities; The Facility Guidelines Institute, 2010 Edition; refer to website [www.fgiguideines.org](http://www.fgiguideines.org) .



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

HFBS provides edit access to all iHFG standard rooms, and departments, and more than 100 custom report templates.

## HFBS Health Facility Briefing System



### Briefing Module

The Health Facility Briefing System (HFBS) has numerous modules available via annual subscription. It suits healthcare Architects, Medical Planners, Equipment Planners Project Managers and Health Authorities.

Use the HFBS Briefing Module to quickly drag in health facility departments or pre-configured room templates from the iHFG standard, edit the room features such as finishes, furniture, fittings, fixtures, medical equipment, engineering services. The system can print or download as PDF more than 100 custom reports including room data sheets, schedules, and more...

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

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