



EMERGENCY DEPARTMENT DESIGN GUIDELINES

Contents

1.	Purpose	4
2.	Background	5
2.1	Emergency Department purpose	6
2.2	Patient flow and models of care.....	7
2.3	Internal functional relationships	10
2.4	External functional relationships.....	10
2.5	Facilities for multi-disciplinary teams	11
2.6	Major space determinants	12
2.7	Emergency Department size	12
3.	General considerations	14
3.1	Patient experience	14
3.2	Art	15
3.3	Bariatric requirements	16
3.4	Paediatric facilities in mixed Emergency Departments.....	17
3.5	Facilities for elderly patients in Emergency Departments	18
3.6	Healthy working environment for staff.....	19
3.6	Information and Communications Technology	20
4.	Built Environment: General Considerations.....	24
4.1	Wayfinding.....	24
4.2	Finishes and robustness.....	24
4.3	Lighting	25
4.4	Sound attenuation	25
4.5	Privacy.....	26
4.6	Infection control standards and hand hygiene.....	26
4.7	Service panels.....	27
5.	Built Environment: Specific Rooms and Functional Requirements	29
5.1	Ambulance bay/ambulance reception	29
5.2	Decontamination room/area.....	30
5.3	Disaster and decontamination store.....	32
5.4	Ambulance store	32
5.5	Triage	33
5.6	Patient registration and reception area.....	35
5.7	Waiting room.....	36
5.8	Security	37
5.9	Trauma and resuscitation rooms	38

5.10	Isolation rooms.....	39
5.11	General/acute treatment cubicles	41
5.12	Acute mental health area	42
5.13	Behavioural Assessment Room (BAR)/Safe Assessment Room	44
5.14	General consultation area and Fast Track/ambulatory area	45
5.15	Eye room.....	46
5.16	Ear, nose and throat room.....	47
5.17	Plaster room	48
5.18	Procedure room	50
5.19	Interview room.....	51
5.20	Distressed relatives' room	52
5.21	Staff work stations	53
5.22	Department Corridors.....	55
5.23	Dirty utility/Disposal room.....	56
5.24	Equipment/Store room.....	57
5.25	Pharmacy/Medication room/Clean utility	58
5.26	Disaster equipment room.....	59
5.27	Short Stay Unit.....	60
5.28	Administration areas.....	60
5.29	Teaching facilities	61
5.30	Staff room.....	62
5.31	Staff amenities.....	63
6.	Glossary.....	65
7.	Appendix 1: Images of Emergency Department Features and Design	66
8.	Appendix 2: Images and Dimensions of Complex Patient Ambulance Vehicle	71
9.	References	76
10.	Document Review	77
10.1	Responsibilities.....	77
10.2	Revision History	77

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1. PURPOSE

The ACEM Emergency Department (ED) Design Guidelines are intended to support clinicians in the design process, and inform government, health planners, architects and designers about what constitutes a contemporary Emergency Department in Australasia. The document aims to:

- Outline the clinical requirements of an Emergency Department;
- Outline the need to integrate the clinical requirements, functional needs and practical size requirements of an Emergency Department;
- Describe the important relationships within the Emergency Department, and the relationships between the Emergency Department and other hospital departments;
- Describe the elements of Emergency Department design that work well, and those that do not;
- Emphasise the importance of good design in all new and redeveloped Emergency Departments in Australasia regardless of location, size, clinical user groups (i.e. doctors, nurses and other health professionals);
- Assist in the development of Emergency Departments that support an improved patient, family/carer and staff experience; and
- Promote dialogue and engagement between Emergency Department staff and architects, designers, engineers and health planners such that they may apply their knowledge, experience and expertise to the practical workings of the Emergency Department.

Whilst the guidelines outline the need to integrate the clinical requirements, functional needs and practical size requirements of an Emergency Department, the document is not intended to be an exhaustive guide to models of care and patient pathways as such information can become outdated quickly.

In the dynamic environment of Emergency Departments, models of care can change rapidly depending on government policies and initiatives, patient needs and demographics, Emergency Department staffing, and other factors.

In comparing the ACEM ED Design Guideline to the Australasian Health Facility Guidelines - Emergency Unit document [1], differences exist in the level and type of detail about particular Emergency Department spaces and issues that have been encountered by clinical users.

Both documents do not exist in isolation, and should typically be viewed as complementary. ACEM however reserves the right to propose different views on certain elements of Emergency Departments considering Emergency Physicians and other staff spend more time in and use Emergency Department facilities more than any other group.

ACEM regularly produces and reviews policy documents such as Emergency Department Design Guidelines for use by its members, and these are also available to ACEM's stakeholders.

The peer knowledge and learnings contained in the guidelines are documented elsewhere for Emergency Physicians who are not architects, designers or planners, and who increasingly will be involved in the Emergency Department planning and design process.

2. BACKGROUND

The Emergency Department plays a pivotal role in providing the public with access to acute health care, and the provision of support to primary health care and community services.

An Emergency Department is also an important interface to the many inpatient and outpatient services offered by its parent hospital and the health service of which it is a part. In addition, a large proportion of the total acute admissions to inpatient wards are via Emergency Departments, both in Australia and New Zealand.

Characteristics

Characteristics of an Emergency Department that make it a unique environment and present design challenges include:

- The changing models of care within Emergency Departments and the emergence of associated and co-located inpatient departments;
- The varying levels of staff associated with certain models of care;
- The varied case mix of acutely unwell patients who are often suffering from time critical and life threatening illnesses;
- The role of the Emergency Department/hospital e.g. whether it functions as a major trauma service;
- The presentation of patients with undifferentiated conditions;
- The presence of patients, relatives, carers or friends who are stressed and anxious;
- The presence of patients suffering from an acute psychosocial crisis;
- The high patient turnover;
- The varied patient admission and discharge pathways;
- The 'front loading of patient care' by health professionals primarily stationed in the ED, rather than in the ward, in order to expedite their care; and
- The Emergency Department providing a growing number of unique and important services, mostly by specialist Emergency Physicians.

Design

The design of an efficient Emergency Department in which care is coordinated and carried out in an appropriate environment depends on the productive collaboration between a number of key stakeholders involved in the building or redevelopment process. The process of Emergency Department design should consider:

- Functionality – an Emergency Department's design needs to be practical and reflect how health professionals manage and treat their patients who have different clinical conditions;
- Form – spatial considerations and relationships that promote effective interaction between staff and patients, relatives, carers, and the flow of clinical care. Consideration that Emergency Department models of care will change over time is needed, as well as consideration of the relationship between the Emergency Department and the greater hospital. Over time, clinical treatment spaces will be reallocated, so many spaces need to have flexibility built into them to ensure future proofing;
- Patient and staff needs – the aim of health care is not only to treat disease, but also to create a healing environment for patients that is safe and free of psychosocial elements created through poor design. Additionally, the workplace needs of Emergency Department staff can be promoted through the application of Occupational Health and Safety (OH&S) standards that ensure a work environment that is as safe as possible. The psychosocial wellbeing of staff should be considered through design and space use. This should not be underestimated given that staff will occupy the Emergency Department spaces much longer than any patient, relative or carer.

Pitfalls

Common pitfalls encountered by clinical user groups in the Emergency Department design process include:

- Inadequate briefing of the redevelopment parameters at the outset of the project;
- Poor project governance e.g. inconsistent clinical user group and planning staff leadership, representation, project involvement, and project meeting attendance. One implication of this is that key decisions need to be revisited at later dates or building requirements are overlooked or misunderstood;
- An inadequate period of protected, dedicated time at the project outset to ensure that key decisions are adequately considered;
- A lack of opportunity to visit and discuss the pros and cons of other recently constructed or redesigned Emergency Departments, both locally and overseas;
- A lack of resources and understanding of built environment research and evidence based design;
- A lack of mechanisms to engage with clinical staff with previous experience in Emergency Department design projects, and who have the ability to assist, review and mentor key clinical design decisions;
- Not considering how adherence to the Disability Discrimination Act (DDA) and other relevant legislation will impact on Emergency Department design; and
- Clinical practice, information technology and design not being considered in totality, resulting in the development of a new facility but with no change in clinical practice and inadequate infrastructure for IT, or a lack of space for equipment.

2.1 Emergency Department purpose

The purpose of the Emergency Department is to receive, triage, stabilise and provide acute health care to patients. This includes patients requiring resuscitation and those with emergent, urgent, semi-urgent and less-urgent conditions (Australasian Triage Scale (ATS) categories 1-5 [2]). An Emergency Department also requires the capacity to deal with mass casualty and disaster situations. There are particular patient types seen in the Emergency Department that may have specific psychosocial and treatment needs. These include:

- Major trauma patients;
- Elderly patients;
- Children and adolescents;
- Patients with physical and mental disabilities;
- Victims of child abuse, domestic violence, or sexual assault;
- Patients with mental health issues;
- Patients with infectious diseases or who are immunocompromised;
- Custodial patients; and
- Patients affected by chemical, biological or radiological contaminants.

Health Professionals and other Professionals

Additionally, the Emergency Department needs to be able to cater for a wide variety of health professionals and other professionals who may be stationed primarily in the Emergency Department providing care and support services, or who may be transiting through. These people include:

- On site clinical staff e.g. doctors, nurses, allied health professionals, social workers, psychiatric services;
- Visiting clinical staff e.g. doctors from inpatient units, specialist Nurse Educators, forensic medical officers;
- Liaison staff, care coordinators, disability and respite carers, orderlies, pastoral care staff;
- Teaching staff, students and researchers;
- Ambulance, transport and retrieval services;
- Police, fire brigade, State Emergency Service personnel;
- Administration staff;
- Security personnel;
- Cleaning and maintenance staff;
- Volunteers; and
- Funeral services personnel.

2.2 Patient flow and models of care

Flow

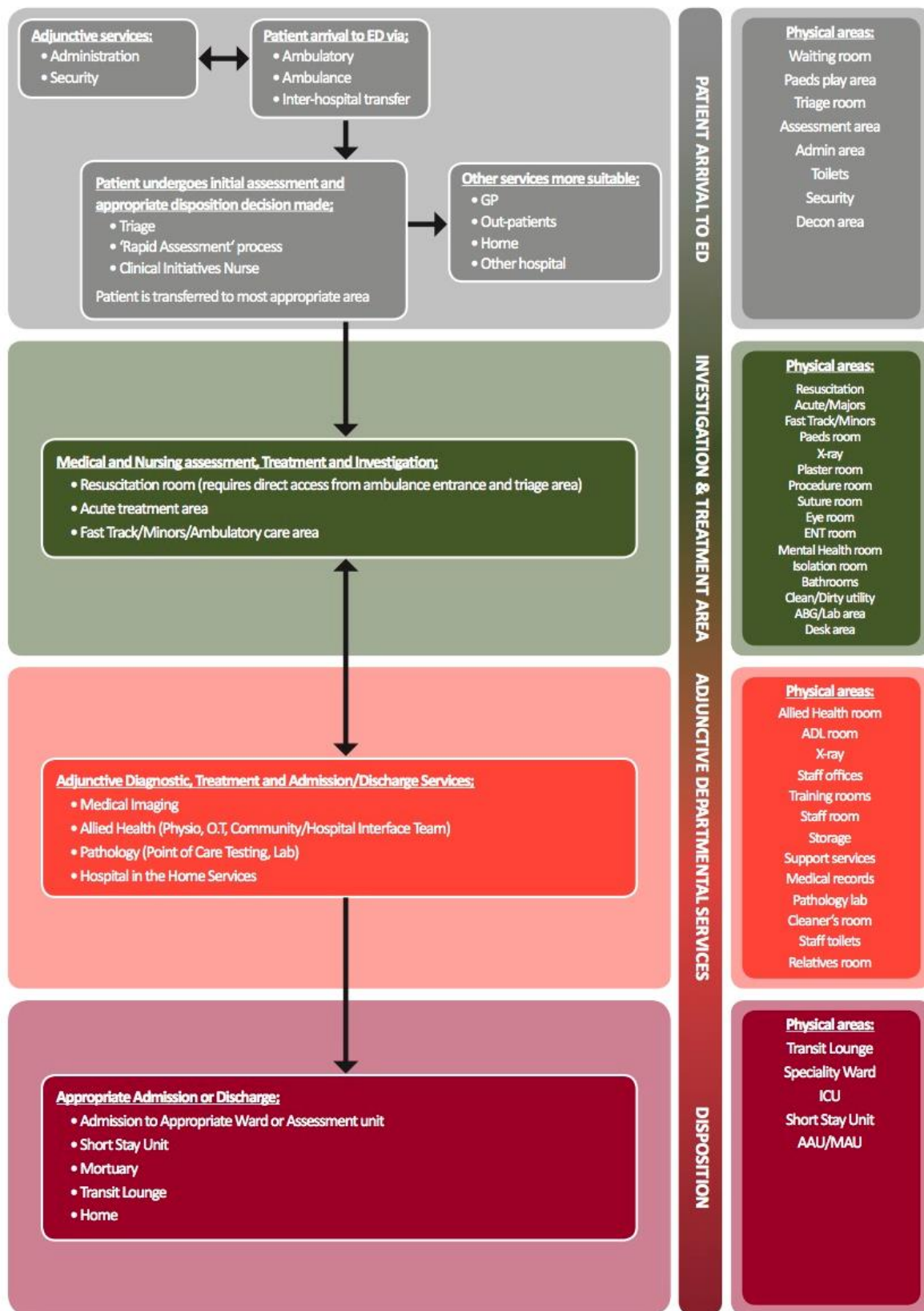
Due to the increasing patient load on Emergency Departments throughout Australasia and internationally, extensive work has been carried out to develop improved models of (patient) care that aid patient flow through the Emergency Department.

Many different solutions have been used successfully to aid patient flow. It should always be considered that barriers to patient flow and especially access block [3] are symptoms of hospital-wide problems. It is therefore strongly recommended that any work on clinical service redesign and redevelopment extends beyond the Emergency Department to incorporate the entire hospital.

The goal for any model of care should be to reduce unnecessary steps in the patient journey, and to optimise the timeliness of all the essential components of the journey. Each individual Emergency Department presents its own challenges, and no one solution fits all.

The following diagram outlines the various pathways that a patient may follow on arrival to the Emergency Department:

Pathways that a patient may follow on arrival to the Emergency Department:



Patient models of care

Some examples of newer patient models of care in Australasia include, but are not limited to:

Medical led triage:

- This involves replacing the Triage Nurse with a doctor, ideally a senior doctor, in order to assess patients on arrival. They may be situated in the waiting room, at the reception desk or within the triage area of the Emergency Department.

Medical led triage and nursing assessment team:

- This involves a senior Emergency Physician (a consultant or senior doctor with appropriate expertise and experience) working in conjunction with the Triage Nurse(s) and/or Clinical Initiatives Nurse (CIN). They are based in the triage and ambulance assessment area and work as a team to augment the triage process with early disposal decisions and investigation instigation.

Rapid Assessment Team (RAT):

- This is a dedicated team that consists of a number of medical, nursing and ancillary team members who are responsible for the assessment of a patient, usually for patients deemed acute/major at triage, on arrival. It may consist of, but is not limited to:
 - A doctor;
 - One or two members of nursing staff;
 - Receptionist/administrative staff;
 - Clinical assistant (whose duties include phlebotomy and cannulation); and
 - Scribe.
- This team may either be mobile around the acute area of the Emergency Department, or based in a geographical area (see 'Dedicated Assessment Areas' below). This is an efficient way of early assessment and investigation/therapeutic instigation. It is resource intensive. Operating this model on a 24/7 basis would limit its general availability.

Dedicated Assessment Areas:

- Some Emergency Departments utilise a dedicated area for acute/major patients who either self-present, or are brought in via ambulance. The reception or triage area may stream selected patients to this area. Alternatively, ambulant and ambulance patients may present in this area and are streamed.
- These areas may be either a re-allocation of existing treatment spaces, or are specifically purpose built to accommodate a multi-disciplinary team who are treating patients together. These areas should be staffed for a rapid turnover of patients with suitable appropriate outflow areas.

Caution should be exercised in physically designing a new Emergency Department around a specific model of care, bearing in mind that best practice approaches in Emergency Medicine may change, and that the lead time from design to completion of an Emergency Department is in the range of years.

Pitfalls

- Having a lack of internal flexibility within the physical build of the Emergency Department, resulting in the inability to adapt the physical environment to a change in models of care
- A more generic approach to treatment spaces, and the clever use of sectioning, allows areas to more readily be reconfigured or closed off when not in use

- Having no dedicated front of house area for seeing and treating or for rapid assessment
- Having an area that is too small

References

- [4]

2.3 Internal functional relationships

Each area of an Emergency Department plays an important part in the patient journey. The Emergency Department consists of a number of functional areas including, but not limited to:

- An entrance/waiting room/reception area;
- A triage area;
- A resuscitation area;
- A mental health assessment area;
- An acute treatment area (also referred to as acute/majors);
- A consultation area (also called Fast Track area/sub-acute/minors/ambulatory care);
- Adjunctive areas (x-ray, Short Stay Unit (SSU), allied health, investigations room (point of care testing));
- Staff/amenities areas;
- Administrative areas;
- Storage areas;
- Clean preparation and drug preparation room(s);
- Dirty utility and disposal areas;
- Patient amenities areas e.g. a food storage fridge that meets OH&S standards for patient sandwiches (for after hours);
- Toilet (staff and patient including for disabled patients) and bathroom/shower facilities; and
- Teaching and research areas.

2.4 External functional relationships

The Emergency Department has a number of key relationships to the remainder of the hospital. These include:

Hospital access/egress:

- A close relationship to the main entrance of the hospital is desirable, for patient and relative wayfinding, after-hours access and egress, and parking/public transport.

Access to investigative modalities:

- Including radiology and other special investigative units e.g. respiratory function lab;
- Many larger Emergency Departments have dedicated radiology units that service them with plain radiology, ultrasound and CT scanning.

Close proximity to other acute services to minimise delay in patient treatment:

- Reserved car parking for on-call anaesthetists, obstetricians, surgeons;
- Helipad;
- Angiography suite;
- High dependency unit;
- Coronary care;
- Intensive care;
- Operating theatre; and
- Clear unencumbered route to wards.

Functional relationships with other aspects of the hospital important in the event of mass casualty incidents:

- Communications/command/media centre;
- Outpatients (for ambulatory patients); and
- Open areas e.g. car parks for mass decontamination requiring state/regional emergency services.

2.5 Facilities for multi-disciplinary teams

Purpose

Facilities for multi-disciplinary care are critical in order to allow medical, nursing and allied health staff to work together effectively to assess and manage patients in the Emergency Department.

Size

Size will vary depending on the size of the Emergency Department and the allied health workload. If relevant, this may be appropriately combined with Medical Assessment and Planning Unit (MAPU)/SSU type facilities.

Functional requirements

- An area with computer access and ability to hold confidential discussions or phone calls
- An occupational therapist (OT)/physio assessment area
- Storage for equipment that is loaned to patients

Spatial relationships

- The multidisciplinary team area should ideally be in the Emergency Department, but if not, should be adjacent to it
- An OT/physio assessment area, if included, should be adjacent to MAPU/SSU or Emergency Department

Equipment requirements

- Computers, telephones, and form storage
- Assessment area: steps, mobility aids, couch and other equipment for assessing Activities of Daily Living (ADL)
- A refreshment area

Pitfalls

- Underestimating the spatial requirements required, particularly for an assessment area and equipment storage
- Not appreciating the need for a private area to facilitate private conversations

2.6 Major space determinants

ACEM has a policy that defines the minimum requirement for a health facility to be identified as having an Emergency Department [5]. The policy outlines minimum requirements for the delineation of the four levels of Emergency Departments. In 2012, ACEM introduced new terminology to delineate Emergency Departments. The following information summarises the difference between the old and the new terminology:

Current Emergency Department Delineation

- Level 4 Emergency Department
- Level 3 Emergency Department
- Level 2 Emergency Department
- Level 1 Emergency Department

Old ACEM Emergency Department Delineation

- Major Referral Emergency Department
- Urban District Emergency Department
- Major Regional/Rural Base Emergency Department
- Rural Emergency Service.

2.7 Emergency Department size**Current practice of size determination**

The current practice for planning Emergency Department facilities is based largely on benchmarking and space planning. Benchmarking involves using published data on attendances per annum, review of current operations and visiting other recently built or redeveloped Emergency Departments. Space planning is carried out by a facility planner using published data, and the layout of the facilities is planned by the architect in consultation with user groups such as clinicians and hospital administrators. The patient's journey through the facility and the spaces and equipment required will also provide a narrative for the consultation.

It is critically important that Emergency Department administrators and clinicians have major input into the planning from the beginning. The major decisions on the function and size of the Emergency Department are usually made in the early planning stages, as changing these decisions later in the design process is difficult and expensive. Generally, planning and design involves:

- Service planning to reflect and support models of care and to estimate the attendances expected;
- Increasing patient demand, limited numbers of hospital beds, the increasing burden of chronic disease, workforce constraints, and regulatory changes;
- Consideration of any mandated performance measures e.g. National Emergency Access Targets (NEAT) in Australia, the Shorter Stays in Emergency Departments Health Targets in New Zealand;

-
- Consideration of published guidelines for the overall Emergency Department area. In particular, the Australasian Health Facility Guidelines - Emergency Unit [1] document sets out the current Australasian approach to health facility planning and standard spatial components;
 - Estimation of the space required by a facility planner. This is documented in the schedule of accommodation. This document lists the number of each space required and the area allowed for each type of space e.g. treatment cubicle. The total area is then estimated using allowances to account for circulation space and building plant requirements; and
 - The design is developed and documented through an iterative process that leads to drawings, specifications and conditions that the builder will use in construction. User groups of clinicians and managers will meet with the architects and engineers to review and approve the design proposed.

There may be many changes to the size of the planned Emergency Department prior to final construction, either due to broader spatial constraints, or due to fiscal constraint. Sometimes even seemingly small adjustments can make the function of an area impractical or dysfunctional. In addition, because size determination is often undertaken far in advance of the capital works being completed, by the time the facilities are operational, the facility can already be too small. This has implications for formulas that are used to estimate future demand on Emergency Departments.

Emerging methods for planning Emergency Department size

There is consideration of the use of lean-led design and simulation modelling in the planning process. Lean-led design is a systematic approach to healthcare architecture that focuses on defining, developing and integrating safe, efficient, waste free operational processes in order to create the most supportive and patient focused physical environment possible.

Simulation modelling uses dynamic computer models to analyse the patient flow, staffing, facilities, technology and operational practices, in order to optimise the planning to satisfy the patient needs. This technology has been widely used in operations research, defence, manufacturing and transport for decades. The methods have been adopted by leading American health care architects.

Successful application of these methods requires commitment by hospital management and clinicians working collaboratively with experts in process improvement, simulation modelling and healthcare architecture. The planning process should include thorough analysis of the current processes and developing optimal future process. These methods use the knowledge available from large data sets, clinicians and managers to develop the optimal solution.

3. GENERAL CONSIDERATIONS

There are a number of factors that must be taken into account when designing an Emergency Department that relate to both patient and staff experience. This includes the needs and requirements of staff, and the varying demographic of those patients who utilise the Emergency Department.

The needs of these varying patient groups can be addressed through, for example, suitably placed furniture and art, adequate access to information and communications technology, and appropriately designed rooms and equipment that are suitable for use by particular patient populations.

Whilst the needs of patients, carers and relatives are highly important, it is also necessary that a healthy working environment for staff is facilitated by the design of the Emergency Department. These needs can be catered to through the use of well-placed staff bases, staff rooms large enough to accommodate the maximum number of possible users, and ensuring that staff facilities are located separately from clinical areas, in order to promote effective breaks from patient care.

3.1 Patient experience

Purpose

In designing an Emergency Department, it is important to consider how to optimise the patient experience in hospital, from the patient's arrival in the Emergency Department, through to their disposition. A positive patient experience can improve patient satisfaction and can reduce perceived waiting times. Studies also show that patient satisfaction is directly related to greater patient adherence to prescribed medications and medical advice, as well as to greater Emergency Department staff satisfaction, increased morale and greater retention [6].

When designing waiting areas, and other areas and facilities that Emergency Department patients and their relatives, friends or carers will use, it is important to consider that these people will often be afraid, anxious or in pain, and so the physical environment should, where possible, play a role in mitigating these emotions.

Patient waiting experience

The following components are required in order to make the patient waiting experience satisfactory:

Service and communication

- Clear signage about the patient pathway and services e.g. 'Go here first';
- Clear signage for facilities such as refreshments, toilets, taxis;
- Signage that includes braille for visually impaired patients;
- A hearing loop system or infra-red system to assist people using hearing aids to hear more clearly by cutting out background noise;
- Multi-lingual signage, where appropriate;
- Information about the Emergency Department process i.e. triage, waiting;
- Information about Emergency Department alternatives e.g. local General Practice clinics;
- Public health themed information to read whilst waiting e.g. on smoking, alcohol abuse;
- Friendly and helpful Emergency Department staff;
- Security personnel located in close proximity to the Emergency Department;
- An Emergency Department that is clean and well maintained; and
- Electronic wayfinding and/or information kiosks.

Facilities

-
- An adequate amount of appropriately sized comfortable seating that is arranged in clusters or groups, with separation and adequate circulation space. Colour coding could potentially be used for waiting room zoning;
 - Recliners for the elderly and spacing to respect personal space and privacy;
 - Availability of food and drink;
 - Toilets: an adequate number, clearly signposted and appropriate for people with disabilities;
 - Breastfeeding/nappy change area;
 - Power points +/- hard wired mobile device chargers; and
 - A separate children's play area that is both safe and hygienic.

Functionality

- Appropriate room temperature; and
- Adequate size to accommodate all waiting patients and relatives, friends or carers during peak times.

Ambience

- Lighting: preferably visibility to natural light;
- Music: calming, non-repetitive;
- Acoustics: sound privacy, noise control during peak times;
- Plants: real or artificial;
- Calming colours; and
- Positive distractions (to reduce perceived waiting time. This is more important to patient satisfaction than actual waiting time) including television, fish tanks, magazines, movies/DVDs.

3.2 Art

Purpose

Art and images can help to reduce stress and anxiety in patients as well as perceived waiting times. In some jurisdictions the allocation of a budget for art is mandated for new health buildings. What is chosen for display should be tailored to the local population and its culture. Other considerations for Emergency Department art or displays include:

- Whether Indigenous/Maori art is desirable;
- Having representational art rather than abstract art;
- Using local artists;
- Having children's art or dynamic display boards;
- Having murals, and ceiling painting/art; and
- Having interactive electronic displays/activities.

Pitfalls

- No allocated funds for art in the fixtures, fittings and equipment budget
- No coordinated interior finishes program that incorporates art and promotes healing environments
- Not taking the opportunity for community engagement in tailoring art to the local population and culture

3.3 Bariatric requirements**Purpose**

The growth in obesity among the population has major implications for both the Australian and New Zealand health systems. Emergency Department design needs to take into consideration the physical and emotional needs of patients who are obese as well as providing a safe work environment for staff. The planning of space and equipment also needs to consider the needs of patients of up to 400kg.

Entry

- Ambulance bay requirements (please refer to Appendix 2 for dimensions)
- Doorways should be able to accommodate bariatric wheelchairs and trolleys
- Handrails to support the bariatric patient
- Corridors require adequate width to allow passage of bariatric patient trolleys, associated equipment, plus allow passage of foot traffic in the other direction as a minimum

Waiting room

Twenty per cent of furniture in the waiting room should be capable of supporting larger patients and visitors. Such furniture should be integrated with standard sized seating so as to avoid stigmatisation.

Patient treatment spaces

Each area of the Emergency Department should ideally have at least one treatment space capable of meeting the needs of the bariatric patient, such as:

- A resuscitation bay;
- A general cubicle; and
- An isolation/negative pressure room.

Rooms for bariatric patients should be designed to allow for the accommodation of a bariatric patient trolley/bed with adequate circulating volume.

Bariatric toilets

- Floor mounted toilets
- Room allowance on each side of the toilet for assistants
- Walls reinforced to support grab rails
- Sink capable of supporting additional load

Equipment

- At least one of the dedicated bariatric treatment areas should be designed with ceiling mounted lifting devices. This can be used to facilitate transfer of a patient from ambulance trolley to Emergency Department trolley. Portable machine(s) are an alternative. A suitable storage space for portable lifting machines needs to be provided
- Weigh scale and hoisting device
- Other adjunctive specialist equipment e.g. slide mats

Bariatric patient movement

In the design phase, it is important to consider how bariatric patients may be received, what their patient pathway within the Emergency Department may be, and what their movement to external areas may be i.e. to medical imaging and wards. Specified routes should be developed with corridors free of equipment and viewing mirrors sited to assist with safe patient movement around corners. Floor coverings and gradients also need to be considered when designing these designated routes. Planning should encompass the storage and ready availability of equipment to assist in patient transfers.

Pitfalls

Pitfalls include providing inadequate circulation and turning space in corridors and doorways to accommodate bariatric beds and associated equipment.

3.4 Paediatric facilities in mixed Emergency Departments**Purpose**

Mixed Emergency Departments require facilities that are appropriate to the care of young children who are accompanied by their families or carers. There is significant variation between states and territories in terms of definition/age parameters of a paediatric patient.

Size

The amount of floor space dedicated to the care of paediatric patients will depend on the overall size of the Emergency Department and the numbers of young children seen. Facilities should include:

- A dedicated waiting area that is separated acoustically and visibly from the main waiting area; being appropriately decorated for young children, and including a play area;
- The paediatric waiting room size should be adequate to accommodate prams, parents, and siblings;
- A resuscitation room;
- A trolley based treatment room; and
- Potentially a consulting type assessment room.

Functional requirements

- All rooms should be decorated appropriately for the age population expected
- Treatment rooms should be accessible from the paediatric waiting area
- A resuscitation room may be better placed alongside or be a part of other resuscitation facilities
- Low handles are needed for any room in which children may become stuck. For rooms that should not be accessible to children e.g. laundry, medication preparation areas, high handles and self-closing doors should be incorporated

Spatial relationships

The paediatric waiting area should be visible to nursing staff at all times.

Equipment requirements

- Weigh scales
- Infant resuscitaire
- Equipped as per adult rooms but with equivalent equipment appropriate for children
- Consideration of a second medical services panel dedicated for paediatric patients, thus allowing for the treatment of a mother and child in the same room
- Ideally paediatric sized toilets
- Seating for adults and children
- Provision of an area for baby change, breast feeding
- Adequate space to accommodate prams and wheelchairs

Other considerations

- Dedicated space for the assessment of paediatric patients with mental health conditions
- Television/video facilities

Pitfalls

Pitfalls include designing and building small rooms for children that can subsequently only be used for paediatric purposes.

3.5 Facilities for elderly patients in Emergency Departments

Purpose

There are specific considerations to assist with treatment and management of elderly patients in Emergency Departments. However, these are not always best met by the minimum legal design requirements for the disabled. It is also important to consider that the elderly may be accompanied by relatives, friend or carers who may also act as a spokesperson for the patient.

Size

The size and patient population of the Emergency Department will determine whether facilities for the elderly:

- Justify a specific purpose built elderly patient area/ Emergency Department; and
- Incorporate elderly friendly design into the generic Emergency Department.

Functional requirements

The functional requirements for elderly patients are similar to those required by other adult patients. However it is necessary to recognise the need for greater investment in time for managing elderly patients who are more likely to have complex problems, and who typically have longer lengths of stay in Emergency Departments and in hospital wards.

Spatial relationships

- Consider patient access to the Emergency Department when they arrive by private transport including:
- Proximity to the ED entrance so elderly patients do not need to walk long distances;
 - Short term parking for vehicles close to the ED entrance;
 - Access to wheel chairs;
 - Ease of requesting assistance from patient transfer services;
- Consider privacy needs – deafness in some elderly patients may lead to louder conversations; and
- Consider ease of access to toilets.

Equipment requirements

- High backed and high level chairs
- Mechanical high-low beds to minimize falls risk
- High level adapters for toilet seats
- Appropriate mattresses for pressure care
- Equipment for managing hypothermia: blanket warming cupboards and warm humidifiers

Other considerations

- Access to natural lighting to minimize diurnal disorientation
- Lighting and colour schemes to assist those with poor vision and to reduce glare
- Non-slip flooring
- Hand rails to assist mobility
- Ensure visibility of time and date to help maintain temporal awareness
- Signage – large fonts with high contrast

Pitfalls

- Pitfalls include having doors that are difficult to open for the elderly i.e. heavy doors or doors with strong spring closures.

3.6 Healthy working environment for staff**Purpose**

Unlike patients who spend hours in the Emergency Department, the time a staff member spends in the Emergency Department may amount to months or years. Due consideration needs to be given to the design of the building environment in order to provide and promote a healthy workplace. Factors that contribute to staff wellbeing include:

- Having a place to sit at staff bases and patient bedside (particularly for nurses);
- Having ergonomically friendly design;
- Having ready access to equipment and supplies storage;

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- Having a choice in terms of how and where work is undertaken e.g. ability to work in different parts of the Emergency Department, having standing and sitting staff bases;
 - Workplace design that limits crowding, and provides adequate circulation space;
 - Provision of quieter staff discussion points throughout the ED;
 - Noise control and attenuation;
 - Air quality with respect to thermal comfort, ventilation, and dispersal of offensive smells;
 - Colours, finishes and artwork that promotes a healing ambience;
 - Access to outside views and daylight;
 - Low level lighting at night, assisting in maintaining diurnal body rhythm;
 - Staff facilities physically separate from clinical areas, promoting proper breaks from patient care;
 - Staff rooms that are able to accommodate the maximum possible number of users at one meal break and have enough equipment i.e. chairs, food preparation areas, microwaves;
 - Adequate facilities to promote walking, running and cycling e.g. bike storage, showers, lockers; and
 - Overnight rooms (where provided) that are adequately sound proofed.

Pitfalls

- Inadequate number of staff toilets in the clinical areas
- Lack of adequate circulation space and seating for staff in clinical areas

3.6 Information and Communications Technology

Purpose

Information and Communications Technology (ICT) or Information Technology (IT) is a rapidly evolving aspect of the Emergency Department. It is extremely important that technology is utilised maximally to facilitate patient care and flow.

ICT infrastructure, devices and applications in the Emergency Department can be broadly divided into five areas:

1. Clinical infrastructure, devices and applications requirements;
2. Communications;
3. Administrative areas;
4. Facilities management and security; and
5. Patients, relatives, friends or carers.

Clinical infrastructure, devices and applications requirements

- The use of a common unified communications cabling system for all communications systems (voice, data, nurse call, security and closed circuit television (CCTV)) is to be considered, as this provides advantages particularly when 'IP communications systems' are provided
- Adequate ICT infrastructure ensures ready accessibility to electronic resources, regardless of whether the computer is fixed or mobile
- Desktop computers – ideally, there should be a minimum of one computer between two cubicles, and one computer with associated desk phone every 1200mm of staff base width

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- Minimum of four General Power Outlets (GPO) and four network points (can be allocated to IT or communications functionality) associated with every desktop computer placed in the department
 - A minimum of a double GPO and double network point at every patient treatment space
 - Medical, nursing and clerical staff that are allocated 'in charge of shift' roles should have an area of the Emergency Department that allow frequent interaction and communication. This includes ready access to:
 - Ambulance notification phone/radio;
 - Dedicated phone extension allowing communication between medical staff outside the ED and in primary care to directly reach the Emergency Department doctor in charge;
 - Disaster communications; and
 - Television and media reports.
 - A printer is required for each major area of an Emergency Department. Types of paper and forms per tray should be standardised between printers. The set up should consider that printing should go to a print server rather than from computer to printer. This allows for 'secure' and 'follow me printing', thus avoiding a single printer as a point of failure. Although a paperless department and electronic patient resources are desirable, printers currently still play an important role.

Communications

- Divest in fax and non-digital infrastructure
 - Avoid installing overhead intercom/announcement technology (except as part of hospital wide system of code and emergency notification)
 - Nurse call and emergency assistance infrastructure is essential
 - Adequate mobile phone signal strength
 - An adequate number of desktop phones (see above)
 - An adequate means of telephone communication, either fixed or mobile, in each patient treatment space (utilisation of Voice over Internet Protocol (VoIP) phones have cost benefit implications for use by patient, relatives, friends or carers)
 - Mobile communication devices are required for staff e.g. Digital Enhanced Cordless Telecommunications (DECT) phone, voice activated communication devices and mobile phones. Ideally, devices should be unified using a communications integration platform
 - There should be fixed duress alarms at key locations and mobile duress alarms should also be considered
- Note: that Warden Intercommunication Point (WIP) phones and walkie talkie, or radio phones for mass casualty/disaster situations where conventional modalities of communication may be compromised.*

Administrative areas

- Administrative and office areas require sufficient computers to enable support staff to readily access electronic information - a computer per staff work station - either as a desktop computer, laptop or 'bring your own device' (BYOD). These are commonly configured with the organisation's computer Standard Operating Environment (SOE)
- Due consideration is needed regarding ready availability and secure access to electronic information for clinical staff not in the immediate clinical area, on call, or at home (conventionally achieved through a Virtual Private Network (VPN), or similar such methodology/technology)

Facilities management and security

- Fixed +/- portable duress alarms should be installed as part of ensuring staff safety in the workplace
- Closed Circuit Television should be colour, have 30 day recording capacity and be designed to suit the location and area of coverage required. They should be installed in all entrances/exits, and areas at higher risk of staff safety/security breaches. Additionally, CCTV in areas such as helicopter pads, waiting rooms, and ambulance bays may assist clinical staff in monitoring patient activity

Patients, relatives, friends or carers

- Ready phone accessibility or an area where patients and others are able to use and charge their own mobile phone
- Positive distractors such as music, television, art
- Internet access
- Taxi phone in the waiting room

Other considerations

- Minimal joinery/storage of paper clinical records, hospital records in anticipation of institution of electronic medical records. Although most hospitals are using electronic medical records, there could be a paper/electronic hybrid model in place for many years. Consequently, there may be some paper work requiring storage until it has been transferred to an electronic format. A medical record storage area with secure access would be beneficial
- Emergency Department clinical reference books and core resources should ideally be available electronically and accessible on all computers
- A minimal number of fluorescent x-ray viewing boxes
- A central coordinated communications area
- The use of VoIP and soft extension numbers to create efficiency and portability of voice communications
- Investment in an integrated communications platform to integrate devices (including BYOD) rather than a specific device driven solution
- The need for adequate Wi-Fi infrastructure/density to allow for patient and asset Real Time Location Services (RTLS) to be installed in the future
- The emerging trend of using technology to assist wayfinding in hospitals and attendance self-registration
- RFID Technology to track patient +/- staff movements
- The allocation and installation of a certain number of predetermined stand alone phones/lines which may be utilised in a disaster situation or when the PABX of the hospital is down

Pitfalls

- Inadequate anticipation of number and allocation of space for computers as more medical resources become electronic e.g. pathology and radiology ordering and results, medication management and medical records
- Treating IT as a separate project and not incorporating it into the 'clinical practice, IT, design triad' when designing spaces
- Letting the IT implementation slip to the latter stages of the building program
- Infrastructure not accounting for future trends e.g. lack of adequate GPOs or network points in treatment areas, no Wi-Fi

Current Trends

- GPO and network point(s) at every patient treatment space to accommodate networked diagnostic sets and physiological monitoring
- One computer for every two cubicles is reasonable, but with the move to fully digital electronic records, a computer per cubicle is more appropriate.

4. BUILT ENVIRONMENT: GENERAL CONSIDERATIONS

The design and build quality of an Emergency Department has important effects on the health, safety and satisfaction of staff and patients as well as on the efficiency with which it performs its role.

Patient safety is directly affected by Emergency Department design. Infection risks can be minimised by, for example, the use of single rather than multi-room bays, adequate numbers and placement of hand washing stations, and ventilation systems that are fit for purpose. Falls prevention is aided by the provision of line of sight supervision of cubicles. Medication errors can be mitigated by decreasing the number of bed transfers, which in turn is aided by the use of cubicles of adaptable functionality.

Patient satisfaction can be improved with appropriate lighting, noise control, positive distractions such as views of nature and art, and the inclusion of well thought out wayfinding systems.

There is no a single best model of care. As such, the Emergency Department layout should allow for future changes to accommodate different models of care. Special attention should be paid to the reticulation system for medical gases and suction, the absence of which, in particular areas, may limit their ability to be repurposed.

4.1 Wayfinding

Purpose

The wayfinding system within an Emergency Department should be integrated with the hospital-wide system, utilising the same styles and conventions. It is recommended that signs be placed at each major intersection and destination. Where a route does not involve intersections or opportunities to go astray, signs should confirm the route approximately every 30 metres. The use of electronic wayfinding and or information kiosks is becoming increasingly common.

Other considerations

- Some Emergency Department are now unable to have lines on the floor due to infection control issues so wayfinding directions may need to be on the wall
- Room signs for toilets should be prominent so they can be easily seen by patients when looking down corridors
- Signage that includes braille for visually impaired patients
- A hearing loop system or an infra-red system to assist people using hearing aids

Pitfalls

Pitfalls include having major corridors ending in 'T' junctions and another corridor, instead of providing a staff base or 'touch point' for patients and visitors to be directed through the Emergency Department.

4.2 Finishes and robustness

The level of finish in areas of an Emergency Department should be robust and easily cleaned with hospital disinfectants, without deterioration. Bed bumpers and reinforcing in walls are desirable where potential contact with trolleys occurs.

4.3 Lighting

Purpose

Ambient lighting in an Emergency Department should provide a calm atmosphere and, as much as possible, make an attempt to mimic the diurnal rhythm, through the dimming of lights at night-time.

Sunlight has been demonstrated to have a positive influence on a patient's health and well-being and has the potential to reduce stress, the perception of pain and the symptoms of depression. Bright morning light has positive effects on agitation in patients with dementia. Daylight ingress should be considered in the Emergency Department design however, glare should be eliminated and electric lighting should be designed to supplement and balance incoming daylight.

Each clinical area should be equipped with task lighting which can be directed to areas in which it is required. A desirable illumination level for task lights is 30,000 lux.

Importantly, solar glazing, paint colours and artificial lighting must not mask the perception of patient skin tones.

In general, lighting should be arranged to minimise glare. Lighting should not shine directly into patients' eyes at any point on their journey – particularly not over their beds in bays or along corridors through which patients will be transported in the supine position.

Dimmable lighting in patient treatment spaces is ideal.

Pitfalls

- Maintaining a fully lit clinical environment throughout the night
- Not having dimmable lighting or dual level lighting, particularly in areas such as the distressed relatives' room, eye room, procedure rooms
- Having an Emergency Department with no visual access to natural light/external weather conditions

4.4 Sound attenuation

Purpose

Emergency Departments should be designed so as to minimise the transmission of sound between adjacent treatment areas. Sound levels should conform to Australian and New Zealand Standards [7] and World Health Organization (WHO) guidelines on night noise. The WHO recommendations for noise levels in hospitals are frequently exceeded [8], and this has been linked to poorer patient outcomes and increased levels of stress in both staff and patients. Noise may also make communication unintelligible. Conversely, poor acoustic insulation may infringe upon patients' privacy.

Strategies for combatting problems with noise levels include:

- Single rooms;
- Sound-absorbing ceiling tiles;
- Ceiling battens;
- Soft floor coverings (where hygienically acceptable);
- Situating clinical areas away from unavoidable sources of noise; and
- Using solid or glass doors and walls rather than curtains.

Pitfalls

- Staff bases that allow for conversations to be easily overheard by patients in adjacent cubicles
- Lack of a dedicated patient handover area(s)
- Lack of solutions/systems in place that minimise the need for using overhead call systems i.e. for locating staff or keys

4.5 Privacy

- For patient privacy, ideally all Emergency Department cubicles are single
- For cubicles, three walls and curtain (as a minimum) are required
- Certain types of cubicles should include walls/robust partitions and a door for privacy and noise attenuation; especially those for paediatric patients, migraine patients, and for gynaecological procedures

4.6 Infection control standards and hand hygiene**Purpose**

Hand wash basins with hands-free taps should be readily available adjacent to all treatment areas and patient cubicles as well as in:

- Resuscitation rooms;
- Point of care testing areas;
- Dirty utility rooms; and
- Staff room [9].

For non-soiled hands, alcohol-based hand rubs (ABHRs) are an effective alternative to detergents, causing lower rates of dermatitis. They should be readily available, mounted on walls, trolleys or similar, at all entrances to the Emergency Department, and in all clinical areas. Although unpalatable, ABHRs are toxic if ingested in quantity, and care should be taken with positioning them especially where there are paediatric and other patients with impaired judgement or tendencies towards self-harm [10].

4.7 Service panels

Purpose

Service panels provide power supply for equipment, medical gases and suction, and point of bedside communications.

Functional requirements

Service panels should be minimally equipped as follows:

Resuscitation room (for each patient space)

- 3 oxygen outlets
- Medical air outlet*
- 3 suction outlets
- 16 GPOs in at least two separate panels (at least 50% on essential power)
- Nitrous oxide outlet with scavenging unit*
- 6 data outlets:
 - Staff call panel;
 - Allows for physiologic monitor networking plus remote monitor; and
 - Includes phone and computer.

Acute treatment bed - adult and paediatric

- 2 oxygen outlets
- Medical air outlet*
- 2 suction outlets
- 8 GPOs in two separate panels (at least 50% on essential power)
- Nitrous oxide outlet with scavenging unit*
- 4 data outlets:
 - Allows for physiologic monitor networking;
 - Staff call panel; and
 - Phone (optional) and computer.

**Optional depending on the model of care/equipment used.*

Procedure room/suture room/plaster room

- 2 oxygen outlets
- 2 suction outlets
- 8 GPOs in two separate panels (at least 50% on essential power)
- Nitrous oxide outlet with scavenging unit*
- 6 data outlets:

- Staff call panel;
- Allows for physiologic monitor networking; and
- Includes phone and computer with PACS (Picture Archiving and Communication System) access.

Consultation room

- 1 oxygen outlet
- 1 suction outlet
- 4 GPOs (at least 50% on essential power)
- 4 data outlets:
 - Allows for physiologic monitor networking;
 - Staff call panel; and
 - Includes phone/computer.

External service panels

- 3 oxygen outlets
- 2 suction outlets
- 12 GPOs in at least two separate panels (all on essential power)
- Nitrous oxide outlet with scavenging unit*
- Staff call panel

* Optional depending on the model of care/equipment used.

5. BUILT ENVIRONMENT: SPECIFIC ROOMS AND FUNCTIONAL REQUIREMENTS

When designing an Emergency Department, it is important to consider that each specific room must be designed in order to ensure the safe and efficient delivery of healthcare to patients by Emergency Department staff. Rooms must be safe and hygienic, as well as equipped with adequate and secure storage, and the required medical equipment.

Room space should be determined by function, activity, equipment, station and ergonomics. The number of staff and patients that are likely to be utilising a specific room at a given time must also be considered, as the physical composition of a room within the Emergency Department plays a significant role in its functional capacity.

When designing rooms within the Emergency Department and planning their placement, it is also necessary to consider the spatial relationships between these rooms. Direct access from one specific room within the Emergency Department to another is often required, and it is therefore important to consider that swift access must be facilitated to and from rooms by both staff and patients.

5.1 Ambulance bay/ambulance reception

Purpose

An ambulance bay is used for the delivery of both ambulant and non-ambulant (trolley bound) patients to the Emergency Department by the ambulance service. It has a possible secondary function as a decontamination zone, and as a triage and/or treatment area for Mass Casualty Incidents (MCIs). Depending on the design brief, it may also be used as a parking area and as a point of emergency access to the ED for other emergency services i.e. police, fire brigade.

Size

- Size is governed by the potential number of ambulances attending the Emergency Department at any one time
- A minimum of two spaces for each 4 x 6m per vehicle is required. There must be an allowance for an unloading space at the rear of the vehicle's side door opening and pedestrian access along both sides of a parked vehicle
- Adequate circulation space is required at the rear of parked ambulances in order to manoeuvre stretchers
- Sufficient space is required in front of parked ambulances to enable manoeuvring of vehicles consistent with the turning circle of local vehicles
- Lifting should be minimised by the provision of a plinth or a similar system if drop-down stretchers are not used by the local ambulance

Refer to Appendix 2 for standard and complex patient ambulance vehicle dimensions.

Functional requirements

- Dedicated and separate ambulance vehicle access and egress
- Signage including ground marking for vehicle bays
- Adequate lighting
- Ability to off-load and load patients safely
- Ability to transfer patients rapidly, with ready access to trauma/resuscitation rooms in time critical situations
- CCTV – usually with feedback to security, triage and staff station where the nurse in charge is situated
- Adequate overhead weather protection, including wind protection
- Privacy screening or a location out of public view

- Ability to clean and 'reset' ambulances ready for the next patient episode

Spatial relationships

- Direct access to triage or a dedicated ambulance triage area
- Ideally, direct access to trauma/resuscitation rooms
- Access to ambulance dedicated store room with cleaning facilities

Equipment requirements

- Non-slip surfaces
- Adequate drainage system
- Access to wheelchairs
- Airlock on ambulance entrance with controlled entry
- Anti-soiling systems on entrance for foot and wheel contamination
- Trolley wash
- Hand wash facilities

Other considerations

- External decontamination facilities may need to be factored into the design
- For bariatric patients, weigh scales, and patient lifting devices should be considered
- A gun safe is recommended, for when police are present in the Emergency Department

Pitfalls

- No ambulance parking provided to allow non-offloading vehicles to clear the drop-off zone
- No dedicated and exclusive vehicle access and egress
- An ambulance entrance that is not exclusive or controlled
- Inadequate drop-off and parking facilities for ambulances, police cars and hospital transport

References

- [11]

5.2 Decontamination room/area**Purpose**

A decontamination room is used to decontaminate patients prior to entering the Emergency Department, including those who have potentially or actually been exposed to, or contaminated with toxins, chemicals, radioactive materials and other hazardous substances.

Size

The size of such a decontamination room is dependent on a hospital's role in the regional or state emergency response to Mass Casualty Incidents.

Size can be broadly divided into:

- Decontamination of one to two persons e.g. farm exposure to insecticides;
- Decontamination of up to ten people e.g. facility chemical leakage; and
- Large scale decontamination e.g. Mass Casualty Incident involving local or state emergency response.

Functional requirements

- A flexible water hose, floor drain and contaminated water trap (if required by regulation)
- Both ventilation and drainage systems must be independent and capable of being isolated
- Privacy from public view
- Area to perform immediate life saving measures by staff
- Ideally, there is separation of ambulant and non-ambulant patients

A decontamination area consists of:

- A de-robing area;
- A decontamination area including water hose;
- A drying off area; and
- An entry to the Emergency Department proper.

Spatial relationships

The decontamination room should be directly accessible from the ambulance bay without entering any other part of the Emergency Department.

Other considerations

- Ideally, tepid water should be available via the water hose/shower
- In planning this room, there is a need to think through a decontamination pathway – external access separate from normal access
- Engagement with local fire services may also be required in terms of planning and space required for decontamination areas
- Consideration of contaminated water collection tank depending on local regulations

References

- [12]
- [9]

5.3 Disaster and decontamination store

Purpose

The secure storage of specific equipment is required in order to manage an Emergency Department's disaster response including that from a chemical, biological or radiation incident.

Functional requirements

- Any storage must ensure Personal Protective Equipment (PPE) is not damaged by environmental factors e.g. sun or heat exposure
- Secure storage of equipment

Spatial relationships

- Adjacent to decontamination zone in ambulance bay
- A clear space is required outside the decontamination zone for donning of PPE

Spatial relationships

- Organisation of PPE so that access to equipment and correct size is quick and easy
- Charging facility for equipment e.g. ventilators
- Decontamination materials e.g. decontamination solutions/dry decontamination compounds
- Spill kits
- MCI/decontamination equipment may include signage, barriers and mobile privacy screening

Other considerations

- May be stored in modular form or palletised if transportation is required
- May form part of a regional cache

Other considerations

Pitfalls include having inadequate space or non-dedicated storage or disaster equipment.

5.4 Ambulance store

Purpose

- An ambulance storage area facilitates re-stocking of ambulances that require rapid turnaround
- An ambulance storage area is also a secure area for the return of ambulance equipment, and a cleaning facility for ambulance equipment and vehicles
- It may also incorporate a rest area for ambulance personnel if other Emergency Department rest areas are not available to them

Functional requirements

- Equipment used to re-stock ambulances
- Cleaning equipment, including outside tap

Spatial relationships

- Ambulance bay
- Internal access from triage area may be an advantage

Equipment requirements

- Secure storage system for consumables which may include drug storage
- Cleaning bay for contaminated equipment
- Secure disposal of contaminated materials including sharps

Pitfalls

Pitfalls include having small cupboards in unsecured areas.

5.5 Triage

Purpose

A triage area is designed for the initial clinical assessment of patients and allocation of an urgency score using the ATS. It has a single point of entry for acute patients, and it provides controlled access to treatment areas and to the wider hospital. To fulfil the concept of 'triage first', the triage and reception areas should be designed so that the first point of contact for patients is the Triage Nurse.

Size

The size of a triage area should be governed by the maximum number of triage staff expected to be present at any given time, in proportion to patient census.

Functional requirements

- Triage assessment
- Administration of simple treatment measures e.g. dressing, analgesia, ice, splinting
- Preserve patient privacy and confidentiality
- Security for staff and patients e.g. duress alarm system and CCTV

Spatial relationships

- Ambulance and walk-in entrances
- Internal hospital entrances if Emergency Department bypass from triage systems in operation
- Reception, incorporating the concept of 'triage first'
- Waiting room

- Relationship of triage to areas used by nurses to rapidly perform electrocardiography (ECG) or take blood
- Relationship of triage Fast Track/discharge areas
- Location to advanced Nurse Practitioners providing care
- Relationship to x-ray department and wheelchair route for nurse initiated x-rays
- All acute treatment and assessment areas
- Resuscitation, adult and paediatric assessment, and consultation areas

Equipment requirements

- Mobile patient assessment and monitoring equipment
- Equipment and medications for simple treatment measures
- A triage assessment room incorporating (nude weight) baby weighing facilities
- Wheelchairs and emergency trolley
- Communication system
- Electronic information entry portal (computer terminal or hand held device)
- Security and duress alarms

Other considerations

- The need for design to allow for staff to have a clear line of sight into waiting room
- The adoption of models of care incorporating medical triaging and RAT systems will necessitate an appropriate increase in size in order to accommodate these additional functions
- The ability to accommodate an additional Triage Nurse during busy periods
- The ability to accommodate a Waiting Room Nurse and their equipment requirements
- Pneumatic tube system in the triage/reception area
- Two sided triage with the secondary triage assessment areas to re-assess waiting room patients

Pitfalls

- Split triage areas
- Not having a single triage point of entry for all comers, ambulance and walk-in patients
- Not having a triage area located at the entrance hub
- Not being aware of the Disability Discrimination Act (DDA) and the implications of this for design. For example at the Triage desk where requirements state that there must be wheelchair access for the patient. Consideration must be taken regarding how this affects the space for an administration office or Triage Nurse on the other side of the desk

Current trends

- A pneumatic tube system in the triage area for pathology specimens to be sent to a lab
- Some EDs have placed less emphasis on traditional triage practices with respect to patient location and flow, adopting instead:

- Arrival time based initiation of treatment;
- Streaming of patients to an appropriate area within the department;
- Mobile triage; and
- Bedside triage.

Many Emergency Departments are developing an ambulance offload area that is staffed by nurses. The presence and use of these areas to benefit patient care and flow through the Emergency Department is not supported by current evidence and cannot be included as a recommended area for inclusion in this revision of ACEM's Emergency Department Design Guidelines.

5.6 Patient registration and reception area

Purpose

Patient registration at the reception area allows for the electronic recording of the personal details of presenting patients after triage. This information is required for production of the necessary paperwork and patient labels, for the current episode of care. At reception, hard copy medical records are also retrieved.

Size

Size is governed by the number of reception work stations required for patient census.

Functional requirements

- Dedicated registration area co-located with triage
- Access to an electronic patient information entry portal
- Mechanisms to ensure privacy for disclosed patient details and/or displayed patient information
- Security of staff from any aggressive patients
- Duress alar
- The use of mobile registration at the bedside using mobile devices or bedside computer terminals

Spatial relationships

- Relationship with retrieval of hospital medical records if they are not electronic
- Relationship to a Triage Nurse, either as a triage and a registration pairing, or a separate area for registration only (following triage)
- Relationship to the ambulant entrance of the Emergency Department (often a Registration Clerk is responsible for regulating entry and exit to the Emergency Department)
- Relationship to the entrance of the hospital after hours
- The design must allow for clinical staff to have a clear line of sight into the reception area

Equipment requirements

- A comfortable and ergonomic workspace
- Computer workstations (may be portable)
- Phone and other forms of communication

- Printer
- Forms and stationary storage

5.7 Waiting room

Purpose

A waiting room is intended for patients to wait in both before and after triage, for entry to treatment areas, for waiting for transportation post-discharge, or for accompanying persons waiting.

Size

The size of a waiting room is governed by annual census and models of care, and is also influenced by the role of the Emergency Department within the whole hospital, as well as local cultural factors.

Functional requirements

- Observation of waiting patients for clinical and security reasons
- Minimise patient agitation e.g. décor including appropriate art works, lighting and seating arrangements
- Maximise patient comfort by providing:
 - Ambient temperature control
 - Access to food and drink;
 - Toilets;
 - Special requirements for the disabled, for children, and for mothers and babies i.e. feeding and nappy change facilities, secure play areas that can be observed by seated parents or carers;
 - Patient information including signage and indication of wait times, access to written material and public health information;
 - Distractions from the wait e.g. public television, magazines, video entertainment for children
 - Emergency call system e.g. patient activated in toilets;
 - External vehicle drop off area and provision for short term parking;
 - Facilities for communication e.g. public phone, free taxi phone;
 - Facilities for the disabled including those in wheelchairs or with mobility, sight, or hearing impairment;
 - Adequate signage and wayfinding; and
 - Seating to accommodate for mobility aids wheelchairs.

Spatial relationships

- Triage
- Reception
- Ambulance and walk-in entrances
- Clinical areas of the Emergency Department

Equipment requirements

- Portable patient monitoring and assessment equipment
- A security system including monitored CCTV, emergency call system including duress alarm for staff
- Display system for patient and public health information
- Seating and fixtures that cannot be used as weapons in the event of an altercation

Other considerations

- Colour coded seating for zoning
- An electronic display with current waiting times
- Sub-waiting areas within the Emergency Department
- Facilities for charging mobile phones and electronic devices
- Electronic systems that allow patients to be in other areas of the hospital whilst waiting, and then be recalled when they are able to be seen by a clinician

Pitfalls

- Inadequate wayfinding
- Waiting room that is too small
- Inadequate distractions
- Oppositional seating
- A poor public announcement system that cannot be heard
- Door swings that become hazardous or automated doors that are unduly sensitive to passing pedestrian traffic

5.8 Security

Security issues arise in all Emergency Departments, exacerbated by drugs, mental illness and anxiety amongst patients and those accompanying them. Much work has been done on Crime Prevention through Environmental Design (CPTED), and some of the most relevant security recommendations are listed below:

- External design of the ED must be carefully considered, as Emergency Departments are usually open 24-hours and the public congregate around it at all times of the day. The external design needs to be designed in such a way that there was no areas in which people can hide, or that these areas are limited;
- CCTV cameras in visible locations. It has been suggested that having an additional monitor facing the patients gives them a stronger visual cue that they are being observed and are accountable for their behaviour;
- Proximity of security staff to the Emergency Department, preferable visible at all times;
- Clear communication methods and duress alarms throughout the Emergency Department, including in ambulance bays;
- Physical barriers to aggression - for example, glass screens for triage and clerical staff. These unfortunately have the potential to make communication more difficult;
- Well-maintained facilities;
- Clear verbal and signed communication and wayfinding, to mitigate anxiety;

- Fixtures should have minimal sharp edges and be well-secured; and
- Access points to clinical areas should be controlled, with swipe or proximity card access.

References

- [9]
- [13]
- [14]

5.9 Trauma and resuscitation rooms

Purpose

A trauma room provides reception, assessment and initiation of treatment of patients who have been subjected to major trauma.

A resuscitation room provides reception, assessment and initiation of treatment for patients who have life threatening or time critical illness.

Size

- A trauma room should be at least 30m²
- A resuscitation room should be at least 25²

Functional requirements

- An assembly area for the trauma team with ability to assign roles and gown up
- Rapid reception of patient from waiting room, ambulance bay or helipad
- Rapid off load from ambulance stretcher to ED trolley with minimal manoeuvres
- A central mobile trauma trolley with 360 degrees access to patients
- All medication and equipment at hand and stored in or immediately adjacent to the room
- Adequate floor space to accommodate mobile equipment e.g. ultrasound machine
- Adequate shelving to accommodate medication and equipment required for trauma care
- Adequate space to accommodate the maximal personnel concurrently involved in treating a patient

Spatial relationships

- Access from the waiting room, ambulance bay or helipad
- CT scanner should be close to resuscitation room
- Ready access to the radiology department and operating theatre/Intensive Care Unity
- It is desirable for resuscitations rooms to be equipped for radiology
- Relationship to the distressed relatives' room that provides for privacy of relatives in the room, and in transit to the trauma/resuscitation rooms

Equipment requirements

- Staff workstation area with computers, phones and dedicated PACS
- Staff workstation area dedicated to the work a nurse may perform as a scribe
- Full monitoring equipment, including invasive monitoring
- Service panel or pendant(s). pendants can make full access of services to patients easier
- Diagnostic set
- Nurse call and an emergency alarm
- Procedure light(s) able to illuminate all parts of the patient
- Floor space for mobile equipment trolleys typically including an airway trolley, circulation trolley, two procedure trolleys, plaster/splint trolley, ultrasound machine
- Shelving/storage to accommodate equipment and procedure packs
- Accommodation for non-infectious waste and sharps
- ABHR, non-sterile gloves and procedures hand basin
- Patient gowns and bed linen
- Whiteboard

Other considerations

- Fully digital radiology may improve the function of a trauma/resuscitation area
- An example of excellent resuscitation design is several identical rooms that are all interconnected
- The ability to maintain patient privacy, whilst allowing ready access and monitoring by clinical staff
- Use of pendants rather than wall mounted service panels
- Adjacent equipment store for portable equipment and other commonly used items
- Ceiling rail for IV fluids (though trolleys with IV poles incorporated make transport much easier)
- Plumbing to accommodate for haemodialysis
- Adequate floor space to accommodate for Extracorporeal Membrane Oxygenation Equipment (ECMO) in certain institutions

Pitfalls

- Inadequate space to accommodate the maximal personnel concurrently involved in treating a patient
- Resuscitation areas that are located too far from the ambulance bay
- CT scanner too far from the resuscitation area

5.10 Isolation rooms**Purpose**

Isolation rooms should be provided for the treatment and possible resuscitation of potentially infectious patients, or for the protection of immunocompromised patients.

Terminology

- Class: New South Wales and Victoria
- Type: Other jurisdictions as per HB260 (Standards Australia 2003c)
- Class S – Positive pressure: Patient protection – Type 4
- Class P – Positive pressure: Patient protection – Type 3
- Class N – Negative pressure: Respiratory isolation – Type 5

The types and functions of isolation rooms are further describe in Part D of the Australasian Health Facility Guidelines [12].

Size

- Each Emergency Department should ideally have at least one isolation room
- Each room should be of similar size to an acute treatment bay to allow for the treatment and resuscitation of critically ill isolated patients if required
- The anteroom should be such a size as to allow for adequate supplies of PPE, linen and supplies and for waste disposal inside the room

Functional requirements

- Respiratory isolation rooms for patients who require airborne droplet nuclei isolation (Type 5) should have negative ventilation, an anteroom with scrub up facilities (Type A hand-basin), and be self-contained such that they have shower/toilet en-suite facilities that are compliant with Australian Standards
- The air handling systems designed for airborne infection isolation should be connected to the emergency backup power in case of power failure
- A communication system should be provided so that staff and patients can communicated with people outside the room without having to leave the room

Spatial relationships

- Positioning of these rooms should be adjacent to the triage area where patients are received to allow for the immediate isolation of potentially highly infectious patients without the need for the patient going through and potentially contaminating or infecting other patients in the Emergency Department
- Each Emergency Department should have one Type 5 isolation room with additional requirements being determined by hospital location, role and patient demographics

Equipment requirements

- The room should be fitted as per acute treatment areas
- Macerators for the treatment of human wasted or individual equipment sterilisers should be considered
- A Type A clinical basin – large (scrub basin)

Other considerations

- Type 5 negative pressure rooms are not suitable for potentially immunocompromised patients – these patients require a Type 4 standard isolation room, or Type 3 positive pressure patient protection room

- Isolation rooms may also be used to treat patients with conditions that require separation from other patients e.g. patients who require privacy for clinical conditions, or who are a source of visual or auditory distress to others

Pitfalls

- Isolation rooms that have the capability of being switched between negative and positive pressure, as inadvertent inappropriate pressure selection may occur
- A Type 5 isolation room that cannot be securely locked from the inside if it has a separate entry in addition to the anteroom. Such a room must not be able to prevent entry whilst in use as a Type 5 isolation room
- Not having enough negative pressure rooms for the demographic type of patients attending the hospital

5.11 General/acute treatment cubicles**Purpose**

A general/acute cubicle is required to assess, manage and initiate treatment on patients with a high likelihood of admission.

Size

- Minimum treatment area should be 12m²

Functional requirements

- Space to fit a standard mobile trolley
- Space to fit essential equipment e.g. oxygen masks
- Space for accompanying persons to sit comfortable (minimum of two people)
- Space to allow procedure trolleys to be at the bedside, and functional
- Where possible, the cubicle should have solid walls extending from floor to ceiling in order to provide privacy for the patient
- The cubicle should be able to be closed at the entrance by either a sliding partition (preferable), or a curtain
- Storage for limited amounts of linen and easy access to bedside equipment
- Direct observation is possible from the staff position

Spatial relationships

- Ready access to clean and dirty utility rooms
- Ready access to the medication room
- Ready access to patient toilets/shower

Equipment requirements

- A service panel
- A nurse call and emergency alarm
- A diagnostic set including ophthalmoscope and otoscope

-
- Monitoring equipment
 - An examination light
 - A storage area to accommodate emergency airway equipment, and bedside equipment
 - A sharps bin, non-infectious and infectious disposal bin
 - Patient gowns and bed linen

Other considerations

- A ceiling rail for IV fluids (though trolleys with IV poles incorporated make transport much easier)
- A defined number of cubicles fitted with lifting equipment for the disabled or bariatric patient
- Cubicles catering for the elderly or children
- Internal decoration of the room e.g. colour, health promotion posters, art/television on the roof for people on spinal precautions
- Natural light, wherever possible

Pitfalls

- Inadequate footprint resulting in limited circulation space and space for IV trolleys
- Inadequate lighting and lighting that cannot be dimmed
- Limited privacy – three sides of cubicle curtained, conversations able to be overheard by adjacent patients
- A lack of correct disposal bins for infectious and non-infectious waste

5.12 Acute mental health area**Purpose**

Patients suffering from an acute psychological or psychiatric crisis have unique and often complex requirements. An Emergency Department should have adequate facilities for the reception, assessment and stabilisation and initial treatment of patients presenting with acute mental health problems.

It is not intended that an Emergency Department should reproduce the facilities of dedicated mental health admission centres, nor should it be used for prolonged observation of uncontrolled patients. The main purpose of such an area is to provide a safe and appropriate space for patient interviews and stabilisation.

Acute presentations of patients with a behavioural disturbance of whatever cause, have the potential to disrupt the usual operation of an Emergency Department. Conversely, the busy environment of an Emergency Department may not be conducive to the care of patients with an acute mental health illness.

Patients presenting with symptoms of an acute mental health crisis may have co-existent medical problems that require concurrent management. Life-threatening illness or injury remains the first priority, and should be managed within the appropriate clinical area of the Emergency Department.

In the interest of good patient care, uncontrolled patients should never be left unsupervised in any area of an Emergency Department, and the acute mental health area should be remote from paediatric areas.

Size

Ideally, the space should contain at least two separate but adjacent areas including an interview room and examination room. Each should have a minimum size of 16m².

There should be capacity to accommodate discussion amongst multiple people e.g. family members and more than one health professional concurrently.

Functional requirements

- Provide an area that is conducive to the assessment of patients with mental health issues, and for discussion with family/friends
- Ensure patient and staff safety
- Décor promoting a sense of calm, the consideration of patient comfort
- Easy access to assistance should a threatening situation arise

Privacy

- The area should be separate enough from adjacent patient care areas to allow for the privacy of both the mental health patient and for the protection of other patients from potential disturbance or violence
- There should be both acoustic and visual separation from adjacent clinical areas, but ready access for staff in the event of an urgent need for intervention
- Patients should be continuously observable by staff either directly or via CCTV

Spatial relationships

- The acute mental health assessment facility should ideally be located in, or adjacent to, the Emergency Department
- A separate mental health facility needs to be close enough to the main staff base area of the Emergency Department in order to allow for adequate response and observation, unless it is to have its own staffing
- A separate secure entrance for use by community emergency mental health teams and police may be desirable

Equipment requirements

- Smoke detector
- Duress alarm
- Electrical outlets and medical gasses (if installed) that are not accessible to the patient

Other considerations

Safety for staff

- The room should not contain objects that could be thrown at staff
- The exit doors should open outwards
- If a window is incorporated, it should be made from shatter-proof material

Safety for patients

- All window furnishings such as shading devices and others, should be appropriately designed and located so that they cannot be accessed by patients and potentially used for self-harm

- The area should be free of mobile or breakable furniture, sharp or hard surfaces which could injure an uncontrolled patient – furniture made mostly of foam rubber has an advantage in this regards
- CCTV in any mental health assessment areas should be concealed in order to minimise distress for those patients suffering from paranoia
- The area should be arranged to ensure that patients have no access to air vents or hanging points, and should also incorporate tamper resistant electrical fittings
- The area should be shielded from external noise and designed in such a way that direct observation of the patient by staff outside the room is possible at all times
- Medical gasses, if fitted, should be located behind a solid non tamper proof roller panel accessible by staff via swipe care access

Pitfalls

- Designing a self-contained area that cannot be adequately staffed or monitored creates clinical risk and becomes useable. This results in patients being managed in a general Emergency Department environment that does not meet the needs of this patient group.

Current trends

- Mental Health Assessment units are now being developed and trialed. Such units operate along SSU principles i.e. being for up to 24-hour stays

5.13 Behavioural Assessment Room (BAR)/Safe Assessment Room

Purpose

- The Behavioural Assessment Room/Safe Assessment Room is required for safe management of acutely disturbed and violent patients
- When receiving a patient from the ambulance or police who is violent, aggressive or behaviourally disturbed, they are triaged immediately to this area for urgent assessment and containment, if required
- Once calm, the patient can be brought out into the main work area of the Emergency Department without disrupting the work of the Emergency Department or distressing other patients, relatives, friends or carers
- This area allows for the privacy and dignity of the patient to be maintained

Size

This area should be no less than 16m².

Functional requirements

- The room is used for rapid assessment and containment only
- There must be the capacity to close the door and observe through a window, but the BAR is not designed for long-term seclusions. A staff member is to be with the patient at all times if they are in the BAR. If patients from the main Emergency Department area become violent or behaviourally disturbed, they should be taken to the BAR for further management (and then brought back out to the main Emergency Department once settled).

Spatial relationships

- Next to triage in the ambulance reception area
- Immediately adjacent to the resuscitation cubicles, but separated from them by a large glass security access door

Equipment requirements

- Trolley with limb restraints
- Locked cupboard in the wall for oxygen and suction

Other considerations

It is vital to have robust local procedures for how the room is used/operates, and how behavioural disturbance is managed.

5.14 General consultation area and Fast Track/ambulatory area**Purpose**

The consultation area (also known as the Fast Track area, sub-acute, minors or ambulatory care area) should be an area dedicated to the management of patients without major illness, who do not require resuscitation or monitoring; often these patients are non-complex, presenting with single system conditions and traumatic injuries.

Functional requirements

- The area is for assessment and treatment of patients who are mostly ambulatory and who are anticipated to go home
- The design should be based around a rapid turnover of patients

Spatial relationships

- There should be access directly from the reception/triage and waiting room areas without having to pass through other areas
- Ready access to x-ray

Equipment requirements

- There can be some benefit to having dedicated trolleys (e.g. suture/dressing/cannulation) prepared and stored centrally in the area, rather than stocking each room with all potentially required equipment
- An examination chair or couch
- A service panel
- Wall mounted diagnostic set
- A desk with computer and forms storage
- Two patient chairs
- Adequate space to accommodate a wheelchair

Other considerations

- Some rooms within this area may be dedicated to a specific function. The area should be fully reticulated with gas, suction, power and data points to accommodate any future change in role

Pitfalls

- Having write up areas that are too small
- A consultation area that is too small with no ready access to an adjacent waiting area
- Locating the consulting area away from other clinical areas. This results in staff feeling isolate

Current trends

- Some Emergency Departments have non-private rooms but have common areas with chairs allowing several patients to be treated
- Bigger consultation areas, with their own sub-waiting areas. This demonstrates the nature of Emergency Departments' changing business, and the way Emergency Department staff work

5.15 Eye room**Purpose**

- Used for assessment of patient's visual acuity using a Snellen chart
- Detailed examination of patient's eyes using a slit lamp and/or fundoscopy
- Examination and treatment of common eye conditions including blunt trauma, foreign bodies, chemical splashes and glaucoma

Size

The eye room should be at least 12m² (unless combined with other rooms e.g. ENT room)

Functional requirements

- Consultation room type set up
- Slit lamp examination
- Ability to dim lighting in room
- Ability for patients to sit reclined
- Ability to irrigate a patient's eye
- Ability to black out the room

Spatial relationships

The eye room is in the ambulatory/discharge/Fast Track area of an Emergency Department as most patients stay a short period and will go home after treatment.

Equipment requirements

- Desk with storage area for forms
- Diagnostic chart
- Eye chart – traditionally a 6-metre chart. Consider using a 3-metre chart (eliminates the need for reflective mirror) which is best if well illuminated
- Marking on wall/floor to determine correct distance from eye chart
- Slit lamp and two examination chairs
- Hand basin/facility to irrigate eye, or hairdressers basin
- Ability for patient to lie recumbent either in chair or on examination couch
- Shelving for eye equipment (eye pads/shields/cotton buds)
- Refrigerator for eye medication requiring refrigeration
- Computer (ideally) to enable patient to be seen, treated and discharged from room

Other considerations

- Combining the eye room with ENT room
- Place slit lamp lighting on timer
- Wall mounted ophthalmoscope and otoscope for those patients not tolerating slit lamp examination
- Ability to dim room lights rather than an on/off light switch

Pitfalls

- A lack of circulation space around slit lamp
- Inability to lie patient down, if required
- Not having access to both sides of the patient
- Having the eye room as part of another room, rather than it being a separate room

5.16 Ear, nose and throat room**Purpose**

The Ear, Nose and Throat (ENT) room is used for the examination and treatment of ENT conditions, such as removal of foreign bodies in the ear or epistaxis.

Size

The ENT room should be at least 12m² (unless combined with other rooms e.g. eye room).

Functional requirements

- Consultation room type set up
- Ability to sit reclined or lie supine
- Ability to use suction for the removal of aural or nasal foreign bodies

- The ability to examine the ear canal using a specialised ENT microscope
- Ability to perform aural toilet

Spatial relationships

- The ENT room is in the ambulatory/discharge/Fast Track area of Emergency Department, as most patients stay a short period and will go home after treatment
- The dirty utility room is for the disposal of blood stained linen

Equipment requirements

- Staff desk with computer, forms storage
- Diagnostic set on wall
- Chair/couch with the ability to position the patient anywhere between supine and upright
- ENT microscope
- Wall mounted suction
- Oxygen, suction, monitoring equipment
- Shelving or ENT trolley containing all equipment for treatment of most common ENT presentations e.g. ear specula, nasal packs, suction tubing
- Head lamp storage
- Ready access to clean and dirty linen
- Infectious and non-infectious waste disposal

Other considerations

- Combination of the room with the ophthalmology room
- Secure storage of therapeutic medications (otitis external ointments/drops, silver nitrate sticks)

Pitfalls

- A lack of circulation space and access to both sides of the patient
- Inability to lie the patient down (if required)
- Inability to cope with a patient who collapses
- Having the ENT room as part of another room, rather than it being a separate room

5.17 Plaster room**Purpose**

The plaster room is used for the application of splints, plasters and mobility aids, associated with musculoskeletal injuring, dislocations and fractures. Procedural sedation and reduction of dislocations and fractures also occurs commonly.

Size

The room should be at least 20m² in size (unless combined with other rooms e.g. procedure room)

Functional requirements

- Adequate size to allow a trolley
- Appropriate physiological monitoring systems and resuscitation equipment to allow safe analgesia and sedation
- Adequate room/storage capacity to allow for procedure trolleys and equipment e.g. tourniquet matching
- Room to accommodate portable x-ray of image intensifier
- Access to the patient from both sides

Spatial relationships

- The plater room is in the ambulatory/discharge/Fast Tract area of the Emergency Department, as most patients stay in the plaster room a short time and will go home, to a ward or elsewhere in the Emergency Department after treatment
- There should be consideration of placing the plaster room close to both minor and major areas of the Emergency Department if sedation is likely to occur in the room
- The close proximity of the plaster room to the medication area would allow for ready access to local anaesthetics and take home analgesics

Equipment requirements

- Staff workstation with computer, phone and form storage
- PACS viewing on computer or via dedicated PACS terminal
- X-ray viewing box for printed films (usually bought in by patient from external source)
- Monitoring equipment and access to resuscitation equipment
- Services panel
- Nitrous oxide deliver system or portable nitrous oxide delivery system
- Operating theatre light suspended from the ceiling with minimum 80,000 lux
- Plaster equipment and plaster trap
- Plaster saw with vacuum fitting
- Other storage for splints, braces, crutches
- Pneumatic tourniquet

Other considerations

- There should be enough floor space to accommodate an image intensifier or portable x-ray machine, when required
- The room should have dimmable lights

Pitfalls

- A plaster room that is cluttered, reducing access to both sides of a patient
- Not having a separate plaster room

5.18 Procedure room**Purpose**

The procedure room(s) may be required for the performance of procedures such as suturing, phlebotomy in very young children, lumbar puncture, tube thoracotomy, thoracocentesis, abdominal paracentesis and bladder catheterisation.

Size

The procedure room should be at least 20m² in size (unless combined with other rooms e.g. plaster room).

Functional requirements

- Adequate size to allow a bed
- Appropriate physiological monitoring systems to allow safe analgesia and sedation
- Adequate room/storage capacity to allow suture trolleys/procedure, trolleys/dressing, trolleys/resuscitation equipment
- Sound proof (from external auditory stimuli)

Spatial relationships

- The procedure room should be in an ambulatory/discharge/Fast Track area of Emergency Department as most patients stay in the procedure room for a short time and will go home to a ward or elsewhere in the Emergency Department after treatment
- Consideration is required regarding placing the procedure room close to both minor and major areas of the Emergency Department, if conscious sedation is likely to occur frequently

Equipment requirements

- A computer screen for digital imaging viewing and use as a work station
- Monitoring equipment including access to resuscitation equipment
- Wall oxygen and suction
- Storage for suture equipment, dressings, catheters, sterile packs/procedure bundles
- Nitrous oxide delivery system or storage space for a portable nitrous oxide delivery system
- Image intensifier and/or x-ray machine if room is to be used for orthopaedic procedures
- Operating theatre light suspended from the ceiling with minimum 80,000 lux
- A procedure room should have dimmable lights

Other considerations

The room could be furnished to accommodate for paediatric patients e.g. have glow in the dark stars in the room.

Pitfalls

Pitfalls include inadequate floor space that does not allow for ready access to both sides of a patient.

5.19 Interview room**Purpose**

An interview room is used to conduct patient (including psychiatric patient) and relative and carer interviews safely, comfortably and privately.

Size

- At least 12m²
- Comfortably fit at least three people without feeling crowded

Functional requirements

- Sound proof (from external auditory stimuli)
- Be directly visualised by observers (one-way mirror, CCTV)
- Not contain objects that may be thrown at staff e.g. light weight chairs
- Furniture should have soft corners and no hard edges
- There should be no parts of the furniture that could be removed and used as a potential weapon
- A functional duress/panic alarm is needed within easy reach of the interviewer and at each exit
- Two doors, opening outwards and able to be locked from the outside, but not from the inside
- The room should be square and not have any narrow corners in which people could become cornered
- Have low stimuli décor and muted colours
- The room does not require medical gases or suction
- There should be no vents or lights or other apparatus that could be used as a hanging point
- Smoke detector(s)

Spatial relationships

- The interview room should be in a high visibility part of the Emergency Department
- Near to a treatment/examination room for physical assessment

Equipment requirements

- A couch and/or appropriate furniture
- Duress alarms

Pitfalls

- Items in the rooms that could put the interviewer/interviewee in harms way
- A room with high levels of auditory/visual stimulation e.g. television

References

- [15]

5.20 Distressed relatives' room**Purpose**

A distressed relatives' room provides a private, quiet room for distressed relatives, carers or friends of all ages and cultural backgrounds to gather. The room also provides a space to obtain a collateral patient history and potentially to deliver bad news about a patient.

Size

- If should be able to comfortably seat at least four relatives, friends or carers as well as seating room for a nurse or doctor to enter and deliver news regarding a patient
- Special consideration should be made in geographical areas where families tend to be larger and family roles are defined differently e.g. areas with a high Maori or Indigenous population

Functional requirements

- A private and soundproof space
- A space where distressed relatives, friends or carers may gather and support each other
- A space that is culturally neutral and inoffensive
- A space that is aesthetically calming and peaceful

Spatial relationships

- The room should be close to the resuscitation area so that relatives, friends or carers do not feel distanced from their loved one, and so that doctors and nurses who are with the family, friends and carers can be quickly and easily located if needed. The room should not be so close that these people can see or overhear clinical care being delivered to the patient (or to other patients)
- Ready access to refreshments
- Ready access to toilets

Equipment requirements

- Comfortable furnishings
- A telephone with mobile and external line access
- Power point(s) for mobile phone charging
- Muted décor and unobtrusive, culturally non-offensive artwork

Other considerations

- Calming, peaceful music may or may not be appropriate
- Cultural or religion specific needs
- In small Emergency Departments, this room could double as a psychiatric interview room, however ideally, they should be separate due to the unique requirements of each
- Unrestricted access to waiting room, but controlled access to the Emergency Department

Pitfalls

- Cramped rooms with inadequate seating or natural light
- Inappropriately locating the distressed relatives' room
- Rooms that allow for interruptions in the form of external noise or other people traversing the area
- A space that has been purpose built for something else e.g. treatment cubicle, an isolation room
- Rooms with restricted access to communication e.g. no telephone line or a mobile phone black spot
- A space that is aesthetically too stimulating or confronting
- A space that does not reflect basic human needs e.g. it does not have good access to food, drink, toilets, is too hot or cold

5.21 Staff work stations**Purpose**

Staff work stations are where staff can undertake work that is not performed at a patient's bedside. They are used for discussion, for advice and referrals, and for the entry or writing of notes. There is a need for a range of private meeting rooms that will enable confidential discussion and collaboration between staff. Separate consulting rooms will be provided specifically for patient consultation.

Terminology

- Work desk – an individual area for a single staff member to work at
- Work station – group of conjoined work desks with associated storage and other facilities

Size

- A desk area of minimum 1.2m wide by 600mm deep, per individual work desk
- A minimum number of work desks equals 1.5 x (average number of Emergency Physicians + average number of Emergency Nurses on daytime weekday shifts)
- Additional dedicated work desks for the nurse and the doctor in charge of the shift, clerk +/- dedicated communications personnel

Functional requirements

- Aspects to be factored in include ergonomics, such as computer monitors being 800mm from eyes and at correct height
- Bench space around computers must be adequate to allow for papers to be on the desk. Desk height is ideally adjustable

- Sufficient space to allow for an adequate number of chairs and circulation within staff area (opposing work desks should have minimum of 2m between desk edges)
- Work station(s) ideally should have clear vision of the Emergency Department clinical areas they are serving
- Consider separate work stations for different areas of Emergency Department
- Consider local work desks for cubicle groups (e.g. on end of dividing wall) as this allows data entry without leaving the patient
- Design needs to consider security for staff and privacy for conversations

Spatial relationships

- The design needs to facilitate staff flow between work station and cubicles
- Clear views of nurse call displays

Equipment requirements

- One computer per work desk – consider the need for widescreen or dual monitors
- All monitors suitable for viewing standard radiology images
- Selected monitors suitable for viewing special radiology images (e.g. CT/MRI/USS)
- One telephone per work desk
- Senior Emergency Physician desk to have Direct Dial In (DDI) facility for GP calls
- Nurse in Charge desk to have DDI phone for emergency services uses
- Space for central monitoring, printers, photocopiers, nurse call system control panel
- Waste paper baskets, confidential waste collection point
- Space for storage of patient records, stationery, reference material
- Radio aerial connectors for emergency services and internal systems (unless placed in triage areas)
- Duress alarm (probably under desk but must be located so it will not be in contact with the knees of whoever is sitting at the desk)
- Police Blood Alcohol Sample Safe (where required)
- Pneumatic tube to access labs, consider need to access wards and departments
- Adequate power and data points (see IT and Communications section)
- Intercom system (if fitted)
- Whiteboards and pin boards: consider using pin board as upright backing for work desk

Other considerations

- Enclosing part of work station to increase privacy
- Under desk brackets/shelves for computers with cable tidying systems
- One or two x-ray viewing boxes if the department is not equipped for PACS/radiological films originating from outside the hospital. Note: rapid progress or eliminating film based radiology systems making x-ray viewing boxes rapidly redundant

- Need to allow staff to perform appropriate hand hygiene between patients, and between patients and workstation

Pitfalls

- A work area for computers or laptops that is too small
- Insufficient circulation room inside enclosed work stations
- Insufficient number of work desks and computers

5.22 Department Corridors

Purpose

Corridors provide patient, relative and staff access to all parts of the Emergency Department, as well as access to service areas of the Emergency Department, to storage, and access to equipment that is needed frequently or urgently.

Size

- Clinical areas - the minimum must be to allow 2 trolleys/wheelchairs to pass easily with associated equipment e.g. IV stands. A minimum width of 3m is recommended
- Access to service areas will need width suitable for purpose e.g. disposal areas may need access for large refuse bins, equipment stores will need trolley (supermarket style, or dressing). Consider the need for storage of mobile patient hoists and other large equipment

Functional requirements

Parking/storage of ECG and ultrasound machines, IV, dressing and procedure trolleys:

- Parking/storage of clean linen trolleys and used linen bags; and
- Equipment bays need GPOs to plug power cables into for charging batteries.

Beverage bay(s) with:

- Hot and cool drinking water; and
- Beverage preparation equipment and waste disposal.

Patient meal delivery area:

- Consideration regarding the process for managing patient meals; and
- Parking of patient meals trolley.

Consideration is necessary for infection control/hygiene. This includes:

- The need for wash basins will depend on cubicle design and staff flows; and
- The need to allow staff to wash hands between patient and workstation. If suitable basins are in all cubicles, then hand sanitiser dispensers may suffice.

Other considerations

- Ensure sufficient room for trolleys to enter/leave cubicles
- Notice boards and/or decorations (photographs or paintings), if appropriate
- Kitchenette facilities if reheating of food is required

Pitfalls

- Having poor access for trolleys and equipment
- Having items in corridors obstructing flows
- Patient care in corridors

5.23 Dirty utility/Disposal room**Purpose**

The dirty utility/disposal room is used for the disposal of clinical and other wastes and soiled linen; for testing and disposal of patient specimens; for decontamination and storage of patient utensils such as pans, urinals and bowls; for cleaning and holding of used equipment for collection and sterilisation elsewhere.

Size

This room should be a minimum of 12m².

Functional requirements

- There must be a sink for hand washing and a rim sink that is able to be flushed
- There should be sufficient space to house the equipment listed below

Spatial requirements

Access should be available to this room from all clinical areas.

Equipment requirements

- Stainless steel bench top with sink and drainer
- Pan and bottle/urinal rack
- Bowl and basin rack
- Utensil washer
- Pan/bowl/utensil washer/sanitiser
- Flushing sink
- Storage space for testing equipment e.g. urinalysis
- An optional disposal room adjacent to the dirty utility should be considered

Other considerations

- A macerator for disposable bedpans/urinals rather than washer/sanitiser
- Two or more dirty utility rooms may be required to minimise travel distance in a large Emergency Department
- Consider single patient pan cleaners and macerators in isolation room en-suites

Pitfalls

- A pan room/area where urine testing takes place that is not separate from the storage of clean equipment

References

- [12]
- [1]
- [9]

5.24 Equipment/Store room**Purpose**

The equipment/store room is used for storing equipment and disposable supplies for the Emergency Department, and portable equipment may also be stored and recharged in this room.

Size

The total area of dedicated store rooms must take into account central and decentralised storage of equipment and disposables, in conjunction with the presence of equipment at the bedside.

Functional requirements

The room should be secure with access limited to authorised personnel only. There should be sufficient space and power sockets to store and charge battery powered equipment e.g. infusion pumps.

Equipment requirements

As a general principle, Emergency Departments should have sufficient storage space to carry a week's worth of disposable medical supplies and intravenous fluids.

Other considerations

- A decentralised storage solution in large Emergency Departments including separate storage for disposables, trauma resuscitation equipment, mobile equipment, stationery
- A separate room for equipment servicing should be considered
- Bar coded systems allowing top up of supplies on a daily basis can reduce the need for larger amounts of stock to be kept in the equipment room

Pitfalls

- Poor supply chain logistics creating poor efficiency of space utilisation
- Equipment and supplies distant to where it is required to be used clinically

5.25 Pharmacy/Medication room/Clean utility

A pharmacy/medication room is used for storage and dispensing of medications, and the preparation of drugs (including IV administered).

Size

The pharmacy/medication room/clean utility room should be a minimum 12m².

Functional requirements

Either:

- Secure electronic medication storage solution, and open access to pharmacy/medication room (preferable); or
- Storage space and shelving for all Emergency Department medication, including Imprest system.

Either:

- Centralised - single medication area serving all of an Emergency Department; or
- Decentralised - multiple medication areas, more common in larger Emergency Departments or those with electronic medication storage solutions.

Spatial relationships

The pharmacy/medication room needs to be situated so as to allow easy access to all clinical areas.

Equipment requirements

- Secure electronic medication storage including power and data points or
- Storage space and shelving for all Emergency Department medication including:
 - Shelving for storage of medication;
 - Lockable cupboard for restricted medications;
 - Cupboard for take home and after hours medication (pre-packs);
 - Secure steel lockable cabinet secured to the wall for restricted schedule drugs; and
 - Consider digital keypad access to control drug safe to avoid use of keys and enable tracking.

Common to both:

- Shelving for syringes, labels, medication containers and other equipment required for the preparation of medication;
- Shelving for IV fluid used to prepare infusions;
- Secure box for the placement of medication that is to be returned to the pharmacy;
- Shelving for written resources not available electronically;
- Sharps container(s);
- Non-infectious waste bin;
- Sink(s); and
- Computer (for references, guidelines and electronic medication charts).

Other considerations

- Space for the storage and charging of IV infusion pumps
- Cold water dispenser e.g. hydro tap
- Refrigerator monitor and alarm (linked to security) to prevent warming of temperature sensitive medications
- Consider space for a medication trolley
- Wall mounted push button alert indicating to staff outside the pharmacy/medication room that the controlled drug cupboard keys are required
- If an automated dispensing machine is installed, consider omitting swipe card door access in favour of open access to room with secure storage of medication

Pitfalls

- Not having sturdy shelving or baskets to support IV fluids

5.26 Disaster equipment room**Purpose**

A disaster equipment room is a storage room for equipment that would be used in a Mass Casualty/Disaster Incident, CBR (Chemical, Biological or Radiation) incident, or for retrieval of patients from the Emergency Department.

Size

The size of this room should be consistent with the role of the individual Emergency Department in a major incident or disaster.

Functional requirements

This room should be easily accessible and have sufficient supplies to fully equip the disaster team for on-site or off-site incidents.

Spatial relationships

- Close to ambulance bay (ideally, door access via the ambulance entrance)
- Accessible to the helipad if appropriate

Equipment requirements

- Hanging space for specialised clothing/protective suits
- Work benches for equipment checking
- Power sockets for battery banks charging

5.27 Short Stay Unit

Purpose

Short Stay Units (SSU) serve an important function in the diagnosis and management of Emergency Department patients. There are a number of criteria that apply to an SSU, including that they:

- Are designated and designed for the short term treatment, observation, assessment and reassessment of patients initially triaged and assessed in the Emergency Department;
- Have specific admission and discharge criteria and policies;
- Are designed for short term stays no longer than 24 hours;
- Are physically separated from the Emergency Department's acute assessment area;
- Have a static number of beds with oxygen, suction and patient ablution facilities; and
- Are not a temporary Emergency Department overflow area nor used to keep patients solely awaiting an inpatient bed, nor awaiting treatment in the Emergency Department.

There should be the ability to monitor each bed to the same level as an acute cubicle, and dedicated staff bases. Hospital beds, not Emergency Department trolleys, should be used.

5.28 Administration areas

Office space

Offices provide space for the administrative, managerial, safety and quality, teaching, and research roles of the Emergency Department.

Spatial and Functional requirements

- Offices should be located close to each other and close to secretarial services
- Wi-Fi should be available throughout
- There should be ready access to printing and scanning/photocopying
- Staff members who are mostly office workers should, if possible, have offices with natural light
- The area should be accessible by authorised staff only
- The administration area should have room(s) in which private meetings may be held

Consistent with the role delineation of the Emergency Department, office space should be provided for the following staff:

- Director;
- Deputy Director;
- Director(s) of Emergency Medicine Training;
- Director of Emergency Medicine Research;
- Staff Specialists;
- Registrars;
- Nurse Manager(s);
- Nurse Educator(s);
- Nurse Practitioner(s);

- Administrative staff;
- Social worker, mental health worker;
- Information support officer/data manager;
- Research and project officers; and
- Allied health teams e.g. physiotherapists.

Senior managers may require a single person office with adequate space to seat up to three others. Each office should have a desk or workstation with a computer and telephone, as well as adequate storage for printed materials. The design should enable confidential discussions.

Other offices may be designed to accommodate two or more staff concurrently with a computer workstation for each person. Each office should have at least one telephone, and adequate storage for printed matter. The design should allow for confidential discussions.

Other considerations

- The total office space should be sufficient for future expansion of staff numbers and new roles
- There is an emerging trend for common and shared office areas
- Some hospitals have common meeting areas for all departments to share

Telemedicine area

Emergency Departments using telemedicine facilities should have a dedicated room with appropriate communications infrastructure and equipment. This room should be of a suitable size to allow for simultaneous viewing by members of multiple service teams.

5.29 Teaching facilities

Purpose

The Emergency Department requires dedicated facilities for formal education, tutorials/mannequin simulation, and meetings. This area may be used by medical, nursing, or other staff and undergraduates. It should be a private, non-clinical area with noise attenuation, often near the staff room and offices, and with access to toilets and amenities.

Equipment requirements

- Tables and stackable chairs
- Audio-visual equipment with ability to plug in mobile devices/laptop
- Projection screen, ceiling mounted recommended
- Networked computers
- Wi-Fi access
- Bookshelves for written reference materials and journals
- Teaching aids and equipment
- X-ray viewing facilities/digital imaging system
- Whiteboard (electronic whiteboard preferable)
- Telephone

- Videoconferencing capability
- Storage for simulation mannequins, teaching aids and training materials
- Library for written, audio-visual and electronic reference materials. Ideally, all computers are able to access electronic resources

Other considerations

- Natural light
- Teaching rooms that can be adequately darkened for viewing projected material
- An ability to expand the area of the room to cater for large groups. Large Emergency Departments may benefit from having more than one room, or a room that can be divided. The divider should be of high quality to ensure adequate sound attenuation
- Projectors offer better viewing compared to large television displays
- The size of the room should be calculated based on the maximum number of people likely to use it at any one time e.g. a combined medical and nursing meeting or a network teaching session

Pitfalls

- Combined tearooms with meeting/teaching rooms
- Permanent audio visual equipment set up is often easier to use than portable equipment that requires setting up/putting away
- Remote controls. With permanent equipment, there comes the option of wall controllers which are preferable
- Insufficient tutorial space

5.30 Staff room**Purpose**

The clinical environment is often stressful. Well-designed staff facilities provide time out, relaxation and add to morale and staff functioning. The staff room is used by staff to consume meals, for social events and for the celebration of achievements. The kitchen area may be incorporated within the staff room or immediately adjacent to it. Staff should be able to prepare hot and cold drinks and prepare or heat food. Depending on the size of the Emergency Department, the kitchen area may also be used for the preparation of beverages for patients.

Size

The size of the staff room should be big enough to seat all staff on a rostered meal break.

Functional requirements

- Preparation and consumption of meals
- Located away from patient care areas
- Natural lighting is desirable
- Secure

- Access to an outside area if possible
- Other aspects of relaxation e.g. music, television

Spatial relationships

- Toilets in close proximity
- Offices usually located in the same area of the Emergency Department

Equipment requirements

- Kitchen/pantry
- A food preparation area
- On demand hot and cold water
- Tables and comfortable seating (for dining and for relaxation)
- Computer/Wi-Fi access
- Television, telephone
- Microwave ovens
- An industrial grade refrigerator and dishwasher

Other considerations

- ABHR or hand basin at the entrance to the staff room
- Multiple microwaves allows faster preparation of food
- Industrial grade, fast cycle dishwashers, and industrial refrigerators
- A managed beverage service negates the need for replenishment and maintenance of tea and coffee

Pitfalls

- A staff room that is too small
- Using staff room for meetings
- Notice boards, mail boxes, Emergency Department performance statistics and lockers in the staff room
- Concertina walls between staff room and adjacent meeting rooms, as these are rarely sound proof

5.31 Staff amenities**Purpose**

To provide staff with an area to store personal items securely, change clothes and attend to personal grooming and hygiene. There should be:

- An adequate number of staff toilet facilities in the staff area and in clinical areas;
- Separate male and female shower and change facilities;
- Secure bicycle lock up (if not provided by hospital in general);
- A sufficient number of lockers for staff members' personal belongings;

- Overnight room with desk, computer or Wi-Fi access;
- Staff mail boxes; and
- Notice boards.

Pitfalls

- Staff toilets without restricted access (either a numeric keypad or proxy card)
- An inadequate locker facility for cyclists
- An inadequate number of shower facilities for the number of cyclists who work in the Emergency Department
- Overnight rooms that have inadequate sound and light proofing

6. GLOSSARY

- **Medical Assessment and Planning Unit (MAPU), or Medical Assessment Unit (MAU)** – a MAPU or MAU provides assessment, care and treatment for a designated period prior (usually 48 hours) to transfer to a medical ward or home.
- **Short Stay Unit (SSU), or Short Stay Observation Unit (SSOU)** – a SSU or SSOU is an area within or attached to Emergency Departments for patients requiring a short episode of care i.e. 4-24 hours. They are designed to provide intensive short-term assessment and/or therapy for select conditions in order to streamline the episode of care.
- **Electrocardiography (ECG)** – an ECG is a commonly used, non-invasive procedure for recording electrical changes in the heart. The record shows the series of waves that relate to the electrical impulses which occur during each beat of the heart.
- **Clinical Initiatives Nurse (CIN)** – a CIN is a Registered Nurse (RN) on their specialty career path. The role requires the nurse to holistically manage the waiting room which includes re-assessment, care initiation, and provision of symptom management for undifferentiated patients.
- **Mass Casualty Incident (MCI)** – a MCI is sometimes referred to as a multiple-casualty incident or multiple-casualty situation. It is any incident in which emergency medical services resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties.
- **Ear, Nose and Throat (ENT)** – ENT medicine or otolaryngology or is the branch of medicine and surgery that specializes in the diagnosis and treatment of disorders of the head and neck.
- **Activities of Daily Living (ADL)** – routine activities that people tend to do every day without needing assistance. There are six basic ADLs: eating, bathing, dressing, toileting, transferring (walking) and continence.
- **Picture Archiving and Communication System (PACS)** – a picture archiving and communication system is a medical imaging technology that provides economical storage of, and convenient access to, images from multiple modalities (source machine types).
- **Ultrasound Scan (USS)** – USS is a scan that uses high frequency sound waves to demonstrate internal body structures. It is a commonly used to study the developing foetus, abdominal and pelvic organs, muscles and joints, and the heart and blood vessels. Also called a sonogram and ultrasonography.
- **Alcohol Based Hand Rub (ABHR)** – ABHRs are used in health care settings and are more effective against most bacteria and many viruses than either medicated or non-medicated soaps.
- **Personal Protective Equipment (PPE)** – PPE refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury.
- **Multi-Disciplinary Team (MDT)** – a MDT is composed of members from different healthcare professions with specialised skills and expertise.
- **Intensive Care Unit (ICU)** – an ICU is a designated ward of a hospital which is specially staffed and equipped to provide observation, care and treatment to patients with actual or potential life-threatening illnesses, injuries or complications, from which recovery is possible.
- **Voice over Internet Protocol (VoIP) phone** – VoIP is a methodology and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet.

7. APPENDIX 1: IMAGES OF EMERGENCY DEPARTMENT FEATURES AND DESIGN

Bariatric toilet



Ambulance offloading bay



Computer between two cubicles



Ambulance offloading



Corridor and staff station



Corridor staff base



Cubicle



Draegar pendant



Cubicle



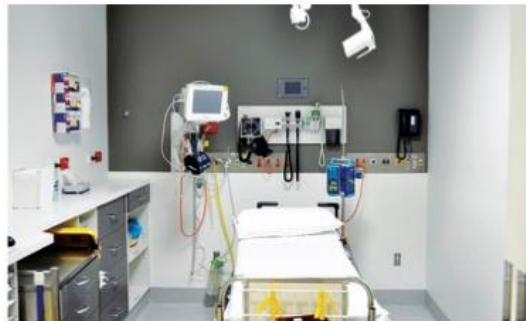
Cubicle



Cubicle



Cubicle



Eye room and ENT room



Radiology sub-waiting room



Linen bay



Medication storage



Medication room



Paediatric waiting room



Waiting room



Triage



Triage



Triage



Trauma bay



Resuscitation room with direct ambulance entry



Resuscitation room



Paediatric resuscitation room



Shared staff office



Staff base and corridors



Staff base



Staff base



Staff base



Staff base



Staff base

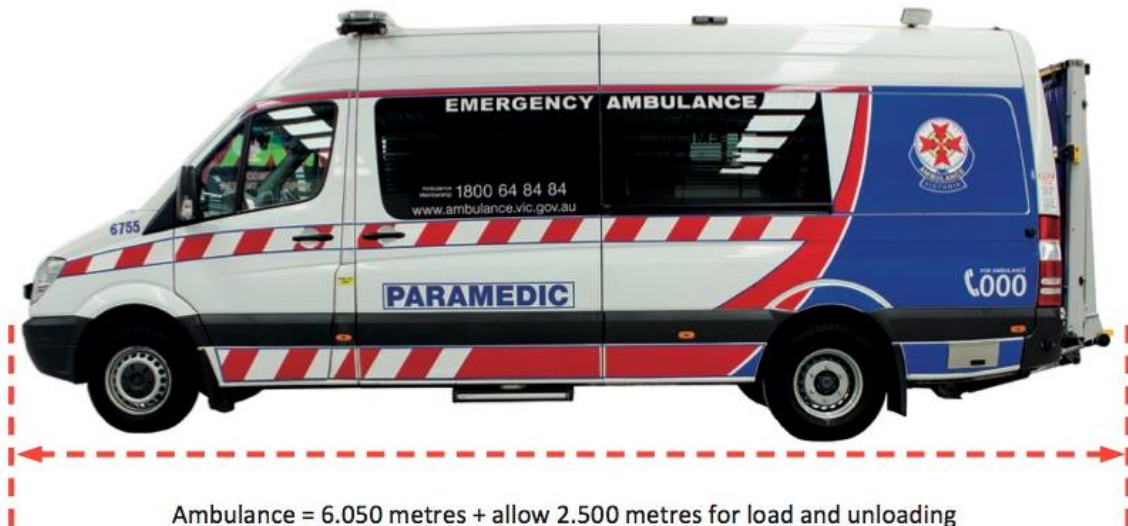


Staff room



8. APPENDIX 2: IMAGES AND DIMENSIONS OF COMPLEX PATIENT AMBULANCE VEHICLE

Complex Patient Ambulance Vehicles (CPAV) are the extreme of vehicle dimensions

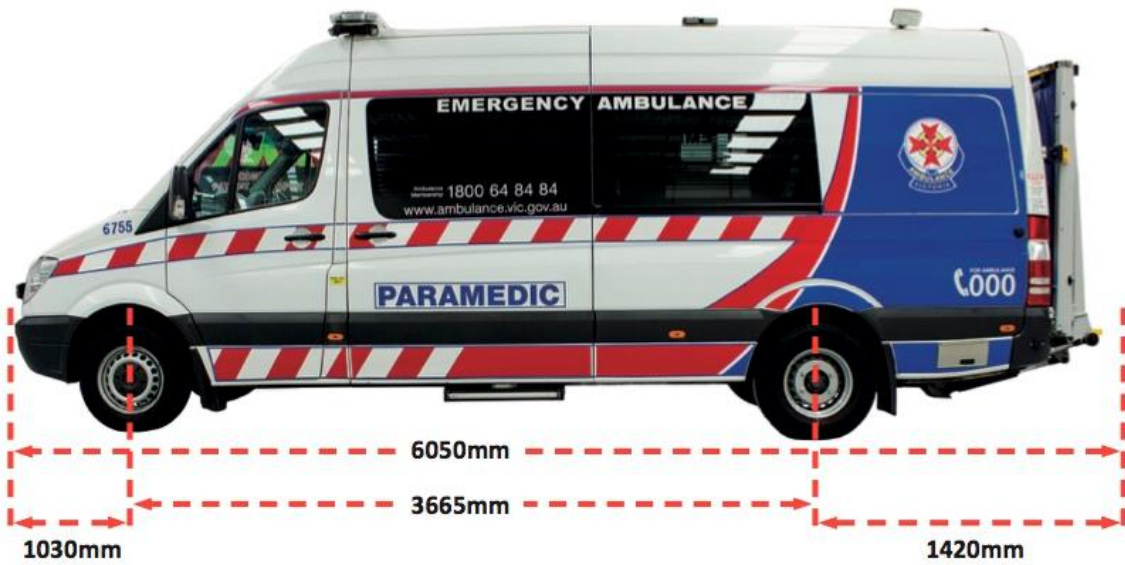


Ambulance = 6.050 metres + allow 2.500 metres for load and unloading
CPAV = 7.200 metres + allow 4.500 metres for hoist and load/unloading

Ambulance vehicle

Ambulance = 6.050 metres + allow 2.500 metres for load and unloading

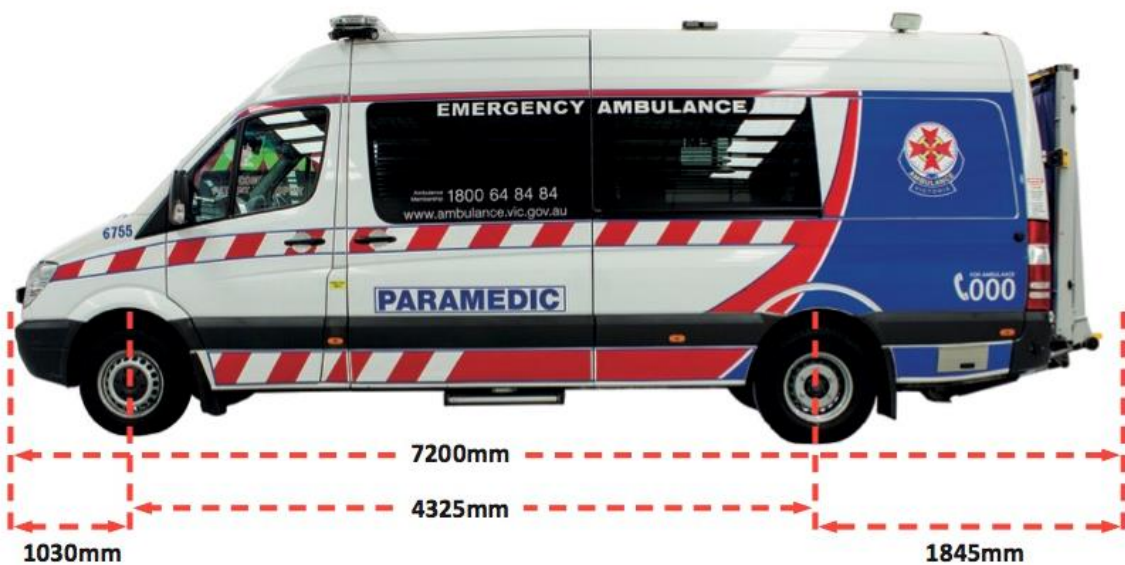
CPAV = 7.200 metres + allow 4.500 metres for hoist and load/unloading



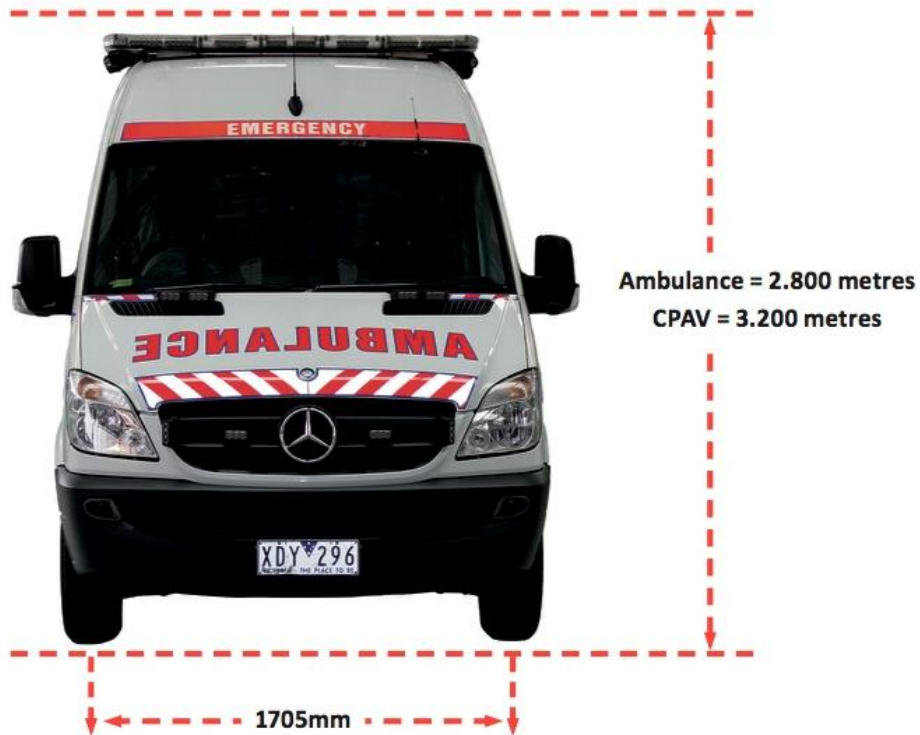
CPAV vehicle

Ambulance = 6.050 metres + allow 2.500 metres for load and unloading

CPAV = 7.200 metres + allow 4.500 metres for hoist and load/unloading



Height allowances

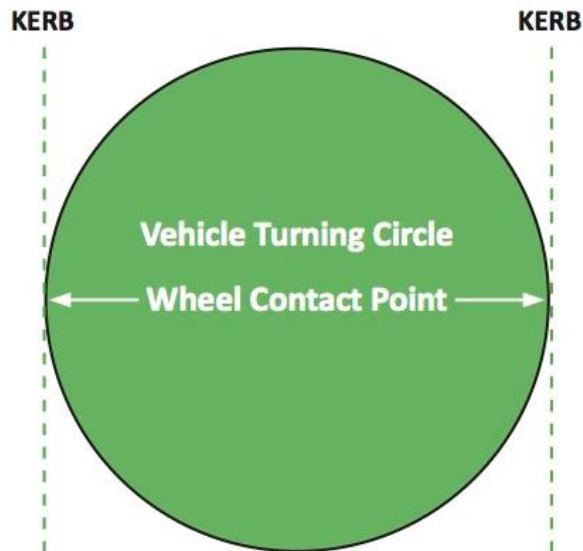


Width allowances

Ambulance = 2.005 metres + allow 750mm per side mirrors and door opening
CPAV = 2.005 metres + allow 750mm per side for mirrors and door opening

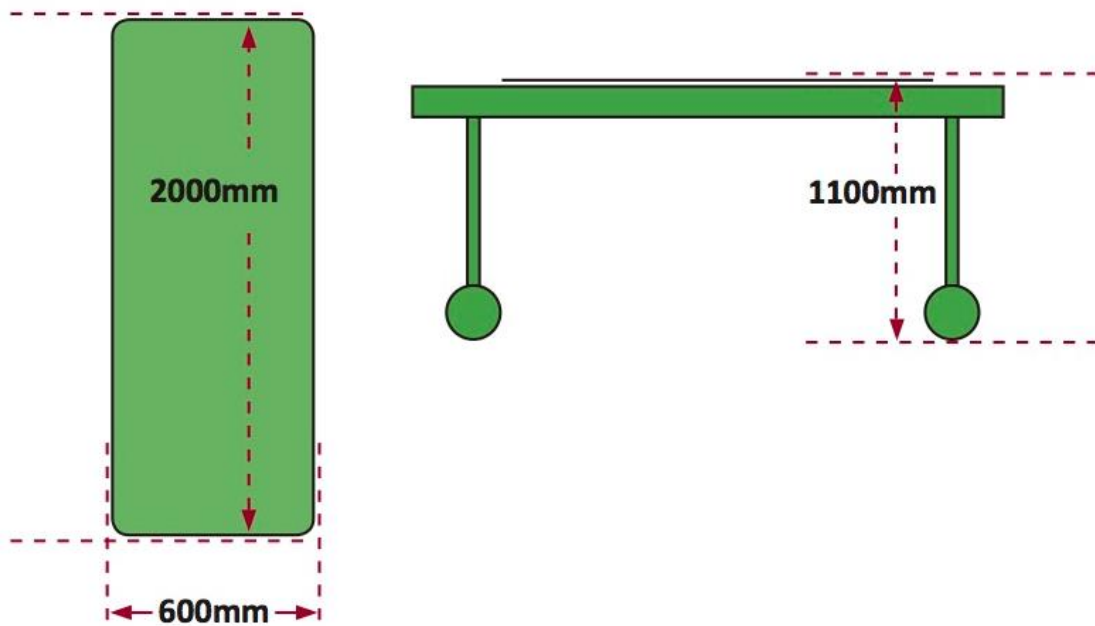


Vehicle turning circle and wheel contact point



- Ambulance = 13.6 metres kerb to kerb + allow 1000mm front and rear for body lines (15.6 metres)
- CPAV = 15.6 metres kerb to kerb + allow 1000mm front and 1500mm rear for body lines (18.1 metres)

Stretcher dimensions



Operating weights



Ambulance = 3350kg - including all seated passengers and patient
CPAV = 4200kg - including all seated passengers and patient

Source: Ambulance Victoria, 2014

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10. DOCUMENT REVIEW

Timeframe for review: every two (5) years, or earlier if required.

10.1 Responsibilities

Document authorisation: Council of Advocacy, Practice and Partnerships

Document implementation: Council of Advocacy, Practice and Partnerships

Document maintenance: Policy and Research Department

10.2 Revision History

Version	Date of Version	Pages revised / Brief Explanation of Revision
3.0	Oct-14	Complete review undertaken

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