Australasian College for Emergency Medicine
ABN 76 009 090 715

GUIDELINES ON CONSTRUCTING AN EMERGENCY MEDICINE MEDICAL WORKFORCE

1. EXECUTIVE SUMMARY

This document can be used as a basis for building ED staffing requirements. The research literature and national surveys have made evident that there is not one model of ED staffing that will suit all needs, as local factors vary considerably. A formulaic approach is therefore impossible. This document provides elements and factors needed to plan a workforce combined with a model that provides the basis for producing a safe number of FACEMs for emergency departments to maintain quality outcomes.

It is beholden upon Directors of Emergency Medicine, and health organisation administrators, to ensure that ED staffing allows for the delivery of high quality patient care. Activities described in this document and some minimum requirements are described. These should correlate with safe practice, quality patient care and improving outcomes.

1.1 Base Model

Several assumptions have been made which will have an impact on final calculations, if not in place. The attendance number (25,000 per year) selected for the model was based on the ACEM guidelines for 12 month accreditation of training, the 2007 ACEM survey of emergency departments and a document prepared for the NSW Department of Health (*Metropolitan Emergency Department Staffing Recommendation)*. The starting point for the model was adequate evening and weekend cover and was extrapolated to cover weekday shifts and a Short Stay Unit function.

Inherent in the model are adjustment factors which have been quantified on the best available evidence, and where possible, referenced. Fatigue factors have also been considered. Clinical Support time has been included and quantified. Allowances for leave are also included in staffing calculations (Appendix 1). There has been no attempt to create calculations or formats for predicting growth in staffing numbers.

Appendix 1 summarises the calculations for increasing attendance numbers.

1.2 Performance Targets

Established performance targets are acknowledged. However, the emphasis of these guidelines is a shift to outcome based measures which should reflect, albeit indirectly, on quality of patient care. Continual development and improvement of these types of indicators are important components in evaluating staffing levels and skill mix.

Appendix 2 lists suggested indicators.

1.3 Clinical Support

Non direct patient care time has previously been poorly defined and the importance and relevance not clearly described. These guidelines have attempted to more clearly define the importance and the impact of this time in relation to the standard and quality of patient care. It is evident that adequate supervision, training and education and involvement in quality and safety development by emergency physicians are integral parts of the delivery of a high quality service.

This activity should be recognised as an important and an essential component of emergency physicians' work.

Appendix 2 summarises the suggested quality and safety elements.

1.4 Education

Education and training responsibilities comprise an important and significant component of emergency physicians' work time. This area has been addressed as a separate section as it is included in both clinical and clinical support time. Education and training extends beyond the specialty training requirements to include a multitude of other educational responsibilities. The demand on emergency physicians' time in educational and training areas is increasing and therefore is an important component in calculating workforce numbers.

1.5 Sustainability

The concept of sustainability not only includes the ability of emergency physicians to maintain a satisfying and rewarding working life span but also for the specialty to continue to develop and maintain high quality specialists. Recruitment and retention of quality staff is a significant issue in Australasian emergency departments and needs to be addressed.

Several of the factors that impact on both of these areas are outlined. Consideration of these factors is an integral and important component of workforce planning and calculation of FACEM numbers.

2. INTRODUCTION

It is evident from the literature that access to senior experienced emergency medical staff improves decision making and outcomes for patients. In Australasian emergency departments, senior clinicians can be emergency medicine specialists or career medical officers with extensive experience and/or other post graduate qualifications. The mix of these two groups is dependent upon multiple factors including geographical location, hospital service profiles and emergency department size. With present increasing demands on emergency departments and the current completion rates within the College training program, it is apparent there will be a mix of specialist and non specialist senior staff in emergency departments, particularly in rural areas for the foreseeable future.

It is estimated the numbers of non-specialist clinicians available will decline over the next ten years in urban areas. However, in some states, alternative pathways are being developed for non-specialist recognition for credentialing in emergency medicine in non-urban and rural areas.

The eventual goal should be to provide access to specialist emergency physicians (FACEMs) to all patients presenting to emergency departments in Australasia.

Emergency physicians are a core element of hospital staffing. Emergency physicians provide the clinical leadership and quality of care for emergency department (ED) patients, and perform essential teaching, education, managerial, administrative, planning and advisory roles. These activities occur within the ED, and at hospital, district, regional, state, and national level. Emergency physicians form an essential core craft group within the health system, particularly within the public health system, which is experiencing an increasing demand and pressure on maintaining standards of care.

This document describes the various roles of the emergency physician, and the considerations to make when planning ED staffing. The needs of the junior doctors who make up the majority of our hospital workforce, and include doctors in training, are also described.

The aim of these Guidelines is to guide the construction of emergency medicine medical workforces. The approach is directed at individual departmental level but with clear implications for the entire Australasian emergency medicine medical workforce. It is recognised that as there is a wide variability of roles and work practices between departments there cannot be a single staffing formula or profile for all departments. However, there are common issues that must be addressed including, but not limited to those listed below.

2.1 Extent of specialist emergency physician clinical cover. This is dependent on:
- Direct patient care requirements
- Supervisory requirements
- "On the floor" administrative load

2.2 Australasian College for Emergency Medicine (ACEM) trainees, junior medical staff, career medical officers, locums
- Role substitution and task delegation
- Supervision of junior staff
- Expanded ED roles

2.3 Short Stay, Hospital in the Home, Retrieval activities, Toxicology

2.4 Leave availability and cover

2.5 Performance Targets

2.6 Clinical and clinical support roles
- Direct patient care
- Clinical support activities (refer Section 5 Clinical Support)

2.7 Teaching and training
- Bedside and "on the run" teaching
- Participation in formalised teaching programs
- Continuing Medical Education (CME) or Maintenance of Professional Standards (MOPS)

2.8 Factors related to a safe and satisfying workplace
- Optimal rostering practices
- Consideration of the impact of evening, weekend and night shift work
- Recruitment and retention
- Increased productivity from a motivated workforce
- Recognition of the positive impact of a high quality ED on
  - Individual patient outcomes
  - Community health services
  - Hospital outcomes and performance
  - The wider health system

3. BASE MODEL FACEM STAFFING GUIDELINES FOR EDs WITH 25,000 PATIENT PRESENTATIONS PER YEAR

The number of 25,000 patient presentations is consistent with ACEM Accreditation Guidelines for 12 months accreditation of training. (Refer: G01 *Guidelines for Adult and Mixed EDs Seeking Training Accreditation)*.

It is recognised that the number of attendances is a crude estimation of workload and activity demand, even when combined with triage categories. Research is continuing into the development of reliable and accurate tools to measure true emergency department workload and activity. Until these are developed, the calculation of the workforce can only be made with existing statistics such as attendance numbers.

3.1 Assumptions

This model is based on the following assumptions:
- All patients should have senior medical input into their diagnostic and management plan. FACEM involvement is optimal.

- Minimum midweek FACEM coverage of the main ED is 2 per day and 1 per evening shifts.
- Minimum weekend / public holiday coverage of the main ED is 1 per day and 1 per evening shifts.
- FACEMs are employed pro-rata such that one full time equivalent (FTE) works four shifts per week with the following configuration over an average week: two day clinical, one evening clinical and one clinical support shift.
- Maximum sustainable long term weekend commitment is one weekend (two shifts) in every five weeks, but while more frequent weekend commitment is possible it is not desirable.
- Appropriate registrar staffing (as per Section 3.3.1 Registrar Staffing)
- Appropriate levels and skill-mix of nursing staff are in place
- Appropriate levels of other non-medical and support staff are in place (secretarial, clerical, allied health, clinical and hotel support staff etc)

3.2 Base Calculations

Staffing (FTE) is driven by weekend coverage in the sense that provision of adequate FTE to achieve minimum weekend clinical coverage will provide sufficient FTE to achieve both minimum weekday clinical coverage and minimum clinical support coverage. FTE is a statistical unit which can be a single person or composite of persons in any mix, such that it comprises a total of 4 x 10 hour shifts per 7 day period. This mix may include Visiting Medical Officers (VMOs) and can be considered a "decision making unit" in departments where both specialist and non-specialist staff work concurrently.

The FTE will also be in excess of those required for ACEM accreditation as this accreditation relates only to minimum appropriate staffing to provide emergency medicine registrar training, and not necessarily the FTE required to provide appropriate direct clinical or clinical support coverage[10].

- Two FACEM shifts (day and evening) per weekend on a 1 in 4, 5 or 6 rotation will necessitate 8, 10 or 12 FTEs respectively.
- Based on this FTE the total number of midweek shifts can then be calculated: i.e., for a 1 in 5 weekend rotation there will be 20 day clinical, 10 evening clinical, and 10 clinical support shifts.
- Using non-weighted time in lieu for weekend shifts these midweek shifts will be reduced by four shifts.
- For the purposes of these calculations these shifts have been subtracted from the day clinical shift component, understanding that each FTE will be doing two day and two evening clinical weekend shifts over an 8, 10 or 12 week period depending on the frequency of rotations.
- These midweek shifts could be used to provide the following:
  - Minimum midweek clinical coverage of the main ED – i.e. two day and one evening shift per day, to a total of 10 day and 5 evening shifts), and
  - Minimum clinical coverage of a Short Stay Unit (SSU) – i.e. one day and one evening shift per day, to a total of 5 day and 5 evening shifts. The type of SSU (e.g. emergency medicine unit, chest pain unit, clinical decision unit, etc) would vary from site to site depending on clinical need, and
  - Minimum levels of clinical support time.

The Director of Emergency Medicine (DEM) of a department of this size would require at least 50% clinical support time[10]. This would mean the remaining day shift clinical would be utilised by this person as an additional clinical support shift required for their administrative duties.

Leave entitlements vary between regions but usually total between seven and nine weeks per FTE per year for annual and professional development leave. This necessitates a requirement for an additional 1.6 – 2.1 FTE to cover leave and provides additional roster flexibility to support at least one additional clinical support shift per fortnight for the Director of Emergency Medicine Training (DEMT) in line with the minimum 30% clinical support time required[10]. Leave calculations do not take into account unplanned leave e.g. sick leave, maternity leave, family bereavement leave.

FACEM staffing required for this base model will vary according to the weekend rotation frequency and the relevant industrial award leave entitlements. Appendix 1 gives the numbers required for each weekend rotation frequency.

3.3 Adjustments to the Base Model

3.3.1 *Registrar Staffing*

The base model is dependent on adequate registrar numbers and skill-mix to provide a minimum of two senior clinical decision-makers on all day and evening shifts (seven days) in the main ED, and at least one senior decision-maker in the main ED and SSU at times outside FACEM coverage. Specifically, appropriately senior registrars should be available to provide the following:

- At least one, but more appropriately two, registrars per midweek day and evening shift in the main ED, and
- At least one, but more appropriately two, registrars per weekend main ED day and evening shift, and
- At least one registrar (and two Junior Medical Officers [JMO]) per night shift in the main ED, and
- At least one registrar (and one JMO) per day and evening SSU shift (7 days), and
- At least one registrar (to facilitate 24/7 clinical decision-making), per SSU night shift

Increased FACEM FTE will be required to provide senior clinical decision-making in the absence of adequate registrar numbers and skill-mix as detailed above.

3.3.2 *Higher presentation rates*

Increased numbers of presentations invariably increase the workload of the ED and the need for FACEM staffing, for both direct clinical and clinical support activities. The increase in FTE required to effect an increase in weekend shifts will provide flow-on benefits in terms of staffing to address heightened midweek direct clinical and clinical support requirements. For calculations of additional FTEs for higher presentation rates see Appendix 1.

3.3.3 *High complexity presentations*

- **Very young (< 3 years) and/or very elderly (≥ 85 years)**
  Clinical assessment of the pre-verbal child, especially those under three years of age or of the very elderly is challenging and requires senior clinical input for quality care and risk management. The patients at the extremes of age are expected to account for an increasing proportion of total patient presentations.

  It is recommended that increased FACEM staffing should be obtained at sites where the combined number of very young and very elderly patients is in excess of 8% of total presentations.

- **Major trauma (ISS ≥ 15)**
  Patients with major trauma require urgent intensive assessment and rapid senior clinical decision making. The presence of a well trained trauma service can bring

external resources to management of the major trauma patient in the ED. However in the absence of a well trained trauma team, additional FACEMs will be required for skill provision in relation to urgent patient care procedures.

In the absence of a multidisciplinary trauma service, it is recommended that increased FACEM staffing should be obtained for sites regularly receiving major patients (i.e. approximately 50 patients per year).

- **Interhospital transfer for diagnostic or therapeutic reasons**
  Inability to provide diagnostic or therapeutic services at the primary hospital necessitates decision making regarding the need for such services and their urgency. Senior clinical input to such transfer decisions is essential to ensuring that the indication for transfer outweighs the patient risk and system resources inherent in inter-hospital transport (i.e., risk-benefit ratio).

  In the absence of a dedicated retrieval service senior medical resources are required to affect the safe transfer of the patient.

  It is recommended that increased FACEM staffing should be obtained for a site regularly requiring urgent inter-hospital transfer of patients (i.e. 0.25 FTE per patient transfer per week).

3.3.4 *Combinations of the above factors*

The threshold values for each factor individually provide the need for increased staffing.

The effect of lesser changes in the above factors will be additive and resolves the need for further FTE.

Any FTE increase must also incorporate an appropriate leave cover (see Appendix 1)

3.3.5 *Factors not considered*

The following factors were not included in the model due to site variability, relevance and difficulty in quantifying resource requirements:

- Populations with increased health needs. These may include socio-economic, indigenous and ethnic factors influencing possible demand on ED resources
- Triage categories are an indication of urgency for care rather than necessarily reflecting total or senior medical input required.
- Admission rates were not included as they are subject to numerous local factors and the relative need for total or senior medical input can frequently be lower than that for ensuring patients can be safely discharged.
- Access block rates have significant impact on emergency department function and increased staffing may be required.

3.4. Alternatives to Suggested Model

There are other models such as weekend frequency which can be achieved with less FTE. Such models compromise the ability to provide clinical coverage for SSU, appropriate supervision of registrar and junior staff, and must be viewed as non-standard working conditions due to the impact of such work arrangements on sustainability.

4. PERFORMANCE TARGETS

Performance targets and key performance indicators for EDs have traditionally focused on operational characteristics. This emphasis has partly been driven by the ease of data collection of such parameters and partly by political and media interest in rapidity of provision of service.

There is a need to change the focus of emergency department, and FACEM, performance assessment from operational parameters to measures of quality of care.

Most operational parameters which measure 'entry' processes in emergency departments (i.e. triage benchmarks, did not wait numbers) are more closely related to total medical staff numbers (resources) than to seniority of medical staff or quality of care. The purpose of this section is to outline performance targets that are more closely aligned with quality emergency department care – the expected outcome of appropriate staffing levels and skill-mix within EDs.

Examples of suggested indicators are listed in Appendix 2. The utility and applicability of these indicators will vary according to local needs and requirements of health organisations.

5. CLINICAL SUPPORT

5.1 Quality and Safety

Continuous improvements in quality and safety require time and resources. Activities such as data and KPI analysis, development of pathways, audit, sentinel event monitoring, adverse outcome monitoring, complaint investigation and resolution, as well as pathology and radiology reviews are examples of activity conducted by FACEMs in EDs. Additional activities such as hospital quality assurance committees, risk management committees and quality improvement projects are other examples. All these activities provide improvement in service delivery and patient outcomes (refer Appendix 2 for other examples).

5.2 Supervision of Emergency Department Staff

Independent/unsupervised practice of emergency medicine is best performed by medical specialists who have completed the Fellowship of the Australasian College for Emergency Medicine - which has standards for competency and definitions for professional practice principles.

All medical staff as well as non-medically trained staff who provide clinical care for patients are required to be supervised according to their level of experience, clinical abilities and insight into their personal limitations.

ACEM has requirements for the percentage of time trainees spend supervised by a FACEM as described in G01 *Guidelines for Adult and Mixed EDs Seeking Training Accreditation*.

As emergency departments operate 24 hours a day, 7 days per week (= 168 hours per week), it is recommended that at least 60% of the operational hours per day (16/24 hours) are supervised by FACEMs. Larger departments with high attendance/complexity rates at night may review the need for overnight in department FACEM cover.

Registrars (trainees/non-trainees), Career Medical Officers (terminology may vary in different regions), Resident Medical Officers, Interns/House Officers, International Medical Graduates (IMGs) (including 'occupational trainees' and specialists requiring periods of supervision prior to full recognition), non-FACEM physicians, Nurse Practitioners, other 'role substitutes' are less likely to possess the cognitive and technical skill set necessary for rendering unsupervised care for the tremendous breadth and acuity of situations encountered in the emergency department (refer to ACEM document G19 *Guidelines on the Role of Interns in the Emergency Department*).
The supervising workload of the emergency physician depends on the skill mix and staff numbers of the ED staff. Departments with issues concerning recruitment and retention/poor morale, workload, ethnicity, language barriers, offer a higher supervision burden to the emergency physician. It is recommended that emergency physicians and

EDs look at ways of redesigning patient journeys, pursuant to local issues, so that the quality and timeliness of service provision are not compromised.

6. REQUIREMENTS FOR EDUCATION

Teaching and training are core components of emergency departments. FACEMs have their own specific educational requirements. The role of FACEMs in the education and supervision of junior medical staff is paramount but the two activities are also performed to a lesser extent by registrars to their peers and to more junior staff. FACEMs act as mentors to more junior staff. Additional teaching is often provided by emergency physicians both inside the hospital and in the wider health community.

Accreditation of EDs by both the ACHS and ACEM requires teaching and training. ACEM requires both Fellows and trainees to meet educational objectives. In the case of Fellows this is measured through the MOPS program and for trainees through ongoing assessment and review.

Interns must complete a mandatory term in an emergency department. Their educational and supervisory needs are high and place additional requirements on staff in EDs.

The components necessary for teaching and training must include programs for medical staff with varied career intentions and levels of seniority and experience. Medical staff pursuing a non-emergency vocation may have particular rostering requirements in order to attend teaching in their planned vocation.

Medical students create additional educational demands. Most medical student programs now include a module for emergency medicine. Medical students require mentorship of a nominated senior member of medical staff.

The education provided in EDs is of two varieties, formal and informal. Formal education requires physical space and supporting resources including but not limited to computer access and projectors. Protected teaching time must be incorporated into rosters to facilitate this. A significant amount of preparation time is required for presentations.

7. SUSTAINABILITY

Emergency medicine is a developing and evolving specialty. The increasing demand on EDs and changing roles over the last decade has increased service provision with proportionally less resources. Central to most EDs is the accurate, timely and appropriate assessment, clinically sound management and safe disposition of patients. Additionally public expectation and the increasing complexity and co-morbidities of patients have placed additional demands on EDs.

Accordingly the roles of emergency physicians are changing particularly in the management of department and patient flow as well as maintaining standards of clinical practice. The rapidly developing changes in clinical practice and information such as evidence based medicine, clinical pathways, guidelines and care plans are placing increased pressure on emergency physicians to maintain high clinical practice standards while providing maximum service delivery activity. Maintaining these levels of expertise and practice requires significant time and resources.

Additionally the changing demographics of the Australasian workforce, lifestyle and work balance and societal attitudinal changes to work, are impacting upon recruitment, retention and maintenance of the ED workforce. Flexibility in work is a key area of concern for most workers in the healthcare industry, including emergency physicians.

The changing roles and increased demands upon emergency physicians are potentially major issues for the profession to manage. There is an attrition rate from overwork, family and leisure commitments, alternative career pathways and retirements. Sufficient trainees must be recruited to replace this loss and to satisfy the increasing demand for FACEMs. The following

recommendations are designed to provide a framework to ensure working life longevity, satisfaction and continuity of emergency medicine as a profession.

7.1 Well Being

- Hours of work - emergency physicians should have a fair, equitable and supportive environment. It is recognised that shift work is a standard component of emergency medicine practice. This creates anti-social working hours and should be compensated appropriately by remuneration and/or incentives to compensate for these types of shifts. Appropriate rostering, in a manner consistent with circadian principles, is necessary and long sequences of rotating rostered shifts should be avoided. Fatigue issues are being addressed through several strategies and must be considered an important factor in determining staffing levels.

- Age Factors - It is recognised that tolerance of rotating shifts deteriorates with age. Therefore, the age of consultants should be taken into account when rosters are constructed.

- Rostering - Shifts should be no longer than 10 hours. Continuous working hours should not exceed 12. Evidence clearly shows that decision making accuracy decreases, mental alertness decreases whilst error rates increase when physicians work continuously beyond 10 hours and changes exponentially beyond 12 hours of continuous duty. A minimum of 10 hours between finishing and resuming clinical duties is mandatory. Regular 48 hour minimum periods off work with no less than a total of 60 hours per fortnight are recommended. On call should be limited to no more than two on call 24 hour periods per seven days with neither to be consecutive. Total employed hours should be 40 per seven days.

- Night Shifts - Whilst, at present, few emergency physicians perform night shifts, it is possible in the future more will be rostered to do so. Night shifts represent the most disruption to diurnal patterns and have been extensively researched. Adequate recovery time is essential with at least 1 x 24 hour period rostered off work for every night shift, not including the first 24 hour period after finishing night shift.

- Conditions of work - a minimum of 25% of total employed hours should be set aside for clinical support activities (refer section 5), as well as other activities as requested by the organisation such as meetings and committee commitments. There should be provision for adequate annual leave, conference leave and professional development leave.

- Career development and pathways - should be clearly delineated and available. Remuneration should be commensurate with other professional colleagues performing at similar levels. It is recognised that remuneration and conditions of employment across Australasia are not uniform. However, remuneration and conditions of employment should be comparable and emergency physicians should not be disadvantaged by working in different regions of Australia or New Zealand.

7.2 Environment

- A safe, clean and appropriately equipped working environment is essential. Staffing in all disciplines, patient treatment areas and facilities must be adequate and commensurate with the level of departmental activity. Access to ancillary services and investigation modalities is also essential - refer to *G15 Emergency Department Design Guidelines*.

- Adequate resources should be available for each emergency physician to perform their various functions, including (but not exclusive of) adequate office space, information

and communication technology access, library, internet access, secretarial support and relaxation area. Work practices should be in accordance with standard clinical practice and guidelines. Teaching and research facilities and resources should be available.

7.3 Professional Development

Emergency physicians should have adequate time and resources allocated to maintain professional standards of practice. They should also have organisational recognition of their value to the organisation, professional standing and collegiate recognition.

7.4 Roles and Responsibilities

It is widely recognised that emergency physicians have a variety of functions and roles within emergency departments. As part of the conditions of employment, roles, responsibilities and functions should be clearly described. Additional activities outside of clinical practice such as teaching and research must be accepted as part of the role as an emergency physician and must be taken into account as part of the total employed hours. Time and resources for professional development must be available. Emergency physicians should not be required to perform surrogate roles for deficiencies of other specialties within organisations.

7.5 Additional Activities

- Some emergency physicians have roles and responsibilities outside of their area of employment. These include activities such as College Committee membership, College Examination process participation, accreditation surveying such as Australian Council on Healthcare Standards, membership of clinical associations, and societies and Joint Colleges Committees.

- These activities are important to some emergency physicians for professional development, satisfaction and expanding the development of emergency medicine as a discipline in its own right. These activities should be encouraged and supported by employers of FACEMs and these types of activities recognised and facilitated.

7.6 Risks

Risks to longevity of emergency physicians and sustainability of the emergency medicine workforce have been identified:

- The inability to recruit sufficient trainees
- Inadequate remuneration and incentives for anti-social working conditions.
- Generational changes in attitudes to work.
- Failure of maintenance of adequate staffing levels.
- Lack of appropriate ED resources.
- Inadequate organisational support and recognition.
- Inadequate workforce planning both intermediate and long term.

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APPENDIX 1

1 in 5 ROTATION – REQUIRED FACEM STAFFING CALCULATIONS ACCORDING TO DIFFERENT LEAVE ENTITLEMENTS

Required FACEM staff assuming 7 weeks leave per FTE per year (i.e. each FTE works 45 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	10.0	1.6	11.6
37,500	15.0	2.4	17.4
50,000	20.0	3.2	23.2
62,500	25.0	3.9	28.9
Adjustment factors	1.0	0.16	1.16

Required FACEM staff assuming 8 weeks leave per FTE per year (i.e. each FTE works 44 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	10.0	1.9	11.9
37,500	15.0	2.8	17.8
50,000	20.0	3.7	23.7
62,500	25.0	4.6	29.6
Adjustment factors	1.0	0.19	1.19

Required FACEM staff assuming 9 weeks leave per FTE per year (i.e. each FTE works 43 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	10.0	2.1	12.1
37,500	15.0	3.2	18.2
50,000	20.0	4.2	24.2
62,500	25.0	5.3	28.3
Adjustment factors	1.00	0.21	1.21

Leave cover is calculated as follows:

***'Base FTE' multiplied by 'weeks of leave per FTE' = 'number of weeks of leave cover required'**

***Each additional 1 FTE provides 52 weeks less 'weeks of leave per FTE' = 'number of weeks of cover per additional FTE'**

*** 'Number of weeks of leave cover required' divided by the 'number of weeks of cover per additional FTE' = FTE required for leave cover**

***Values have been rounded up to the nearest 0.1 FTE, except for those associated with adjustment factors which have been rounded up to the nearest 0.01 FTE**

1 in 6 ROTATION – REQUIRED FACEM STAFFING CALCULATIONS ACCORDING TO DIFFERENT LEAVE ENTITLEMENTS

Required FACEM staff assuming 7 weeks leave per FTE per year (i.e. each FTE works 45 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	12.0	1.9	13.9
37,500	18.0	2.8	20.8
50,000	24.0	3.8	27.8
62,500	30.0	4.7	34.7
Adjustment factors	1.0	0.19	1.19

Required FACEM staff assuming 8 weeks leave per FTE per year (i.e. each FTE works 44 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	12.0	2.2	14.2
37,500	18.0	3.3	21.3
50,000	24.0	4.4	28.4
62,500	30.0	5.5	35.5
Adjustment factors	1.0	0.22	1.22

Required FACEM staff assuming 9 weeks leave per FTE per year (i.e. each FTE works 43 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	12.0	2.6	14.6
37,500	18.0	3.8	21.8
50,000	24.0	5.1	29.1
62,500	30.0	6.3	36.3
Adjustment factors	1.00	0.26	1.26

Leave cover is calculated as follows:

***'Base FTE' multiplied by 'weeks of leave per FTE' = 'number of weeks of leave cover required'**

***Each additional 1 FTE provides 52 weeks less 'weeks of leave per FTE' = 'number of weeks of cover per additional FTE'**

***'Number of weeks of leave cover required' divided by the 'number of weeks of cover per additional FTE' = FTE required for leave cover**

***Values have been rounded up to the nearest 0.1 FTE, except for those associated with adjustment factors which have been rounded up to the nearest 0.01 FTE**

1 in 4 ROTATION – REQUIRED FACEM STAFFING CALCULATIONS ACCORDING TO DIFFERENT LEAVE ENTITLEMENTS

Required FACEM staff assuming 7 weeks leave per FTE per year (i.e. each FTE works 45 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	8.0	1.3	9.3
37,500	12.0	1.9	13.9
50,000	16.0	2.5	18.5
62,500	24.0	3.8	27.8
Adjustment factors	1.0	0.13	1.13

Required FACEM staff assuming 8 weeks leave per FTE per year (i.e. each FTE works 44 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	8.0	1.5	9.5
37,500	12.0	2.2	14.2
50,000	16.0	3.0	19.0
62,500	24.0	4.4	28.4
Adjustment factors	1.0	0.15	1.15

Required FACEM staff assuming 9 weeks leave per FTE per year (i.e. each FTE works 43 weeks of the year)

Annual patient presentations	Base FTE	FTE required for leave cover	Total FTE required
25,000	8.0	1.7	9.7
37,500	12.0	2.6	14.6
50,000	16.0	3.5	19.5
62,500	24.0	5.1	29.1
Adjustment factors	1.00	0.17	1.17

Leave cover is calculated as follows:

***'Base FTE' multiplied by 'weeks of leave per FTE' = 'number of weeks of leave cover required'**

***Each additional 1 FTE provides 52 weeks less 'weeks of leave per FTE' = 'number of weeks of cover per additional FTE'**

***'Number of weeks of leave cover required' divided by the 'number of weeks of cover per additional FTE' = FTE required for leave cover**

***Values have been rounded up to the nearest 0.1 FTE, except for those associated with adjustment factors which have been rounded up to the nearest 0.01 FTE**

APPENDIX 2: QUALITY ELEMENTS AND PERFORMANCE INDICATORS

Some operational parameters are of value in the setting of emergency medicine practice, particularly those that relate to within-department patient processing and time to decision in the patient journey. Examples of such operational parameters might include:

- Time to disposition decisions (medical time seen to disposition decision time)
- Time to time-critical interventions (time to thrombolysis, time to analgesia, time to antibiotics in sepsis).
- Turnaround time (medical time seen to departure ready time). Departure ready time has been chosen in preference to actual departure time as the latter is considerably more subject to external factors (i.e. delays in accessing transport via ambulance or relatives, elderly patients living alone not being suitable for discharge overnight).
- Resource utilisation, particularly in relation to pathology and radiology orders.

Although quality outcomes are, in general, more difficult to measure there are facets of quality that can be collected currently. These include:

- Written complaint rates
- Sentinel and other significant adverse events identified through departmental or hospital morbidity and mortality review processes.
- Numbers of missed diagnoses/significant results identified through routine case based quality assurance activities (i.e. pathology and radiology results review etc), and the subsequent actions required for these patients as a measure of potential severity.
- Documentation standards (i.e. medical records, discharge summaries, medication orders). There are existing legislative and other standards that can be used to systematically assess the standard of documentation.
- Unplanned returns to ED within 24, 48 or 72 hours and the number of such unplanned returns to ED requiring hospital admission. It is acknowledged that there are issues in data collection as patients may not return to the same ED on the second occasion. Ongoing work in many jurisdictions on unique patient identifiers at an Area Health Service or Regional level will improve the quality of this data.
- Clinical pathway compliance/variance.
- Turnaround times and percentage discharge rates from short stay units, which reflects the quality of decision making and the clinical guidelines relating to appropriate patient selection for these units.
- Patient and carer satisfaction.
- Staff related quality outcomes such as sick leave rates, turnover rates at each level and for each discipline, vacant positions and time to recruit, completion rates of contracts, and direct measures of staff satisfaction (i.e. surveys).

The increasing use of electronic capture of clinical information and the improved linkage of clinical and/or operational databases will make more direct quality outcome measures obtainable over coming years. The exact nature of these measures will depend on the type and quality of data collected in local databases but might include parameters such as:

- Age/sex adjusted all-cause mortality rates for patients discharged from ED.
- Age/sex adjusted mortality rates for specific presentations or diagnoses discharged from ED.
- Re-presentation, and readmission, rates for patients discharged from ED (i.e. chest pain presentations, elderly patients).
- Accuracy of ED provisional diagnosis for admitted, or discharged, patients.

There is an undoubted need for additional research into the measurement of quality outcomes in emergency medicine care. The results of such research will be invaluable in defining the most appropriate dataset to best reflect quality of care as an expected outcome of appropriate ED staffing.