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Effectiveness of acute medical units in hospitals: a systematic review

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Abstract

Purpose. To assess the effectiveness of acute medical units (AMUs) in hospitals.

Data sources. (i) Controlled and observational studies in peer-reviewed journals retrieved from PubMed, EPOC, CINAHL and ERIC databases published between January 1990 and July 2008; and (ii) reports from non-peer-reviewed websites combined with Google search.

Study selection. Articles reporting effects of the introduction of an AMU on mortality, length of stay, discharge disposition, readmissions, resource use and patient and/or staff satisfaction.

Data extraction. Data on unit operations and outcome measures were extracted by a single author and confirmed by a second author, with disagreement settled by consensus.

Results of data synthesis. Nine peer-reviewed reports of before–after analyses of seven units introduced into the UK and Ireland were analysed. Two studies, one prospective, reported significant reductions in in-patient mortality between 0.6 and 5.6% points following commencement of AMU. Four studies reported significant reductions in the length of stay between 1.5 and 2.5 days. Waiting times for patient transfer from emergency departments to medical beds decreased by 30% in one study. In three studies, the proportion of medical patients discharged directly home from the AMU increased by 8–25% points. Three studies noted no increase in 30-day readmission rates following unit commencement. Two studies described significant improvements in patient and staff satisfaction with care. Eight non-peer-reviewed reports relating to 48 units confirmed reductions in the length of stay.

Conclusion. Limited observational data suggest AMUs reduce in-patient mortality, length of stay and emergency department access block without increasing readmission rates, and improve patient and staff satisfaction.

Keywords: acute medical unit, systematic review

Introduction

In the last decade most acute hospitals have seen an inexorable rise in emergency admissions juxtaposed with a reduction in numbers of hospital beds and an increase in bed occupancy rates to above 85% [1]. Admission rates continue to climb due to increasing numbers of emergency presentations of elderly patients with multiple chronic diseases [2], raised expectations of care and lower thresholds for admission. Historically this has resulted in admitted patients being distributed to multiple wards distant from investigative facilities and receiving fragmented care by unsupervised junior medical staff working complex and often inappropriate rosters. Early assessment by medical specialists and allied health professionals, although being the expected standard of care, is rarely the norm. The lack of spare bed capacity has led to overcrowding in hospitals and congestion in emergency departments with resultant inefficiencies in service delivery, length of stays that may be longer than necessary [3] and greater risk to patients of medical error, avoidable death and complications [4]. Hospitals worldwide have had to consider structural reforms for optimizing evaluation, treatment and subsequent transfer of care of patients, presenting acutely to hospital in order to avoid in-patient admission if possible, reduce length of stay and discharge patients to the most suitable post-acute care setting [5]. One solution that is growing in popularity is the establishment of acute medical units (AMUs) within acute hospitals.

The anatomy of an AMU

In both the UK and Australia, many hospitals have established AMUs or units with synonymous names including

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acute medical assessment unit (AMAU), medical assessment and planning units (MAPU), acute assessment unit (AAU), acute medical wards (AMW), acute planning units (APU), rapid assessment medical units (RAMU) and early assessment medical units (EMU). These are defined here as: designated hospital wards specifically staffed and equipped to receive medical inpatient presenting with acute medical illness from emergency departments and/or the community for expedited multidisciplinary and medical specialist assessment, care and treatment for up to a designated period (typically between 24 and 72 h) prior to discharge or transfer to medical wards. These units are supervised by consultants with an interest in acute general medicine, feature multidisciplinary teams that comprehensively assess and manage both medical illness and functional disability, and, in many instances, are geographically co-located with emergency departments and key diagnostic services such as pathology and radiology [6].

In general, AMU admission policies grant entry to any patient referred from emergency departments or directly from primary care practitioners with an acute medical condition who, in most cases, exhibit none of the following contra-indications to entry: (i) haemodynamic instability requiring invasive monitoring and/or critical care facilities; (ii) special need patients (e.g. acute stroke, dialysis, oncology, endoscopy); (iii) presentations for respite or residential care; (iv) geriatric syndrome presentations best suited for admission to geriatric rehabilitation or dedicated elderly care units; and (v) severely behaviourally disturbed patients best suited for mental health care.

While AMUs have local and national peculiarities in organization and operation, all share several common objectives (Table 1) and patient flow characteristics (Fig. 1), which confer potential flow-on benefits for patients, clinicians and health services as a whole. These include the following: more appropriate and timely assessment, diagnosis and treatment of patients leading to reduced length of stay; more organized work environment with standardized admission and discharge processes; reduced overcrowding in emergency departments and avoidance of unnecessary admissions; improved bed management and smoother patient flows; increased staff job satisfaction and more effective use of resources for the hospital as a whole.

In the UK, the Royal College of Physicians of London since 2001 has repeatedly recommended the establishment of AMUs to provide hospitals with defined medical cover for acute general medicine in order to respond more effectively and safely to the increasingly complex demands placed on the hospital with regard to acute medical care [7, 8]. The Society of Acute Medicine (SAM), established in 1999, is supported by the UK Royal Colleges of Physicians and is the representative body for physicians with expertise in acute hospital medicine and has previously issued guidelines for the operation of AMUs [9]. This has been most recently echoed by the Consensus Statement issued by the Royal College of Physicians of Edinburgh in late 2008 [10]. The most recent census of the Royal College of Physicians reported that 92% of all hospitals in the UK now admit acutely unwell medical patients to an AMU, which number 210, and the consultant workforce practising in acute/general medicine has expanded by 63% in the 5 years period from 2002 to 2007 [11].

Table 1 Objectives of AMUs

Rapid and comprehensive multidisciplinary assessment of acutely ill medical patients led by appropriately trained acute care physicians
Early consultant review of admitted patients and referral, as appropriate, to speciality teams
Rapid turnaround in pathology, radiology and other clinical investigative services
Improved access to aged care assessment, community health nurse review and other clinical management resources
Reduction in waiting times for patients in emergency departments to access in-hospital beds (alternatively termed access block) and reduction in numbers of patients who do not wait to be seen by emergency department staff
Elimination of the need to outlie patients in non-home wards and disrupt ward environment with after-hours admissions
Standardized care of acutely ill medical patients based on agreed care protocols and guidelines
Optimization of bed management using care pathways that obviate the need for hospitalization
Facilitation of clinical and health services research into care of acutely ill medical patients
Reduction in staff fatigue by improved rostering and use of shifts.

In Australia and New Zealand, the Internal Medicine Society of Australia and New Zealand (IMSANZ), which is affiliated with the Royal Australasian College of Physicians, is the representative body of general physicians and has taken the lead in promoting acute care medicine by releasing trans-Tasman guidelines for AMUs [12]. Recent surveys confirm 48 units in existence, with another 18 planned for commissioning across both countries, while IMSANZ now has over 400 consultant members.

In view of these developments, what is the evidence that AMUs in the UK and Australasia have improved patient outcomes and hospital efficiency, and what are the critical success factors for their operation? This study attempts to answer these questions by conducting a systematic review of reports from both peer-reviewed journals and non-peer-reviewed sources.

Methods

Electronic databases of PubMed, EPOC, CINAHL and ERIC were searched for all randomized, controlled and uncontrolled studies published in English-speaking journals between January 1990 and July 2008 using search terms 'acute medical unit' or synonyms. With regards to the grey

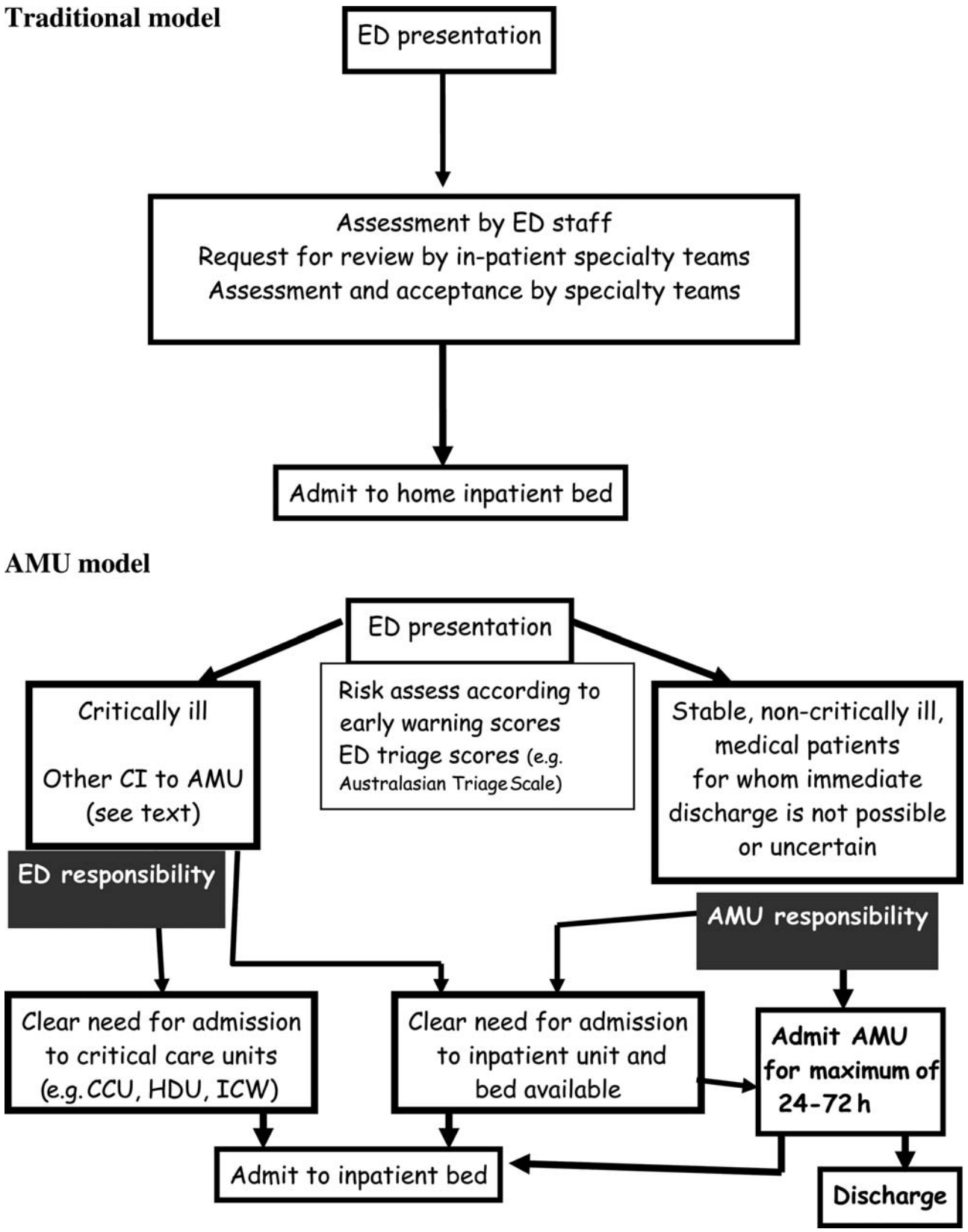

Figure 1 Patient flow within traditional model of care vs. AMUs traditional model.

literature, websites of hospitals or hospital trusts, health departments, professional societies and health service evaluation units within Australasia and the UK were scanned for operational analyses, technical summaries, position statements or annual reports relating to AMUs. A Google search was also performed using 'acute medical unit' or synonyms, which included retrieval of conference proceedings. Bibliographies of retrieved articles were scanned for additional reports, and experts within SAM and IMSANZ were consulted for other references.

Articles from peer-reviewed and grey literature were selected for inclusion if they described the effects of an AMU which met our unit definition on at least one of the following outcomes: mortality, length of stay, discharge rates, readmissions, discharge destination, costs, resource and bed usage and patient and/or staff satisfaction. Data was extracted pertaining to unit operations and outcome measures. Article selection and data extraction were performed by a single author and then confirmed by a second author, with disagreement settled by consensus.

Results

Peer-reviewed evidence of efficacy

The literature search yielded 89 abstracts of which 80 were excluded as they failed to meet selection criteria (49 describing non-AMU wards; 9 describing models of care; 9 assessing specific clinical conditions; 5 analysing knowledge, skills and attitudes; 5 evaluating risk prediction and disease severity tools; 2 editorials; and 1 completely unrelated). The study characteristics and principal findings of the nine articles [13–21] included in the analysis are summarized in Table 2. No randomized or controlled studies were found, with two prospective [14, 21] and seven retrospective [13, 15–20] before–after analyses of seven units, all of which were in the UK or Ireland and six of which had been in existence no longer than 5 years. Because of study heterogeneity with respect to periods of observation and outcome measures, no formal meta-analysis was performed.

Mortality. A prospective study of 33 367 episodes of care at the AMU of St James's Hospital in Dublin [21] demonstrated a 44.4% relative reduction in all-cause hospital mortality over 5 years from 12.6% in 2002 to 7.0% in 2006 ($P < 0.001$), yielding a number needed to treat to save one life of 18. After adjusting for age, gender, major disease category, Charlson co-morbidity index, modified version of the acute physiology and chronic health evaluation (APACHE) II score, number of admissions and acute or non-acute ward destination, the odds of death were reduced by 72% (odds ratio [OR] = 0.28 [95% CI: 0.23–0.35]). The downward slope in mortality began 12 months after unit commencement and continued despite significant increases over the 5 year period in annual workload (from 5476 episodes of care to 6254), level of co-morbidity (proportion of patients with Charlson index of >0 increasing from 39.7 to 46.4%) and acute illness severity (median APACHE score increasing from 6 to 7; $P \leq 0.001$ for all comparisons). The survival benefit was observed across (and was independent of) a wide spectrum of diagnostic categories.

A retrospective study at Royal Liverpool University Hospital between 1995 and 2003 revealed that establishment of an AMU in 1999 was associated with a decline in all-cause hospital mortality for general medical patients from 7.2 to 5.9% ($P = 0.04$) and a significant 27% reduction in mortality from 3.1 to 1.8% ($P = 0.02$) in the under-65 year age group of acute medical presentations, which was in excess of the underlying downward trend in overall mortality rates [18].

Length of hospital stay. The establishment of the previously mentioned AMU at St James's Hospital, in an early retrospective study of 10 566 admissions over 2 years, was associated with a significant reduction in median (interquartile [IQR]) length of stay of medical admissions from 6 (3–13) to 5 (2–11) days ($P < 0.001$) [17], an effect that persisted after adjusting for the number of co-morbid conditions. Patients admitted under general medical teams compared with those admitted under subspecialists had significantly shorter length of stay (5 vs. 6 days; $P < 0.001$). In a more recent update, a decrease from 7 (3–15) to 5 (2–12) days ($P < 0.001$) over 5 years was reported with less variation in the length of stay between different on-take medical teams [19]. In a retrospective study of 3163 medical admissions to Chelsea and Westminster Hospital in London before and after instigation of an AMU [20], the mean length of stay was seen to significantly decrease from 9.3 days to 7.8 days after 4 months of the AMU operation ($P = 0.03$). Similar results were noted at Stobhill Hospital in Scotland where, following commencement of an 'acute medical receiving ward', the mean length of hospital stay decreased from 7.0 to 4.5 days [15]. At Royal Liverpool University Hospital an AMU led to a decrease in the average length of stay from 9.3 to 8.8 days, which failed to reach statistical significance ($P = 0.07$) [18].

Waiting times in emergency department. At St James's Hospital, the number of medical patients waiting in the emergency department for a hospital bed for more than 4 h decreased by 30% following the AMU commencement ($P < 0.001$) [17]. In a later report, the median (IQR) number of patients in emergency department awaiting beds at 7 a.m. decreased from 14 (8–19) in 2002 to 2 (0–13) in 2006 ($P = 0.001$) [21].

Discharge disposition. The impact of an AMU on the rate at which patients were discharged directly home within 48 h of presentation to the emergency department was assessed at Chelsea and Westminster Hospital, with direct discharge rates at 24 h increasing from 21 to 29% ($P < 0.005$) and at 48 h increasing from 31 to 40% ($P = 0.04$) [20]. At the Leeds General Infirmary, instigation of an AMU led to an increase in the direct discharge rates at 24 h from 4% to between 15 and 29% ($P < 0.001$) [14]. At the Royal Bournemouth Hospital, an AMU was associated with 21% direct discharge rate in its first 2 years of operation, which increased to 32% by the third year, coupled with a decrease in the number of medical outlier bed-days of 16% [16].

Table 2 Study characteristics and main outcomes

Reference	Site	Study design	Total episodes	Time period	Description	Main outcomes
[13]	Royal Alexandra Hospital, Paisley, Scotland	Prospective cohort (retrospective cohort for pre-AMU data)	Unstated	1993–1995	Reorganization of medical services. New 38 bed AMU that became operational in August 1994. Dedicated consultant of the week for 7 days.	Improved distribution of patients to appropriate downstream specialist wards ($P < 0.001$). No changes in outpatient waiting times, despite cancellation of clinics during consultant on-call. Staff surveys: non-consultant medical staff reported less concerned about losing track of patients ($P < 0.01$); less worried about patient placement ($P < 0.01$); more concerned about 'blocked beds' ($P < 0.05$). Nursing staff reported more time for health promotion ($P < 0.01$); increasing stress levels ($P < 0.05$). Patients reported improved explanations of treatment ($P < 0.05$) and higher proportion felt ready for discharge ($P < 0.05$).
[14]	Leeds General Infirmary, England	Prospective cohort	1277	1993–1995 (three study periods)	Opening of Medical Receiving Room (five-bed unit for assessment of acute medical referrals). Became operational in 1993. Rearrangement of middle level staffing for each of three study periods	Direct discharge rates at 24 h increased from 3.6 to 29% in period 2 ($P < 0.001$) and 15% in period 3 ($P < 0.001$). Re-admission rate at 4 weeks decreased from 13.3 to 6.0%. Improved appropriate bed usage. High level of general practitioner satisfaction.
[15]	Stobhill Hospital, Scotland	Retrospective cohort	30 088	1992–1997	Reorganization of medical services (total 152 beds). New 26 bed AMU, operational in 1993. Dedicated consultant of the day for 24 h take. AMU maximum length of stay: 48 h.	Average length of stay for medical admissions reduced from 7.12 to 4.5 days. Direct discharge rate at 48 h was 31%. Reduction by 28% in total medical beds from 223 to 161. Improvement with new system perceived by 91% nursing staff, 93% medical staff.

(*continued*)

Continued

Reference	Site	Study design	Total episodes	Time period	Description	Main outcomes
[16]	Royal Bournemouth Hospital, England	Retrospective cohort	18 735	1997–2002	Reorganization of medical services. New 22 bed AMU, operational in 1997. Further beds added in third and fourth years to total of 42 beds. One acute care physician assumed care of patients with expected stay of <72 h. Consultant of the day for post-take ward rounds. AMU maximum length of stay: 72 h.	Direct discharge rate at 24 h increased from 21% during first 2 years to 32% during third year. Reduction in total medical beds by 17%. Re-admission rate at 2 weeks was 2.37%. Decrease in the number of outlier bed days of 16%.
[17]	St James's Hospital, Dublin, Ireland	Retrospective cohort	10 566	2002–2003	Reorganization of medical services. New 59 bed AMU, operational in 2003. Dedicated consultant of the day for 24 h take. AMU maximum length of stay: 5 days.	Median length of stay reduced from 6 to 5 days ($P < 0.0001$). General physician teams had significantly shorter length of stay than specialists, adjusted for co-morbidity ($P < 0.001$). Reduction by 30% in number of emergency patients waiting for inpatient bed ($P < 0.001$).
[18]	Royal Liverpool University Hospital, England	Retrospective cohort	133 509	1995–2003	Reorganization of medical services. Expansion of existing admissions unit into 47 bed AMU with early speciality triage; operational in May 1999. Dedicated consultant of the day for 12 h take. Four acute physicians with responsibility for care of patients with expected short stay AMU maximum length of stay: 24 h	All-cause hospital mortality for general medical patients reduced from 7.2% to 5.9% ($P =$ ns). All-cause hospital mortality for general medical patients of <65 years reduced from 3.1 to 1.8% ($P = 0.02$). Re-admission rate at 4 weeks reduced from 10.2 to 8.3% ($P =$ ns). Average length of stay reduced from 9.3 days to 8.8 days ($P = 0.07$). Triage to appropriate speciality increased from 27 to 56%.

[19]	St James's Hospital, Dublin	Retrospective cohort	17 211	2002–2004	Reorganization of medical services. New 59 bed AMU, operational in 2003. Dedicated consultant of the day for 24 h take. AMU maximum length of stay: 5 days.	Median length of stay reduced from 7 days to 5 days ($P < 0.0001$). Readmissions rates at 28 days showed no change. Reduction in variation of length of stay between medical teams.
[20]	Chelsea and Westminster Hospital, London, UK	Retrospective cohort	3263	2005–2006 (three study periods)	Reorganization of acute medical services, including expansion of existing admissions unit into AMU. Operational in 2006. Consultant of the day during week, with 'consultant of the weekend'.	Average length of stay reduced from 9.3 to 7.8 days ($P = 0.03$). Direct discharge rate at 24 h increased from 21.3 to 28.5% ($P < 0.005$). Direct discharge rate at 48 h increased from 31.2 to 39.5% ($P = 0.04$). Re-admission rate at 7 days remained unchanged: 4.5 vs. 4.0%.
[21]	St James's Hospital, Dublin, Ireland	Prospective cohort	33 367	2002–2006	Reorganization of medical services. New 59 bed AMU, operational in 2002. Dedicated consultant of the day for 24 h take. AMU maximum length of stay: 5 days.	All-cause hospital mortality in acute medical patients reduced from 12.6 to 7.0% ($P < 0.0001$). 30-day all-cause hospital mortality in acute medical patients reduced from 8.8 to 5.6% ($P < 0.0001$). Median length of stay reduced from 7 to 5 days ($P < 0.0001$). Median number of patients in emergency department awaiting beds at 7 a.m. reduced from 14 to 2 ($P < 0.001$).

Establishment of an AMU at Royal Liverpool University Hospital led to an increase from 27 to 56% in the proportion of patients being cared for by the appropriate speciality following admission [18]. Similar findings were seen following establishment of an AMU at the Royal Alexandra Hospital [13], which saw the proportion of patients requiring coronary care who were transferred to cardiology increase from 39 to 83% and proportion of patients with major respiratory diagnosis placed under the care of respiratory physicians rise from 53 to 67% ($P < 0.001$ for both comparisons).

Readmission rates. Studies have shown that reduced length of stay and increased direct discharge rates achieved by AMUs have not been associated with increased rates of readmission at 30 days, which might otherwise indicate premature discharge, despite increases in total numbers of presentations and greater co-morbidity burden and illness severity [16, 17] At Leeds General Infirmary, the readmission rate actually fell from 13 to 6% following the instigation of their AMU [14].

Bed cost and resource utilization. An analysis at St James's Hospital revealed that AMU had led to a saving of 4039 bed-days over a 12 month period yielding an estimated cost benefit of €1 714 152 after excluding patients with length of stay of >30 days [19].

Patient and staff satisfaction. A survey conducted at Stobhill 6 months after the opening of its AMU showed that 52% of patients, 91% of nurses and 93% of medical staff (response rates not reported) perceived the new model of care as being better than the traditional model [15]. At the Royal Alexandra Hospital, staff surveys showed that, following establishment of an AMU in 1994, non-consultant medical staff (response rate 66%) were less concerned about losing track of patients ($P < 0.01$) or having patients admitted to non-medical wards ($P < 0.01$), but became more worried about 'blocked beds' ($P < 0.05$); nursing staff (response rate of 64%) reported more time for health promotion ($P < 0.01$), but also felt more stress in dealing with a concentration of acutely ill patients ($P < 0.05$). More patients reported via surveys (average response rate of 57%) that staff had time to explain their treatment after the process of reorganization (89 vs. 79%, $P < 0.05$) and a higher proportion felt ready for discharge (93 vs. 84%; $P < 0.05$) [13]. In an article published after the study retrieval end date for this review, a safety culture questionnaire survey conducted at the AMU of St James's Hospital in 2008 revealed significantly greater scores for teamwork climate, safety climate, stress recognition and job satisfaction compared with international benchmarks [22].

Non-peer-reviewed evidence of efficacy

Conferences held in Sydney and Melbourne, Australia, in April 2009 provided recent data relating to units in three states. In New South Wales, the average length of stay for patients admitted to inpatient wards from 19 AMUs declined over 8 months by 27% from 11 days to 8 days [23], with one unit reporting a decrease from 7.9 days to 5.7 days [24]. Average direct discharge rates to home within 48 h for all units over the study period ranged from 54 to 57% with readmissions rates showing a slight increase from 11.8 to 13.9%, attributed to decreasing access to community support [23]. At Flinders Medical Centre in Adelaide, Australia, establishment of an AMU, combined with changes in bed management practices, reduced length of stay for medical patients by 0.8 day over 8 months and reduced the proportion of inpatient bed-hours occupied by ward outliers from 29 to 10% over 4 years [25]. A unit in a Melbourne hospital resulted in reductions in the length of stay of medical patients of 0.4 days over 12 months, although readmission rates went up from 24 to 28% ($P < 0.05$) [26]. Analyses reported from units in Brisbane and Perth, Australia, and Auckland in New Zealand revealed consistent reductions in in-patient length of stay ranging from 0.5 to 1.7 days, with estimated bed-day savings of between 3000 and 12 000 days [12]. A survey of 21 hospitals in Victoria, Australia, in 2003 showed that, following establishment of AMUs, the average length of stay for common presentations such as exacerbation of chronic obstructive pulmonary disease, pneumonia and heart failure decreased by between 1.4 and 2.7 days [27].

In the UK, recent audits conducted at Chelsea and Westminster Hospital revealed that, compared with 2005, in-hospital mortality for patients with acute medical illnesses fell from 1.6% (34 deaths in 2096 patients) in 2005 to 1.1% in 2007 following the opening of an AMU (not significant), accompanied by a decrease in the length of stay from 8.8 to 6.9 days ($P < 0.005$) and an increase in the direct discharge rate at 48 h from 33 to 53% ($P < 0.005$) [28]. At Ipswich Hospital in East Anglia, an AMU with an on-the-floor medical consultant led to a decrease in hospital length of stay of 1.3 days ($P = 0.048$) and increase in same-day discharge of patients admitted to an AMU of 9% ($P < 0.001$) [29].

Success factors

The reviewed literature consistently emphasized several factors critical to the success of an AMU, which have been endorsed in recent guidelines for AMU operations [8, 9], and issues that have proved problematic for some units (Table 3). The extent to which AMUs currently in existence demonstrate such characteristics is unclear but data is presently being gathered from questionnaire surveys of all AMUs in all the three countries.

Discussion

The evidence base around the efficacy of AMUs remains limited and no controlled trials have been reported to date. Therefore, confounding of results and other methodological flaws cannot be discounted. For example, Moore *et al.* [18] concede that a background decrease in mortality of the catchment population, change in demographics of admitted patients or a selection bias from referring primary care practitioners may account for the observed decrease in

Table 3 Factors that influence AMU operations

Success factors
Governance structure that includes medical, nursing and allied health disciplines
Rigorous business rules around patient entry and clearly defined processes of admission and discharge of eligible patients
Consultant leadership and strongly supportive hospital management
Group of generalist physicians willing to take part in acute roster
Dedicated multidisciplinary support (nursing, junior medical staff, allied health, pharmacists, clerical staff, wardsmen)
Proximity to, and close working relationship with, emergency department
Twice daily multidisciplinary ward rounds
Prioritized access to investigative facilities
Implementation of standardized evidence-based protocols
Co-operation of speciality colleagues in early review and acceptance of patients referred from AMU
Access to early clinic appointments and other post-discharge support services
Regular evaluation and feedback of quality indicators
Clerical assistance and strong information technology support
Problematic issues
Difficulties recruiting nurses and allied health staff with appropriate levels of acute assessment skills
Inadequate nurse–patient ratios ($\leq$1:5) which slow patient assessment and care
Exit block from AMU due to lack of access to ambulance transport and community services (for patients being discharged) or to subspeciality in-patient beds or general medical units (for patients requiring admission)
Patient entry creep with non-AMU patients being admitted (especially after-hours) as outliers because of hospital bed pressures with no planned approach to move them on as quickly as possible
Desire for infectious disease units to admit patients requiring isolation to single rooms in AMU, or of geriatric units to admit patients requiring allied health intervention in the absence of dedicated rehabilitation wards
Reluctance of subspeciality units to allow low acuity, highly complex patients to be admitted to AMU from emergency department for initial assessment and management
Perception of AMU as a receiving and holding area for acute interhospital transfers accepted by subspeciality units while awaiting inpatient beds to become available
Reluctance of subspeciality units to accept patients from AMU, especially after-hours
Concerns about consultant burn-out due to relentless acute work, dislocation of acute medicine from subsequent in-patient care (in the UK units) and inadequate skills in acute medicine

in-hospital mortality following commencement of their AMU. Peer-reviewed studies are confined to seven units in the UK and Ireland with none from Australia or New Zealand, with non-peer-reviewed reports arising from 47 units across all the three countries. Given that there are more than 300 AMUs currently in existence, our sample may not be representative. Another study limitation relates to a publication bias that may cause over-estimation of the benefits of AMUs, further limiting the generalizability of our results.

To date, there has been no formal investigation of the effects of AMUs on the quality of care in regards to the disease-specific process of care indicators, hospital costs and resources related to actual budgetary expenditures (as opposed to estimated savings), or on the continuity of care and communication involving referring general practitioners or other community-based health professionals. Finally, there are differences between AMUs both at the local level and between national jurisdictions and thus the current analysis of a relatively small number of units does not allow identification of differences in operational methods that impact on outcomes. For example, Australian units differ from most UK units in having the one consultant-led team provide care to the same patient for the whole hospital stay (including time spent in AMU), as well as clinic follow-up after discharge. This ensures continuity of care and removes the need for handovers from an AMU team to a separate in-patient team.

However, irrespective of differences in design, the reports discussed in this study provide consistent evidence of the benefit of AMUs in terms of a reduced in-hospital length of stay and increased direct discharge rates, improved efficiency of hospital resources and greater patient and staff satisfaction. One study showed benefit in reducing waiting times and access block in the emergency department. These gains were seen without any increase in readmission rates or mortality. Indeed, one prospective and one retrospective study indicate reduced in-hospital mortality as a result of AMU operation, despite an increase over time in numbers and complexity of patient presentations to emergency departments. On average 70% of patients presenting to the emergency department with acute medical presentations will be eligible for admission to an AMU [30], and of those patients, between 20 and 50% will be fit for discharge within 48 h [9]. Recent investigations have identified patient variables that predict which of these individuals are more likely to have a short length of hospital stay and thus more suitable for admission to the AMU [31].

As a result of continued demand pressures on hospitals, workforce shortages and budgetary constraints throughout Western countries, it is probable that the number of medical specialist-led AMUs will continue to grow given the evidence (albeit limited) of efficiency and outcome benefit with no added harm. Similar initiatives under the control of emergency physicians, such as short stay units, observation wards and rapid assessment areas, have targeted less severely ill and less complex patients, with a recent review concluding benefits in terms of improved patient satisfaction, decreased length of stay, early senior emergency physician involvement and reduction in unnecessary admissions [32]. The role of more specialized sub-units such as chest pain units, asthma units and acute elderly care units is more controversial with studies showing mixed results [33–35].

In conclusion, AMUs staffed by multidisciplinary teams led by acute medicine physicians have the potential to improve the quality and the safety of care of a significant proportion of acutely ill medical patients presenting to hospital. While flexibility is required in adapting guiding principles to local needs and constraints, factors conducive to AMU success in achieving efficiency objectives have been identified. In order to further consolidate their position as an accepted medical intervention applicable to most acute hospitals, robust evidence from well-designed prospective trials is required.

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