

Acute Medical Assessment Units: Evidence of effectiveness

Ian Scott

Director of Internal Medicine and Clinical Epidemiology
Associate Professor of Medicine
University of Queensland

Louella Vaughan

Senior Lecturer in Acute Medicine, Imperial College
Consultant Physician, Chelsea and Westminster NHS Foundation Trust,
London

Derek Bell

Professor of Acute Medicine, Imperial College
Consultant Physician, Chelsea and Westminster NHS Foundation Trust,
London

Study aims

To determine effects of AMAUs on patient outcomes and hospital efficiency

Systematic review of peer-reviewed publications and non-peer-reviewed reports

Literature review

Peer-reviewed literature

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

Non-peer-reviewed literature

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

Study selection and data collection

- Articles selected for inclusion if they described effects of an AMU meeting our unit definition* and reported at least one of the following outcomes
 - mortality, LOS, discharge rates, readmissions, discharge destination, costs, resource and bed usage, and patient and/or staff satisfaction.
- Data extracted pertaining to unit operations and outcome measures. Article selection and data extraction performed by a single author and then confirmed by a second author, with disagreement settled by consensus.

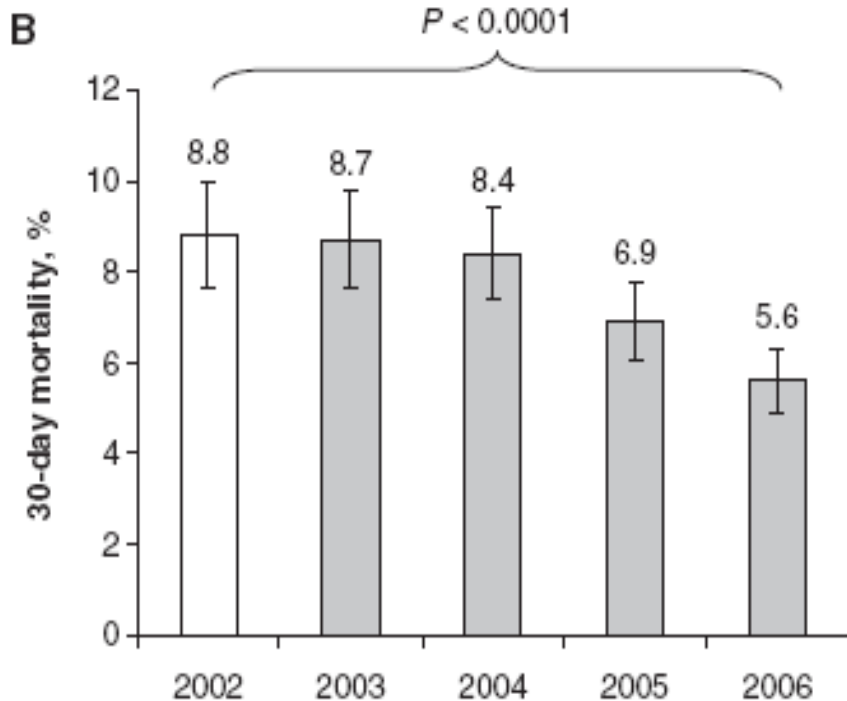
*Designated hospital wards specifically staffed and equipped to receive medical inpatients presenting with acute medical illness from ED and/or community for expedited multidisciplinary and medical specialist assessment, care and treatment for up to a designated period (between 24 and 72 hours) prior to transfer to medical wards or discharge to community as appropriate.

Results

- 89 abstracts retrieved
- Excluded studies (n=80)
 - 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
 - 1 completely unrelated
- No randomised or controlled studies
- 2 prospective, 7 retrospective before-after analyses
- 7 units: UK (6) or Ireland (1)
- 6 in existence no longer than 5 years
- Because of study heterogeneity in periods of observation and outcome measures, no formal meta-analysis performed

Results

Mortality



Rooney et al QJM 2008

- MAPU St James Hospital Dublin
- Prospective study of 33,367 episodes of care 2002-2006
- 36% relative reduction in 30-day all-cause hospital mortality over 5 years
- Odds ratio: 0.28 (95%CI 0.23-0.35)
 - after adjusting for age, gender, major disease category, Charlson co-morbidity index, modified APACHE II score, admission nos. and acute or non-acute ward destination
- Mortality benefit seen despite significant increases in:
 - annual workload of 14% (from 5476 episodes of care to 6254)
 - co-morbidity (proportion of patients with Charlson index >0 increasing from 39.7% to 46.4%)
 - acute illness severity (median APACHE score increasing from 6 to 7).
- The survival benefit was observed across (and was independent of) a wide spectrum of diagnostic categories

Results

Mortality

- Retrospective study RLUH between 1995 and 2003 - AMAU initiated 1999
 - All cause hospital mortality for general medical patients: 7.2% to 5.9% (p=NS)
 - All-cause mortality in the under-65 year age group of acute medical presentations: 3.1% to 1.8% (p=0.02)

Results

LOS

- Retrospective studies StJH (1)
 - over 2 years: decrease in median (IQR) LOS from 6 (3,13) to 5 (2,11) days ($p < 0.001$)
 - remained significant after adjusting for the number of co-morbid conditions
 - general medical teams had shorter LOS cf subspecialty teams (5 vs 6 days; $p < 0.001$)
 - over 5 years: decrease from 7 (3,15) to 5 (2,12) days ($p < 0.001$) (2)
- Retrospective study CWH (3)
 - mean LOS decreased from 9.3 days to 7.8 days after 4 months of MAPU operation ($p = 0.03$)
- Retrospective study Stobhill Hospital (4)
 - mean length of hospital stay decreased from 7.0 to 4.5 days over 4 years.
- Retrospective study RLUH (5)
 - decrease in average length of stay from 9.3 to 8.8 over 4 years ($p = 0.07$).

1. Moloney et al QJM 2005
2. Rooney et al QJM 2008
3. St. Noble et al QJM 2008
4. McLaren et al Health Bull (Edinb) 1999
5. Moore S et al Clin Med 2006

Results

ED waiting times

- At StJH, number of medical patients waiting in ED for a hospital bed for more than 4 hours in 2004 decreased by 30% after MAPU commencement in 2002 ($p < 0.001$)¹
- Update: median (IQR) number of patients in ED awaiting beds at 7am decreased from 14 (8,19) in 2002 to 2 (0,13) in 2006 ($p = 0.001$)²

1. Moloney et al QJM 2005

2. Rooney et al QJM 2008

Results

Specialty transfer

- RLUH (1):
 - Increase from 27% to 56% over 2 years ($p < 0.05$) in the proportion of patients being cared for by the appropriate specialty following admission.
- RAH (2):
 - Increase over 4 years ($p < 0.001$) in proportion of patients
 - requiring coronary care transferred to cardiology: 39% to 83%
 - with major respiratory diagnosis transferred to respiratory physicians 53% to 67%

1. Hanlon et al Health Bull (Edinb) 1997

2. Moore et al Clin Med 2006

Results

Direct discharge rates

- CWH (1) over 1 year:
 - 24 hrs: ↑21% to 29% ($p < 0.005$); at 48 hours ↑32% to 40% ($p = 0.04$)
- LGI (2) over 2 years:
 - increase in DDR at 24 hours from 4% to between 15% and 29% ($p < 0.001$)
- RBH (3) :
 - 21% DDR in its first two years of operation
 - 32% by the third year
 - Decrease in the number of medical outlier bed-days of 16%.

1. St Noble et al QJM 2008
2. Wanklyn et al J R Coll Phys 1997
3. Armitage & Raza Clin Med 2002

Results

Utilisation

- *Readmission rates*
 - Despite reduced LOS and increased DDR, no increase in 30-day readmission rates
 - despite increases in total numbers of presentations and greater co-morbidity burden and illness severity
 - In some cases, readmission rates actually fell from 13% to 6%¹

- *Bed cost and resource utilisation*
 - Analysis at StJH: saving of 4039 bed-days over 12 month period
 - = estimated cost benefit of €1,714,152
(after excluding patients with LOS >30 days)²

1. Moore et al Clin Med 2006

2. Moloney et al Postgrad Med J 2007

Results

Patient/staff satisfaction

1. McLaren et al Health Bull (Edinb) 1999
2. Hanlon et al Health Bull (Edinb) 1997

- Stobhill (1):
 - 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.
- RAH (2):
 - Non-consultant medical staff (response rate 66%):
 - less concerned about losing track of patients ($p < 0.01$) or having patients admitted to non-medical wards ($p < 0.01$)
 - more worried about 'blocked beds' ($p < 0.05$)
 - Nursing staff (response rate 64%):
 - more time for health promotion ($p < 0.01$)
 - more stressed in dealing with a concentration of acutely ill patients ($p < 0.05$).
 - More patients reported via surveys (average response rate 57%):
 - staff had time to explain their treatment after the process of reorganisation (89% vs 79%, $p < 0.05$)
 - higher proportion felt ready for discharge (93% vs 84%; $p < 0.05$).

Results

Unplanned readmissions

- StJ (1) CWH (2) and LGI (3):
 - no increase despite rise in total numbers of presentations, co-morbidity burden, illness severity

1. Rooney et al QJM 2008
2. St Noble et al QJM 2008
3. Wanklyn et al J R Coll Phys 1997 JRCP 1997

Results

Australasian/UK audits

	Auckland City Hospital (550 beds)	Sir Charles Gairdner (606 beds)	RBWH (680 beds)	CWH (665 beds)
<i>Details</i>	45 beds Oct 03 36 hr limit 16,000 adms pa	25 beds May 01 48-72 hr limit 4,500 adms pa	18 beds Sept 99 48 hr limit NR	29 beds August 2007 48-72 hour limit 6,390 admissions per annum 3 study periods: Sept-Dec of 2005,
<i>Direct discharges</i>	45% Med pts not requiring IP beds 39% vs 17%	35%	14%	24 hours: 23% in 2005 to 42% in 2007 48 hours: 33% increasing to 53%
<i>Reduction in in-patient LOS</i>	0.5 day (4.2 to 3.7)	0.7 day (excl long-stay pts) (5.9 to 5.2)	1.7 days	1.7 days (from 8.8 to 6.9 days)
<i>Savings in beddays</i>	12,000 pa	3,000 pa	4,800 pa	NR
<i>ED access block</i>	NR	NR	NR	Reduced time spent in ED but not quantified
<i>Cost savings</i>	\$900,000 pa	NR	NR	NR

Results

Australasian/UK audits

- Survey of 21 hospitals in Victoria, Australia in 2003 (1):
 - Average LOS for common presentations (exacerbations COPD, pneumonia, heart failure) decreased by between 1.4 and 2.7 days over 2 years.
- Flinders Medical Centre in Adelaide (2):
 - Establishment of an AMU, combined with changes in bed management practices, reduced the proportion of inpatient bed-hours occupied by ward outliers from 29% to 10% over 4 years.
- CWH (3):
 - In-hospital mortality for patients with acute medical illnesses fell from 1.6% in 2005 to 1.1% in 2007 (p=ns)
 - Decrease in LOS from 8.8 days to 6.9 days (p<0.005)
 - Increase in DDR at 48 hours from 33% to 53% (p<0.005).
- Ipswich Hospital (IH) in East Anglia (4):
 - Decrease in hospital LOS of 1.3 days over 2 years.

1. CEHSEU, 2004.
2. Ben-Tovim et al. MJA 2008
3. Mayor BMJ 2008
4. McNeill, Proceedings SAM Glasgow, 2007.

Interpretation

- The evidence base around the efficacy of AMU remains limited with no controlled trials reported to date.
- Peer-reviewed studies confined to 7 units in the UK and Ireland; non-peer-reviewed reports arising from 27 units across all 3 countries.
- Limited representativeness given >300 AMUs currently in existence.
- Publication bias may cause over-estimation of the benefits of AMUs.
- Non-standardised outcome measures and data collection
- No systematic investigation of effects of AMUs on quality of care re:
 - disease-specific process of care indicators
 - real (vs estimated) hospital savings
 - continuity of care and communication involving community-based clinicians
- Heterogeneity in AMUs does not allow identification of operational factors that impact differentially on outcomes
 - Australasian units differ from most UK units in having a one-team approach for whole hospital stay

Summary

Peer- reviewed literature

- Two studies reported significant reductions in in-patient mortality of between 0.6 and 5.6 percentage points following AMU commencement despite increase in numbers and complexity of patient presentations to ED
- Four studies reported significant reductions in LOS of between 1.5 and 2.5 days.
- One study reported 30% decrease in waiting times for patient transfer from emergency departments (ED) to medical beds
- Two studies showed more appropriate assignment of patient care to downstream subspecialty teams
- Three studies showed the proportions of medical patients discharged directly home from AMU increasing by 8 to 25 percentage points.
- Three studies noted no increase in 30-day readmission rates following AMU commencement.
- Two studies described significant improvements in patient and staff satisfaction with care.

Summary

Non-peer-reviewed literature

- Consistent evidence of
 - Decrease in LOS
 - Gradually rising DDR
 - No increase in readmission rates
- Less certainty around effects on mortality and other outcomes