A Day in the Life of the AMU– The Society for Acute Medicine's Benchmarking Audit 2012 (SAMBA '12)

CP Subbe, D Ward, L Latip, IL Jeune & D Bell

Abstract

Background

The absence of published data for benchmarking serves as a disincentive for Acute Medical Units to improve care.

Aim

To test feasibility of a national audit in Acute Medicine for compliance with common standards

Methods

On line questionnaire with summary data for patients admitted to participating Acute Medicine Units over a 24-hour-period.

Results

30 units submitted summary data. The mean number of admission was 36 (SD 14). Compliance with standards around timing of junior and senior review was highly variable. In almost all other standards only a small number of units achieved high reliability with compliance of more than 90%.

Conclusion

SAMBA provides a data set that can be used for local and national benchmarking and quality improvement work. Annual audit might be beneficial to track improvements.

Keywords

Hospital, Emergency admission, Death, Quality of Care, Early Warning Score.

Key Points

1. Acute Medical Teams see between 14 and 84 patients in a 24-hour period.
2. There was high variability with regards to care delivered.
3. 74% of patients were seen by a Consultant within 14 hours.

Background

Acute Medical Units (AMUs) have been developed as the common portal of entry to secondary care in the United Kingdom for patients presenting with emergency or urgent medical problems. Staffing and expertise across allied health disciplines has been designed in these units to ensure that this diverse group of patients are offered a high quality of care.

Published recommendations and quality standards have focused on delivering a consistent and timely process of care designed to ensure the desired clinical outcomes. This process involves activities within the control of the Acute Medicine team such as initial medical assessment and those which are influenced by other departments such as diagnostics, specialty in-reach and bed management. There are few data available on compliance with these standards.

Assessment of clinical outcome and benchmarking between units requires correction for the variation in case-mix. This might include scores which reflect both the severity of illness such as Track & Trigger score,[1] the Simple Clinical Score[2] or the Medical Admissions Risk System,[3] and pre-morbid functional dependency such as the Barthel[4] or Katz index[5] or the Clinical Frailty Scale.[6]

In order to be able to benchmark standards of care and plan interventional trials in this strategically important area of health care provision in the UK, data are needed that describe the case mix and workload of AMUs. It was therefore the aim of this audit by the Society for Acute Medicine to turn quality and performance indicators that have been recommended by national bodies into a data collection format that is feasible for the majority of AMUs in order to begin to explore some of the dimensions of Acute Care listed above.

Methods

Members of the SAM research committee designed a data collection form that could be used to collect data reflecting the process of care from each individual patient admitted to an acute hospital over a single day. The data collection form was piloted in a single centre and modified accordingly.

Recruitment of centres

All hospitals participating in an acute "unselected" medical take were invited to participate in SAMBA 2012 by electronic mail shot from the Society for Acute Medicine's research committee. Community hospitals or hospitals without resident physician were excluded from the audit.

Dr Christian P Subbe
DM, MRCP
Senior Clinical Lecturer,
Bangor University,
School of
Medical Sciences,
Bangor,
UK

Dr David Ward
BMBS, BmedSci, MRCP
Consultant in Acute
Medicine Queen Elizabeth
Hospital,
Woolwich,
South London Healthcare
NHS Trust,
UK

Dr Lenny Latip
MRCP,
Locum Registrar in Acute
Medicine,
Ysbyty Gwynedd, Betsi
Cadwaladr University
Health Board,
Bangor,
UK

Dr Ivan Le Jeune
BMBCh, BA, MRCP, PhD
Department of Research and
Education in Emergency
Medicine,
Acute medicine and Major
trauma (DREEAM),
Nottingham University
Hospitals NUH Trust,
Nottingham,
UK

Professor Derek Bell
BSc, MB ChB, MD, FRCP
Professor of Acute
Medicine,
Imperial College,
London,
UK

Correspondence:
Dr Christian P Subbe
Senior Clinical Lecturer,
Bangor University,
School of
Medical Sciences,
Ysbyty Gwynedd,
Penrhosgarnedd,
LL57 2PW,
Bangor,
UK
Email: csubbe@hotmail.com

© 2013 Rila Publications Ltd.

Patient selection

Inclusion: Patients aged 16 or above who were seen for admission or assessment on an Acute Medical Unit over a 24-hour period from midnight to midnight.

Exclusion: Elective patients or day-case patients for technical procedures such as endoscopies or biopsies. In some hospitals the AMU is a virtual space in the Emergency Department (ED) with the Acute Team operating side-by-side with the Emergency Physicians. For this scenario we suggested auditing care in all patients who were referred to Medicine for an inpatient opinion (as opposed to an urgent out-patient appointment).

Data collection

Participating sites were advised to collect as much data as possible prospectively. However, some of the outcome data needed to be collected at a later data. The data were collected from written and electronic medical records. Additional data could be collected from electronic patient administration systems. The data from each site was summarised into an Excel file template provided by the SAM research committee. The chief investigator at each site was then able to add anonymous summary data to an online form.

Standards surveyed

The audit was organized around compliance against the following standards:

- Standards concerning service delivery set out at the Acute RCPE UK Consensus Statement on Acute Medicine, November 2008 including safety data,[7]
- NICE CG 50: Severity of illness assessments,
- NICE CG 29: Care of pressure ulcers (and risk factors for these),
- Standards set out in national guidelines for specific conditions (Stroke care, Acute Kidney Injury, Gastrointestinal Bleed) (Table 1).

In order to demonstrate timely care of patients in line with the Consensus Statement[7] key investigations performed in more than 90% of all acute medical admissions (full blood count, urea and electrolytes, electro-cardio-gram and an X-ray of the chest) were used to assess an approximation of the 'four-hour standard'.

Table 1. Standards of the Society for Acute Medicine's Benchmarking Audit 2012.

Document	Standards
Clinical Quality Indicators for Acute Medical Unit[7]	• Patients should be assessed by a competent decision-maker within 30 minutes of in-hospital referral to an acute medical team from the emergency department or on arrival at an acute medical unit if directly referred. • A treatment and investigation plan should be formulated and instigated within 60 minutes of arrival • Patients to be seen and management plan reviewed within 12 hours, but preferably sooner, by the admitting consultant physician. • Patients to have an early warning scoring system recorded at point of entry to care. • Single sex accommodation to be provided except when the within monitored areas (i.e. when the severity of the condition outweighs this) • The initial assessment, investigation and treatment of all patients presenting in an unscheduled manner should be consistent with the 'four hour standard' regardless of their place of treatment (Emergency Department, Acute Medical Unit or joint early care unit) • Data items: key investigations performed in more than 90% of all acute medical admissions are full blood count, urea and electrolytes, electro-cardio-gram and an X-ray of the chest. In order to assess the 'four hour standard', the presence and timing of these tests are recorded. • Mortality rates within 7 days. • Direct discharge rates monitored within 24 or 48 hours of admission • Re-admission rates within 7 days of discharge
NICE CG 50 measures[11]	• A full set of observations is taking on admission including blood pressure, heart rate, temperature, oxygen saturations, respiratory rate, level of consciousness. • There is evidence of activation of a member of the medical team or a critical care outreach team for any patient triggering the local "high" level. • There is evidence of a monitoring plan in medical or nursing notes
Disease specific standards	• Patients with suspected stroke: CT head performed within 24 hours of admission (NICE CG 68)[12] • Patients with suspected pulmonary embolism (PE): CT-pulmonary angiogram (CTPA) or Ventilation-Perfusion (VQ) or perfusion (Q) scan performed within 24 hours of admission (BTS 2003)[13] • Patients with acute upper gastro-intestinal bleed: gatroscopy performed within 24 hours of admission (SIGN 105)[14]
Standards of nursing care	• Prevention of pressure ulcers in hospitalized patients: A structured assessment of risk factors for pressure ulcers is meant to be performed on every patient admitted. The Waterlow score is one of the most recognized tools[15,16].

© 2013 Rila Publications Ltd.

The clinical quality indicators by the Society for Acute Medicine[7] had not been published at the time of the planning of SAMBA and were therefore not included. Reliability was evaluated based on principles by the Institute for Healthcare Improvement[8] where a healthcare provider is labelled as 'reliable' when it is able to provide 90% or more of the service to the prescribed standard.

Ethics

The study was reviewed by the North Wales Research Ethics committee and classified as an audit.

Funding

No dedicated funding was available for this audit.

Statistics

Statistics were calculated using SPSS Statistics Version 20.

Results

Thirty units from the UK collected data from 1006 patients. Twenty-seven units collected data on Wednesday the 20th June 2012 ("Acute Medicine Awareness Day") and three units collected the data at a later date within a month of the first. The mean number of admissions in each AMU was 36 patients (SD 14, minimum number 14, maximum number 84). Of the units twenty-six units were from England, three from Wales and one from Scotland.

Timing of processes

285 (28%) patients were seen within 30 minutes, 393 (39%) received the initial treatment within 60 minutes, and 487 (48%) were assessed by competent decision-makers within four hours. 93 (9%) patients were discharged prior to consultant review and 677 (74%) were reviewed by consultants within 14 hours. 27 (90%) of AMUs were able to provide single sex accommodation for the patients, with the exception of the participating units in Wales.

Baseline assessment and investigation

Parameters required to calculate the Early Warning Scores were available for the majority of the patients at time of admission – respiratory rate in 954 (95%), oxygen saturation in 959 (95%), blood pressure in 961 (96%), pulse rate in 960 (95%), level of consciousness in 939 (93%) and temperature in 927 (92%) patients.

Basic laboratory test results were available in the majority of patients within four hours of admission (full blood count in 877 (82%) and urea and electrolytes in 878 (87%) patients). The remaining investigations were significantly less prevalent within the first four hours – ECG in 690 (69%) patients, chest X-ray in 600 (60%) and urine dipstick in 274 (27%) patients.

Track and trigger

115 (11%) patients had abnormal physiology leading to a trigger in the local Early Warning Score. Of these, 82 (71%) patients had an appropriate escalation response according to the local protocol with 14 (12.2% of patients triggering and 1.4% or all patients) requiring admission to the Intensive Care units.

Nursing care

674 (67%) patients had Waterlow scores or similar assessments of the risk of pressure sores, including assessment of mobility, dependency, continence status and body mass index, recorded within 24 hours of admission.

Disease specific standards

Computed tomography (CT) head in stroke, CT-pulmonary angiogram (CTPA) in pulmonary embolism and endoscopy in upper gastrointestinal bleeding were used as markers of quality of care in key indicator acute presentations. Results showed that out of 59 patients with a probable diagnosis of stroke, 58 (98%) underwent CT head within 24 hours. Of 28 with suspected PE, 23 (82%) had a CTPA within 24 hours. 15 (60%) of 25 patients who presented with upper gastrointestinal bleeding had a oesophageal-gastro-duodenoscopy procedure within 24 hours.

Discharge data

At 48 hours a median of 405 (40%) patients were discharged (inter-quartile range = IQR was 29-50%), 526 (52%) patients were transferred to other wards; and 33 (3%) patients remained on AMUs. There were 13 deaths recorded within 48 hours of admission. The outcome data for 29 patients were not available (Figure 1).

High reliability organisations

Of thirty participating AMUs, very few achieved 90% compliance with standards: in only one unit (3%) 90% of patients were seen within 30 minutes, no units achieved the treatment of 90% of patients within 60 minutes. In 5 units (17%) 90% of patients were seen by a consultant within 14 hours and in only 5 units 90% of patients had Waterlow-scores or similar assessments of the risk of pressure sores recorded.

If a composite quality indicator would be generated from 90% compliance with patients seen within 30 minutes, treated within 60 minutes, seen by consultants within 14 hours, and transferred from the AMU within 48 hours together with reaching availability of X-rays, baseline pathology results and ECGs within 4 hours the following results would result: One unit achieved a value of 5, three units a value of 3, four a value of 2 and nine a value of 1. There was weak correlation ($r=0.4$, $p<0.04$) between the number of patients seen within 30 minutes and the number of patients that were reviewed by a consultant physician within 14 hours.

Discussion

Data collection was performed in a sample of the UK AMUs by volunteering clinicians over and above

© 2013 Rila Publications Ltd.

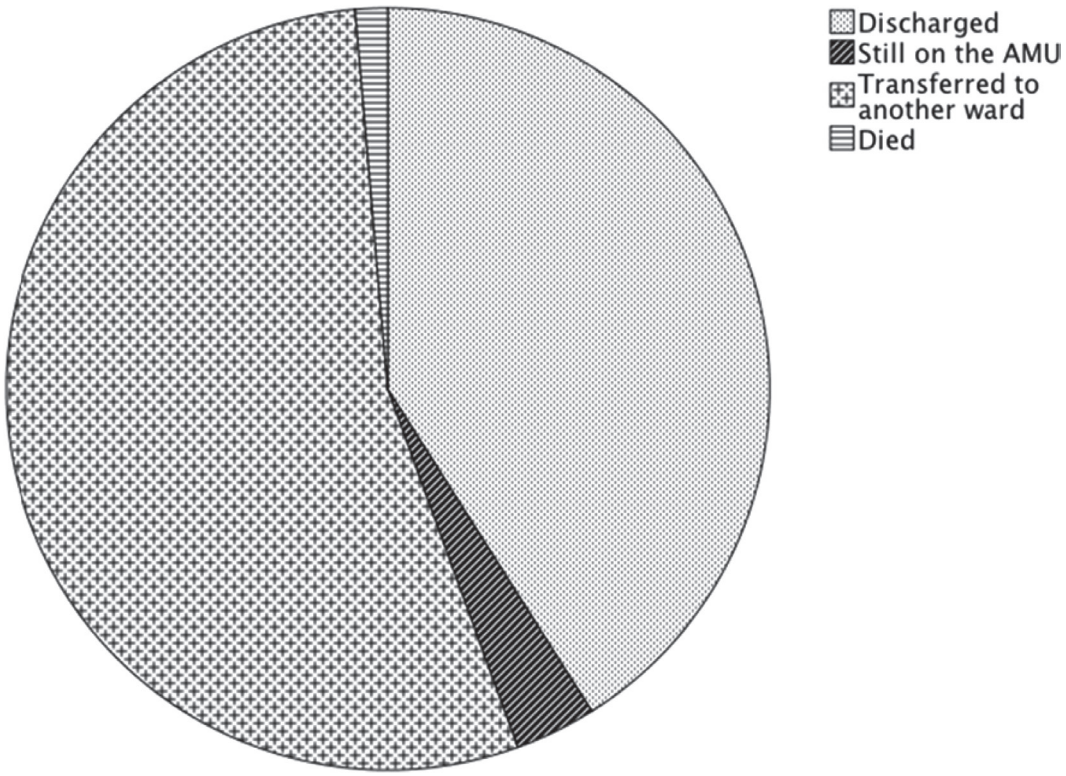


Figure 1. Patient flow after 48 hours.

of their clinical duties. Thanks to the enormous commitment of the clinical teams this first pilot of a national data collection of the work provided by AMUs in the UK has now collated data that can be used as a benchmark standard for local audit.

There was considerable variation in performance suggesting inconsistencies in the level of care that patients can expect on admission with an acute medical condition. At the same time it was clear that some standards were universally poorly followed. Patients were assessed according to NICE CG 50 but compliance with a number of the standards that SAM set out in 2012 are currently aspirational. Delayed assessment and treatment of Acute Medical admissions are still frequent occurrences. While patients could expect to have a CT of the brain for suspected stroke within the prescribed time frame, endoscopies for gastro-intestinal bleedings were rarely performed on the same day. The lack of single sex accommodation in Wales is only from a single day but does probably reflect the clinical reality.

The presence of units that perform well on most standards opens opportunities for organisational learning. There is considerable variation in discharge patterns between units.[9,10] These differences are difficult to understand without understanding the set-up of units or their case mix. Given that all units participating in SAMBA 2012 collected a set of physiological observations, a set of basic laboratory tests and functional assessments within hours of admission the development of an Acute Medicine propensity tool appear realistic. These would allow adjustment of clinical outcomes for case mix and facilitates comparative audit and research on mortality, length of stay and resource requirements.

The variable interface between Emergency Medicine, Acute Medicine and ambulatory care provided us with a major challenge for standardized data collection in this audit. The patients' perspective will dictate which data is most relevant to assess quality of care provided in the long run. There were significant methodological problems in defining the patient groups that are part of Acute Medicine and times of admissions. The bulk of the data is also from a single day, which might or might not have been representative for the work of the participating hospitals. However with a sample size of over 1000 patients ball-park figures for compliance with key standards for acute medical care are beginning to emerge. Performance against some of them was satisfactory but for the majority of indicators improvements are still needed. Learning can result from the AMUs that are already achieving good results in some of the parameters where most others struggle.

Discussions resulting from the data collection in thirty centres will enable the development of an improved data collection tool from what is likely to become an annual quality assurance test for AMUs. SAM's research committee is also hoping that the

© 2013 Rila Publications Ltd.

data set will highlight the need for Research & Development funding in the area of Acute Medicine.

Conclusion

Despite its limitations SAMBA 2012 has achieved what it set out to do: To provide benchmarking data for quality markers in Acute Medicine and ascertain the feasibility of a national audit and research program in Acute Medicine supported by appropriate propensity data.

Conflict of Interest

All authors have no conflict of interest to declare. No extraneous funding was obtained.

Acknowledgement

The authors would like to thank all collaborators and data collectors for SAMBA 2012. Their help and critical feedback has shaped the format of the audit for 2013, which is planned for the 20th of June. We would like to apologize to all those who helped to run the audit but who are not mentioned. Calderdale Royal Hospital: Andrew Hardy; Chelsea and Westminster Hospital, London: Gary Davies; Chorley and South Ribble District General Hospital: Faiyaz Mohammed, Shoneen Abbas; City General, University Hospital of North Staffordshire: Lisa Carroll; Countess Of Chester Hospital, Chester: Tapas Chakraborty; Doncaster Royal Infirmary: Lucy Peart; Gloucestershire Royal Hospital: Stephan Birkner, Siyum Strait, Louise Beckham; Huddersfield Royal Infirmary: Rob Moisey; John Radcliffe Hospital, Oxford: Matthew Giles; Musgrove Park Hospital, Taunton: Andrew Thompson; New Cross Hospital, Wolverhampton: Katherine Willmer, Araz Pourkashanian, Vijayta Duggal; Poole Hospital: Rachel Davison; Queen Elizabeth Hospital, Kings Lynn: Dipankar Bhattacharjee, Gavin O' Sullivan, David Fearnley; Queen Elizabeth Woolwich: David Keith Ward, Charlotte Masterton-Smith, Harriet Owles, Nidhi Puri; Queen's Medical Centre, Nottingham: Ivan Le Jeune. Royal Devon and Exeter Hospital; William Lusty; Royal Glamorgan Hospital, Llantrisant: Leslie Ala, Heather Evans; Royal Hampshire County Hospital, Winchester: Philip Swales, Rebecca Butchart, Jas Bhullar, Hossein Sotoudeh Ravan, Amina Begum; Royal Lancaster Infirmary: Yunus Seth; Royal Liverpool University Hospital: Bryan Renton, Colin Thorbinson, Ragit Varia, Shehzad Khan; Scarborough Hospital: Christos Dimopoulos; Scunthorpe General Hospital: Vijaykumar Singh, Stephen Beer, Anwer Qureshi, Anuoluwapo Aiyemo, Mohammed Elhamudie; St Helier Hospital: Ranjit Shail; St John's Hospital, Howden: Clive Goddard, Linah Suleiman, Rose Pincott, Juliana Moni, Gillian Pickering, Sarah Mitchell, Mohammed S Khogali, Joseph Rowton, Charles Rich, Michael Manson; Torbay Hosptial: Helen Waters, Hannah Linford, Simon Roberts, Kat Mulcachy and Kim Shaylor; University Hospital of Hartlepool: Jane Atkinson; West Suffolk Hospital, Bury St Edmunds: Mark Cranston; Wrexham Maelor Hospital: Sheraz Khan, Sophi Williams, Emma Kinsella; York Teaching Hospital NHS Foundation Trust: Stephen Waring, Tom Jaconelli; Ysbyty Gwynedd, Bangor: Chris Subbe, Rashid Farid, Lenny Latip, Khaled Tofeec, Babiker Babiker.

References

1. Prytherch DR, Smith GB, Schmidt PE, *et al.* ViEWS--Towards a national early warning score for detecting adult inpatient deterioration. *Resuscitation* 2010; **81(8):** 932-7.
2. Kellett J, Deane B. The Simple Clinical Score predicts mortality for 30 days after admission to an acute medical unit. *Q J Med* 2006; **99(11):** 771-81.
3. Silke B, Kellett J, Rooney T, *et al.* An improved medical admissions risk system using multivariable fractional polynomial logistic regression modeling. *Q J Med* 2010; **103(1):** 23-32.
4. Mahoney FI, Barthel DW. Functional Evaluation: The Barthel Index. *Maryland State Medical Journal* 1965; **14:** 56-61.
5. Katz S, Down, TD, Cash HR, *et al.* Progress in the development of the index of ADL. *The Gerontologist* 1970; **10(1):** 20-30.
6. Rockwood K, Song X, MacKnight C, *et al.* A global clinical measure of fitness and frailty in elderly people. *CMAJ* 2005; **173(5):** 489-95
7. The Society For Acute Medicine. Clinical Quality Indicators for Acute Medical Unit. http://www.acutemedicine.org.uk/index.php?option=com_content&view=article&id=81:acute-care-quality-and-performance-indicators&catid=72:position-statements&Itemid=30 (accessed on 15th January 2012)
8. Nolan T, Resar R, Haraden C, *et al.* Improving the Reliability of Health Care. IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement; 2004.
9. Subbe CP, Gauntlett W, Kellett JG. Collaborative Audit of Risk Evaluation in Medical Emergency Treatment (CARE-MET I) - an international pilot. *Eur J Intern Med.* 2010; **21(3):** 222-5.
10. Fit for the Future? Dr Foster Hospital Guide 2012. Dr Foster ltd.
11. National Institute for Health and Clinical Excellence. Clinical Guideline 50. Acutely Ill Patients in Hospital. London 2007.
12. National Institute for Health and Clinical Excellence. Clinical Guideline 68. Diagnosis and Initial Management of Stroke and Transient Ischemic Attack (TIA). London 2008.
13. British Thoracic Society Standards of Care Committee Pulmonary Embolism Guideline Development Group. British Thoracic Society guidelines for the management of suspected acute pulmonary embolism. *Thorax* 2003; **58:** 470-484.
14. Scottish Intercollegiate Guidelines Network. Guideline 105: Management of acute upper and lower gastrointestinal bleeding. Edinburgh 2008.
15. Guy, H. Pressure ulcer risk assessment and grading. Nursing Times 2007; **103:** 38-40.
16. National Institute for Health and Clinical Excellence. Clinical Guideline 29: The management of pressure ulcers in primary and secondary care. London 2005.

© 2013 Rila Publications Ltd.