

SAMBA2016

Society for Acute Medicine Benchmarking Audit 2016

ANNUAL REPORT

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1. The Society for Acute Medicine

ACUTE MEDICINE

Acute Medicine is defined as that 'part of general internal medicine (GIM) concerned with the immediate and early specialist management of adult patients suffering from a wide range of medical conditions who present to, or from within, hospitals, requiring urgent or emergency care'[1]. Acute Medicine differs from other medical specialties as it is not based around a body system, disease or patient characteristic, such as age. A rich description of the specialty can be found in the Royal College of Physicians of London web resource Medical Care[2].

The aim of Acute Medicine is to provide patients with the very best clinical experience. The challenge is to provide a range of high quality services to a heterogeneous group of patients. Acute medical care must be timely, organised, well-led and delivered by senior staff. The core processes are:

- Initial assessment by a competent clinician
- Early review by a senior clinician (consultant)
- Diagnosis, with early access to diagnostic tests
- Assessment of physiological stability and the ability to resuscitate patients
- Care delivered by a multidisciplinary team (MDT) in a dedicated Acute Medical Unit (AMU).

Acute Medicine is now well established[3]. Since the first units were created in the 1990's the specialty has expanded significantly to around 200 AMUs across the UK. Acute Medicine has spread outside the UK, most notably to the Republic of Ireland, the Netherlands, Australia, Singapore and Malaysia.

THE SOCIETY FOR ACUTE MEDICINE

The Society for Acute Medicine (SAM) was founded in 2000, when Acute Medicine was in its infancy. In the intervening years SAM has played a pivotal role in developing the specialty, which was formally recognised for medical training as Acute Internal Medicine (AIM) in 2009. Most hospitals now have an AMU. There are 564 consultant Acute Physicians in the UK and acute medicine remains the fastest growing medical specialty[4].

SAM is represented on many national committees, providing a strong voice for Acute Physicians within the medical Royal Colleges and other key organisations. In August 2016, SAM's membership had grown to 1138 members, of whom 112 were not doctors. A founding principle of the Society was recognising the importance of the MDT; nurses, advanced practitioners, physiotherapists, occupational therapists and pharmacists are all represented on the SAM Council.

WHAT DOES SAM DO?

SAM has a number of roles:

- Promote education for all members of the Acute Medicine MDT
- Facilitate and co-ordinate the collection of data relevant to acute medical assessments and admissions – Society for Acute Medicine Benchmarking Audit (SAMBA)
- Facilitate collaborative research in Acute Medicine
- Promote the creation of appropriate environments for acute medical care
- Share good practice
- Promote acute care models that exist to improve the management of patients
- Provide encouragement and support to all members of the MDT
- Organise twice yearly CPD accredited conferences, which have grown in size and stature.

2. The History of SAMBA

SAMBA is an annual national audit of the quality of care delivered by Acute Medicine and AMUs in the UK. Initially designed to focus on SAM's 2011 four Clinical Quality Indicators[5] (Table 1), which underpin the delivery of acute medical care, it has evolved to analyse other fundamental aspects of performance.

SAMBA serves to drive performance in AMUs by enabling units to be comparatively benchmarked. The first audit in 2012 had 30 AMUs participating. Its success has seen a rapid expansion in the participation of UK AMUs with 82 collecting data in 2015 and 94 in 2016 (Figure 1). Results from SAMBA have been published in peer reviewed journals[6-10].

SAMBA provides a data set for national benchmarking and has been used to deliver many local quality improvement projects. There has been the opportunity to learn key lessons from high performing units and gain a clearer understanding of how to deliver high quality acute medical care. SAM views SAMBA as a commitment to achieving its goals and acts as a beacon for clinical leadership.

The expectation and desire is for SAMBA to continue to grow with participation of all UK AMUs. International involvement is the next step as many countries adopt the model of Acute Medicine and this will facilitate and benchmark international standard setting.

Figure 1 Number of participating units submitting patient data and number of patients audited

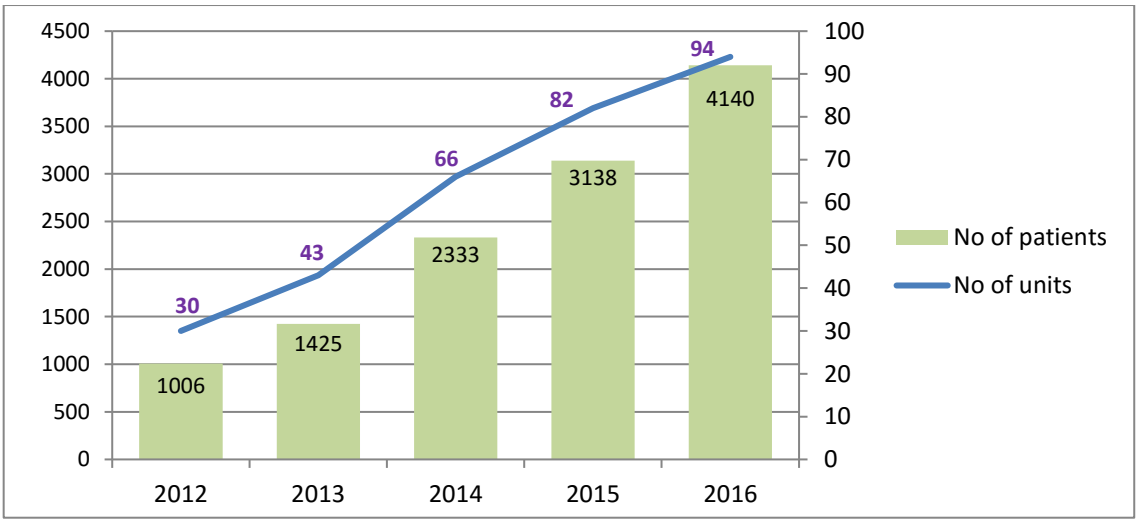


Table 1 Clinical Quality Indicators for Acute Medical Units (AMUs)[5]

1. All patients admitted to AMU should have an early warning score measured upon arrival
2. All patients should be seen by a competent clinical decision maker within 4 hours* of arrival on AMU who will perform a full assessment and instigate an appropriate management plan
3. All patients should be reviewed by the admitting consultant physician or an appropriate speciality consultant physician within 14 hours of arrival on AMU**
4. All AMUs should collect the following data:
   - Hospital mortality rates for all patients admitted via AMU
   - Proportion of admitted patients who are discharged directly from AMU
   - Proportion of patients discharged from AMU and readmitted within 7 days of discharge

**In most cases, clinical assessment and initiation of a management plan should be undertaken in much less time, and prioritised in accordance with clinical need.*
***Consultant review for patients arriving on AMU between 08.00-18.00 should usually be undertaken within 8 hours of the patient's arrival on AMU with provision for earlier review according to clinical need.*

3. Data Collection

Recruitment to SAMBA2016 was open to all hospitals in the UK running an unselected acute medical take. Non-acute and community hospitals were excluded from participating. Units were invited to collect data on the 16th June 2016 from 00:00 to 23:59. Each unit registered participation with their local audit office and Caldicott Guardian.

Data collection and entry for SAMBA2016 was through a purpose built online portal. There were two questionnaires:

- Data on the structure of participating AMUs
- Patient data pertaining to performance.

Patient data was anonymised on entry to the portal but codes held by local data collectors allowed for review and correction of entered data items. Data on the acuity of illness was standardized using the National Early Warning Score (NEWS)[11] and data on the dependency of patients was standardised using the Clinical Frailty Scale (CFS)[12].

In 2016 103 hospitals submitted data describing their hospital and unit. 94 also submitted patient data for the audit.

STANDARDS SURVEYED FOR 2016

For SAMBA2016 time zero was taken as the time of admission to hospital (via the Emergency Department (ED), AMU, or other ports of entry) for Clinical Quality Indicators 1 and 2[13]:

1. Clinical Quality Indicator 1
   We defined compliance as an early warning score within 30 minutes of arrival in hospital
2. Clinical Quality Indicator 2
   The time to a competent medical decision maker was measured from the time of admission to the time of the first medical contact in the ED or AMU by either a doctor based in the ED or a doctor from the medical on-call team (Figure 2)
3. Clinical Quality Indicator 3
   The time for consultant review was calculated from the time of referral from ED or from the time of admission to AMU for direct admissions.

The common typical pathways for referral to, and discharge from, Acute Medicine are illustrated in Figure 2.

Figure 2 Common referral pathways for admission from Primary Care & Emergency Departments

Figure 2a Typical referral pathway for direct admission to AMU

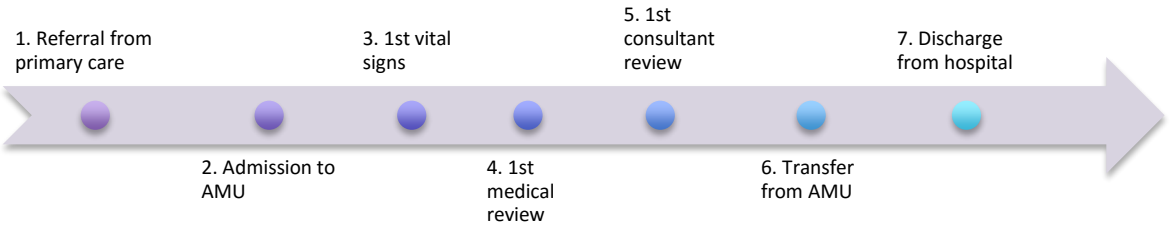
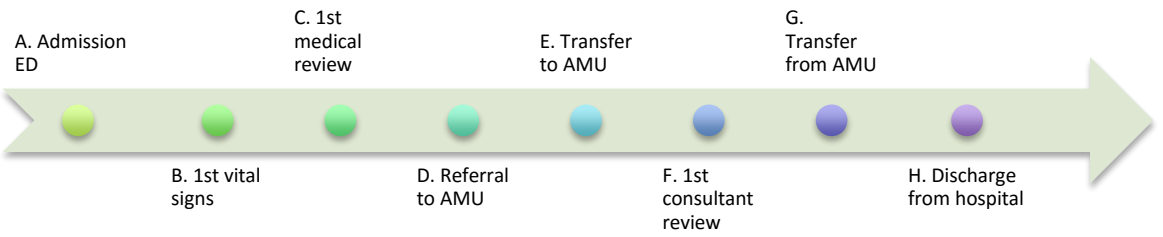


Figure 2b Typical referral pathway for admission referred from ED



Note:

1. Clinical Quality Indicator 1
   Measured as 2 to 3 in direct admission to AMU and as A to B in admission to ED
2. Clinical Quality Indicator 2
   Measured as 2 to 4 in direct admission to AMU and as A to C in admissions to the ED
3. Clinical Quality Indicator 3
   Measured as 2 to 5 in direct admission to AMU and as D to F in admission ED.

4. The Structure & Staffing of AMUs

STRUCTURE

AMUs are the main point of entry for the majority of medical patients, those referred by their General Practitioner (GP) with urgent and emergency medical conditions and those patients self-presenting to ED. Patients can be admitted into beds or, if suitable, they can be seen in an Ambulatory Emergency Care (AEC) unit.

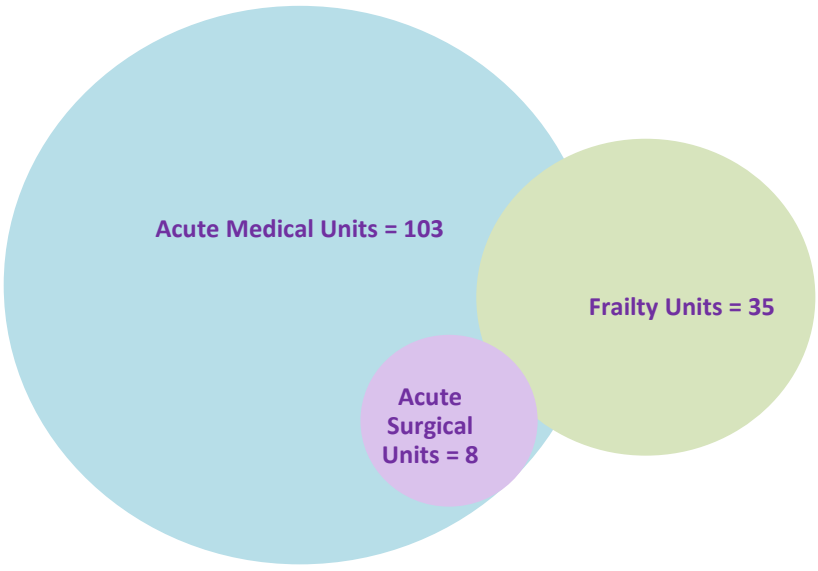
The units are structured in a way to facilitate timely and effective patient assessment, with rapid access to diagnostics and senior clinical decision making, aimed at early appropriate treatment and discharge or transfer to the relevant specialty within the main hospital.

The median number of hospital beds was 550 (interquartile range 401 to 784). AMUs had a median of 36 beds (interquartile range 25 to 51).

Of the 103 AMUs submitting data describing their unit and service:

- 35 have frailty units of which 10/35 are co-located within the AMU
- 16 units reported a separate take run by Geriatricians
- The selection of patients for a separate take for older people was needs-related in 7 units and age related in 9 units (range 65 to 80 years)
- 8 AMUs were co-located with Acute Surgical Units (ASUs)
- Only one unit had both a frailty unit and ASU co-located with AMU (Figure 3)
- AEC units were reported in 79 hospitals
- 45 AEC units were separate from the AMU
- AEC units had a median of 8 trolleys (interquartile range 4 to 12) and 3 clinic rooms.

Figure 3 Co-location of units



STAFFING

The staff numbers for doctors and nurses are summarised in Table 2.

Table 2 Staff numbers for doctors and nurses expressed as median with interquartile range

Time	11:00	19:00	03:00
Acute Medicine Medical Team			
Consultants	3 (2-5)	On-Call	On-Call
Middle-Grade (ST3+ or equivalent)	1 (1-2)	On-Call	On-Call
Junior Grade	3 (2-4)	On-Call	On-Call
FY1	2 (1-3)	On-Call	On-Call
Nursing Team			
Matron	1 (1-3)	0 (0-1)	0 (0-0)
Ward Sister	2 (1-2)	2 (1-2)	1 (0-2)
Staff Nurse	7 (4-9)	7 (4-9)	6 (4-8)
Nursing Assistant	4 (3-6)	4 (3-6)	4 (2-5)
On-Call Medical Team			
Consultants	1 (0-3)	1 (0-1)	0 (0-0)
Middle-Grade (ST3+ or equivalent)	1 (1-2)	1 (1-2)	1 (1-1)
Junior Grade	2 (1-3)	2 (2-4)	2 (1-2)
FY1	1 (1-2)	1 (1-2)	1 (0-1)

Note: Junior Grade (Core Trainee or Foundation Year 2)

5. Outcome Data

PATIENT AND ADMISSION DATA

Clinical Quality Indicators were audited in 4140 patients admitted from 94 units on the 16th June 2016. 2139 (52**%)** patients were female. The median age was 70 years (interquartile range 50 to 80). The age distribution is shown in Figure 4 and the route of admission in Figure 5.

The data pertaining to admissions include:

- 2565 (62%) patients were admitted between 08:00 to 18:00
- Units admitted a median of 40 patients (interquartile range 28 -56)
- 537 (13%) were 30-day readmissions
- 28 patients self-discharged prior to consultant review
- 2437 (59%) patients had their initial consultant review by an Acute Physician.

Figure 4 Age distribution of 4140 patients

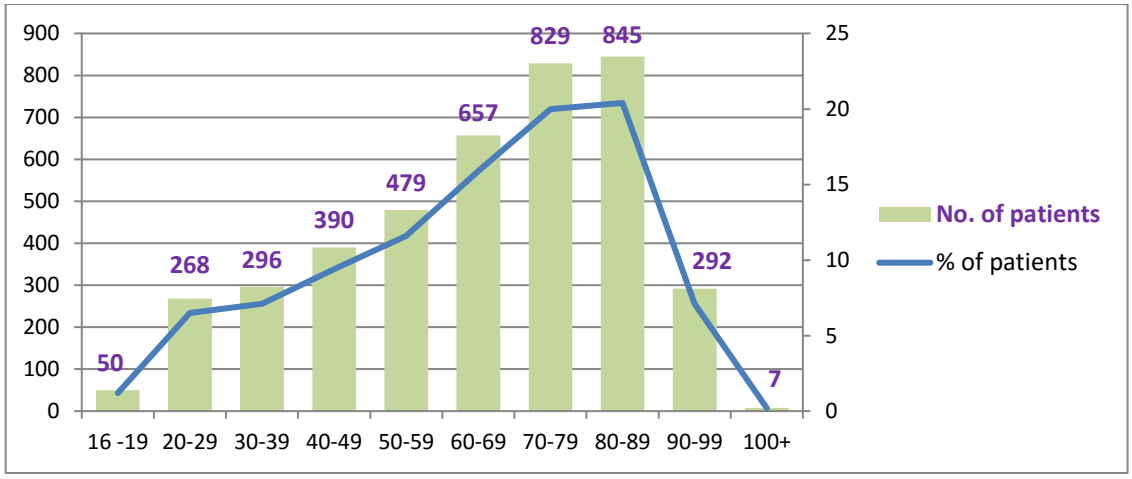
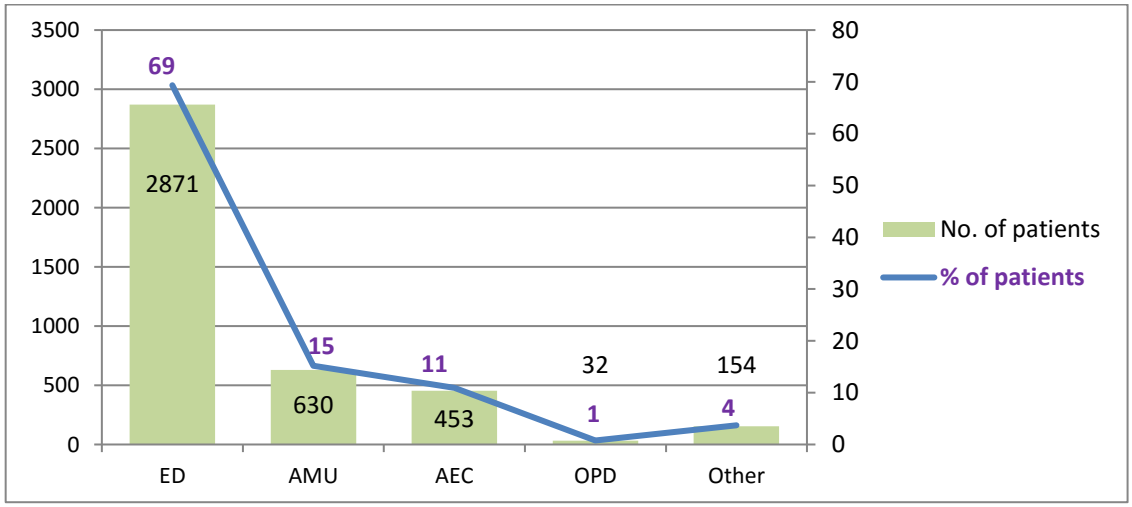


Figure 5 Route of admission



CLINICAL QUALITY INDICATORS FOR ACUTE MEDICINE

The overall success in achieving the Clinical Quality Indicators is summarised in Table 3.

Table 3 Attainment of Clinical Quality Indicators 1, 2 and 3

Clinical Quality Indicator 1

- All patients admitted to the AMU should have an early warning score (EWS) measured upon arrival on the AMU

  2461 (59%) of patients had their first EWS within 30 minutes of hospital arrival

Clinical Quality Indicator 2

- All patients should be seen by a competent clinical decision maker within four hours of arrival on the AMU

  2695 (65%) of patients received this standard

Clinical Quality Indicator 3

- All patients should be reviewed by the admitting consultant physician or an appropriate specialty consultant physician within 14 hours of arrival on the AMU (8 hours if arrival was between 08:00 and 18:00)

  2799 (68%) of patients had this review

Composite end-point for Quality Indicators 1,2 and 3

1249 (30%) of patients met all three of the above SAM quality standards

In Table 4 the success in achieving the Clinical Quality Indicators is broken down by the route of admission. In the analysis there were a number of missing data items. The missing data was most common in the time to consultant review in AEC. This omission of data is likely to reflect the fact that patients presenting to AEC are seen and discharged by trainee grade doctors, for example patients with suspected deep vein thrombosis. To give an accurate reflection of the data, Table 4 shows the outcomes based on complete and incomplete data sets.

At face-value, incomplete data is not welcome. However, the heterogeneity of pathways to access acute medical care, coupled to the increase in AEC, means that for future SAMBAs data needs to more accurately reflect care pathways. The Clinical Quality Indicators need to be reviewed for their applicability to current practice, especially in relation to AEC.

5. Outcome Data

Table 4 Attainment of Clinical Quality Indicators 1, 2 and 3 for patients with complete data sets and incomplete data sets by route of admission

	ED	AMU	AEC	Total
Patients with complete data sets with complete and validated times				
Clinical Quality Indicator 1	68%	70%	73%	69%
Clinical Quality Indicator 2	60%	90%	94%	69%
Clinical Quality Indicator 3	80%	79%	98%	81%
Composite Clinical Quality Indicators1,2+3	36%	53%	73%	41%
All Patients including those with incomplete data points				
Clinical Quality Indicator 1	60%	62%	58%	59%
Clinical Quality Indicator 2	57%	86%	86%	65%
Clinical Quality Indicator 3	71%	67%	55%	68%
Composite Clinical Quality Indicators1,2+3	28%	39%	33%	30%

ACUITY OF ILLNESS

The levels of care required by acutely unwell patients in hospital can be described on four levels[14]:

- Level 0 Ward care
- Level 1 Frequent observations or interventions, including continuous monitoring
- Level 2 Single organ support such as non-invasive ventilation or inotropic support; commonly provided in High Dependency Units (HDU) or Coronary Care Units (CCU)
- Level 3 Support for multiple organs, usually provided in an Intensive Care Unit (ICU).

Acuity of illness was measured using the first set of vital signs recorded on admission to hospital. Data from vital signs are collated and summarised with NEWS[11]. Escalation of care is recommended for patients with a NEWS of 7 or greater. Escalation should be to a clinical team with critical care competencies, such as an experienced doctor or a Critical Care Outreach team.

The mean NEWS on admission to hospital was 1.7 (standard error 0.03, range 0-20). Patients admitted through the ED had a higher NEWS than those admitted directly from primary care, mean 2.1 (standard error 0.04) versus mean 1.2 (standard error 0.05) ($p<0.001$). Table 5 shows NEWS values and associated patient outcomes.

Of 201 patients with a NEWS of 7 or greater, 41 were escalated to a Critical Care Outreach team and 31 were referred to Intensive Care Medicine.

26 patients were admitted to an ICU and 62 to a CCU. In the AMU, approximately 1 in 8 patients needed care above Level 0; 492 patients had continuous monitoring (Level 1 care) and 30 patients received either non-invasive ventilation and/or support with inotropic drugs (Level 2 care).

There was variation between AMUs in the percentage of patients with an abnormal NEWS (Figure 6).

Figure 6 Percentage of patients per unit with a NEWS of 5 or more

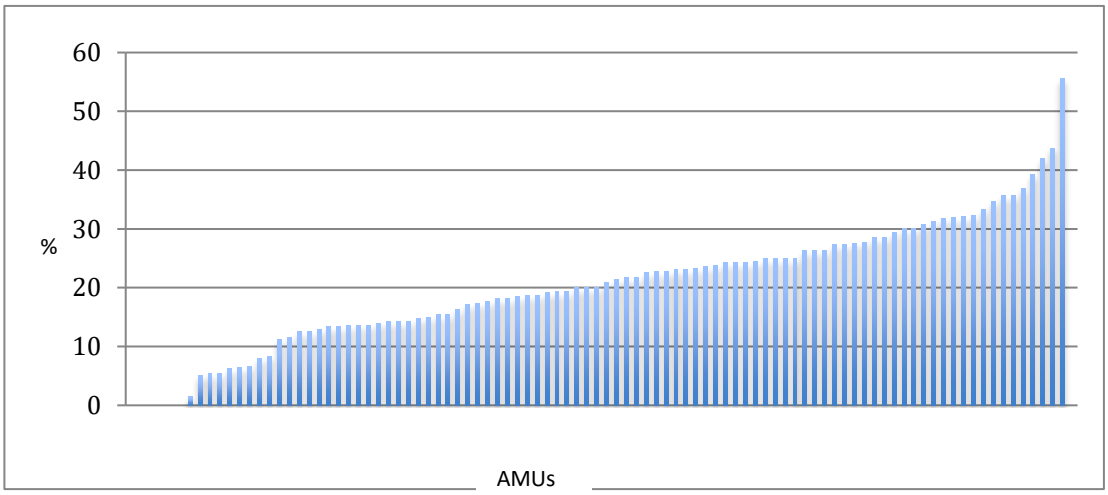


Table 5 Clinical outcomes for patients by acuity of illness as measured by the National Early Warning Score (NEWS)

NEWS	0	1-4	5-6	7+
Number	1792 (41%)	2038 (47%)	294 (6.8%)	201 (4.6%)
Median age (interquartile range)	60 (40-80)	60 (50-80)	70 (50-80)	70 (60-80)
Admitted to ICU	2 (0.1%)	12 (0.6%)	3 (1%)	9 (4.5%)
Admitted to CCU	21 (1.2%)	32 (1.6%)	6 (2%)	3 (1.5%)
Continuous monitoring	88 (5%)	229 (11%)	75 (26%)	100 (50%)
Non-invasive ventilation or inotropic support in AMU	0	11 (0.5%)	4 (1.4%)	15 (7%)
Died	2 (0.1%)	23 (1.1%)	4 (1.4%)	13 (6.5)
Discharged within 72 hours	838 (47%)	802 (39%)	7 (26%)	36 (18%)

CARING FOR ACUTELY UNWELL FRAIL AND OLDER PATIENTS

An estimation of frailty two weeks prior to admission was made for every patient using the Clinical Frailty Scale[12]. The CFS is a scale of 1 to 9:

- 1 to 4 is not frail
- 5 is mildly frail
- 6 is moderately frail
- 7 is severely frail
- 8 is very severely frail
- 9 is terminally ill

5. Outcome Data

A record was made of whether patients had a pre-existing diagnosis of dementia. The presence of delirium at the time of admission was recorded. Frailty increased with age (Figure 7). The distribution of frailty is summarised in Figure 8.

The findings were:

- Clinical frailty data was submitted for 3752 patients
- 350 patients were mildly frail
- 285 patients were moderately frail
- 742 patients were severely frail or very severely frail
- A diagnosis of dementia was recorded in 368 patients
- Delirium was present in 248 patients
- Clinical outcomes varied with different levels of frailty (Table 6).

Table 6 Association of frailty and clinical outcomes

Clinical Frailty Scale	1 to4	5 to 9
Number	2622	1119
Median age (interquartile range)	60 (40-70)	80 (70-80)
Dementia	52 (2%)	306 (27%)
Do-Not-Attempt-Resuscitation recorded	61 (2%)	336 (32%)
Discharged at 72-hours	1364 (55%)	246 (24%)
Died in first 72-hours	7 (0.3%)	35 (3.4%)

Figure 7 The percentage of patients with frailty by age

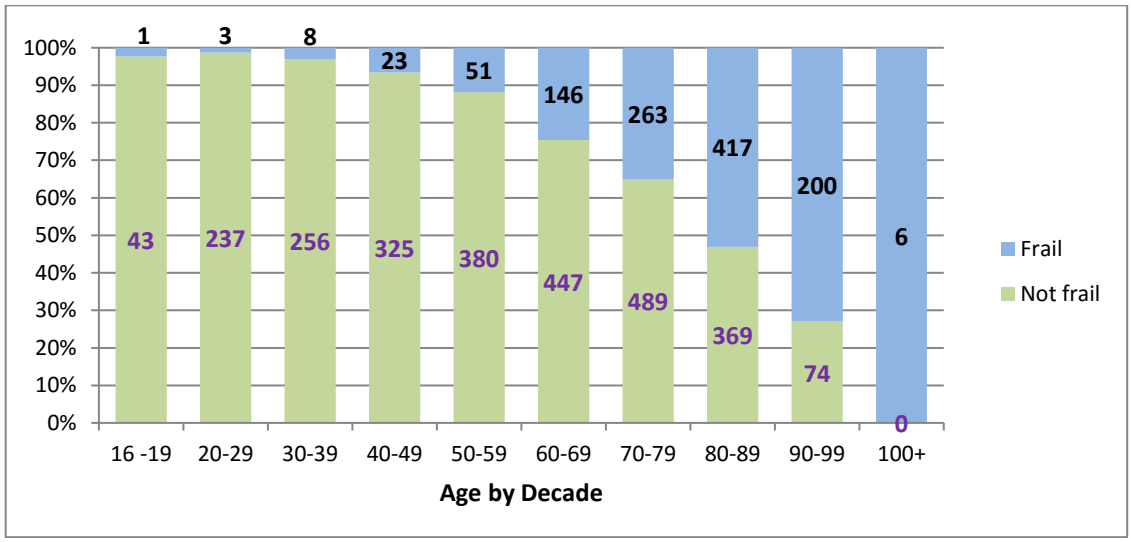
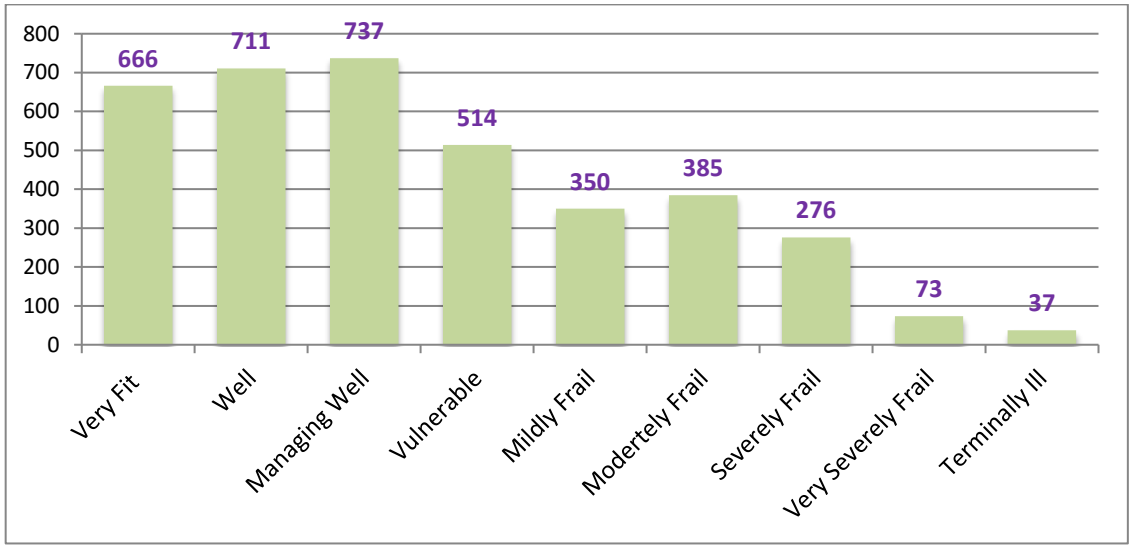


Figure 8 Distribution of frailty based on the Clinical Frailty Scale



TRANSFER AND DISCHARGE

Patients were followed from their admission on Thursday 16th June 2016 to Monday 20th June 2016. The transfer and discharge outcomes from AMU and AEC at 72 hours are shown in Table 7

In all patients, including ambulatory (n=3084 complete data sets):

- 44.3% were discharged directly from Acute Medicine and of these:
  - 48.0% were discharged on the same day
  - 67.6% were discharged within 24 hours
  - 87.6% were discharged within 48 hours
  - 92.4% were discharged by 72 hours.
- 55.7% of patients were transferred from Acute Medicine to another ward and of these:
  - 57.1% moved within 24 hours
  - 87.5% moved within 48 hours
  - 94% moved by 72 hours.

Of those transferred off AMU to another ward, and for whom we have discharge data, 3.7% were discharged from hospital within 24 hours and 17.7% within 48 hours of arriving in hospital. The destinations for patients discharged or transferred from Acute Medicine are shown in Table 7.

5. Outcome Data

Table 7 Transfer or discharge at 72 hours

Destination	Number	Percentage
CCU	62	1.5
Critical Care	26	0.6
Died	42	1
Discharged home	1751	42.3
Discharged to care home	27	0.7
Still in AMU	127	3.1
Transferred to ward	1652	39.9
Other	53	1.3
Transferred to another hospital	41	1
Self-discharged	28	0.7

Note: For complete data sets (n=3809)

AMBULATORY EMERGENCY CARE

AEC is defined by the Royal College of Physicians as 'clinical care which may include diagnosis, observation, treatment and rehabilitation, not provided within the traditional hospital bed base or within the traditional outpatient services, and that can be provided across the primary/secondary care interface'[15,16]. The operational opening times of AEC units vary from one hospital to another; however the majority are not designed to provide a 24 hour service.

Of 103 hospitals submitting unit data, 79 had an AEC unit, with 34 (43%) integrated within AMU.

605 patients were cared for in AEC. 453 patients were directly admitted AEC from the community and 152 were admitted from ED or AMU. Of the 605 patients:

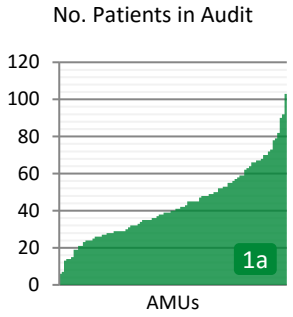
- 344 (57%) were female
- 39 patients had been discharged in the proceeding 30 days
- 537 (89%) patients were discharged home
- Mean NEWS 1.95 (standard error 0.06)
- 13 patients had a NEWS of 5 or more
- 58 patients were frail (CFS 5 or more)

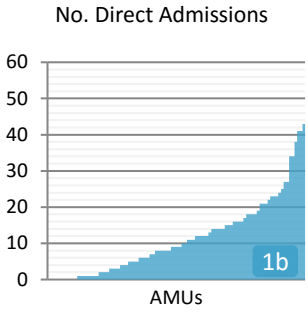
Where outcome data was recorded for AEC patients (n=572), 96% went home. Where data is available (n=395) the discharge times are:

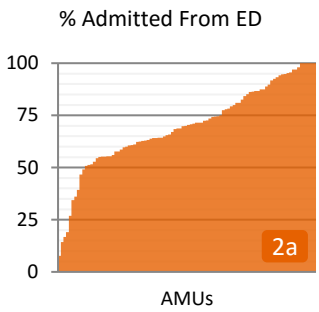
- 89.6% before midnight on the day of admission
- 94.4% in less than 24 hours
- 98.5% within 48 hours
- 99.2% by 72 hours.

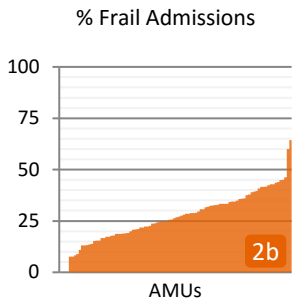
6. SAMBA Reports to AMUs

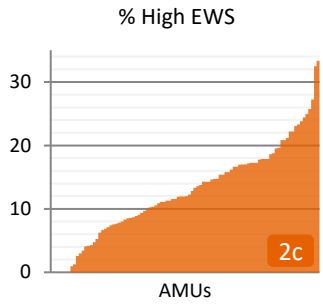
These graphs show the performance of each AMU. Each participating unit will receive summary data in this format with their AMU highlighted but the identity of other units remaining anonymous.

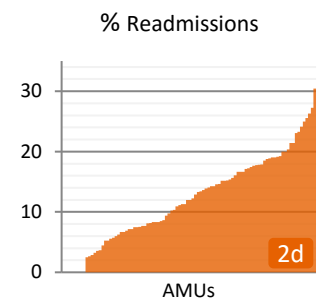


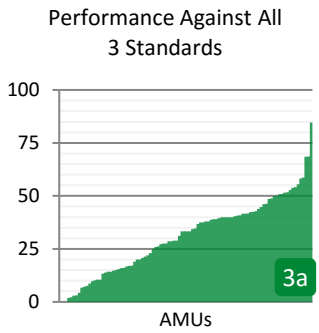


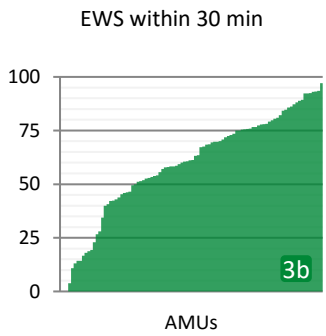


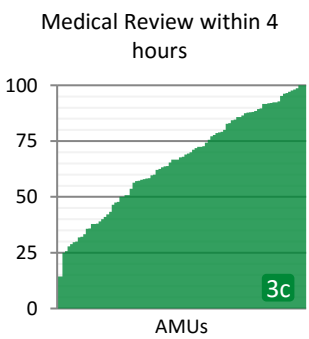






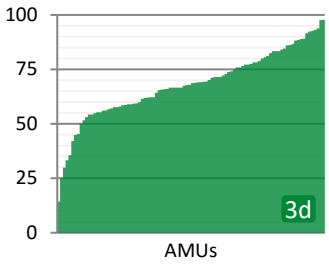




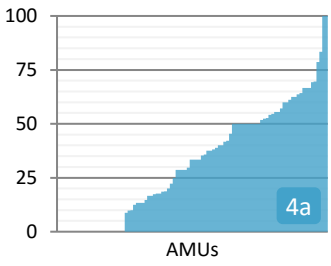


6. SAMBA Reports to AMUs

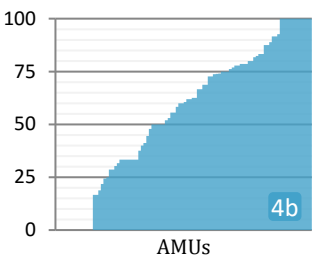
Consultant within
8 to 14 hours



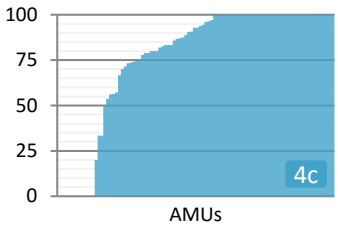
Performance Against All
3 Standards
Direct Admissions Only



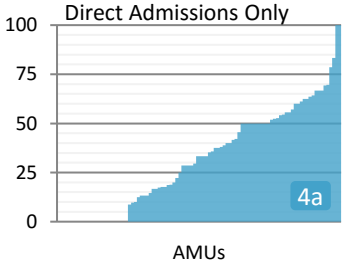
EWS within 30 mins
Direct Admissions Only

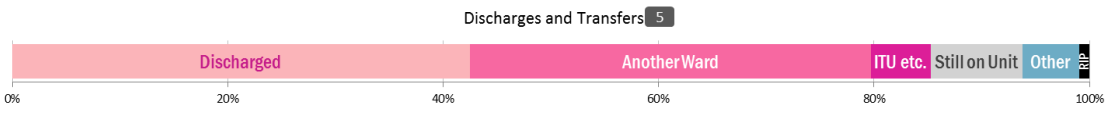


Med. Rev. within 4 hrs
Direct Admissions Only



Performance Against All
3 Standards
Direct Admissions Only





7. Summary

There is a challenge for AMUs to improve compliance with the Clinical Quality Indicators. Quality improvement projects need to focus on to how to adapt working models and processes to ensure that more acutely unwell medical patients receive appropriately delivered care. Trends in SAMBA have shown that patients presenting in the evening are significantly less likely to receive timely interventions[8]. This reflects a cohort that is the most likely to arrive on the AMU outside of the extended consultant working day. Placing patient need at the heart of workforce planning and using supply and demand models to design systems has been shown to improve performance[17].

Early consultant review has been shown to improve outcomes in patients presenting to the AMU, with reductions in mortality and lengths of stay[18]. This is a key measure of early decision making, quality of care and the way to enhance safety of service. Consultant Acute Physicians overseeing the acute take has a significant supervisory contribution and may assist in improving junior doctor performance and training[13]. Thus, early consultant review of patients is an important Clinical Quality Indicator.

In SAMBA2016, for complete data sets, 81% of patients were seen by a consultant within target time, 69% by a competent decision maker within 4 hours and 69% had an early warning score recorded on arrival, with 41% of patients receiving all 3 Clinical Quality Indicators. This performance is on a background of a significant increase in the number of patients being admitted to the acute medical take and a marked deterioration nationally in the ED 4 hour performance target. This has necessitated many acute medical patients being reviewed by consultant Acute Physicians through an in-reach service in EDs to maintain standards.

SAM Clinical Quality Indicators were originally designed to assess the performance of AMUs, so that the clock began when the patient arrived on AMU. However, SAMBA2016 data shows that a majority of acutely ill medical patients commence their journey in ED. Therefore, the time lapse between hospital admission and assessment may be a more pertinent indicator of performance. It is likely to provide a more comprehensive overview of quality and if achieved have further beneficial impacts on outcome measures. SAMBA2015 and SAMBA2016 data have been collected and analysed in this way and therefore provide a more robust assessment of acute medical care. Direct admission to an AMU is the best care pathway for patients but is currently limited by demands on the service.

SAMBA not only benchmarks performance but informs us about developing future Clinical Quality Indicators. This iterative process benefits patient care. As Acute Medicine continues to expand the need for SAMBA style data collection has also increased. AMUs need the resources and technology to facilitate SAMBA data collection more easily, accurately and frequently.

The NHS currently faces unprecedented demands for its services, especially acute services. This demand is reflected in the performance data collected in SAMBA2016. The summary data in Chapter 6 (page 19) show a wide variation in performance between units. SAMBA is not a competition and the mechanisms to improve care are now frequently beyond the gift of individual units. The primary objective of SAMBA is to improve care nationally and the role of SAM is to facilitate this process.

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Aintree University Hospital	Stephen Smith
Airedale General Hospital	Jan Droste
Altnagelvin Area Hospital	Abdul Hameed
Arrowe Park Hospital	Vijdan Gani Abdul Majeed
Barnsley General Hospital	Nasir Ameer
Basingstoke and North Hampshire Hospital	Sebastien Ellis, Hannah Thorman, Charles Hungwe, Sufyan Benamer
Birmingham Heartlands Hospital	Clare Pollard
Bradford Royal Infirmary	Susan Crossland
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Cheltenham General Hospital	Stephen Birkner
Chesterfield Royal Hospital	James Hankinson
City Hospital	Sarb Clare
Conquest Hospital	Edward Pineles
Countess of Chester Hospital	Tapas Chakraborty
Derby Teaching Hospitals NHS Foundation Trust	Alasdair Miller
Derriford Hospital	Nirosha Gunatillake
Dewsbury & District Hospital	Tendekayi Msimanga
Fairfield General Hospital	Nicola Rothwell
Gloucester Royal Hospital	Karina Wortelboer
Good Hope Hospital	Susan Fair
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Hinchingbrooke Hospital	Christopher Tuplin
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James Paget Hospital	Louise Bond
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King's Mill Hospital	Kamal Naser
Kingston Hospital NHS Foundation Trust	Charlotte Masterton-Smith
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Leighton Hospital	Shirley Hammersley
Lister Hospital	Mark Cranston
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Maidstone Hospital	Babiker Babiker, Andres Acosta
Manchester Royal Infirmary	Johnathan Elliot
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Northumbria Specialist Emergency Hospital	Aylwin Chick
Peterborough City Hospital	Omer Elneima
Pilgrim Hospital, Boston	Pavlos Zafeiris
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