Length of stay in Acute Medical Admissions: Analysis from the Society for Acute Medicine Benchmarking Audit

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Abstract

Introduction: Medical admissions to hospital represent a diverse range of patients, from those managed on ambulatory pathways through Same Day Emergency Care (SDEC) services, to those requiring prolonged inpatient admission. An understanding of current patterns of admission through acute medicine services and patient factors associated with longer hospital admission is needed to guide service planning and improvement.

Methods: Data from the Society for Acute Medicine Benchmarking Audit (SAMBA) 2021 were analysed. Patients admitted to acute medicine services during a 24-hour period on 17th June 2021 were included, with data recording patient demographics, frailty score, acuity and follow-up of outcomes after seven days.

Results: 8101 unplanned medical admissions were included, from 156 hospitals. 31.6% were discharged without overnight admission; the median hospital performance was 30.1% (IQR 19.3-39.3%). 22.1% of patients remained in hospital for more than 7 days. Those remaining in hospital for more than 48 hours and for more than seven days were more likely to be aged over 70, to be frail, or to have a NEWS2 of 3 or more on arrival to hospital.

Conclusion: The proportion of acute medical attendances receiving overnight admission varies between hospitals. Length of stay is impacted by patient factors and illness acuity. Strategies to reduce inpatient service pressures must ensure effective care for older patients and those with frailty.

Keywords

acute medicine, same day emergency care, admission pathways, frailty, length of stay

Introduction

Front-door services in secondary care are under increasing pressure, with rising attendances to urgent and emergency acute care services,[1] alongside increasing disease complexity, mostly due to frailty and multimorbidity.[2] Many of these patients need investigation in secondary care, and may require admission to hospital. Unplanned hospital admissions account for up to 80% of inpatient episodes, with internal medical emergencies the most common cause; these patients require assessment and treatment through acute medicine services.[3]

There is considerable variation within acute medical admissions, with a range of acuity of illness and disease severity,[3] and not all patients require inpatient admission. A proportion of patients can be managed without an overnight admission through Same Day Emergency Care (SDEC) services,[4] delivered by acute medicine services through Ambulatory Emergency Care (AEC).[5, 6] In contrast, many patients have longer inpatient admissions,[7] which may be influenced by a variety of factors.[8, 9]

There is a current emphasis on avoiding inpatient admission, and reducing length of hospital admissions where possible, but further evidence is needed as to where interventions can be most effectively targeted.[10,11]

This analysis aims to assess the length of hospital stay in patients admitted to acute medicine services, including factors that may be associated with longer hospital admission, using data from the Society for Acute Medicine Benchmarking Audit (SAMBA) 2021.

Method

SAMBA21 took place on 17th June 2021, with registration open to all hospitals accepting unplanned medical admissions. Non-acute and community hospitals were excluded. Multiple units could register separately within each individual hospital or NHS Trust, including acute medical units (AMUs), AEC or SDEC units and frailty units accepting unplanned medical admissions.

SAMBA is registered with the Healthcare Quality Improvement Partnership (HQIP https://www.hqip.org.uk). The North-West Wales Ethics Committee confirmed that the process for SAMBA described here did not require formal ethical review. Individual units register and obtain audit approvals locally at each site, including Caldicott Guardian

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Table 1. Patient demographics for unplanned admissions in SAMBA21

	All unplanned admissions (n=8101)	<2 nights (n=3738)		2 nights or more (n=3935)	
		N (%)	95% CI	N (%)	95% CI
Age					
Under 70	4327 (53.4%)	2506 (67.0%)	65.5-68.6%	1609 (40.9%)	39.4-42.4%
Over 70	3774 (46.6%)	1232 (33.0%)	31.5-34.5%	2326 (59.1%)	57.6-60.7%
Gender					
Female	4312 (53.2%)	2032 (54.4%)	52.8-56.0%	2081 (52.9%)	51.3-54.5%
CFS (in patients over 70)					
1-4	1595 (47.8%)	676 (63.8%)	60.9-66.7%	864 (41.5%)	39.4-43.7%
5 or more	1742 (52.2%)	383 (36.2%)	33.3-39.1%	1217 (58.5%)	56.3-60.6%
Unknown	*437*	*173*		*245*	
Location before admission					
Home	7505 (92.7%)	3597 (96.3%)	95.7-96.9%	3540 (90.0%)	89.0-90.9%
Institutional care	464 (5.7%)	108 (2.9%)	2.4-3.5%	308 (7.8%)	7.0-8.7%
Other	127 (1.6%)	30 (0.8%)	0.5-0.1%	85 (2.2%)	1.7-2.7%
Admission in previous 30 days					
Yes	1483 (18.3%)	546 (14.6%)	13.5-15.8%	833 (21.2%)	19.9-22.5%
NEWS2 on arrival					
0-2	5856 (72.3%)	3198 (85.6%)	84.4-86.7%	2422 (61.6%)	60.0-63.1%
3+	2242 (27.7%)	538 (14.4%)	13.3-15.6%	1512 (38.4%)	36.9-34.0%

approval. The full protocol for SAMBA21 is available through the SAM website.[12]

Data are collected locally from clinical records and patient administration systems (PAS) and anonymised before transfer to the central database. No patient identifiable data is collected or stored within the national database. An organisational questionnaire is also completed by each participating unit, describing the structure and services of their AMU.[13]

For participating units, all medical admissions arriving to hospital within a 24-hour period (00:00-23:59) were included, with data collected for each patient describing demographic variables and processes of care, and with performance compared to the clinical quality indicators recommended by the Society for Acute Medicine.[14] Data on seven-day outcomes was collected, including any hospital discharge or readmission until 23:59 on 24th June 2021.

Frailty scores were recorded using the Clinical Frailty Scale; a score of 5 or more was classified as frail. Early warning scores were recorded using NEWS2.[15]

Descriptive statistics were calculated using Microsoft Excel and Stata SE 16.1. Data are summarised using median and interquartile range (IQR) as the data were not normally distributed. Dates of death, self-discharge or transfer to another hospital were not collected. Evaluation of the number of days patients were admitted excludes these patients, as well as patients that were discharged and readmitted within the seven-day follow-up period.

Results

158 units participated in SAMBA21, from 156 hospitals. Two dedicated frailty units were excluded from this analysis. Patient level data was collected for 8930 patients, 828 of which (9.3%) were scheduled returns. The demographics of unplanned admissions is shown in Table 1.

Outcome data at seven days was available for 8100 patients with an unplanned attendance. 44 patients (0.5%) were an inpatient in hospital at seven days following discharge home and subsequent readmission, 122 patients (1.5%) had self-discharged from hospital, 161 had died within the seven-day follow-up period (2.0%), and 93 (1.1%) had been transferred to another healthcare facility.

31.6% of unplanned attendances were discharged on the day of attendance without overnight admission. The proportion of patients discharged on the day of admission varied between units (median 30.1%, IQR 19.3-39.3%, range 0.0-75.8%). Overall, 22.1% of unplanned admissions remained in hospital for more than 7 days.

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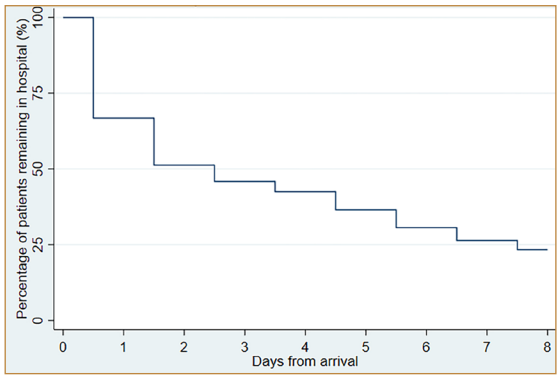


Figure 1. Length of stay. Percentage of patients remaining in hospital per day, by day from start of admission.

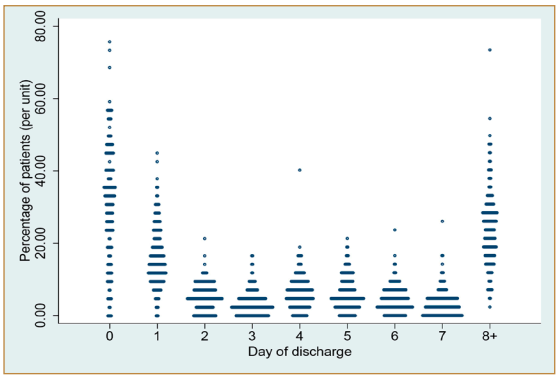


Figure 2. Proportion of patients discharged each day by unit. Results available for first seven days following attendance.

Table 2. Proportion of unplanned admissions discharged each day per unit. Day 0= day of admission, without overnight stay.

	Percentage of patients admitted on SAMBA day discharged on each following day, per unit		
	Median	IQR	Range
Day 0	32.7%	19.9-41.1%	0-75.8%
Day 1	15.2%	10.6-20.8%	0-46.2%
Day 2	5.0%	2.9-7.9%	0-21.7%
Day 3	2.7%	0-4.9%	0-16.3%
Day 4	5.8%	3-8.5%	0-40.0%
Day 5	5.0%	2.8-8.6%	0-21.2%
Day 6	3.7%	2.1-6.4%	0-24.2%
Day 7	2.4%	0-4.5%	0-25.0%
Remaining in hospital for over 7 days	23.5%	17.3-28.9%	3.4-55.6%

Initial length of stay could be assessed for 7674 patients with an unplanned admission. The percentage of patients admitted on SAMBA day who were discharged on each of the following 7 days is shown in Figure 1. Variation between units in the percentage discharged each day is shown in Figure 2 & Table 2.

Pathways through acute services

In patients where length of stay could be calculated, 18.9% (1450 patients) had their initial clinician assessment in AEC/SDEC services. 86.8% of these patients went home the same day without overnight admission, compared to 18.8% of those who were initially assessed in the Emergency Department. The proportion of patients with an initial assessment in AEC/SDEC who were discharged the same day varied between units (median 92.9%, IQR 78.2-100%).

There were differences in the cohort of patients receiving their initial clinician assessment in AEC/SDEC (Table 3).

Patient factors

Patient factors were assessed for those patients where length of stay could be calculated. Those who remained in hospital for two or more nights were more likely to be aged over 70, to have had an admission in the last 30 days, and to have had a NEWS2 on admission of 3 or more, and those aged over 70 were more likely to have a CFS of 5 or more (Table 1). A lower proportion of patients remaining in hospital for more than 2 nights were admitted from their own home.

Comparing by patient factors, a lower proportion of female patients remained in hospital for over 7 days (female 22.0% (95% CI 20.7-23.3%) vs male 24.9% (95% CI 23.5-26.4%)(Figure 3a).

A higher proportion of those aged over 70 remained in hospital for over 7 days compared to those aged under 70 (over 70s 34.8% (95% CI 33.2-36.4%) vs under 70s 13.4% (95% CI 12.4-14.5%)) (Figure 3b). In patients aged over 70 years, a higher proportion of those with a frailty score of 5 or more remained in hospital for over 7 days compared to those with a CFS of 1-4 (CFS 5+ 45.9% (95% CI 43.4-48.4%) vs CFS 1-4 25.3% (95% CI 23.0-27.4%))(Figure 3c).

Comparing NEWS2 on arrival, a higher proportion of those with a NEWS2 of 3 or more remained in hospital for over 7 days (NEWS2 3+ 35.5% (95% CI 33.4-37.6%) vs NEWS2 0-2 18.9% (95% CI 17.9-20.0%))(Figure 3d).

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Table 3. Patient demographics by location of first clinician assessment

	Initial clinician assessment in AEC (n=1450)		Initial clinician assessment in any non-AEC location (n=6223)	
	N (%)	**95% CI**	**N (%)**	**95% CI**
Age				
Under 70	1013 (69.9%)	67.4-72.2%	3102 (49.9%)	48.6-51.1%
Over 70	437 (30.1%)	27.8-32.6%	3121 (50.1%)	48.9-51.4%
Gender				
Female	854 (58.9%)	56.3-61.5%	3258 (52.4%)	51.1-53.6%
CFS (in patients over 70)				
1-4	1076 (90.9%)	89.1-92.5%	3544 (66.6%)	65.3-67.9%
5 or more	108 (9.1%)	7.5-10.9%	1776 (33.4%)	32.1-34.7%
Unknown	*266*		*903*	
Location before admission				
Home	1426 (98.6%)	97.8-99.1%	5711 (91.8%)	91.1-92.5%
Institutional care	15 (1.0%)	0.6-1.7%	401 (6.5%)	5.8-7.1%
Other	6 (0.4%)	0.1-0.9%	109 (1.7%)	1.4-2.1%
Unknown	*3*		*2*	
Admission in previous 30 days				
Yes	192 (13.2%)	11.5-15.1%	1187 (19.1%)	18.1-20.1%
NEWS2 on arrival				
0-2	1369 (94.4%)	93.1-95.6%	4250 (68.3%)	67.1-69.5%
3+	81 (5.6%)	4.4-6.9%	1970 (31.7%)	30.5-32.8%

Discussion

These results demonstrate that length of hospital admissions for patients admitted to acute medicine services can vary considerably; while more than 30% of unplanned admissions were discharged the same day, more than 20% remained in hospital for more than 7 days.

The proportion of patients who were discharged the same day without overnight admission varied between units, ranging from none to 75% of patients. More than 85% of patients who received their initial clinician assessment in AEC/SDEC were discharged home the same day. A much smaller proportion of patients seen in AEC/SDEC had high CFS scores compared with those in AMU (9.1% vs 33.4%), and the extent to which SDEC triage scoring systems or availability of allied health professionals in SDEC drive this difference is not yet known.

The NHS Long Term Plan suggests that a third of acute admissions should be managed without overnight admission, through the increased use of SDEC services,[10] however this requires availability of appropriate services to deliver SDEC effectively. Further in-depth evaluation of units that are able to deliver SDEC for high proportions of patients including those who are older and living with frailty may offer insight into how these services can be delivered most successfully. This evaluation should consider fluctuations over time, which cannot be assessed within SAMBA due to its day of care methodology, and the impact of local population demographics, which may influence suitability for SDEC.[16, 17]

Comparing patient demographics, those remaining in hospital for more than 48 hours and for more than seven days were more likely to be aged over 70 and to be frail compared with those discharged within 48 hours. Tackling the increased pressures on inpatient services must therefore aim to improve care for these patients. This should include evaluation of missed opportunities for managing this cohort through admissions shorter than 48 hours, including through SDEC services. Furthermore, over 20% of patients in hospital at 48 hours had been previously admitted within the last 30 days, suggesting that health and/or social factors in the community or at previous hospital discharge may be contributing to increased pressures on acute care.

While there are national recommendations promoting delivery of SDEC in patients with frailty,[18] there is considerable variation in how frailty services are delivered in acute medical services.[19] How these services can deliver the most benefit for patients requires further exploration, including evaluation of additional facilities that may support this, such as hospital at home services.[20-22] However,

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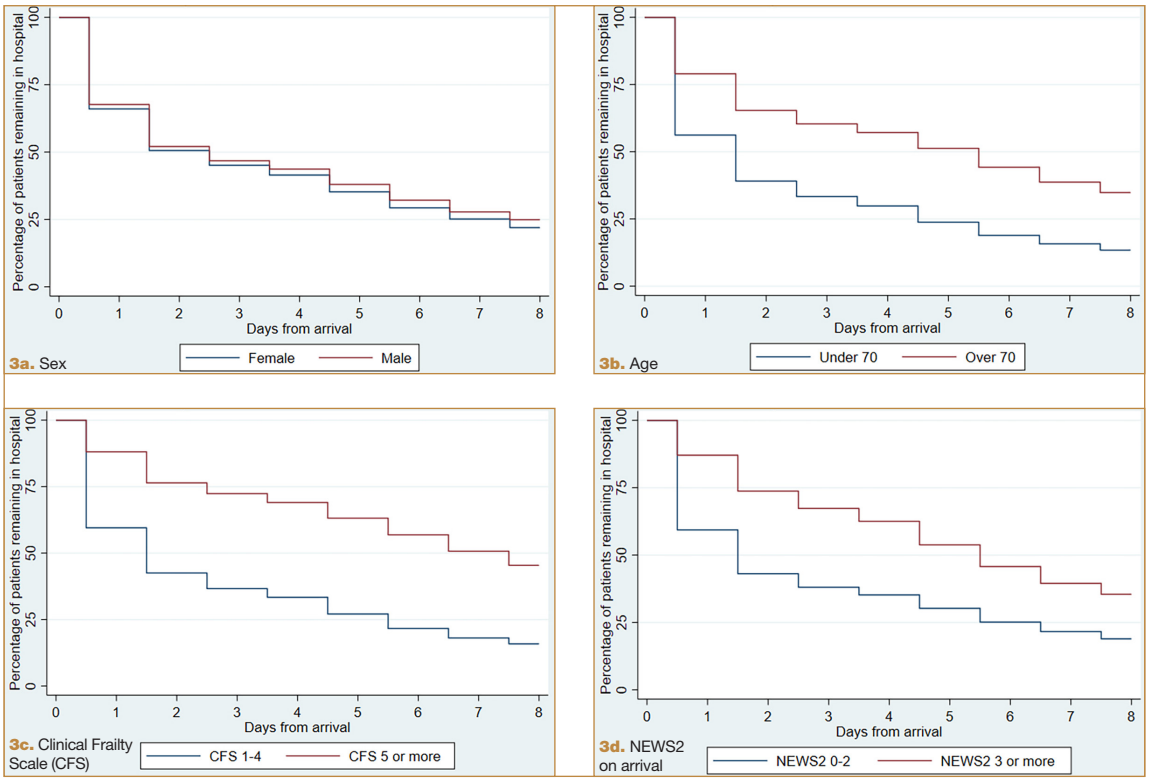


Figure 3. Patient factors and length of stay. Percentage of patients remaining in hospital per day, by day from start of admission. NEWS2: National Early Warning Score 2.

older adults and those with frailty are more likely to have complex needs that may require inpatient admission for longer than 48 hours. Recognition that these patient cohorts are likely to be admitted for longer is important, to ensure that the appropriate multidisciplinary services are available within inpatient settings. To provide the best care for these cohorts, social care input must be available and easily accessible, including access to increased care within the community post-discharge, and to residential and nursing care when required. Delayed discharge from hospital in older adults, related to these factors, has a significant impact on length of hospital stay.[7, 9] Any measures aiming to reduce pressure on inpatient services must incorporate improvements in care, both medical and social, for these patients.

This analysis has limitations – due to the nature of the audit, and its day of care methodology, we are unable to fully explore the interactions between the factors discussed here. However, there is likely interaction between frailty, age and acuity of illness plus additional factors not captured such as comorbidity. These variables and their interactions have not been fully analysed due to the limitation of design of SAMBA. Within this analysis, those with NEWS2 0-2 were grouped, as these patients have lowest mortality risk.[23] Further analysis of the impact of raised NEWS2 scores should consider overall score alongside individual components, which are not collected within SAMBA data, as components such as new confusion may have greater impact on length of stay.[24]

Data for SAMBA21 were collected on a Thursday. The proportion of patients sent home the same day or on subsequent days may be affected by day of the week, due to availability of services such as imaging and support teams, particularly over the weekend.[25] Evaluation of AEC/SDEC performance at different sites would benefit from analysis over longer time periods, alongside in-depth exploration of how services can be most effectively structured. This should include the delivery of SDEC for patient cohorts that may be unlikely to access these services currently. Data were not collected regarding the reasons for patients remaining in hospital at 7 days, therefore we are unable to determine the impact of 'delayed' discharges on the number of patients remaining in hospital at seven days in this analysis.

Conclusion

While more than 30% of unplanned medical admissions are discharged without overnight hospital admission, more than 20% remained in hospital for more than 7 days. Older adults and those with frailty were more likely to have a hospital admission longer than 7 days – any strategy to reduce inpatient service

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pressures must ensure timely access to acute frailty services.

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Authors' contributions

All authors were involved in the design of this study, collection of data and analysis. All authors have approved the final manuscript.

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