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# Society for Acute Medicine Benchmarking Audit 2021 (SAMBA21): assessing national performance of acute medicine services

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**Abstract**

**Introduction:** The Society for Acute Medicine Benchmarking Audit 2021 (SAMBA21) took place on 17<sup>th</sup> June 2021, providing the first assessment of performance against the Society for Acute Medicine's Clinical Quality Indicators (CQIs) within acute medical units since the start of the COVID-19 pandemic.

**Methods:** All acute hospitals in the UK were invited to participate. Data were collected on unit structure, and for patients admitted to acute medicine services over a 24-hour period, with follow-up at 7 days.

**Results:** 158 units participated in SAMBA21, from 156 hospitals. 8973 patients were included. The number of admissions per unit had increased compared to SAMBA19 (Sign test  $p < 0.005$ ). An early warning score was recorded within 30 minutes of hospital arrival in 77.4% of patients. 87.4% of unplanned admissions were seen by a tier 1 clinician within 4 hours of arrival. Overall, the medical team performed the initial clinician assessment for 36.4% of unplanned medical admissions. More than a third of medical admissions had their initial assessment in Same Day Emergency Care (SDEC) in 25.4% of hospitals. 62.1% of unplanned admissions were seen by two other clinical decision makers prior to consultant review. Of those unplanned admissions requiring consultant review, 67.8% were seen within the target time. More than a third of unplanned admissions were discharged the same day in 41.8% of units.

**Conclusion:** Performance against the CQIs for acute medicine was maintained in comparison to previous rounds of SAMBA, despite increased admissions. There remains considerable variation in unit structure and performance within acute medical services.

**Keywords**

Acute medicine, admission pathways, same day emergency care, readmission

**Key points**

- SAMBA21 was the largest to date with 158 units participating from 156 hospitals, and provides the first assessment of acute medicine services in comparison to the Society for Acute Medicine Clinical Quality Indicators since the start of the COVID-19 pandemic.
- The number of admissions per unit had increased compared to previous rounds of SAMBA.
- Performance against the clinical quality indicators appears to be maintained, despite increases in service demands and pressures due to the pandemic.
- More than 75% of patients receiving initial assessment in an emergency department were seen by two clinicians before review by a consultant physician.
- Only 49.2% of unplanned admissions arriving between 08:00-20:00 were seen by a consultant physician within the target time of 6 hours from arrival.

**Introduction**

Acute medicine services provide immediate, specialist management of unwell adult patients presenting to hospital with medical conditions.<sup>1</sup> Patients access these services via several routes, including referral from Emergency Medicine departments and from primary care. Patients may be seen via varied pathways, ranging from unstable patients managed within Acute Medical Units (AMUs), to assessment and treatment through Ambulatory Emergency Care (AEC) services, now termed Same Day Emergency Care (SDEC) units.<sup>2</sup>

These services face ever increasing demands due to rising numbers of attendances and admissions, and increasing levels of multimorbidity and patient complexity, compounded by the considerable ongoing demands placed on acute care services by the Covid-19 pandemic. Despite this increased demand, acute medicine services must continue to provide prompt and effective patient assessment and care.

The Society for Acute Medicine Benchmarking Audit (SAMBA) provides an assessment of performance within acute medicine services, by comparing

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performance against national clinical quality indicators for acute medicine. SAMBA21 provides the first assessment of acute medicine services performance in comparison to these indicators since the start of the Covid-19 pandemic; SAMBA has previously taken place annually since 2012, however was postponed in 2020 due to Covid-19.

### Methods

SAMBA21 took place on 17<sup>th</sup> 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, AEC/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 approval. The full protocol for SAMBA21 is available through the SAM website.<sup>3</sup>

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 completed by each participating unit, describing the structure and services of their AMU.

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.

The questions included in SAMBA21 were developed through a national multi-professional forum, informed by national guidance, health care policy and professional society standards.<sup>4,5</sup>

The acute medicine clinical quality indicators included in SAMBA21 are those recommended by the Society for Acute Medicine,<sup>6</sup> which take account of recommendations from the Royal College of Physicians of Edinburgh,<sup>7</sup> the Royal College of Physicians<sup>1</sup> and NICE.<sup>8</sup> The key clinical quality indicators assessed were:

- All patients admitted to the AMU should have an early warning score measured upon arrival (within 30 minutes)
- All patients should be seen by a competent clinical decision maker within 4 hours of arrival.
- All patients should be seen and their management plan reviewed by the admitting consultant physician. This should occur within 6 hours for patients admitted to the hospital between 08:00 and 20:00 and within 14 hours for those admitted between 20:00 and 08:00.

Time intervals are assessed from time of arrival to the hospital, to reflect the complete patient journey through

acute care across departments.<sup>5</sup> Early warning scores were recorded using NEWS2.<sup>9</sup> Definitions for clinical quality indicators and data collection items relating to these indicators remained consistent between SAMBA21 and the last two rounds of patient data collection, in January 2020 (WinterSAMBA)<sup>4</sup> and June 2019 (SAMBA19).<sup>5</sup> The methods used in these audit rounds have been described previously.<sup>4,5</sup>

Descriptive statistics were calculated using Microsoft Excel and IBM SPSS statistics version 25. Data are summarised using median and interquartile range (IQR) as the data were not normally distributed.

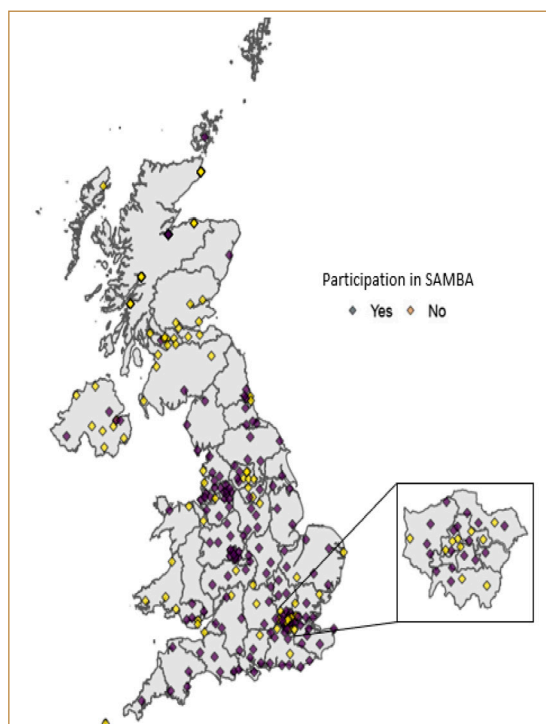
### Results

158 units participated in SAMBA21, from 156 hospitals (Figure 1). Of these hospitals, 141 submitted organisational data related to the structure of their acute medicine services.

#### *Service structure and delivery*

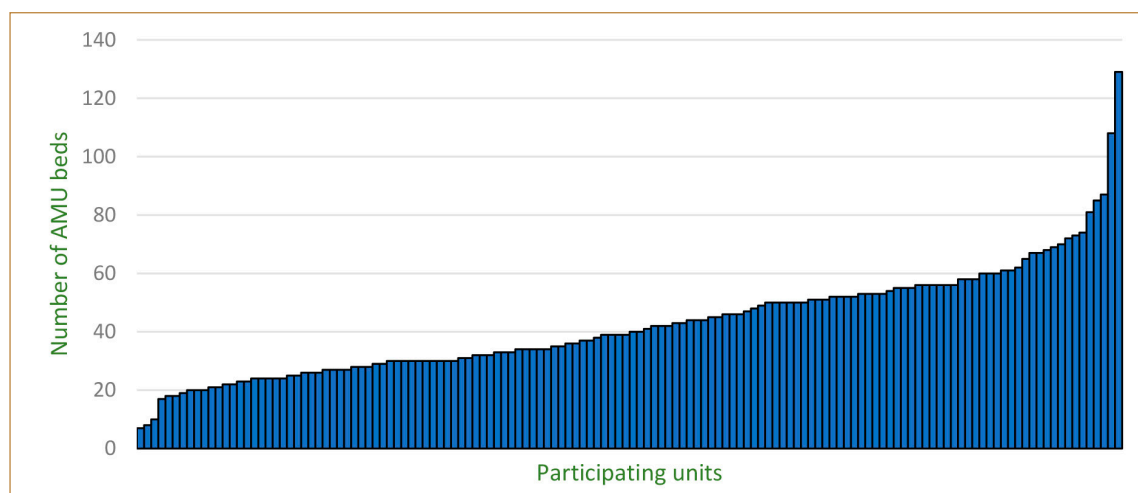
The median number of inpatient beds at participating hospitals was 499 (IQR 376–692, range 48–1500). The median number of beds available on AMU at each hospital was 40 (IQR 29–53, range 7–129) (Figure 2).

Eighteen hospitals (18/139 respondents, 12.9%) had level 2 beds available within AMU. Hospitals with level 2 beds on AMU had a higher average number of inpatient beds (median 560 vs 463, Kruskal-Wallis  $p=0.014$ ) and a higher number of total AMU beds (median 48 vs 37, Kruskal-Wallis  $p=0.044$ ).



**Figure 1.** Map of UK hospitals with a Type 1 Emergency department participating in the Society for Acute Medicine Benchmarking Audit. Greater London area shown as inset map.

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**Figure 2.** Number of beds available on the Acute Medical Unit at participating hospitals. Units ordered along x-axis according to number of beds.

Direct referral of patients to acute medicine services by paramedics is available in 46.8% of units. 120 units (95.1%) provide telephone triage of GP referrals. This is performed by consultants (54.0% of units with telephone triage), registrars (44.2%), core trainees (11.7%), ANPs (20.8%), nurses (32.5%), ACPs (13.3%) or administrative staff (5.8%); 45% utilised a single staff group for this.

### **AEC/SDEC provision**

AEC/SDEC is provided by 97.8% of units (136 units from 139 responses). Of those delivering AEC/SDEC, this was delivered solely within a stand-alone unit by 83 hospitals (61.0%), solely within AMU by 26 (19.1%) and in both these settings by 20 units (14.7%); 8 units (5.9%) that delivered AEC/SDEC provided this entirely outside these settings.

Fifteen units had AEC services that are open 24 hours a day (11.0%); 52.2% of AEC units opened between 08:00–08:29, 28.7% started between 09:00–09:29, with

closing times between 18:00–18:59 in 25.0%, 19:00–19:59 in 14.0% and 20:00–20:59 in 20.6%.

Performance against the SAM/RCPE AEC standards<sup>(2)</sup> is shown in Box 1.

### **Patient cohort**

Patient level data was collected for 8973 patients. 53.8% of patients were female (SAMBA19 53.3%, WinterSAMBA 54.8%). 25.5% were aged 80 years and above (SAMBA19 27.4%, WinterSAMBA 29.6%). Comparison to previous rounds of SAMBA is shown in Figure 3.

Of the patients seen on SAMBA-day, 9.2% (828 patients) of patients were scheduled returns (SAMBA19 9%, WinterSAMBA 7.5%); 90.8% (8145 patients) were unplanned admissions.

### **Admission numbers and patient pathways**

The total number of patients seen at each unit ranged from 4 to 161 (median 50 patients, IQR 36–74), with the number of unplanned admissions ranging from 4 to 141 (median 48 patients, IQR 34–66). There was a moderate correlation between the number of unplanned admissions seen and the number of AMU beds (Pearson's  $r=0.55$ ,  $p<0.005$ , Figure 4). The median number of unplanned admissions per AMU bed was 1.2 (IQR 0.9–1.6, range 0.5–5; SAMBA19 median 1.1, IQR 0.8–1.5, range 0.4–3).

Admission numbers were compared for units taking part in both SAMBA21 and SAMBA19, and both SAMBA21 and WinterSAMBA. On average the number of patients seen per unit had increased from SAMBA19 to SAMBA21 (median difference 4.5 patients, Sign test  $p<0.005$ ), and from WinterSAMBA to SAMBA21 (median difference 2 patients, Sign test  $p=0.021$ ). The number of unplanned admissions per unit had increased from SAMBA19 to SAMBA21, with a median difference of 3.5 patients (Sign test  $p<0.005$ ); there was not a statistically significant increase from WinterSAMBA to SAMBA21 (median difference 1, Sign test  $p=0.284$ ).

### **Box 1.** Performance against AEC standards from RCPE/SAM

#### **Performance against RCPE/SAM AEC Standards**

**Do you undertake surveys of patients in AEC to ask about their experience of the care they receive?**

- Yes – 80.0%

**If patients do not attend appointments at AEC, do you have an agreed standard procedure to follow?**

- Call the patient – 74.8%
- Inform the GP – 62.2%
- No action taken – 8.1%

**Do you give AEC patients an information sheet telling them how to seek care if they become unwell at home?**

- Yes – 39.3%

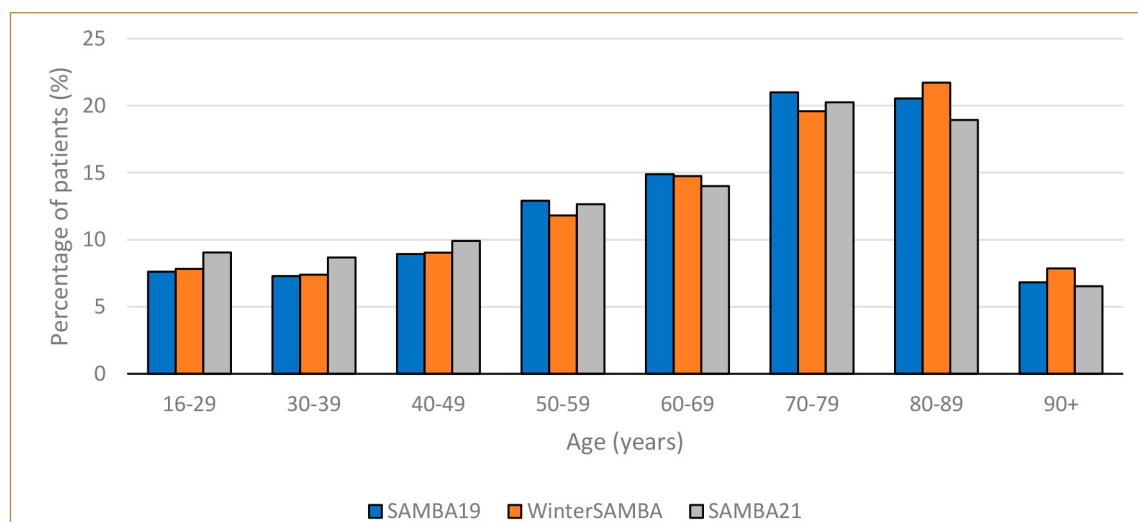
**During periods of high demand, is your AEC unit used to provide in patient care?**

- Yes – 47.4%

**Do you have a private area in your AEC unit where confidential discussions are not overheard?**

- Yes – 88.9%

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**Figure 3.** Age of patients included in SAMBA.

The location of clinical and medical assessment by arrival time for unplanned admissions is shown in Table 1. The medical team performed the initial clinician assessment for 36.4% of unplanned admissions (2967 patients), half of these patients were in AEC/SDEC (Table 1). The percentage of all unplanned admissions receiving their first medical assessment in AEC/SDEC services varied between units, and was over a third of patients in 25.4% of units (Figure 5). The proportion of unplanned admissions receiving their first assessment in ED had not changed compared to WinterSAMBA (69.4% (95% CI 68.4–70.4%) vs 67.8% (95% CI 66.5–69.1%)).

### Performance against clinical quality indicators

#### **Clinical quality indicator 1: Early warning score measurement**

An early warning score was recorded within 30 minutes of hospital arrival in 77.4% of patients (95% CI 76.5–

78.3%). Comparison to previous rounds of SAMBA is shown in Table 2. Performance at each unit varied, median performance was 79.7% (IQR 79.7–92.2%).

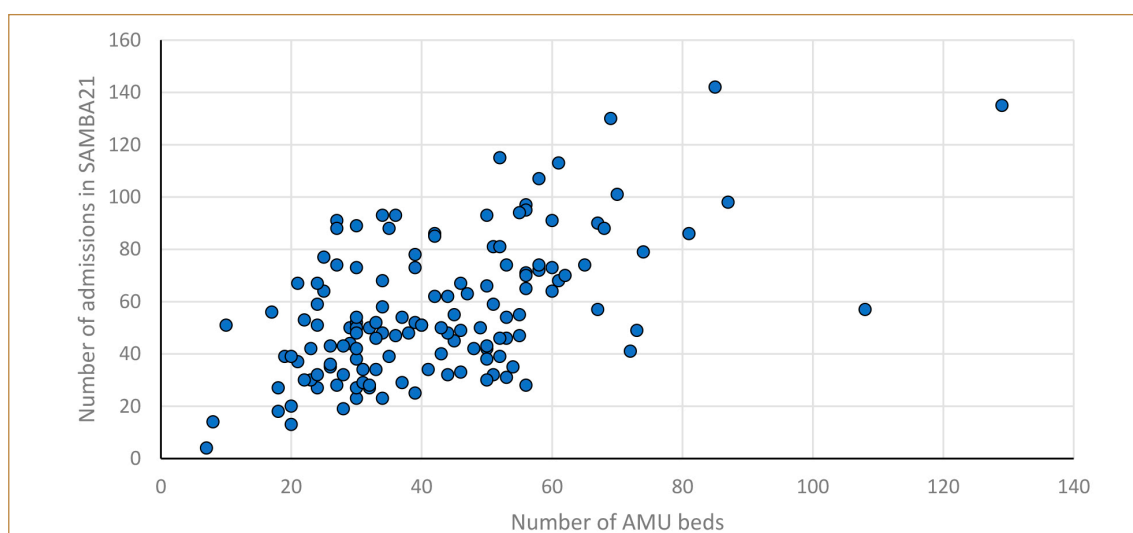
Overall, 74.4% of admissions had a NEWS2 score of  $\leq 2$ . 94.4% of unplanned admissions receiving their initial assessment in AEC/SDEC services had a NEWS2 score  $\leq 2$ .

#### **Clinical quality indicator 2: assessment by clinical decision maker within 4 hours**

87.4% of unplanned admissions were seen by a tier 1 clinician within 4 hours of arrival to hospital (Table 2). Median unit performance was 90.7% (IQR 82.3–95.4%).

#### **Clinical quality indicator 3: consultant review within target time**

Review by medical consultant was not required for 12.3% of unplanned admissions – 5.8% of patients were discharged by registrar (or equivalent) doctor, 4.2% were discharged by another clinician.

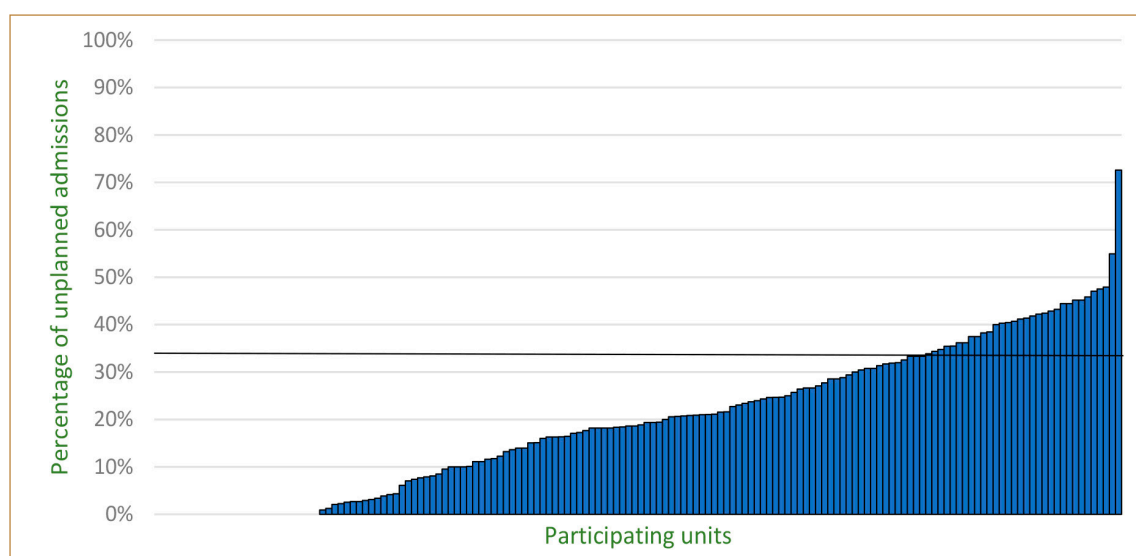


**Figure 4.** Number of beds available in the Acute Medical Unit, and the number of patients seen at each on unit on the day of SAMBA21.

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**Table 1.** Assessment location by arrival time. For all patients, location of initial assessment, and first assessment by the medical team, by time of arrival to hospital. Location of assessment by arrival time also shown for patients who were seen by the medical team without initial assessment by another team. Note: Only 29 patients were seen in AEC outside of daytime hours.

|                                            |                                        | Arrival time   | Assessment location |              |              |                |
|--------------------------------------------|----------------------------------------|----------------|---------------------|--------------|--------------|----------------|
|                                            |                                        |                | ED                  | AMU          | AEC          | Other location |
| <b>Initial assessment location</b>         |                                        | 00:00-08:00    | 14.4%               | 0.9%         | 0.4%         | 0.1%           |
|                                            |                                        | 08:00-20:00    | 44.6%               | 7.85%        | 17.6%        | 1.9%           |
|                                            |                                        | 20:00-00:00    | 10.4%               | 1.4%         | 0.2%         | 0.3%           |
|                                            |                                        | <b>Overall</b> | <b>69.4%</b>        | <b>10.1%</b> | <b>18.2%</b> | <b>2.3%</b>    |
| <b>Initial medical assessment location</b> | All unplanned admissions               | 00:00-08:00    | 7.8%                | 6.7%         | 0.8%         | 0.6%           |
|                                            |                                        | 08:00-20:00    | 26.8%               | 20.9%        | 20.8%        | 3.5%           |
|                                            |                                        | 20:00-00:00    | 6.0%                | 5.4%         | 0.2%         | 0.5%           |
|                                            |                                        | <b>Overall</b> | <b>40.6%</b>        | <b>33.0%</b> | <b>21.8%</b> | <b>4.6%</b>    |
|                                            | Patients seen directly by medical team | 00:00-08:00    | 1.8%                | 2.8%         | 1.0%         | 0.4%           |
|                                            |                                        | 08:00-20:00    | 11.9%               | 22.3%        | 47.8%        | 5.2%           |
|                                            |                                        | 20:00-00:00    | 2.4%                | 3.4%         | 0.4%         | 0.5%           |
|                                            |                                        | <b>Overall</b> | <b>16.1%</b>        | <b>28.5%</b> | <b>49.3%</b> | <b>6.0%</b>    |



**Figure 5.** Percentage of patients who received their first medical assessment in Ambulatory Emergency Care (AEC). Units ranked along x-axis by percentage seen in AEC. Target line at 33.3% based on recommendations for provision of Same Day Emergency Care (SDEC) from NHS Long Term Plan.<sup>10</sup>

Assessing only unplanned admissions that required a consultant review, 62.1% were seen by two other clinical decision makers prior to consultant review. The proportion seeing two clinicians prior to consultant review varied by initial assessment location and time of arrival: during daytime hours, 76.1% of those with an initial assessment in ED were seen by two clinicians before consultant review (95% CI 74.6–77.5%) compared to 13.9% of those assessed in AMU (95% CI 11.1–17.1%) and 9.1% of those seen in AEC (95% CI 7.3–11.3%); out of hours, this was 82.7% of patients assessed in ED (95% CI 80.9–84.4%) and 27.0% of patients initially assessed in AMU (95% CI 20.3–34.5%).

Of the patients requiring a consultant review, 67.8% were seen within the target time (95% CI 66.6–68.9%; Table 2). Median performance per unit was 66.0% (IQR 58.1–78.1%).

For patients arriving in daytime hours, 59.2% were seen by a consultant within the 6-hour target time (95% CI 57.8–60.6%; SAMBA19 56.3%, WinterSAMBA 54.9%). Median unit performance was 58.1% (IQR 43.8–70.7%).

### **CQI performance by location of initial assessment**

Comparison of performance against the clinical quality indicators dependent on initial patient assessment

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**Table 2.** Comparison of performance against clinical quality indicators between SAMBA21, WinterSAMBA and SAMBA19.

^includes both unplanned admissions and scheduled returns.

\*unplanned admissions requiring consultant review, patients who did not require consultant review excluded.

| Percentage meeting Clinical Quality Indicator                                 | Year    |            |             |            |         |            |
|-------------------------------------------------------------------------------|---------|------------|-------------|------------|---------|------------|
|                                                                               | SAMBA21 |            | WinterSAMBA |            | SAMBA19 |            |
|                                                                               | %       | 95% CI     | %           | 95% CI     | %       | 95% CI     |
| CQI 1: Early Warning Score within 30 minutes^                                 | 77.4%   | 76.5-78.3% | 74.3%       | 73.2-75.5% | 80.3%   | 79.4-81.3% |
| CQI 2: Assessment by Tier 1 Clinical decision maker within 4 hours of arrival | 87.4%   | 86.6-88.1% | 84.4%       | 83.3-85.3% | 87.7%   | 86.8-88.5% |
| CQI 3: Review by consultant within target time (overall)*                     | 67.8%   | 66.6-68.9% | 61.9%       | 60.5-63.3% | 64.3%   | 63.0-65.5% |

location is shown in Table 3. Compared to patients initially assessed in the ED or AMU, a higher proportion of unplanned admissions who had their initial assessment in AEC/SDEC services were seen by a tier 1 clinician within the target time. A higher proportion of those seen in AEC/SDEC for their initial assessment were seen by a consultant within the target time than those seen in AMU or ED; a higher proportion of those assessed in AMU were seen by a consultant physician within the target time than those initially assessed in ED. Performance against the CQIs based on time of arrival for each initial assessment location is shown in Table 3.

### Seven-day outcomes

Outcomes at seven days are shown in Figure 6. Overall, 31.5% of unplanned admissions were discharged on the day of arrival. The percentage discharged the same day varied between units (median 30%, IQR 19-39.1%, range 0-75.8%); 66 units (41.8%) discharged more than a third of patients the same day.

4.3% of patients discharged the same day had an unscheduled attendance within the next 7 days (2.5% returned via an Emergency Department attendance, 1.8% via another route including AMU).

### Discussion

SAMBA21 provides the first assessment of acute medicine service performance since the start of the Covid-19 pandemic in the UK, undertaken using methodology which permits comparisons over time. Although more than three quarters of patients had an early warning score recorded within the target time, and 87% of unplanned admissions were assessed by a clinician within 4 hours of arrival to hospital, less than 70% of patients requiring a consultant review received this within the target time.

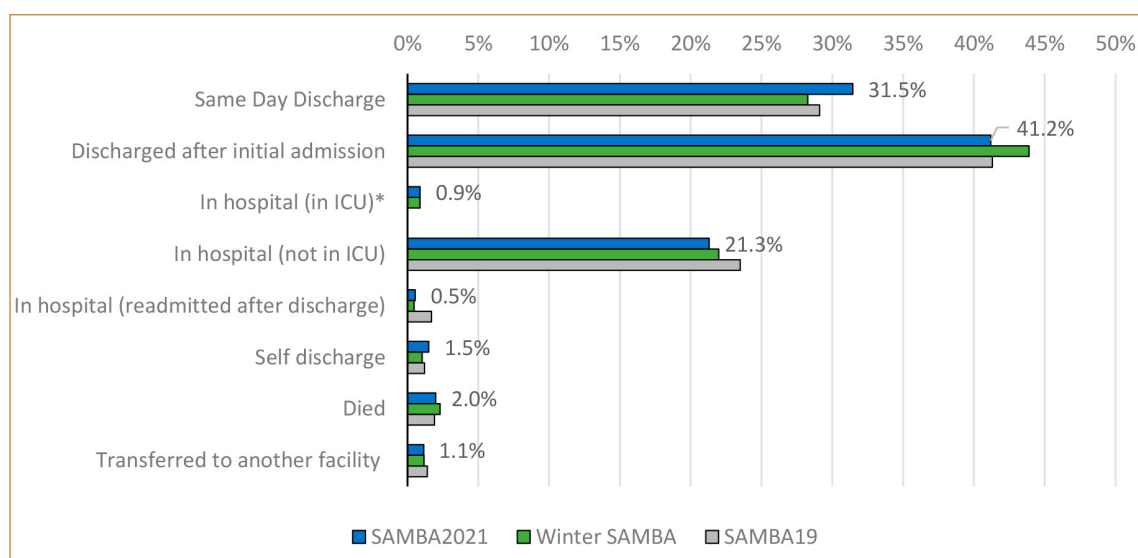
In comparison to previous years, the proportion of patients receiving their first clinician assessment within 4 hours of arrival to hospital was unchanged from SAMBA19, and higher than WinterSAMBA. Although the proportion of patients receiving an early warning

**Table 3.** Performance against Clinical Quality Indicators based on location of initial assessment.

^includes both unplanned admissions and scheduled returns. \*unplanned admissions requiring consultant review, patients who did not require consultant review excluded. Note: only 29 patients were seen in AEC outside of daytime hours

| Percentage meeting Clinical Quality Indicator | Location of initial assessment |                              |                              |
|-----------------------------------------------|--------------------------------|------------------------------|------------------------------|
|                                               | ED                             | AMU                          | AEC                          |
| CQI 1^                                        | 78.4%<br>(95% CI 77.2-79.5%)   | 75.6%<br>(95% CI 72.6-78.5%) | 76.6%<br>(95% CI 74.7-78.4%) |
| 00:00-08:00                                   | 79.8%                          | 85.7%                        | 75.0%                        |
| 08:00-20:00                                   | 78.8%                          | 75.1%                        | 76.6%                        |
| 20:00-00:00                                   | 74.3%                          | 71.9%                        | 81.3%                        |
| CQI 2                                         | 86.4%<br>(95% CI 85.5-87.3%)   | 83.5%<br>(95% CI 80.8-86.0%) | 93.9%<br>(95% CI 92.5-95.1%) |
| 00:00-08:00                                   | 81.1%                          | 73.3%                        | 76.7%                        |
| 08:00-20:00                                   | 89.4%                          | 85.8%                        | 94.4%                        |
| 20:00-00:00                                   | 80.9%                          | 77.7%                        | 85.7%                        |
| CQI 3*                                        | 62.9%<br>(95% CI 61.5-64.2%)   | 76.4%<br>(95% CI 73.1-79.5%) | 88.5%<br>(95% CI 86.2-90.5%) |
| 00:00-08:00                                   | 89.1%                          | 97.0%                        | 95.0%                        |
| 08:00-20:00                                   | 49.2%                          | 71.4%                        | 88.4%                        |
| 20:00-00:00                                   | 83.8%                          | 91.8%                        | 77.8%                        |

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**Figure 6.** Patient outcomes at 7 days. \*note ICU admissions were not recorded for SAMBA19.

score within 30 minutes was lower than in SAMBA19, it was higher than WinterSAMBA in January 2020, and the proportion of patients requiring a consultant review who received this within the target time was higher in SAMBA21 than in WinterSAMBA and SAMBA19. Alongside this, the number of admissions per unit has increased. This suggests that despite increased pressure on acute services due to rising numbers of admissions,<sup>11</sup> and considerable service demands and changes due to Covid-19,<sup>12</sup> acute medicine services are maintaining or improving their performance.

More than a third of unplanned medical admissions received their initial clinician assessment in AEC/SDEC services in a quarter of units, however there was considerable variation. The delivery of Same Day Emergency Care is a priority within the NHS Long Term Plan,<sup>10</sup> with potential to deliver medical assessment and treatment for a subset of medical admissions without overnight admission, reducing demands on inpatient services and avoiding risks associated with admission.<sup>13, 14</sup> The underlying reasons for the variation in the proportion of patients seen through SDEC services requires further evaluation, including the impact of local population demographics that may influence patient suitability for SDEC<sup>15,16</sup> alongside service structure that may facilitate these pathways.

There remain areas where performance against these clinical quality indicators suggests that improvement is needed. Overall, the lowest performance was in consultant review within 6 hours of arrival for unplanned admissions during daytime hours receiving their initial assessment in the Emergency Department. As this was the most common pathway for patients seen in acute medicine services, it is important that the reasons for this, and the impact it may have on patient care, are explored further. The clinical quality indicators used within SAMBA have a shorter target

time to consultant review for those arriving during daytime hours (6 hours), in line with the recommendations on which the CQIs were based.<sup>6,8,17</sup> The methodology currently used in SAMBA21 does not allow the overall average wait time for consultant review to be quantified.

The results of SAMBA21 again highlight the close working between acute medicine and emergency medicine, who are also facing escalating service demands, that are impacting patient care.<sup>18</sup> The majority of unplanned medical admissions are referred from the emergency department, and this is the most common location of initial assessment by the medical team. As both teams are so central to these pathways, any strategies to improve care will need to involve both acute and emergency medicine. One aspect of this pathway that may be targeted for improvement is assessment by more than one competent clinical decision maker prior to consultant review. In SAMBA21, more than 75% of those receiving their initial assessment in the ED were seen by two clinicians before review by a consultant physician. Although there have been local evaluations of 'single clerking' strategies aiming to streamline this process,<sup>19, 20</sup> current approaches vary between hospitals and there has not been multi-centre analysis or consensus on adoption. The impact of this repeated clinical assessment, both positive and negative, on patient care and on service delivery, should be thoroughly evaluated.

The geographical spread of SAMBA21 shows that Scotland and Northern Ireland have less representation in this dataset and this may limit our understanding of differences in acute medical care delivery. With devolved nations taking responsibility for their national health policies, understanding variation between the nations in SAMBA becomes ever more important, as different policy approaches may influence performance measures. We hope to address this in future SAMBA rounds.

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As with previous rounds of SAMBA, there remains considerable variation in patient pathway and service performance between units. The day-of-care survey methodology used in SAMBA21 has limitations that prevent this variation from being fully explored in the current analysis, for example variation in performance over a longer time period, and detailed assessment of all factors that may drive this variation. However, this study does provide a comparison of current practice that affords a basis on which to build future research in these areas.

### Conclusion

Performance against the CQIs for acute medicine was maintained in comparison to previous rounds of SAMBA, despite increased admissions. There remains considerable variation in unit structure and performance within acute medical services, as well as specific areas that require further evaluation, including the impact of multiple clinician assessment prior to consultant review, and pathways to consultant review for patients arriving in daytime hours.

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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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