



WHITE PAPER: ESTABLISHMENT OF AMBULATORY EMERGENCY SERVICES AT JAMES PAGET UNIVERSITY HOSPITAL UTILISING POINT-OF-CARE TESTING AND PROCESS CHANGE

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INTRODUCTION

A study of emergency admissions in England found that over a quarter of admissions did not require an overnight stay (length of stay [LoS] of zero).¹ This suggests that many emergency patients could benefit from ambulatory emergency care (AEC).¹

Fundamental to AEC is the identification and management of patients with acute medical conditions that do not require overnight admission.² This entails immediate access to urgent care that would usually require the resources and expertise available in an acute hospital.³

BACKGROUND

Effective AEC can deliver streamlined, efficient patient care within one working day.⁴ This may improve clinical outcomes, the patient experience, and costs.^{4,5} The Royal College of Physicians (RCP) speculates that, in the near future, emerging technologies, such as improved with-patient point of care testing (POCT) platforms, are likely to offer more options for managing patients in an AEC setting.⁴ Integrated POCT devices, such as the *i-STAT System™*, could be a key part of the future of AEC.

The James Paget University Hospital (JPUH) cares for approximately 240,000 residents across Great Yarmouth, Lowestoft and Waveney, as well as visitors coming to East Anglia.^{6,7} The number of yearly emergency admissions at the JPUH is approximately 67,000.⁷ Within the JPUH Acute Medicine Unit (AMU), the Emergency Assessment and Discharge Unit (EADU) was used for the immediate review and treatment of patients who were expected to require inpatient therapies and investigations, while the AEC unit served less dependent patients.⁸

As the AEC service was unable to meet demand, steps were taken to redesign the patient management streams and form a new unit called the Ambulatory Care Unit (AmbU).⁹ This culminated in a “proof-of-concept” pilot, using POCT and process change, which were in line with NHS best practice guidelines and RCP principles.^{1,10,11} With no central laboratory service at the AEC site, the use of with-patient POCT, using devices such as the *i-STAT System*, was seen as a key method in improving efficiency.¹² The pilot was later extended with financing from the Trust and approved as a business case to provide a permanent service.¹¹ This white paper discusses both the process and results of the AEC redesign at JPUH.

THE JPUH AEC REDESIGN PROCESS

Project team

The project team included hospital staff, who collaborated with multidisciplinary stakeholders and industry partners. Industry partner support/sponsorship was obtained from Abbott Point-of-Care, Radiometer® and Operasee Limited.^{7,11,12}

Systematic approach to process redesign

The AEC redesign process consisted of evidence-based methodologies, including:^{7,12}

- *Demand and Process Activity Mapping* to understand how the current system worked and to identify an evidence-based, ideal future-state, capable of fulfilling demand. This identified leverage points on which to focus, such as POCT, to catalyse change
- *Failure Mode Effect Analysis (FMEA)*, which is a step-by-step approach to identifying all possible failures in a design, process, product or service. FMEA was utilised to provide evolving process governance, and to obtain input from multiple stakeholders to identify, quantify, prioritise and resolve potential issues in terms of severity, occurrence and detection

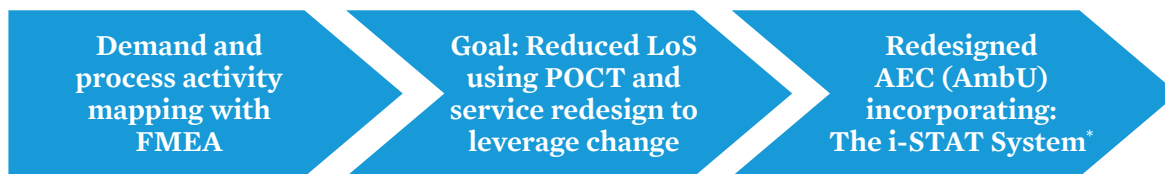
RESULTS

Reduced patient LoS was identified as the goal of the redesigned AEC service and POCT as a method of leveraging change (Figure 1)¹²

To reach the goal of reduced LoS, the new service implemented the following:

- POCT, including the *i-STAT System*
- Appropriate treatment/discharge planning
- Early senior clinical decision maker input
- Condition-specific management algorithms (outlined by the RCP³)

Figure 1: POCT was identified as a main way to leverage change in the AEC¹²



* Additional POCT technology included the CELL-DYN Emerald[®] (full blood count analyser) and the Radiometer[®] AQT90 FLEX analyser (D-dimer test).^{7,12}

POCT fulfilled over 85% of patient diagnostic needs in the AEC setting.⁷ The *i-STAT System*, in particular, was used for a variety of common tests, with the following cartridges used most widely:^{7*}

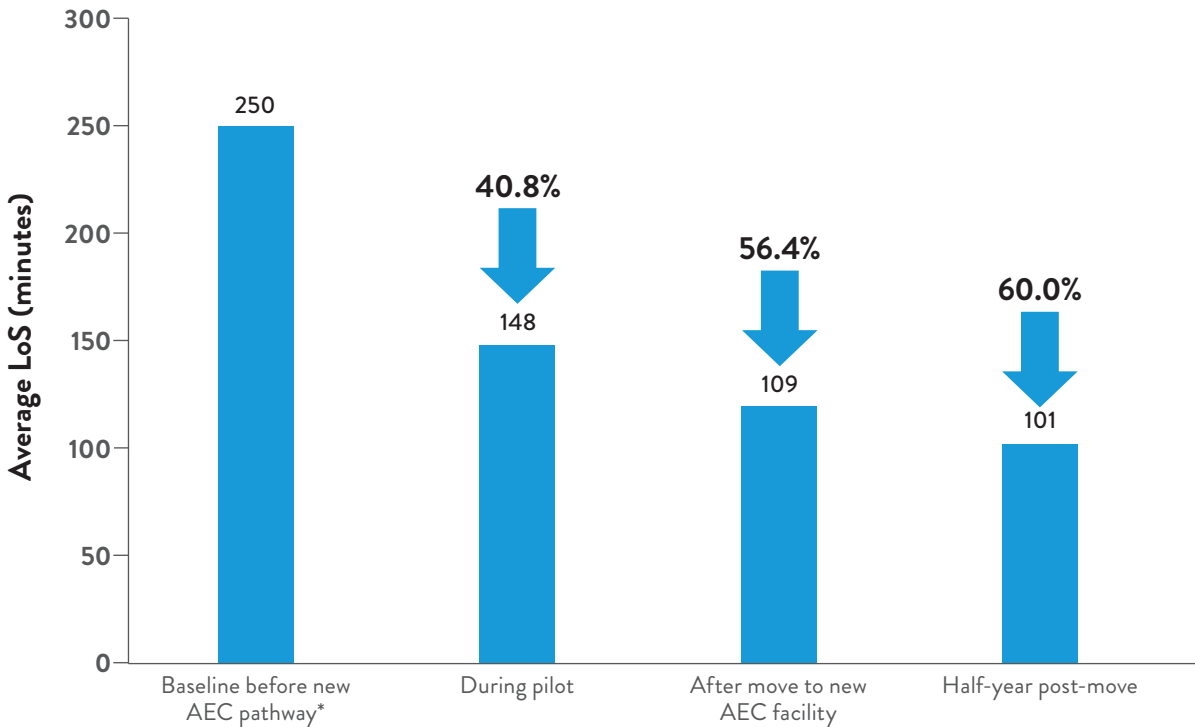
- CHEM8+ to test blood electrolytes, basic haematology parameters and TCO₂
- CG4+ to test lactate and blood gases
- PT/INR to test prothrombin time (a measure of blood coagulation)

Additionally, the CELL-DYN Emerald[®] analyser performed full blood count testing and the Radiometer[®] AQT90 FLEX carried out D-dimer tests.^{7,12}

New AEC service demonstrated dramatic improvements in LoS

The new AEC pathway started in August 2014 (Monday through Friday, 08:30–18:30). It began as a three-month pilot, which led to dramatic improvements in patient flow and reductions in LoS (Figure 2). These improvements continued post-pilot and after the AmbU moved into a newly-built environment (within the AMU) with additional staff to support the extended service (Figure 2).^{11,13}

Figure 2: New AEC service reduced average LoS for patients^{11,13}

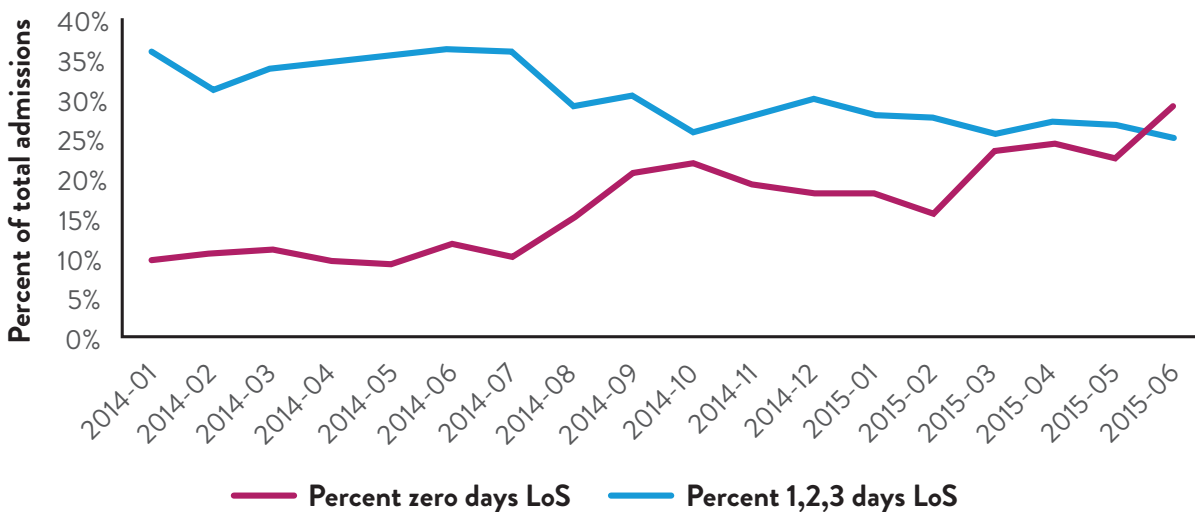


* As there was no AmbU service at the Trust prior to the pilot, this baseline was derived from an extensive Information Services model capturing the patient cohorts expected in an Ambulatory Unit.¹³

New AEC service improved zero day LoS rate within EADU/AmbU admissions

Emergency care was expedited as a result of the new outpatient AEC service, in both the EADU and the AmbU. The rate of patients going home on the same day increased and the rate of patients admitted for 1, 2 or 3 days decreased, demonstrating that fewer patients required overnight stays. The reduced LoS was achieved despite the patient admission rate remaining constant (Figure 3).¹³

Figure 3: Effect of new AEC service on zero day and 1, 2 and 3 day LoS within the EADU/AmbU¹³

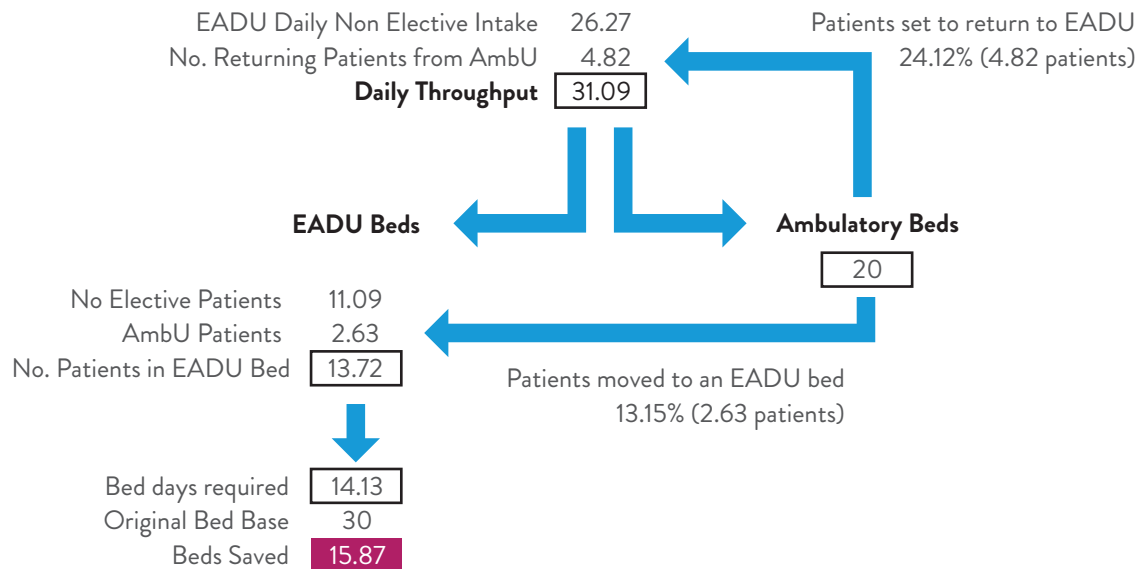


RESULTS CONTINUED

New AEC service has a proposed economic benefit of more than £1 million

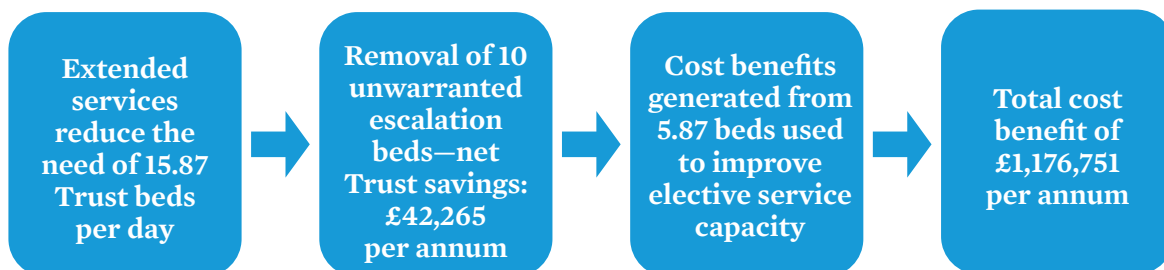
Following the pilot's success, a business case was approved to provide 7-day AEC services, with operational hours extended from 08:30–18:30 to 08:00–21:30.¹¹ It was calculated that the extended AEC services would save 15.87 Trust beds per day within the EADU (Figure 4).⁷

Figure 4: New AEC service reduced beds needed within EADU⁷



Despite the decrease in overnight stays, reducing Trust income (representing a £557,146 saving for the Clinical Commissioning Group), and the cost of providing the service (increased staffing and POCT diagnostics, etc.), it was estimated that implementation of the service would result in a net Trust saving of £42,265 per annum in the acute setting—through the safe removal of 10 unwarranted escalation beds. The remaining capacity (approximately 5.87 beds) could be used to improve elective service capacity. This equates to a total economic cost benefit of £1,176,751 per annum (Figure 5).¹¹

Figure 5: Cost benefit estimation¹¹



DISCUSSION

The new AEC service at JPUH concentrated on the implementation of POCT and process redesign.¹¹ Integrated POCT devices, such as the *i-STAT System* (providing multiple traditionally laboratory-associated tests on a portable single platform), are designed to provide rapid diagnostic information that enables faster clinical management decisions. Within the new AEC service, this helped reduce LoS and costs.¹¹ Other benefits may also be realised when POCT is incorporated into a workflow that allows real-time availability of results, including improved patient satisfaction and clinical outcomes.⁵

Additional POCT benefits experienced at this site included:

- Patient data integration within the hospital information system^{7,14}
- Senior clinical decision maker review within one hour¹²
- Static readmission rates¹²
- Positive patient feedback with 79% “extremely likely” to recommend the service¹²
- Under 10 minutes to initial review¹²

By incorporating process redesign changes, the AmbU has become an integral part of the emergency care system within the JPUH.⁸

Following the pilot, some staff felt that the *i-STAT System* gave them more time with the patient. They also felt that it increased their ability to communicate with the patients about their results.

Conclusion

The overall changes to process and adoption of the ambulatory model, along with integration of POCT, such as the *i-STAT System*, and evidence-based service redesign, have achieved reduced LoS for medical patients simultaneously with a proposed economic benefit of more than £1 million.¹¹

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