An evaluation of the impact of advanced nurse practitioner triage and clinical intervention for medically expected patients referred to an acute National Health Service hospital.

Abstract:

Aims and objectives: To evaluate the impact of advanced nurse practitioner triage on the management of medically expected patients referred to an acute National Health Service hospital. The objectives of the study were to determine whether advanced nurse practitioner triage reduced waiting times and hospital admissions and expedited essential investigations and treatments.

Background: The effectiveness of employing advanced nurse practitioners to meet service demands has been widely studied in emergency departments and critical care units. However, no studies have evaluated the impact advanced nurse practitioners can have on the management of medically expected patients, who have been referred to hospital because they are acutely unwell and require immediate medical intervention.

Design: A pre and post implementation evaluation.

Method: The Revised Standards for Quality Improvement Reporting Excellence guidelines were used as a framework to guide the triaging role of advanced nurse practitioners. The charts of patients attending before and after the implementation of the advanced nurse practitioner triage role were retrospectively analysed.

Results: The implementation of advanced nurse practitioner triage for medically expected patients saw a statistically significant reduction in the length of time patients have to wait to be seen. There were also significant improvements in timings to diagnosis and treatment of

patients presenting with conditions such as sepsis or community acquired pneumonia. Additionally, patient admissions to hospital beds were reduced, as advanced nurse practitioners instead streamed a number of patients to ambulatory care for same day treatment and/or medical follow up.

Conclusions: Advanced nurse practitioner triage has made significant improvements to the efficiency and effectiveness of care and management of medically expected patients who were referred to acute hospital settings.

Relevance to practice: Utilization of advanced nurse practitioner triage in the ambulatory care setting is an effective method by which to streamline and improve the management of medically expected patients.

Keywords: advanced nurse practitioner, medically expected patients, triage,

Abbreviations: ACU, ambulatory care unit; ANP, advanced nurse practitioner; DOH, Department of Health; ED, emergency department; MAU, medical admissions unit; MEU, medically expected unit; NEWS 2, National early warning score; NHS, National Health Service; Revised Standards for Quality Improvement Reporting Excellence (SQUIRE2.0); SAMBA, Society for Medicine Benchmarking Audit; UWE, University of the West of England, Bristol.

1 INTRODUCTION

In spring 2017 the Department of Health (DOH) announced an allocation of £55.98 million to help ease winter pressures in emergency departments (EDs), (DOH, 2017). This funding aimed to enable National Health Service (NHS) hospitals to implement strategies to ensure that patients in the ED were managed in the most appropriate setting, and that 95% of these patients were either admitted, transferred or discharged within four hours.

However, these targets were not met. In England, attendances to EDs over the winter period of 2017/2018 rose by 1.6%, with 22.9% of patients waiting longer than four hours (from time of arrival to discharge or admission). This was a rise of 2.2% from the previous year, (Baker, 2018).

In England alone, on average 944 patients per day required emergency hospital admission. Simultaneously, the number of acute hospital beds in the country was reduced by 1,100. Coupled with an above average 95.2% bed occupancy in acute hospitals, NHS services were left struggling to meet demands for inpatient beds, (Baker, 2018).

As well as the above issues, NHS Improvement (2018) identified that poor patient flow was an additional operational factor which negatively impacted upon NHS hospitals' performance, and increased pressures on services in emergency care areas.

Streaming patients to the most appropriate setting for their condition has proven to reduce pressures on ED's, with 98.5% of hospitals now using some form of patient streaming in the ED to ensure better patient flow (NHS Improvement, 2018). Figures from winter 2017/2018 show considerable variation in patient streaming numbers between hospitals. However, 96% of patients who were streamed appropriately, were 'seen and admitted or discharged within 4 hours' (NHS Improvement, 2018).

It has been suggested that one way in which to stream patients to optimise throughput and care management in emergency care is to integrate ambulatory care units (ACUs) into emergency services (NHS Improvement, 2018). The aim of ambulatory emergency care in this context is to work alongside EDs to provide safe and appropriate same day urgent care, by facilitating early access to diagnostic services, timely senior decision making and rapid treatment. Consequently, ACU's, if used effectively, can help reduce rates of emergency admissions (Ambulatory Emergency Care Network 2018). However, although ambulatory emergency care is an NHS-recommended model of care delivery, implementation has been inconsistent across the country (NHS Improvements, 2018).

2 Background to the ANP triage initiative

Within our NHS hospital situated in the south west of England we have an ACU. Despite having such a resource, historically, the service was not being used as efficiently as it could have been, with many ED patients being transferred to the main medical admission unit (MAU) for care and treatment, rather than being streamed to the ACU. This was an inefficient use of services, as patients often had to wait for long periods to be assessed and managed by medical staff on the MAU, and frequently ended up being admitted, unnecessarily. Therefore, further initiatives needed to be considered in order to make the most efficient use of acute hospital services.

In an attempt to further rationalise services, an additional intervention in the form of a medically expected unit (MEU) was developed alongside the MAU on the third floor of the hospital. The term medically expected encompasses all medical conditions that are deemed to require immediate intervention for an acute deterioration in health but do not require emergency department attendance. The MEU was intended to be used as a dedicated assessment area for such patients. Patients were referred to the MEU from General Medical

Practitioners (GPs), and advanced nurse practitioners (ANPs) in primary care, paramedics and by clinicians in outpatient clinics within the hospital.

Initially this improved patient care and experience by streamlining patients to the most appropriate setting for their condition. However, a performance audit of the assessment of patients directly admitted to the MEU by the Society for Acute Medicine Benchmarking Audit (SAMBA), (2017) indicated our service was still performing below the national average, and not hitting required benchmarks for patient care. Consequently, strategies for service delivery to medically expected patients needed to be further reconsidered.

3 Trial of advanced nurse practitioner (ANP) triage

Due to the failure to meet assessment and care delivery targets that we experienced in the MEU, a new model of care delivery was proposed. This entailed employing ANPs to triage and manage the medically expected patients who arrived in the MEU.

3.1 Background to advanced nurse practitioners and service delivery

The shortage of medical staff in practice has been a longstanding problem in healthcare across the globe. In order to redress this shortfall, ANPs have increasingly been employed to take on a number of roles that would have traditionally been performed by doctors, including patient diagnosis, treatment and management (British Medical Association, 2018; Freund et al, 2015; Gardner, Hase, Gardner, & Carryer, 2006; Griffin & McDevitt, 2016; Jennings, Gardner, & O'Reilly, 2014; Mayer and Aiken, 2016; O'Connell & Gardner, 2012; Poghosyn, Liu and Norful, 2017).

There are a number of studies evaluating the impact of ANP practice in both primary and acute care settings. Most of the more recent studies relating to ANPs in acute care focus on critical and emergency care environments. Systematic reviews undertaken by Jennings, Clifford, Fox, O'Connell, and Gardner (2015a) and Woo, Lee, and Tam (2017) suggest that

the employment of ANPs in these areas results in improvements in patient length of stay, time to consultation and treatment, mortality rates, patient satisfaction and cost savings. Yet, there were concerns with generalisability of the studies used in the reviews, with many of them having small sample sizes, questionable and varied methodology, and inconclusive results (Jennings, Clifford, et al., 2015; Woo et al., 2017).

Additionally, many of the ANP studies that have been carried out in emergency care areas were not based in the United Kingdom and often focused on patients with minor injuries, rather than acute deteriorating medical conditions which may require urgent interventions. None of these studies evaluated the impact of ANP triage of medically expected patients.

3.2 Trial of ANP triage

An initial 1-week trial of ANP triage was introduced on MEU, using ANPs already employed in the ACU. A new ANP triage proforma was designed to supplement the medical clerking proforma. Patients arriving in the MEU were quickly seen by ANPs, who were then able to order investigations (such as CT scans and chest x-rays) and could initiate urgent treatments such as antibiotic therapy. A review of this trial indicated a reduction in the time patients were having to wait for a review by a competent clinical decision maker, which sped up the completion of appropriate investigations and treatment and led to more appropriate and timely streaming of patients between MEU and ACU.

Despite improvements during this trial period, it was apparent the environmental design and size of MEU was not conducive for effective ANP triage. With MEU alongside MAU on the third floor, the logistics of getting radiography investigations were complicated as all radiography equipment is housed on the ground floor of the hospital. Furthermore, the waiting area of MEU was not adequate for the large numbers of patients.

Therefore, with funding from the NHS Improvement, a new ANP triage area was built within ACU, next to the ED. Situating the new ANP triage area within ACU meant all ambulatory care and medically expected patients were directed to one area. This improved access for both patients and paramedic crews, and facilitated patient streaming between the ACU, MEU and (if required) the ED team. It also meant that patients were geographically closer to diagnostic facilities, such as the radiography department.

Once the triage area was constructed, the ANP triage service was implemented on a permanent basis. The triage area is divided into four bays, with access to the same waiting area and patient facilities as ACU. The ANP team operate between the hours of 09:00 – 22:00, Monday – Friday, excluding weekends and bank holidays. The area is staffed by one ANP, one staff nurse or sister and one associate practitioner in nursing. An additional two healthcare assistants are employed as the transfer team between the hours of 14:00 – 20:00, to reflect the period of highest demand on the service.

On arrival, each patient has their clinical observations completed using Nervecentre eObs. This mobile technology tool provides clinicians in acute settings with real-time information about the patient's condition. The NEWS2 score generated by eObs helps to ascertain the severity of patient's presenting condition. If patients are identified as having NEWS 2 score of 3 in a single element or an overall score above 5, an alert is raised and the person recording the eObs is asked to forward the alert to the triage ANP. This enables the ANP to prioritise their triage to patients identified as extremely unwell or at potential risk of deterioration. The ANPs utilise their clinical knowledge and skills to collect and organise appropriate investigations and treatments required for each individual patient's presenting condition (Box 1).

Patients deemed to be requiring hospital admission by the ANP are transferred from the ANP triage area in ACU to MEU (alongside MAU on the third floor) to await medical review. The ANPs can liaise with the on-call medical registrar if they require advice regarding a patient's condition, treatment options or to highlight if a patient would benefit from an urgent medical review once transferred to MEU.

4 Evaluation of the ANP triage intervention

This evaluation of the permanent ANP triage service aimed to determine whether the intervention impacted on waiting times and hospital admissions and whether it improved timings to essential treatments and investigations for medically expected patients referred to an acute NHS hospital.

4.1 Method and design

This study was a retrospective evaluation of the medical records of patients referred to an ANP triage unit. A pre and post intervention design was implemented, with data collected for 1week during the pre-implementation period in December 2018 and 1week in April 2019, after initiation of ANP triage. The post intervention data were collected 4-months into the intervention as this allowed the ANPs to become competent in triage and allow clinicians using the referral system to be aware of the new service.

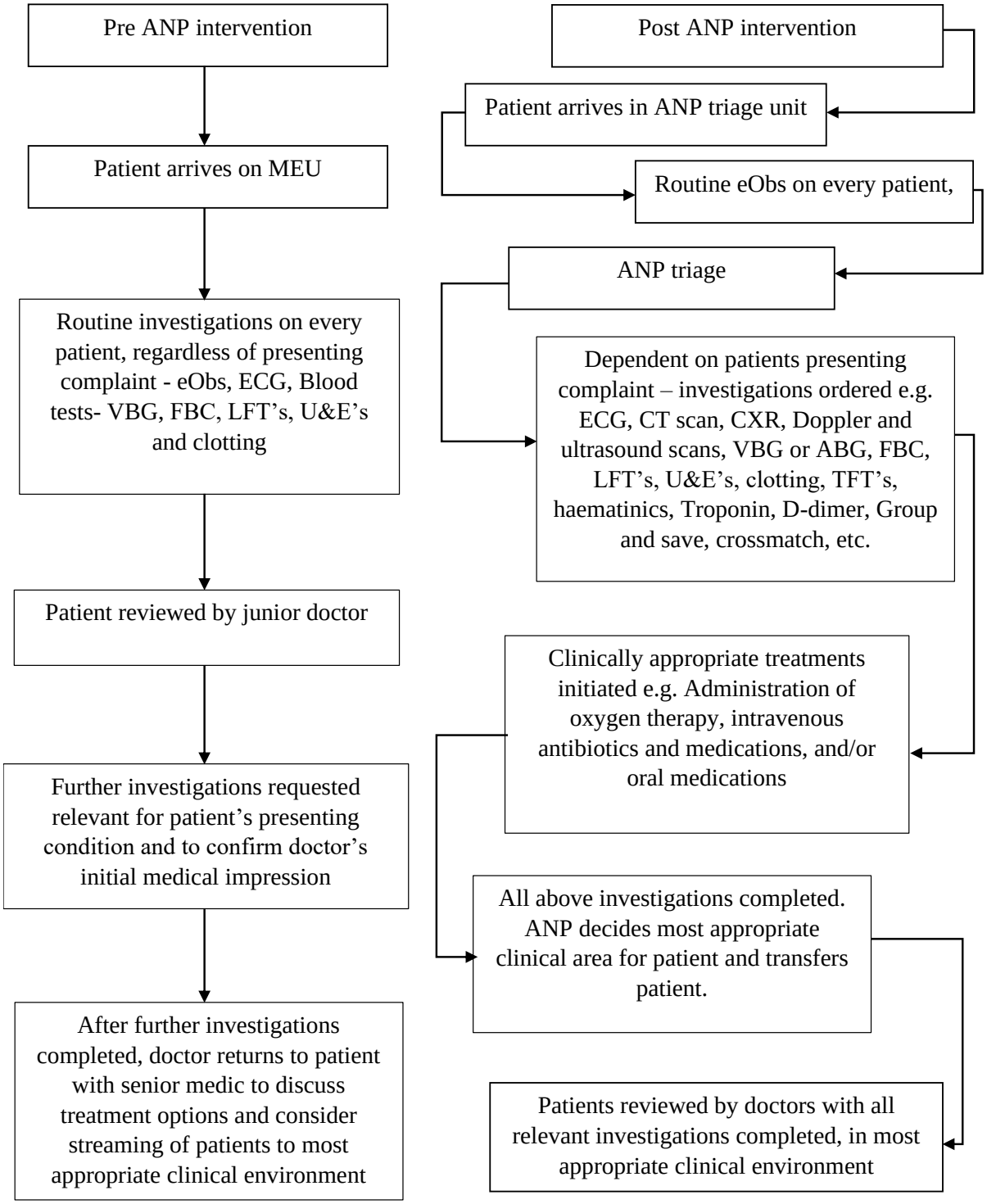
The Revised Standards for Quality Improvement Reporting Excellence (SQUIRE2.0) (2015) guidelines were used as a framework for this intervention (Supporting information).

4.2 Sample

Convenience sampling was used from the study population of medically expected patients over the age of 18 years, referred to the hospital between the hours of 09:00-22:00, Monday – Friday, by GPs, ANPs, paramedics and outpatient clinics.

In total, a sample size of 190 patients were including in this service evaluation, 84 patients in the pre-group and 106 in the post-group.

Box 1. Flowchart of pre and post ANP intervention process.



4.3 Data collection

Data were collected retrospectively from the hospital computer systems. Accessing existing data is a cost effective and less time-consuming alternative to collecting primary data, especially as the pre-existing data held will demonstrate trends over time, as the admission and clinical intervention times are recorded routinely on every patient admitted to the hospital.

Table 1 Patient Characteristics pre and post intervention

Pre-intervention			***Post-intervention***		
Patient age in years	***Number***	***(%)***	***Patient age in years***	***Number***	***(%)***
<=55	12	14	<=55	27	25
56-69	14	17	56-69	26	25
70-77	14	17	70-77	24	23
78-84	25	30	78-84	13	12
85+	19	22	85+	16	15
Total	84	100	**Total**	106	100
Clinical categories	***Number***	***(%)***	***Clinical categories***	***Number***	***(%)***
Cardiology	11	13	Cardiology	19	18
Respiratory	20	24	Respiratory	30	28
Gastroenterology	5	6	Gastroenterology	15	14
Neurology	5	6	Neurology	13	12
Oncology	9	10	Oncology	9	9
Urology	8	10	Urology	3	3
Other	26	31	Other	17	16
Total	84	100	**Total**	106	100

4.4 Data analysis

Data were collected and entered un-coded into an excel spreadsheet for analysis. Initially, descriptive analysis was completed to determine the frequency, central tendency and dispersion, to establish if there was a normal distribution. Categorical variables were coded and shown in frequency and percentages, whereas continuous variables were presented using mean and standard deviation to describe the key features of the data. As data were not normally distributed, non-parametric analysis using the Mann-Whitney U-test was

undertaken. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25 (IBM Corp).

4.5 Ethics

The hospital research and development department confirmed this was a service evaluation, and therefore, full NHS ethics committee approval was not required. The hospital's quality improvement team authorised access to medical data held in the hospital database. Further approval for the project was gained through research governance processes at the University of the West of England Bristol (UWE). All data were anonymised to ensure patient confidentiality, and following collection, it was stored on a password encrypted hospital database. (Data Protection Act, 2018).

5 Results

5.1 Sample Characteristics

In both groups there were slightly more females (pre-group 57.1%, post group 51.9%). The median age pre-group was 78.5 years (range 28-102) while the median age in the post-group was 69.5 years (range 21-95). A comparison of the clinical diagnostic categories of the conditions with which patients presented exhibited some differences as follows: Cardiology (13.1% vs 17.9%), respiratory (23.8% vs 28.3%), gastroenterology (6% vs 14.2%) and neurological (6% vs 12.3%) (Table 1).

5.2 Source of referral

Referrals were predominately from GPs in both groups (pre-group 71% vs post-group 73%). Since the intervention more referrals have been received from paramedics (pre-group 0% vs post-group 3%), ED and the urgent care centre (pre-group 0% vs post-group 12%), with a minimal reduction in outpatient clinic referrals (pre-group 7% vs post-group 6%).

5.3 Waiting times

Post intervention, time to first set of observations and NEWS 2 score actually increased slightly. However, this difference is not statistically significant. Once these observations were completed, the time taken to been seen by a competent clinical decision maker was statistically significant ($p = .002$).

5.4 Treatment/intervention times

In the pre-intervention group only 30% (n = 20) of patients displaying signs and symptoms of sepsis received treatment with intravenous antibiotics within 1hour (average time to first dose 4 hr and 57 min). Post-intervention, 87% (n = 15) patients with sepsis indicators received antibiotics within an hour (average time 32 min) - a statistically significant improvement ($p = .011$.)

The length of time patients with potential diagnosis of community acquired pneumonia had to wait for a chest x-ray was also compared. In the pre-group 33 % (n = 18) had a chest x-ray within 4 hr, with an average wait time of 8 hr and 5 min. Post-intervention, 84% (n = 19) were x-rayed within 4 hr, with an average wait of 3 hr and 4 min. Overall, a mean reduction of 301 min (5 hr and 1 min) was observed when comparing the pre and post group mean times, ($p = .029$) (Table 2).

5.5 Streaming of patients

Significantly more patients in the post-intervention group were assessed as being suitable for streaming to ACU for treatment, (1% (n = 1) in the pre-group and 18% (n= 16) in the post-group). These patients were therefore sent to ACU, treated and discharged from hospital the same day.

Table 2 Time in minutes pre and post intervention groups

	Pre-group (n = 84) ***Mean (SD)***	***Post-group (n = 106)*** ***Mean (SD)***	***Mann-Whitney U test*** ***Sig.***
Observations	24 (22)	26 (22)	p= 0.75
Dr clerking/ANP triage	109 (85)	68 (44)	p= 0.002
Sepsis treatment	297 (442)	32 (25)	p= 0.01
Chest x-ray completion	485 (432)	184 (305)	p= 0.03

Abbreviations: n, number; SD, standard deviation; Sig, statistical significance (p=<0.05 accepted as statistically significant)

5.6 Length of stay in hospital

For those patients that did require hospital admission, a statistical difference of p = .05 was observed for the number of patients who had a hospital stay under 48 hr, (pre-intervention 40%, (n = 26); post-intervention, 50%, (n = 53)). Additionally, 60% (n = 58) of patients in the pre-group and 50% (n = 53) of patients in the post-group had an inpatient stay longer than 48 hr.

6 Discussion

This service evaluation provides further evidence of the positive impact ANPs can have on quality of patient care, and patient waiting times in an acute medical setting.

Prior to this evaluation, there had already been vast improvements in patient waiting times (54% vs 92%) since the original SAMBA audit (2017). However, waiting times were further improved in the ANP triage group, with 100% of patients now being seen within 4 hr. The mean waiting time for ANP triage (1 hr 8 min) was significantly shorter than the mean doctor

clerking time (1 hr 49 min), a statistical difference of p = .002. These findings reflect previous studies results of the impact of ANPs in emergency settings, (Colligan et al., 2011; Jennings et al., 2008; Steiner et al., 2009). However, ANPs were assessing patients of low acuity in these studies, whereas this service evaluation involved patients with high acuity and multiple comorbidities.

There was a slight increase in the time taken to undertake initial observations and NEWS 2 scores post-intervention. This could have been due to factors such as random variations in timing of patient attendance and acuity, and staffing levels.

Despite this, there was a significant improvement in times to essential investigations and treatments, especially in relation to interventions for sepsis and community acquired pneumonia.

Guidance from NICE (2017) and The UK Sepsis Trust (2018) are clear it is imperative to administer intravenous antibiotics to patients meeting high risk criteria for potential sepsis within 1 hr. However, even though the numbers of patients receiving antibiotics within an hour increased from 30% to 87%, there is still improvement to be made in this area.

Previous studies in EDs evaluating the impact of ANPs on time to treatment have mainly reported times of first administration of analgesia (Jennings, Gardner, O'Reilly, & Mitra, 2015). With the exception of one study by Moran, Nakagawa, Asai and Koeing (2016) which demonstrated the positive impact, ANPs can make to patients presenting with acute stroke symptoms, with regards to improved treatment timings. No previous studies have monitored the effectiveness of ANPs assessment to treatment times for patients displaying signs and symptoms of sepsis.

Similarly, a significant reduction in the time patients with suspected community acquired pneumonia had to wait for a chest x-rays was seen in the data collected. Guidance from the

British Thoracic Society (2015) and NICE (2019) advise diagnostic investigations including chest x-rays should be completed within 4 hr of presentation. Pre-intervention only 33% of patients were having a chest x-ray compared to 84% post-intervention. From analysing the data, patients who did not receive their chest x-ray within 4 hr had had their chest x-rays requested by the ANP within 1 hr of triaging them. This implies that other factors are impacting on chest x-ray completion times. Occasionally patients who present to the ANP triage area encounter a delay in chest x-ray completion due to high demand in the radiography department. It is not unusual for the radiography department to ask for patients to be directed to MEU before chest x-ray completion. This could potentially impact on treatment delay and lengthen inpatient stay as not all investigations are completed prior to a senior clinician review.

Where patients required admission to a hospital bed, a significant difference was seen in the length of inpatient stay for patients post-intervention, with 50% of patients staying less than 48 hours, compared to 40 % pre-intervention. Whether this difference was the result of more timely treatment and appropriate investigations by the ANP team or an overall younger sample, with presumed less co-morbidities in the post-intervention group is unclear.

A further significant statistical difference ($p = .004$) was seen in the number of patients streamed to ambulatory care in the post-intervention group. 18% of patients referred as requiring acute hospital admission in the post-intervention group were managed in ACU, where they received follow up treatment and diagnostics, dependant on clinical need and senior clinical review, providing patient centred care in a less acute environment.

Even though cost savings were not an outcome directly measured within this service evaluation, cost effectiveness has a major influence on service planning and delivery (NICE, 2012). In this project, ANPs were redeployed from ACU, so no cost was incurred for new

staffing. Additionally, the indirect cost savings from reduced length of stay in the post ANP intervention group, coupled with the increased number of patients streamed to ACU (thereby avoiding hospital admission at all) and a reduction in unnecessary investigations would suggest this service has financial advantages. However, this is an aspect of the service that warrants further specific evaluation in the future.

7 Limitations

This study relied on a widely popular methodology in healthcare-based studies of retrospective data collection from a heterogenous convenience sample of patient medical records. Even though such a sampling technique can present limitations to the generalizability of the study results, it is an easy, cost effective and time saving approach to recruiting participants (Vassar and Holzmann, 2013), especially in small studies. However, this was an evaluation of a new intervention, it was not the intention to make findings of the study generalizable, therefore, convenience sampling was decided as the best option.

A further limitation to the generalizability of this study is the variability of the clinical knowledge and skills of the small ANP team participating in the study. It is hoped, in the near future, this will be less of a limitation with the development of competency frameworks to provide guidance and professional principles (Health Education England, 2019). This study lacked opinions of staff and patients, but this is an area that could be evaluated in future work to deliver a fully comprehensive evaluation of the effectiveness and quality of the new ANP triage intervention.

8 Conclusion

The implementation of ANP triage for medically expected patients has dramatically improved many aspects of patient service within the acute hospital setting. The results of this study have demonstrated patients now more consistently receive suitable, timely and efficient

treatment, with appropriate diagnostic investigations, which meet national targets. Having a highly competent clinical practitioner at the ‘front door’ facilitates smoother and safer transitions between clinical settings appropriate to each individual patient’s needs and requirements. The adaptability and flexibility of ANP’s mean they can provide a hybrid model of care incorporating nursing and medical tasks.

9 Relevance to practice

This small service evaluation suggests ANP triage can be implemented effectively in an acute medical setting, mirroring the success of ANPs in critical care and emergency department settings in previous studies across the world. Further evaluations of this intervention will aid in providing the much-needed statistical evidence to justify transferability of ANP triage to other acute care settings. Capitalising on the adaptability of ANPs, and effectively utilising their clinical knowledge and skills will better equip the healthcare service to meet the increasing rise in demand and improve patient outcomes in an efficient manner.

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SUPPORTING INFORMATION

Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0)

September 15, 2015

Text Section and Item Name	Section or Item Description	
Notes to authors	• The SQUIRE guidelines provide a framework for reporting new knowledge about how to improve healthcare • The SQUIRE guidelines are intended for reports that describe system level work to improve the quality, safety, and value of healthcare, and used methods to establish that observed outcomes were due to the intervention(s). • A range of approaches exists for improving healthcare. SQUIRE may be adapted for reporting any of these. • Authors should consider every SQUIRE item, but it may be inappropriate or unnecessary to include every SQUIRE element in a particular manuscript. • The SQUIRE Glossary contains definitions of many of the key words in SQUIRE. • The Explanation and Elaboration document provides specific examples of well-written SQUIRE items, and an in-depth explanation of each item. • Please cite SQUIRE when it is used to write a manuscript.	**As you review the manuscript, place a checkmark in this column for each SQUIRE item that is appropriately addressed in the manuscript. Remember that not every item is necessary in every manuscript.**
Title and Abstract		
1. Title	Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patient-centeredness, timeliness, cost, efficiency, and equity of healthcare)	Page 1
2. Abstract	a. Provide adequate information to aid in searching and indexing b. Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	Page 1

Introduction	*Why did you start?*	
3. Problem Description	Nature and significance of the local problem	Page 3
4. Available knowledge	Summary of what is currently known about the problem, including relevant previous studies	Page 4
5. Rationale	Informal or formal frameworks, models, concepts, and/or theories used to explain the problem, any reasons or assumptions that were used to develop the intervention(s), and reasons why the intervention(s) was expected to work	Page 6
6. Specific aims	Purpose of the project and of this report	Page 4
Methods	*What did you do?*	
7. Context	Contextual elements considered important at the outset of introducing the intervention(s)	Page 4
8. Intervention(s)	a. Description of the intervention(s) in sufficient detail that others could reproduce it b. Specifics of the team involved in the work	Page 6
9. Study of the Intervention(s)	a. Approach chosen for assessing the impact of the intervention(s) b. Approach used to establish whether the observed outcomes were due to the intervention(s)	Page 7
10. Measures	a. Measures chosen for studying processes and outcomes of the intervention(s), including rationale for choosing them, their operational definitions, and their validity and reliability b. Description of the approach to the ongoing assessment of contextual elements that contributed to the success, failure, efficiency, and cost c. Methods employed for assessing completeness and accuracy of data	Page 8
11. Analysis	a. Qualitative and quantitative methods used to draw inferences from the data b. Methods for understanding variation within the data, including the effects of time as a variable	Page 8
12. Ethical Considerations	Ethical aspects of implementing and studying the intervention(s) and how they were addressed, including, but not limited to, formal ethics review and potential conflict(s) of interest	Page 9

Results	*What did you find?*	
13. Results	a. Initial steps of the intervention(s) and their evolution over time (*e.g.*, time-line diagram, flow chart, or table), including modifications made to the intervention during the project b. Details of the process measures and outcome c. Contextual elements that interacted with the intervention(s) d. Observed associations between outcomes, interventions, and relevant contextual elements e. Unintended consequences such as unexpected benefits, problems, failures, or costs associated with the intervention(s). f. Details about missing data	Page 10
Discussion	*What does it mean?*	
14. Summary	a. Key findings, including relevance to the rationale and specific aims b. Particular strengths of the project	Page 11
15. Interpretation	a. Nature of the association between the intervention(s) and the outcomes b. Comparison of results with findings from other publications c. Impact of the project on people and systems d. Reasons for any differences between observed and anticipated outcomes, including the influence of context e. Costs and strategic trade-offs, including opportunity costs	Page 11
16. Limitations	a. Limits to the generalizability of the work b. Factors that might have limited internal validity such as confounding, bias, or imprecision in the design, methods, measurement, or analysis c. Efforts made to minimize and adjust for limitations	Page 14
17. Conclusions	a. Usefulness of the work b. Sustainability c. Potential for spread to other contexts d. Implications for practice and for further study in the field e. Suggested next steps	Page 15
Other information		
18. Funding	Sources of funding that supported this work. Role, if any, of the funding organization in the design, implementation, interpretation, and reporting	N/A