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Evaluation of nurse practitioners' extended scope of practice in a regional hospital emergency department in tropical Australia

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Abstract

Objectives: There is very little literature examining the workload and impact of nurse practitioners (NPs) working in emergency departments (ED) in regional and rural Australia. The aim of this paper was to review the ED NPs scope of practice in the ED discharge stream and patient outcomes at Cairns Hospital over a 7-month period.

Methods: This retrospective study examined the ED electronic medical record between 14 May 2019 and 31 December 2019. Cases managed by ED NPs, referrals, procedures performed, representations and disposition data were collected. Adverse events were sought from the Qld Health adverse events register (Riskman), the department complaints register and the ED M&M meeting minutes.

Results: A total of 1443 patients were treated by NPs, with ages ranging from 0 to 98 years (median 40 years). Australasian Triage Score (ATS) 3 cases made up 30% of the workload. Other than ATS 3 cases, time to being seen was better than the general department. There were very few unexpected representations, complaints or adverse events.

Conclusions: This study supports the view that NPs working in a regional emergency department can safely manage a variety of patients outside a fast-track model, with a wide age range and a variety of triage categories and diagnoses. We believe this has important implications for the provision of emergency care, especially in regional and rural Australia.

KEYWORDS

caseload, nurse practitioner, regional healthcare, scope of practice

1 BACKGROUND

According to the Nursing and Midwifery Board of Australia (NMBA), a 'nurse practitioner is an advanced practice nurse endorsed by the NMBA who has direct clinical contact and practises within their scope under the legislatively protected title 'nurse practitioner' under the National Law'.¹ Under section 95 of the Health Practitioner Regulation National Law, successful endorsement as a NP requires general registration as a registered nurse, successful completion of an approved program of study - typically master's level preparation, including leadership.¹

1.1

compared to the fast-track area.

Setting

healthcare services.

advanced pharmacology - and proof the applicant has worked the equivalent of 5000 h of advanced clinical practice within the previous 6 years that includes research and Australian studies examining the role and success of NPs working in an emergency department have come models of care. from capital city or outer metropolitan hospitals, with most NPs working in a fast-track model.²⁻⁵ In Cairns Hospital, a regional hospital, the ED NPs worked in the discharge stream of the ED, which has a broader case mix The aim of this paper was to review the scope of practice of ED NPs in Cairns Hospital over a 7-month period and review the patient outcomes of those treated by NPs. Cairns Hospital is a 634-bed regional hospital in Far North Queensland, 1800 km north of Brisbane, the state capital. Cairns Hospital is the primary referral hospital for Far North Queensland, with the geographical catch-

ment extending to Cape York, Torres Strait Islands and the international border with Papua New Guinea, west to Croydon and south to Tully and covers an area of 380 000 square kilometres⁶ serving approximately 285000 people. The Cairns and Hinterland Hospital and Health Service (CHHHS) has the largest absolute population of Torres Strait Islander and Aboriginal residents of any health service in Queensland, with 14% of people identifying as Indigenous compared to 4% for the rest of Queensland.⁶ Predictably, the large area and low population density result in a challenging environment for the delivery of

The Cairns Hospital ED had 74667 presentations in 2018-19, which was a 4% increase on the previous year and a 24% increase over the previous 5 years. Approximately 30% of ED patients are tourists or people who live outside Cairns, including Cape York and the Torres Strait.⁷ Including admissions to the ED short stay unit, the admission rate from ED is approximately 41.5%.

At the time of the study, Cairns Hospital triaged patients to either admission or discharge streams, with approximately 30% of all ED presentations triaged to the discharge stream. Discharge stream patients were often more complex than traditional fast-track patients. Patients that were treated in the discharge areas included all gynaecology and bleeding in early pregnancy, eye conditions, orthopaedic fractures and dislocations, medical conditions such as respiratory conditions (asthma & COPD), skin conditions, infections (such as skin, renal tract and

What is already known about this subject

Australian Nurse Practitioners have been safely integrated into major city emergency departments as independent practitioners, mainly in fast-track

There is high patients' satisfaction from those treated by Nurse Practitioners.

What this study adds

Australian Nurse Practitioners can provide safe care to emergency department patients outside a fast-track setting, and in regional health facilities.

chest) renal colic and mental health presentations. This stream has an admission rate of 10%.

1.2 | Role of the Cairns emergency department nurse practitioner

Emergency nurse practitioners were introduced in Cairns Hospital ED in 2007 as one strategy for managing increased service demand. Cairns Hospital ED has generally been supportive of the NP role, has mentored 3 candidates to successful endorsement and continues to support a varied scope of practice and role development.

Unlike other hospital ED NP services,²⁻⁵ the NPs in Cairns Hospital are not confined to seeing minor illnesses and injuries, as are seen in a fast-track setting, and work both collaboratively and independently. During this study period, NPs worked in the discharge stream location of the ED. Here they self-selected their patients as the primary provider.

Aside from direct autonomous patient care, the NPs are involved in indirect team care in instances such as the Severe Trauma and Resuscitation Team (STaR) (on average 4 StaR calls per day) and assisting with fracture and dislocated joint management, including reductions. The NPs frequently assist junior medical and nursing staff with wound advice and a variety of procedures. NPs are actively involved in department training and meetings.

1.3 **Ethics**

Ethics permission was sought from the CHHHS Ethics Committee and permission to publish was granted (HREC Ref 1431 AB).

1.4 | NPs at Cairns hospital ED

There are 5 NP's employed in the Cairns Hospital ED working 4.0 FTE. Where possible, the NP's cover 2 shifts per day, 7 days per week. There is no leave cover for NPs.

Each month the NPs formally report their caseloads, performance, any adverse events and non-clinical activities through the leadership of the ED. The NPs have an emergency physician mentor who meets regularly with them.

Over the study period, there was a significant reduction in NP cover due to sickness, secondment and annual leave. There was no NP leave cover. During this study period, there was a reduction in NP staff by 0.75 FTE in June, 0.6 FTE in August, 1.4 FTE in September, 0.6 FTE in October and 0.75 FTE in November and December.

2 | METHODS

This was a retrospective study of prospectively collected data of all the patients managed by the ED NPs from 14 May 2019 to 31 December 2019.

Cairns Hospital ED data are entered real time into Queensland Health's integrated electronic medical record (iEMR). The iEMR was searched for all patients for whom NPs had been identified as the primary treating clinician. Each case was reviewed, and data were collected on a preformatted data collection tool. This data included patient demographics, ATS category, time of arrival and time seen, end diagnosis, procedures performed, referrals and disposition. At the time of the study, the iEMR did not flag cases representing within 72 h, but the data analyst searched to see if there were cases seen by NPs that represented. To ascertain any adverse events for patients treated by NPs, Riskman (the Queensland Health's electronic adverse event register), the department complaints register and the monthly ED M&M meeting minutes were searched from May 2019 to April 2020. This was longer than the study period to capture any possible adverse events that were not reviewed during the study time. The NP examined their monthly reports to identify their casemix, waiting times and any adverse events or complaints. Cairns Hospital ED performance data was obtained from the CHHHS Analytical Intelligence (CHAI) data base. All radiology reports are reviewed by an emergency physician, and any missed fractures that require significant intervention are recorded in Riskman.

3 | RESULTS

A total of 1443 patients (~9.9% discharge stream presentations) were managed by the ED NPs during the study period. Age ranged from 0 to 98 years with a median of 40 years (IQR 27–55 years), with 42% being female. The ED NPs saw a wide range of patient presentations across all ATS categories, although the majority of patients fell within ATS categories 3, 4 and 5 (Table 1). Time to be seen, other than ATS 3 patients, was be the department average (Table 1). NPs managed a wide array of clinical cases (Table 2), ordered a range of investigations, performed a variety of procedures (Table 3) and made referrals to a number of specialties (Table 4).

3.1 | Representations

There were 82 representations to ED after an initial review by an NP. Of these presentations, 35 had a different diagnosis and/or greater than 72 h (some months) apart. Another 35 cases were part of routine follow-up. These included 16 eye review cases, 9 burns or dressing reviews, 7 mental health reviews and 3 homeless patients who were represented. The other 12 cases where representation was related to initial NP care are listed in Table 5.

3.2 | Riskman

There were no Riskman incidences that could be directly attributed to NP care, nor any Severity Assessment Code (SAC) 1 and 2 cases for 12 months from May 2019.

3.3 | Complaints

A homeless 45-year-old male complained he had not been treated appropriately. He presented with non-specific symptoms and, after review by the NP, was asked to leave due to significant verbal abuse the patient had given to the nurses and NP.

3.4 | M&M

There was one NP case reviewed in the ED M&M. A 58-year-old male alcoholic arrived by ambulance intoxicated, complaining of pain and swelling of his knee. He was admitted overnight to the ED short stay unit (EDSSU), and his poor gait was thought to be due to chronic alcohol abuse. He was reviewed by physiotherapy and discharged next morning. One day later, he presented with back pain and poor gait and was admitted medically. Complications of alcohol abuse were again thought to be the cause. Six days later, an MRI revealed significant TABLE 1 Breakdown of ATS categories and performance time of patients seen by NPs in Cairns Hospital ED.

Australasian triage score	Cases	Percentage of cases	Number of patients seen in time	NP performance 2019 (% age seen in time)	DEM performance 2019 (% age seen in time)
1	3	0.002	3	100%	100%
2	25	2	20	80%	78%
3	433	30	302	70%	76%
4	780	54	630	81%	79%
5	202	14	201	99%	96%

TABLE 2Range of cases managed byED NPs at Cairns Hospital.

Case	Numbers	Percentage of cases
Dermatological (Laceration/rashes/wounds/burns)	344	24
Muscular skeletal (Limb injury/joints)	330	23
Surgical specials Eye/ear/nose/throat	176	12
Mental health (including drug and alcohol)	118	8
Abdominal (Abdominal pain/gynaecology/GI symptoms)	114	8
Medical (Respiratory/low risk chest pain/allergy)	62	4
Administrative (Certificates/scripts/results)	53	4
Neurological (Headache/seizure)	33	2
Maxillary facial (including dental)	26	2
Back pain	26	2
Toxicology	10	1
Other	151	10

stenosis of C 4/5 and C 5/6 with cord compression, and he was transferred to a neurosurgical unit for decompression.

There were no deaths reported with NP cases.

4 | DISCUSSION

Our study suggests that NPs can safely work outside a fasttrack setting in a regional hospital. The NPs managed a variety of patient presentations, from a wide age range, across most triage categories and a broad casemix. There were very few unexpected representations, complaints or adverse events in patients treated by NPs. This result is consistent with a number of other NP studies^{2–5,8,9} that have demonstrated a wide array of clinical conditions treated safely and in a timely manner.

Most of the patients seen by NPs were seen quicker than the department's average (Table 1). While 54% of cases were ATS 4, 30% were ATS 3, showing NPs were managing a higher number of higher acuity patients. Other NP studies reported 16% ATS 3 patients being treated by NPs.^{4,8} Our data showed the range of investigations and procedures they performed (Table 3), as well as the range of patients that needed referral to other services in the hospital (Table 4), reflecting the acuity and workload of many of the patients NPs cared for. This diversity in casemix and workload is consistent with other NPs studies, both from an ED setting⁸ and non-ED settings.⁹ Our data support Lowe's NP research showing Victorian NPs managed a wide array of presenting problems or diagnoses, including burns, pneumonias, acute coronary syndromes, diabetic complications and pain-related issues.⁹ The NPs ordered a variety of investigations (blood, X-ray, CT scans and ultrasounds) and prescribed a range of medications, including analgesics through to antipsychotics and antihypertensives similar to this study.

During the study period, there were a number of patients managed by the NPs that were triaged to the discharge stream as they were thought not to be particularly sick. After an NP review, however, the severity of the patient's illness was recognised, resulting in them being moved to the resuscitation area and then admitted to wards, including the intensive care unit. These included diagnoses of airway-threatening Ludwig's angina, sepsis, exacerbation of chronic airways disease, non-STEMI and a new diagnosis of breast carcinoma.

Our ED NPs are senior nurses with an average of 20 years' ED experience, which is consistent with other literature.⁹ This experience enables the NPs to rapidly

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TABLE 3 Range of investigations and procedures performed by Cairns Hospital ED NPs.

Procedure	Number	Percentage
Radiology	417	29
Scripts	304	21
Analgesia (oral, IV, nitrous)	270	19
Wound repair	48	3
Slit lamp use	105	7
Plaster	73	5
LA blocks (digit, nerve, wrist, dental)	56	4
Further investigation (blood microbiology)	282	20
Reductions (Fracture or dislocation)	19	1.3

TABLE 4 Referrals made by ED NPs for cases managed by then at Cairns Hospital.

Guasialty	Cases	Comment
Specialty	Cases	Comment
Orthopaedics	145	38 to fracture clinic
Admission to ED short stay unit	31	
Hospital in the home	61	
Mental health	89	
General medicine and other specialties	35	Haematology 3, Cardiology 2, Gastroenterology 2, Dermatology 4
Ophthalmology	60	
ENT	21	
General surgery and other surgical specialties	61	Plastics 4, Maxillary facial 8, Urology 7, Vascular 5
Drug and alcohol	11	
Physiotherapy	48	
Dentist	6	
Obstetrics and gynaecology	4	
GP	49	
Intensive care	1	Ludwigs angina
Sexual health	4	
Qld police service	4	

identify an unwell patient, especially when the diagnosis was not initially clear, as well as being a highly skilled resource for the ED and nursing staff. In our department, this means supporting our resuscitation team (STaR team), procedures being performed and teaching and mentoring TABLE 5 Representation cases seen initially by ED NPs.

1. 36 years old, M, fell from mountain bike, 2 presentations in a week with ongoing shoulder pain and radiology did not reveal any missed fractures

2. 41 years old, F, diagnosed with sinusitis, represented with worsening symptoms. CT scan and referred to ENT clinic

3. 27 years old, F, presented with an axillary abscess, treated with oral AB, returned and admitted for surgical drainage

4. 31 years old, M, with a fractured fibula, who represented 3 days later requested medical certificate

5. 55 years old, M, homeless with multiple presentations usually within a few days of each other, often intoxicated

6. 47 years old, M, homeless with a fractured scaphoid, treated with a plaster, represented 2 weeks later as had pain and had failed to attend fracture clinic

7. 32 years old, M, with crush injury to fingertip. Wound cleaned and dressed, given AB. Presented with worsening pain 3 weeks later and had wound cleaned again and redressed

8. 54 years old, M, alcoholic and homeless. Fell and sustained likely fractured ribs. Represented 3 weeks later with ongoing pain. Further investigations showed Hb 83 g/L and admitted EDSSU, Fe infusion and GP referral

9. 33 years old, F, otitis externa seen three times with appropriate treatment and referred to ENT clinic as not improving. No change in treatment

10. 41 years old, F, diagnosed ACL tear represents in 6 days with increasing pain

11. 39 years old, M, homeless 8 presentations in time period with itchy rash, then did not wait, then diagnosed scabies and then abrasions needing dressing reviews

12. 21 years old, F, patient with toothache treated with oral antibiotics and referred to dentist. Had dental extraction but returned to ED 4/7 later with infected socket requiring further antibiotics and further dental review

junior medical and nursing staff. This 'invisible' NP workload was difficult to quantify in our study. Lutze and colleagues prospectively studied 12 emergency NPs working in Sydney EDs and found 25% of their consultations were done providing NP expertise to other ED clinicians across a broad spectrum of triage categories, clinical conditions and patient age ranges.⁸ This resulted in a lower rate of representation to ED in these patients.

Other Australian studies reporting the experience in successful introduction of NPs into an ED have been reported from capital city or outer metropolitan hospitals. Four studies show benefits of NPs working solely in ED fast-track areas.^{2–5} One study had NPs successfully treating 'see and treat' patients independently as well as 'fast track or collaborative' with a consultant or registrar overseeing their care.⁵ In most of these studies, the majority of patients NPs treated had diagnoses of wounds, soft tissue injuries and skin infections^{2,3,5} with one service

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limiting patient age range for cases that were suitable for NPs.² In our series wounds, soft tissue injuries and skin infections only counted for 47% of cases seen by NPs (Table 2), maybe reflecting a wider array of cases triaged to our discharge stream as opposed to a fast-track area. This is also supported by the wide array of referrals to a variety of health service services made by the NPs (Table 4).

Whilst the Australian literature around NPs working in EDs has been in the setting of a fast-track model, Lowe described how at the Alfred Hospital, NPs there are seeing patients outside their 'fast track-based' clinical practice guidelines as the role of NPs evolved and expanded.¹⁰ The observations of Lowe's study and others fit with our study showing that NPs can safely manage patients outside a fast-track model, and we feel our study is an important finding for the provision of health care in regional and rural Australia. There is a growing rural and remote population, and, at the same time, the traditional medicalled health care is struggling to attract and retain medical staff.¹¹ This is potentially worsening the health inequities between city and rural Australians. In rural Victoria, this workforce challenge has led to the successful introduction of NP-led Urgent Care Clinics (UCC) covering weekend service delivery (Friday evening to Monday morning).^{11,12} A qualitative study of stakeholders involved in the introduction of the NPs model of care in a rural UCC found the service was well received, helped improve health service sustainability and was more cost-effective (than the GP model) as the NPs provided a more holistic service.¹² With the ability to diagnose and treat a wide array of clinical conditions, as shown in this study¹² and others,^{2–5,8,9} as well as knowing their limitations and being very experienced nurses, NPs offer a skilled workforce opportunity to rural health services. Our study builds on other studies^{2–5,8–10,12} showing the potential for a wider role for emergency NPs, not just working in a fast-track region of any ED.

In a systematic review of the NP role in emergency departments, there were high levels of acceptance of NPs providing direct care by patients, with high levels of patient satisfaction.^{2,9,12,13} There is gaining acceptance of NPs roles by medical colleagues in both city^{2,13} and rural practice,¹² although some medical associations still express negative attitudes.¹⁴ One study found some resistance by senior nurses in positions of power towards NPs,¹⁵ while another study looking at the introduction of NPs into a rural UCC found tension between NPs and RNs, often around role delineation.¹² This highlights the importance of good communication and planning for the introduction of a NP service in rural and remote Australia to mitigate any risks.

5 | LIMITATIONS

It is likely this is an underestimate of the number of patients seen by NPs. With the ieMR data, the initial treating clinician (e.g., NP) is lost as the treating clinician where the patient care is handed over to another primary clinician, for example, at shift handover. An audit done in December 2019 showed the error rate to be as high as 23%. We currently do not document other episodes of care NPs provide to assist other clinicians in the ED (such as wound advice, application of plaster of paris, joint reduction and STaR team involvement). As the study is retrospective, the data obtained is only as good as what is captured during the episode of patient care.

There has not been any follow-up of patients postdischarge to confirm if the discharge diagnosis was correct.

Our Riskman system is such that staff names are deidentified unless the incident is of a nature to warrant a formal human resource review and performance management.

6 | CONCLUSION

This study supports the view that NPs working in a regional emergency department can safely manage patients outside a fast-track model. In this study, the NP patients had a wide age range and were from a variety of triage categories and diagnoses. We believe this has important implications for the provision of emergency care, especially in regional and rural Australia. Further prospective data collection needs to be performed to confirm our findings.

Since this study, the presentation rate for Cairns Hospital ED has increased, with 23084 ED presentations in the April–June 2023 quarter.¹⁶ As a result, and after this study was completed, ED introduced a new model of care, moving to team-based care. Patients presenting to the ED are allocated to one of four teams. The NPs have been incorporated into all teams and will manage patients throughout the ED, not just those likely to be discharged. It is likely their scope of practice will change and broaden because of this. It would be beneficial to follow up this study with another in the future to compare how or if the scope of practice changes with the introduction of the new model of care.

AUTHOR CONTRIBUTIONS

Angela Jackson: Conceptualization; investigation; writing – original draft; methodology; writing – review and editing; data curation; supervision; formal analysis. **Chris Hawkins:** Conceptualization; investigation;

writing – review and editing; methodology; data curation. **Theona Stone:** Conceptualization; investigation; data curation; writing – review and editing; methodology. **Petra Anderson:** Conceptualization; investigation; writing – review and editing; methodology; writing – original draft. **Frances Wilesmith:** Conceptualization; investigation; methodology; writing – review and editing. **Mark Little:** Conceptualization; investigation; writing – review and editing; formal analysis; supervision; data curation.

FUNDING INFORMATION

There is no funding.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICAL STATEMENT

This study was reviewed and approved by the Cairns and Hinterland Hospital and Health Service (CHHHS) ethics committee (HREC Ref 1431 AB) and have therefore been performed in accordance with the ethical standards laid down in an appropriate version of the Declaration of Helsinki. This approval was for the study and publication of the results.

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