

RESEARCH REPORTS

CHARACTERISTICS OF RESPONSES FROM AN AUSTRALIAN EMERGENCY MEDICAL SERVICE THAT RESULTED IN NON-CONVEYANCE: A RETROSPECTIVE CROSS-SECTIONAL STUDY

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ABSTRACT

Rates of non-conveyance (referred to as a patient refusal or non-transport in areas outside of Australia), defined as paramedic discharge of a patient in the community rather than transporting them to hospital, are increasing. These episodes of care require complex decision-making from paramedics to ensure patients' needs are appropriately addressed in a timely manner. Knowledge of non-conveyance case characteristics may be useful to direct the focus of research that aims to inform and design effective, patient-centric models of ambulance healthcare delivery.

A retrospective, observational cross-sectional study describing characteristics of non-conveyance cases occurring within an Australian ambulance service setting between 1 January 2019 and 31 December 2020.

Of 1,533,453 adults attended and assessed, $n=193,970$ (12.6%) were not conveyed to the hospital. Dispatch initially prioritized 43.7% of non-conveyed cases as requiring an emergency (lights and sirens) response. Older people, aged 65 years and above, accounted for 44% of all non-conveyed patients. Pain was the most frequently recorded diagnosis, and less than 1% of all patients not conveyed were recorded as being referred to an alternative form of healthcare service.

This study provides insight into characteristics of ambulance cases in an Australian jurisdictional ambulance service setting which resulted in non-conveyance during the impacts of the COVID-19 epidemic. These findings can be used to focus future investigations that aim to understand how evolving models of ambulance healthcare delivery can safely meet the needs of patients requesting ambulance services and enhance operational efficiency.

INTRODUCTION

Individuals assessed by paramedics after requesting ambulance attendance are typically transferred to an Emergency Department (ED). However, rates of non-conveyance, the discharge of a patient in to the community following paramedic assessment rather than transporting them to hospital, are increasing (Australian Institute of Health and Welfare [AIHW], 2025; King, 2024).

Disposition options for non-conveyed patients include on-site paramedic care, self-care advice, and/or referral to community-based healthcare services or social supports (Blodgett et al., 2021; Delardes et al., 2025; Lunn, et al., 2024). By facilitating non-conveyance decisions, paramedics are able redirect patients to services more tailored to patients' needs and preferences, simultaneously enhancing person-centered care and alleviating emergency health service pressures (King et al., 2023; Jani et al., 2021). However, inappropriate decisions or misdiagnosis that result in delays to patients receiving necessary investigations and care increase risk of patient mortality and morbidity (Yeung et al., 2019; Ebben et al., 2017; Höglund et al., 2022).

Differentiating which patients may benefit the most, and who are at greatest risk, from non-conveyance is complex and multifactorial (Delardes et al., 2024; Morrison et al., 2025; Höglund et al., 2019). Rising demand for ambulance services has been attributed to the growing burden of mental illness, an ageing population, people suffering chronic health issues, and barriers to accessing community-based primary and urgent healthcare services (Andrew et al., 2019; Leyenaar et al., 2021; O'Cathain et al., 2019; Long et al., 2021; McManamny et al., 2022; Booker et al., 2017). However, paramedic education remains focused on time-critical emergency presentations; a clear need has been identified for extended education and training in lower acuity conditions and non-conveyance decisions (Carnicelli et al., 2024). Furthermore, ambulance dispatch systems are designed to enable rapid decisions regarding the urgency of response and level of clinical skill required, they are not designed to differentiate complex clinical or psychosocial presentations (Andrew et al., 2019). This may result in unnecessary ambulance dispatch and conveyance of patients whose needs may be better served in the community or out-patient settings (Delardes et al., 2024).

Health services are working on strategies to reduce preventable hospital admissions. Ambulance services are adopting secondary triage systems, virtual clinical care, alternative response units of healthcare delivery, and increasing access to community referral pathways for paramedics (Eastwood et al., 2016; Shannon et al., 2022; Nehme et al., 2024). Many of these approaches are an outcome of innovations required to maintain the delivery of healthcare services during the COVID-19 pandemic.

However, despite the increasing frequency of non-conveyance, there remains few openly-available empirical descriptions of the characteristics of such cases in Australian ambulance health service settings. Addressing this knowledge gap is a necessary step to guide further exploratory research identified as a priority for Australian and New Zealand paramedicine (Pap et al., 2024; Andrew et al., 2019; Oosterworld et al., 2018; Ball et al., 2016). Descriptions of how the cases are prioritized by dispatch systems, the epidemiological and clinical attributes of those not conveyed, and what interventions and referral decisions are made by the attending paramedics. This would be useful to inform and focus the design of evolving models of care and the educational needs of expanded paramedic roles to make safe, quality decisions aligning with person-centered care (Pap et al., 2024).

AIMS

The primary aim of this study was to systematically describe the operational, demographic, and clinical characteristics of an Australian ambulance service's attendances

to adults that resulted in non-conveyance. By characterizing the frequency, dispatch prioritization and clinical profile of non-conveyed cases, the study seeks to inform the development of safe, person-centered and operationally efficient models of ambulance healthcare delivery.

OBJECTIVES

Previous research has indicated wide variation in non-conveyance rates across international settings, dispatch priority systems over-triage lower acuity cases, paramedics require additional, focused, education on lower-acuity presentations, and despite increasing availability, referral pathways are infrequently accessed (Ebben et al., 2017; Ball et al., 2026; Carnicelli et al., 2024; Delardes et al., 2024). To better understand these concerns in an Australian AHS setting, this descriptive study has three main objectives:

1. To quantify the frequency of adult non-conveyance within the ambulance service over the study period.
2. To describe the initial dispatch priority assigned to cases that ultimately resulted in non-conveyance.
3. To profile the epidemiological and clinical characteristics of adult non-conveyed patients (age and gender, pre-existing conditions, working diagnosis, paramedic-initiated interventions, and referral decisions).

METHODS

DESIGN

A retrospective, observational cross-sectional approach was used to explore characteristics of non-conveyance cases occurring within a single Australian AHS setting over a 2-year period.

RESEARCH SETTING

This study is based on the New South Wales (NSW) Ambulance service response to requests for ambulance attendance via the national emergency number (000). NSW Ambulance is one of the largest Australian AHS that provides emergency response, rescue and retrieval services to those people of NSW with emergency and medical health needs (New South Wales Ambulance, 2025). The service is the sole provider of emergency ambulance response in the state, serving a population of over eight million residents across an area of 801,600 km that includes metropolitan, regional, and sparsely populated rural regions (New South Wales Clinical Systems, 2026).

At the time of this study, 000 calls to ambulance undergo a medical priority dispatch system that determines case urgency and the nature of the responding unit(s). A standard response unit is an ambulance crewed by two registered paramedics who make clinical decisions semi-autonomously under guidance from pre-determined practice guidelines. This includes a level of autonomy, under certain conditions, to recommend the best disposition for a patient, including non-transport to the ED.

DATA COLLECTION

De-identified, aggregated data were collected from electronic databases, Computer Aided Dispatch (CAD), and electronic Medical Records (eMR) of ambulance responses

to adults (aged 18 years) that resulted in non-conveyance between 1 January 2019 to 31 December 2020. To describe case characteristics, variables included: count of patients attended, and patients not conveyed; priority dispatch designation; gender; age; pre-existing medical conditions; final clinical assessment, clinical interventions provided; and referral decision. This selection of variables was chosen to describe characteristics that enable the research aims and is guided by previous research into non-conveyed populations (Ebben et al., 2019; Vloet et al., 2018; Dinh et al., 2016).

STUDY POPULATION

Records of surviving adult patients attended, assessed, and not conveyed to an ED by the attending ambulance clinician within NSW. Exclusion and inclusion criteria are listed in Table 1.

Inclusion	Exclusion
- Records of persons aged 18 years or above who received a response from NSW emergency ambulance; and - Attended by a paramedic of any clinical level; and - Not transported via ambulance to a hospital ED on that occasion.	- Persons who refused to be assessed by paramedics or who were unable to be located; or - Deceased persons at the time of paramedic assessment, or those in cardiac arrest who were not transported; or - Secondary transfers or routine (non-emergency) cases e.g., inter-hospital transfers.
(Persons may have been transported to alternative destinations such as GP, health clinic, or were transported on a separate response occasion to an ED by ambulance or private means).	

Table 1. Data inclusion/exclusion criteria.

DATA ANALYSIS

Analyses were structured to meet the intended objectives; the frequency of non-conveyance, dispatch prioritization, epidemiologic and clinical characteristics of the study population, paramedic interventions count, and referral decisions count. No unique identifier was provided for each set of data therefore additional statistical analysis was not performed. Findings are reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

ETHICS

Approval to release this data was provided by the Executive Director, Epidemiology and Evidence of the NSW Ministry of Health, under clause 16(2) of the Health Administration Regulation 2020. Ethics approval was provided by the South-Eastern Sydney Local Health District Human Research Ethics Committee - 2019/ETH00116.

RESULTS

FREQUENCY OF NON-CONVEYANCE

Between 1 January 2019 and 31 December 2020, NSW Ambulance responded to $n=1,533,453$ patients aged 18 years and above. Of these patients attended, and where eMRs were generated by paramedics, $n=193,970$ (12.6%) were not conveyed to an ED.

DISPATCH PRIORITY CODE

A dispatch priority code 1 (lights and sirens) response was designated to $n=84,757$ (43.7%) of all non-conveyed cases. Table 2 provides the dispatch priority codes allocated

to cases resulting in non-conveyance and includes their corresponding response time targets.

NON-CONVEYED PATIENT EPIDEMIOLOGICAL AND CLINICAL CHARACTERISTICS

Count and percentage for patient associated characteristics are summarized in Table 3.

AGE

Older people, those aged 65 years and over, accounted for 44% of all non-conveyed patients.

FINAL ASSESSMENT

The combination of recorded responses under the options of 'No problem identified', 'Other', 'no assessment' and 'Unknown problem' accounted for 33.8% of all final assessments. Pain was the most frequently recorded specific diagnosis (13%).

PARAMEDIC INITIATED INTERVENTION

Reassurance was the most frequently recorded intervention, followed by advice, assistance, and then analgesia (Table 3). Patients may receive a combination of interventions from paramedics.

REFERRAL DISPOSITION

In $n=192,008$ (99%) of occasions paramedics documented that the patient was not referred to any other agency. Where a referral was made, this was most frequently to a General Practitioner (GP) as reported for $n=1,428$ (0.7%) of all cases. Patients who declined transport against advice, a NSW designated "P2" protocol, accounted for $n=53,963$ (27.8%) of cases, whereas it was the paramedic's recommendation that $n=16,963$ (8.6%) of the patients did not require transport.

DISCUSSION

Discharge of patients into the community is becoming an increasingly frequent outcome following ambulance attendance (Ebben et al., 2017). Ambulance service responses that result in non-conveyance to a hospital have significance in terms of patient safety, operational efficiency, design of ambulance health

Dispatch Priority Code	Count <i>n</i> (%)
1 - Immediate dispatch - Emergency lights and sirens (L&S)	84,757 (43.7)
2 - Immediate dispatch, no L&S	78,619 (40.5)
2A - Arrival within 30 minutes	17,940 (9.2)
2B - Arrival within 60 minutes	12,647 (6.5)
2C - Arrival within 90 minutes	7 (0.0)
Total:	193,970 (100)

Table 2. Non-conveyance by MPDS dispatch code priority designation.

	Count	Percentage of Non-Conveyed Cases
Gender		
Male	105,396	54.3%
Female	88,471	45.6%
Indeterminate	104	0.1%
Age (Years)		
18-25	19,554	10.1%
26-35	23,532	12.1%
36-45	21,267	11.0%
46-55	22,010	11.3%
56-65	22,285	11.5%
66-75	26,628	13.7%
76+	58,965	30.4%
Pre-existing medical conditions (Top 10, there may be multiple per patient)		
Hypertension	44,985	23.2%
No pre-existing condition recorded	36,233	18.7%
Diabetes (not specified)	25,967	13.4%
Hypercholesterolemia	21,876	11.3%
'Other' (not specified)	18,810	9.7%
Depression	17,322	8.9%
Anxiety	16,574	8.5%
Gastric Reflux	13,493	7%
Asthma	12,549	6.5%
Atrial fibrillation	11,056	5.7%

Table 3. Patient characteristics (Epidemiological, clinical, intervention and referral disposition).

service delivery models, and the educational needs of paramedics. Yet there remains little published literature describing the operational, demographic, and clinical characteristics of these cases. To add knowledge to this topic, this study describes the dispatch prioritization, epidemiological and clinical patient characteristics, paramedic-initiated interventions, and referral decisions for non-conveyed ambulance responses in an Australian service setting.

During the two-year study period NSW Ambulance responded to over 1.5 million individual patients aged 18 years and older, of which 12.6% were not conveyed to an ED. It is important to highlight that less than 1% of these non-conveyed patients were recorded as being referred to any alternative health-care service. Older people, those aged 65 years and older, accounted for the greatest proportion (44%) of all non-conveyed patients; more than a third of the responses (33.8%) were not allocated any specific diagnosis by paramedics; and almost half (43.7%) of patients that were not conveyed to a hospital were initially prioritized as requiring an emergency lights and sirens response.

FREQUENCY

The proportion of responses resulting in non-conveyance in NSW was slightly higher than the mean average of other Australian jurisdictional services (11%) (AIHW, 2025). However, during a similar period in areas outside of Australian jurisdiction, rates of non-conveyance, were 13.8% in Stockholm, Sweden (Lederman et al., 2020), 40% to 68% in England (O’Cathain et al., 2018), and 26% in Aotearoa/New Zealand (Swain et al., 2012). Several factors may account for this variation, warranting further investigation as to why these Australian rates appear lower and should include whether patient safety and quality of care outcomes differ.

	Count	Percentage of Non-Conveyed Cases
Final Assessment (<i>Working diagnosis</i>)		
No problem identified	34,190	17.6%
Pain	25,200	13.0%
Other	12,188	6.3%
No Assessment	10,125	5.2%
Unknown problem	9,144	4.7%
Anxiety	9,143	4.7%
Laceration	6,769	3.5%
Abrasion/Graze	6,154	3.2%
Alcohol Intoxication	4,559	2.4%
Short of Breath	3,701	1.9%
Hypoglycemia	3,644	1.9%
Faint	3,458	1.8%
Bruising/Hematoma	3,037	1.6%
Mobility Problem	3,018	1.6%
Combination of other named conditions	134,330	30.7%
Interventions (<i>Top 10, there may be multiple interventions per patient</i>)		
Reassurance provided	145,229	74.9%
Advice to patient/carer: specify	22,625	11.7%
Assistance only	12,790	6.6%
Paracetamol	12,616	6.5%
(No management)	11,320	5.8%
Dressing - wound/burns cover	11,061	5.7%
PPE worn	7,692	4.0%
Ibuprofen	7,633	3.9%
Ondansetron	6,123	3.2%
Mental Health Procedure	5,412	2.8%
Referral decision		
No referral	192,008	99.0%
Doctor	1,428	0.7%
Other: specify	396	0.2%
Alternate pathways	100	0.0%
Other health professional	96	0.0%
Mental health	33	0.0%
Family	15	0.0%
Specialized medical service	2	0.0%
Other team	1	0.0%
Children services	1	0.0%
Assessment Team	1	0.0%

Table 3 (continued). Patient characteristics (Epidemiological, clinical, intervention and referral disposition).

DISPATCH PRIORITY

The high percentage of non-conveyed cases determined to require 'lights and sirens', and immediate response indicates that the triage system is over-prioritizing less urgent cases. Wider research also suggests that ambulance prioritization systems often do not match the acuity of the actual incident with wide inaccuracies (Andrew et al., 2019; Ebben et al., 2019; Ball et al., 2018; Bohm & Kurland., 2018). This highlights the difficulty of predicting the urgency or suitability of health resources until the individual has been assessed by a health professional. As ambulance services are adopting alternative care models, further investigation is required to ensure the appropriate response unit and clinical capability of clinician is made available to the right patients (Cormack, 2024, p. 97) Consideration should also be given to the adverse impacts from unnecessary over-reliance on transporting to ED such as: hospital acquired infections, and ambulance offload-delays impacting both ramped patients and service response to the community (Yardley & Donaldson., 2025; Cook et al., 2024; Li et al., 2019).

EPIDEMIOLOGICAL AND CLINICAL CHARACTERISTICS

AGE

Older people accounted for the largest proportion of patients not conveyed (44%). This finding mirrors those from similar research conducted in Sweden (48%) and Finland (59.8%) (Lederman et al., 2021; Paulin et al., 2021). Studies investigating patient outcomes indicate that older people are at the highest risk for deterioration and re-presentation following non-conveyance (Höglund et al., 2022; Speijers et al., 2025; Møller et al., 2025).

During the period of this study, older people made up 16% of the Australian population and this is predicted to rise to 18.1% over the next decade (AIHW., 2024). Therefore, to risk stratify paramedic clinical decision-making for people suffering complexities of ageing and frailty, entry-to-practice curriculum and in-service education may need to be reviewed for content (Krohn & Singler., 2025; Corman et al., 2025). Although often viewed as a 'safe' option to transport patients to ED, knowledge may also need to be reinforced regarding the potential adverse implications of unnecessary ED attendance for this population, such as hospital acquired infections and increased risk of delirium (Krohn & Singler., 2025; Fogg et al., 2025).

FINAL ASSESSMENT

'Pain' was the most common symptom, though its nature (chronic vs acute) or etiology was unclear. Further research is necessary to understand the specific types of pain AHS paramedics are being requested for. Previous research has indicated that people suffering chronic pain are dissatisfied and feel underserved by paramedics (Peacock et al., 2024). Paramedic-focused curriculum may require review to understand whether content sufficiently covers the multidimensional experience of patients physiological, emotional, and cognitive response to reduce perceived stigma and skepticism towards people suffering chronic pain including pelvic pain (Peacock et al., 2024; Dalhoud et al., 2024).

Over a third of final assessments lacked a specific diagnosis. Without further exploration, this may be the result of record keeping systems forcing responses, or as accurate

as paramedics could identify without the benefit of diagnostic tests or access to medical history.

REFERRAL DECISION

Less than 1% of non-conveyed patients were recorded as being referred to any alternative care pathway. This is much lower than reported across international settings. A study in Sweden reports 30% of non-conveyed patients were referred to primary care (Höglund et al., 2022), and in the Netherlands Ebben et al, report 46.7% of non-conveyed patients were referred to another service. However, differences in systems of care limit further comparisons for the scope of this study.

Australian paramedics are registered health professionals required to support patient autonomy through shared decision making, support referral to other service providers, and formulate appropriate patient care and treatment activities (Cormack., 2024; Paramedic Board of Australia [PBA]., 2021). Referral of a patient to another health service demonstrates person-centered care, understanding of clinical risk, and may assist patients in navigating the health system appropriately. The lack of referrals is concerning as this may reflect a limited understanding of paramedic obligations to make appropriate referrals to other service providers or simply highlights the lack of referral options particularly when care is unscheduled and outside normal operating hours (Delardes et al., 2024; Bloomer et al., 2024; Granlund et al., 2024). Of greater concern is that this may also reflect inaccurate or incomplete documentation. Studies reporting on barriers to referral also include concerns for misdiagnosis (Blodgett et al., 2021; Bloomer et al., 2024), and fear of litigation or sanctions by the employer (Vella et al., 2024). The low referral rate therefore seems counterintuitive, as discharging a patient to another service may mitigate risk and demonstrate a form of safeguarding (Oosterwold et al., 2018; O'Hara et al., 2015).

This finding highlights the value of this research to direct future investigation. This variation requires closer investigation as to factors that may be limiting referral, including the accuracy of paramedic documentation, and whether these factors have changed as the range of referral options have expanded since data were collected.

LIMITATIONS

Several limitations must be noted. This research reports on a single setting in Australia, which due to significant heterogeneity of ambulance systems and their local environment may lack generalizability for other settings. Data was collected during impacts of the COVID-19 pandemic; factors such as limited access to community healthcare, increased levels of anxiety, and reluctance to visit the ED may have influenced the nature of requests for an ambulance and non-conveyance decisions. Furthermore, since the data was collected, enhancements have been made to improve efficiency of ambulance healthcare delivery which includes Virtual Care services and increased availability of referral pathway options to paramedics.

Importantly, this paper provides data that may be used as a baseline to measure the impacts of these changes in the future. Patient specific data was collected from eMR records; this data was manually entered by paramedics and subject to variation, omissions, and errors, therefore reliability could not be assessed. No comparisons were made with

characteristics of patients conveyed to the ED, so it remains unknown if there are differences between these cohorts.

RECOMMENDATIONS

This study contributes to paramedicine research by identifying key characteristics of non-conveyed cases that warrant further exploration. Given variation in rates of non-conveyance within international settings, Australian paramedics may be insufficiently prepared to identify and safely manage presentations that would benefit from non-conveyance (Jani et al., 2021; Yeung et al., 2019; O'Hara et al., 2015). It is also necessary to understand how more recent innovations in dispatch processes and alternative response units, such as extended care paramedics and co-responder units, have influenced non-conveyance rates and patient orientated outcomes.

A deeper dive into the epidemiological characteristics of lower acuity presentations that result in non-conveyance will be useful to inform the development of professional capabilities for registered paramedics and capabilities for endorsement of advanced practice (PBA., 2021). Given the aging population and the proportion of older people not conveyed, particular focus may be required into how well paramedics understand the complexities of older patients and the risk-benefits of transfer to the hospital or other services.

Entry-to-practice curriculum may need to include more emphasis on complex chronic medical conditions that reflect the needs of the majority of presentations, while not limiting performance during high-acuity-low-occurrence presentations (Weber et al., 2025; McAnn et al., 2018). Future research will be also valuable to explore whether entry-to practice curriculum and associated accreditation standards support non-conveyance decision making, or whether this is an advanced skill.

CONCLUSION

This study provides valuable insights into characteristics of ambulance cases in NSW which resulted in non-conveyance during impacts of the COVID-19 pandemic. A significant proportion of cases that ambulance services attend are not conveyed to hospital. Almost half of these cases were responded to using emergency lights and sirens, older people represent the highest cohort of non-conveyed patients, pain was the most frequent complaint, and over 99% of patients were documented as being discharged from paramedic's care without ongoing referral. These findings can be used to focus future investigations that aim to understand how evolving models of ambulance healthcare delivery can safely meet the needs of patients requesting ambulance services and enhance operational efficiency.

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