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# Time to Analgesia in the Emergency Department: A Retrospective Audit of Pain Assessment and Management Practices at a Sydney Metropolitan Hospital Emergency Department

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## Abstract

**Background:** Pain is one of the most common presenting complaints in Australian emergency departments (EDs). National guidelines recommend that patients with pain should receive analgesia within 30 minutes of presentation. However, inconsistent pain score documentation and underutilisation of nurse-initiated analgesia (NIA) protocols remain barriers to timely pain management. **Aims:** This audit aimed to assess the time taken for analgesia (TTA) to be initiated in patients presenting with pain to this hospital's ED. Secondary aims included assessing pain score documentation, evaluating NIA use and identifying factors associated with delays in analgesia. **Methods:** A retrospective clinical audit was conducted over a consecutive 7-day period in April 2025. Data from 280 eligible patients were extracted from electronic medical records. Variables included demographics, presenting complaint, triage category, documented pain score, TTA, prescriber of first analgesia and analgesia type. Descriptive, comparative and subgroup analyses were performed. **Results:** Of 280 patients, 146 (52%) received analgesia, with a median TTA of 61.5 minutes. Only 24% (n = 67) of patients had a documented pain score. Patients with a documented pain score had a shorter median TTA (49 minutes) compared to those without (70 minutes). NIA was utilised in 31.5% of patients who received analgesia and was associated with a shorter median TTA (40 minutes) compared to doctor-prescribed analgesia (83.5 minutes). **Conclusion:** This audit highlights significant variability in pain assessment

and management at this ED. Pain score documentation and NIA use were associated with reduced TTA. Future quality improvement initiatives should include staff education, mandatory pain scoring, NIA implementation and optimising analgesia regimens.

**Keywords**

Analgesia, Emergency, Nurse-Initiated Analgesia, Pain Management, Triage

## 1. Introduction

Pain is one of the most common reasons for emergency department (ED) visits in Australia. A recent report from the Australian Institute of Health and Welfare found that pain-related conditions were among the most common diagnoses in the ED [1]. Effective and timely pain management is a fundamental aspect of emergency care, with national and international guidelines emphasising the importance of early analgesia. In a national pain management study by Doherty *et al.* [2], the authors recommended that pain should be assessed and documented at triage, and patients with pain should receive analgesia within 30 minutes of presentation.

Studies suggest that mandated pain score documentation at triage is associated with increased rates of analgesia administration and reduced time to analgesia (TTA) [3]. However, pain score documentation is not routinely completed at triage at this hospital's ED. Additionally, many patients at this ED do not receive analgesia before being seen by a doctor, leading to delays in achieving adequate pain relief. Quality improvement initiatives such as nurse-initiated analgesia (NIA) have been shown to improve TTA in other hospitals [4]. At this ED, this is facilitated through Emergency Care Assessment and Treatment (ECAT) protocols—evidence-based, standardised guidelines that enable nurses to initiate analgesia when a doctor is not immediately available [5] [6].

There is limited recent literature on TTA in paediatric ED presentations within Australia, as most studies focus on adult populations. Lee *et al.* examined paediatric pain management but focused solely on undifferentiated abdominal pain, limiting the generalisability of their findings [7]. Similarly, Arendts and Fry [8] included paediatric patients in their study but focused specifically on parenteral opioid administration, leaving gaps in the understanding of broader analgesic use.

Furthermore, most Australian studies on TTA in the ED have been conducted in tertiary metropolitan hospitals, likely due to higher patient volumes and fewer funding constraints, which facilitate finding statistically significant results [2]. Doherty *et al.*'s [2] national project on pain management included 55 Australian hospitals (39 metropolitan and 16 regional). However, the results were aggregated across all sites, preventing direct comparison of pain score documentation, TTA or NIA utilisation between metropolitan and regional hospitals. Given this hospi-

tal's ED's status as a non-tertiary metropolitan hospital with significant resource constraints, research from this site may provide broader insights into systemic barriers to timely analgesia administration across different hospital settings. Therefore, there exists an opportunity to holistically characterise pain score documentation, TTA and NIA utilisation across all analgesics and patient age groups in the Australian ED setting.

This study aimed to evaluate the current practice of pain assessment and management at this ED by examining:

1) The frequency of pain score documentation at triage.
2) The TTA for patients presenting with pain-related conditions.
3) The utilisation of NIA.

## 2. Aims

The primary aim of this audit was to evaluate the median TTA for patients presenting with pain-related conditions to this ED. Secondary aims included:

- Assessing the frequency of documented pain scores at triage.
- Determining the proportion of patients receiving analgesia within 30 minutes of arrival.
- Comparing TTA between patients with and without documented pain scores
- Evaluating the utilisation and impact of NIA.
- Exploring demographic and clinical factors associated with variations in TTA.

Finally, we aim to improve pain score documentation at triage and optimise NIA protocols through a subsequent QI phase.

## 3. Methods

### 3.1. Study Design

This was a retrospective clinical audit conducted at this hospital's ED. Data were extracted from electronic medical records (eMR) over a consecutive 1-week period in April. Documented information was collected and recorded on a password-protected networked drive. Ethical review was not deemed required by the local ethics committee, in accordance with guidelines for QI activities in the health district (project number SWS57/2025/06).

Our study population was defined by:

- Inclusion criteria:
  - Adult and paediatric patients who presented to this ED with pain-related conditions.
- Exclusion criteria:
  - Patients with a non-pain-related presenting problem.
  - Patients with incomplete or missing data (e.g., undocumented TTA).

### 3.2. Data Collection and Analysis

The following variables were collected:

- Demographics—age, gender, Aboriginality, country of birth, language spoken

at home.

- Clinical variables—mode of arrival, Australian Triage Score (ATS), presenting problem.
- Pain management data—presence of pain score at triage, numerical pain score, time to first analgesia, analgesia prescriber (nurse or doctor), type of analgesia prescribed.

Data were analysed using three approaches:

1) Descriptive statistics—to characterise demographic characteristics, pain score documentation rates and median TTA for all patients who met the inclusion criteria (n = 280).

2) Comparative analysis—to explore associations between documented pain scores, NIA utilisation and median TTA.

3) Subgroup analyses—to compare median TTA based on triage category, age group (paediatric vs. adult), gender and pain severity for patients who received analgesia (n = 146).

## 4. Results

### 4.1. Patient Demographics and Clinical Characteristics

A total of 280 patients were included in our audit. Demographic data collected included gender, age, Aboriginality, country of birth and language spoken at home. Clinical data included mode of arrival, ATS triage category, presenting problem, documented pain score, time to first analgesia, prescriber of first analgesia (nurse or doctor) and type of analgesia administered.

Of the 280 patients, 44% were male (n = 123) and 56% were female (n = 157). The age range was from seven months to 99 years, with 28 paediatric patients (10% of the study cohort) (<18 years) and 252 adult patients (≥18 years). Only 2.5% of patients were identified as Aboriginal (n = 7), while 97.5% were not (n = 273). 52% of patients were born in Australia (n = 145) and 48% of patients were born overseas (n = 135). Three-quarters of patients spoke English as their primary language (n = 210, 75%), while one-quarter spoke another language at home (n = 70, 25%). A tabular representation of these demographic variables is shown below in **Tables 1-3**.

**Table 1.** Age demographics of all patients.

| Age group (years) | n | % |
|---|---|---|
| 0 - 9 | 10 | 3.6% |
| 10 - 19 | 29 | 10.4% |
| 20 - 29 | 43 | 15.4% |
| 30 - 39 | 40 | 14.3% |
| 40 - 49 | 36 | 12.9% |
| 50 - 59 | 33 | 11.8% |

**Continued**

| | | |
|---|---|---|
| 60 - 69 | 34 | 12.1% |
| 70 - 79 | 33 | 11.8% |
| 80 - 89 | 18 | 6.4% |
| 90 - 99 | 4 | 1.4% |
| Total | 280 | 100 |

**Table 2.** Birth country or region of all patients.

| Country or region | n | % |
|---|---|---|
| Afghanistan | 1 | 0.4% |
| Algeria | 1 | 0.4% |
| Australia | 145 | 51.8% |
| Bangladesh | 4 | 1.4% |
| Brazil | 2 | 0.7% |
| Chinese mainland | 6 | 2.1% |
| Croatia | 1 | 0.4% |
| Egypt | 3 | 1.1% |
| El Salvador | 1 | 0.4% |
| England | 2 | 0.7% |
| Fiji | 1 | 0.4% |
| Greece | 7 | 2.5% |
| Hong Kong SAR, China | 1 | 0.4% |
| India | 1 | 0.4% |
| Indonesia | 1 | 0.4% |
| Iraq | 3 | 1.1% |
| Ireland | 1 | 0.4% |
| Italy | 3 | 1.1% |
| Jordan | 3 | 1.1% |
| Kenya | 1 | 0.4% |
| Korea, Republic of (Sth) | 1 | 0.4% |
| Lebanon | 39 | 13.9% |
| Malaysia | 1 | 0.4% |
| Mauritius | 1 | 0.4% |
| Myanmar | 1 | 0.4% |
| Nepal | 6 | 2.1% |
| New Zealand | 7 | 2.5% |

**Continued**

| | | |
|---|---|---|
| North Macedonia | 5 | 1.8% |
| Northern Ireland | 1 | 0.4% |
| Pakistan | 3 | 1.1% |
| Peru | 1 | 0.4% |
| Philippines | 1 | 0.4% |
| Poland | 1 | 0.4% |
| Portugal | 3 | 1.1% |
| Saudi Arabia | 1 | 0.4% |
| Syria | 5 | 1.8% |
| Tonga | 1 | 0.4% |
| United Arab Emirates | 2 | 0.7% |
| Vietnam | 12 | 4.3% |
| Total | 280 | 100 |

**Table 3.** Primary language of all patients.

| Primary language | n | % |
|---|---|---|
| Arabic | 36 | 12.9% |
| Burmese | 1 | 0.4% |
| Cantonese | 3 | 1.1% |
| Eastern European Languages | 1 | 0.4% |
| English | 210 | 75.0% |
| French | 1 | 0.4% |
| Greek | 6 | 2.1% |
| Hindi | 1 | 0.4% |
| Macedonian | 4 | 1.4% |
| Mandarin | 2 | 0.7% |
| Polish | 1 | 0.4% |
| Portuguese | 2 | 0.7% |
| Spanish | 2 | 0.7% |
| Urdu | 1 | 0.4% |
| Vietnamese | 9 | 3.2% |
| Total | 280 | 100 |

In terms of mode of arrival, most self-presented (n = 203, 72.5%), while the remainder arrived by ambulance (n = 77, 27.5%). Triage categorisation was as follows (also represented in **Figure 1**):

- ATS Category 1 (immediately life-threatening): zero patients (0%).
- ATS Category 2 (imminently life-threatening): 104 patients (37%).
- ATS Category 3 (potentially life-threatening): 135 patients (48%).
- ATS Category 4 (potentially serious): 40 patients (14%).
- ATS Category 5 (less urgent): one patient (0.4%).

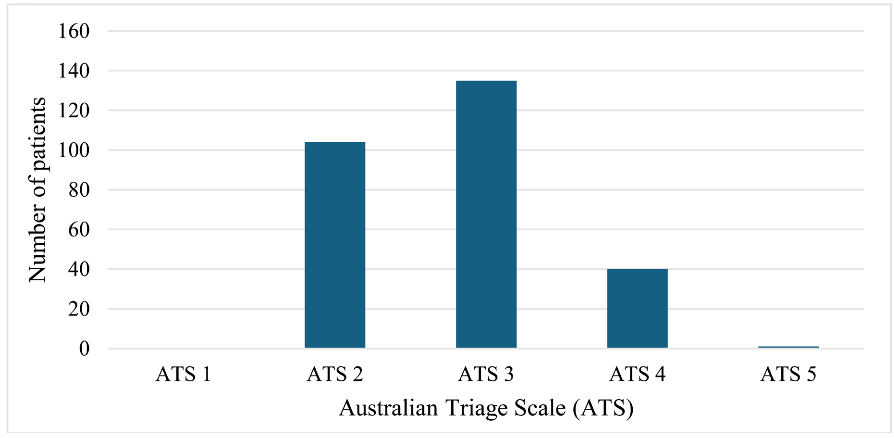


**Figure 1.** Number of patients in each ATS category.

A pain score was documented at triage for only 24% of patients (n = 67), while 76% of patients had no documented pain score (n = 213). The most common presenting problems were abdominal pain (n = 105), followed by chest pain (n = 74). Other presentations included back pain (n = 20), shoulder pain (n = 19), flank pain (n = 14), hip/leg pain (n = 13), genital pain (n = 10), perineal pain (n = 6), urinary pain (n = 4), eye pain (n = 4), neck pain (n = 3), generalised pain (n = 3), joint pain (n = 2), rib pain (n = 2) and breast pain (n = 1). These data are illustrated in Figure 2.

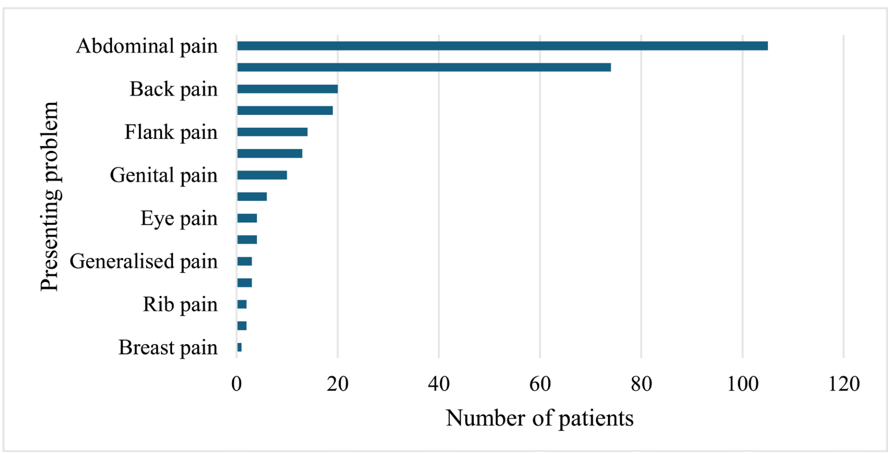


**Figure 2.** Number of patients presenting with different types of pain.

## 4.2. Time to Analgesia

Of the 280 patients, just over half of the patients received analgesia during their ED stay (n = 146, 52%), while the remainder did not (n = 134, 48%). Among those

who received analgesia, time to first analgesia ranged from eight to 621 minutes, with a median time of 61.5 minutes. Only 20.5% of patients received analgesia within 30 minutes of arrival (n = 30), as recommended by national guidelines.

Subgroup analysis revealed the following results (represented in **Figures 3-7**):

- With documented pain scores (n = 67):
  - TTA range: 17 - 283 minutes
  - Median TTA: 49 minutes

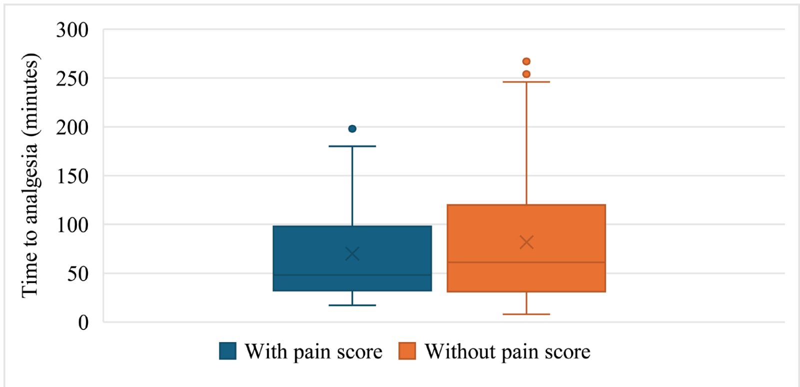


**Figure 3.** Time to analgesia for patients with and without documented pain scores (statistical outliers excluded).

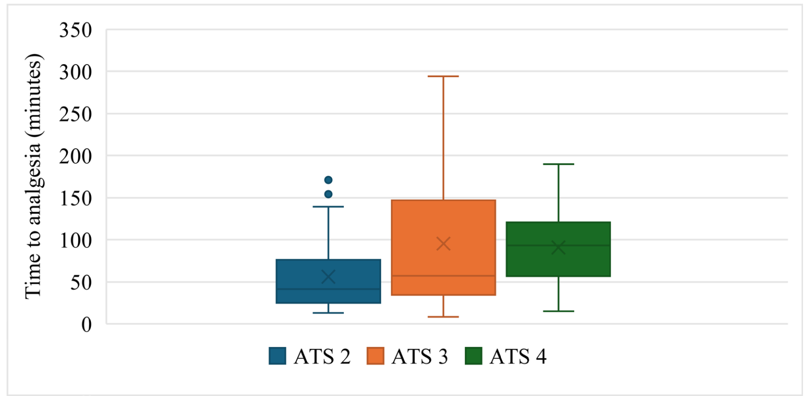


**Figure 4.** Time to analgesia for patients by ATS category (statistical outliers excluded).

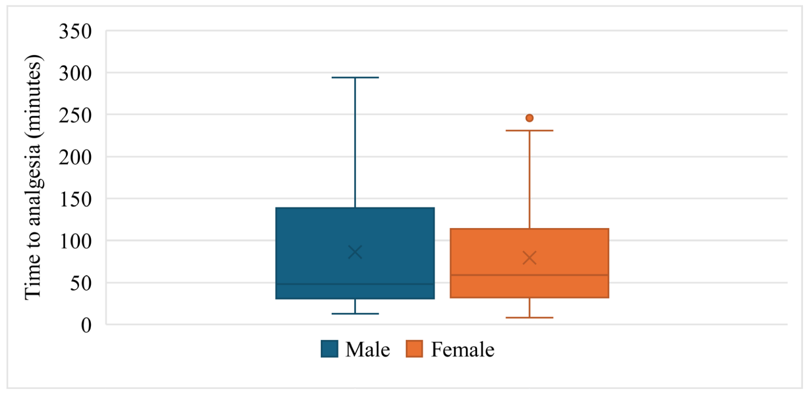


**Figure 5.** Time to analgesia for patients by gender (statistical outliers excluded).

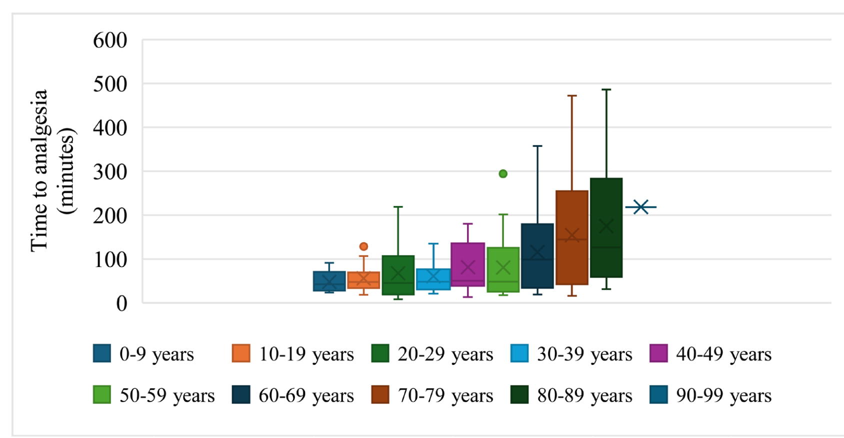


**Figure 6.** Time to analgesia for patients by age (statistical outliers excluded).

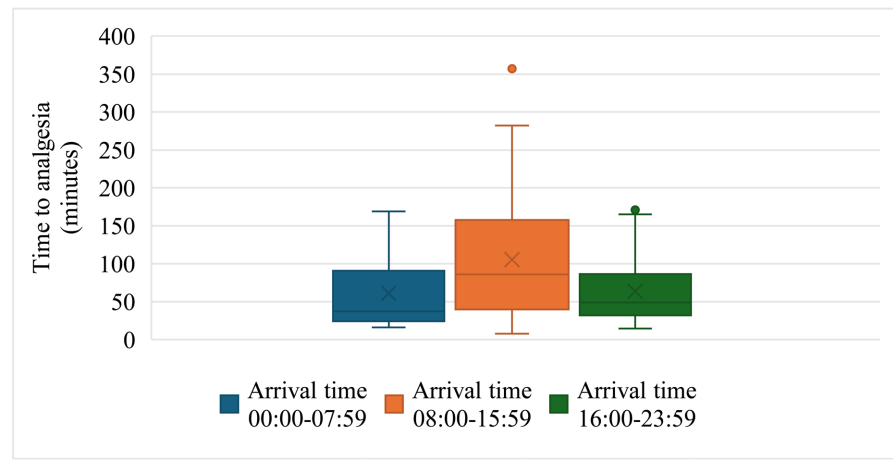


**Figure 7.** Time to analgesia for patients by arrival time (statistical outliers excluded).

- Without a documented pain score (n = 213):
  - TTA range: 8 - 621 minutes
  - Median TTA: 70 minutes
- By ATS category:
  - ATS 2: Median TTA = 47.5 minutes
  - ATS 3: Median TTA = 61.5 minutes
  - ATS 4: Median TTA = 95.5 minutes
- By gender:
  - Males: Median TTA = 55 minutes
  - Females: Median TTA = 67 minutes
- By age group:
  - Paediatric (<18 years): Median TTA = 57 minutes
  - Adults (≥18 years): Median TTA = 65 minutes
- By arrival time (detailed breakdown shown in Table 4):
  - 00:00-07:59: Median TTA = 40 minutes
  - 08:00-15:59: Median TTA = 91 minutes
  - 16:00-23:59: Median TTA = 53.5 minutes

Table 4. Time to analgesia for patients by arrival time.

| Arrival time | Number of patients | TTA (minutes) in ascending order | Median TTA (minutes) |
|---|---|---|---|
| 00:00-07:59 | 25 | 16, 19, 22, 23, 23, 24, 27, 30, 36, 37, 37, 37, 40, 40, 47, 68, 77, 91, 106, 132, 150, 156, 169, 294, 611 | 40 |
| 08:00-15:59 | 59 | 8, 13, 17, 19, 21, 23, 24, 25, 25, 28, 29, 33, 34, 38, 41, 42, 44, 45, 45, 46, 48, 48, 59, 67, 68, 73, 75, 75, 86, 91, 92, 93, 98, 106, 107, 115, 125, 126, 135, 139, 144, 150, 154, 161, 175, 180, 190, 198, 201, 218, 218, 219, 231, 246, 267, 282, 357, 486, 621 | 91 |
| 16:00-23:59 | 62 | 15, 18, 18, 18, 18, 19, 21, 23, 25, 28, 30, 31, 31, 32, 32, 32, 32, 34, 35, 36, 40, 41, 41, 44, 45, 47, 48, 48, 50, 50, 52, 55, 57, 57, 60, 63, 67, 71, 72, 76, 78, 81, 88, 93, 93, 102, 114, 116, 120, 120, 121, 128, 165, 171, 179, 179, 246, 254, 256, 283, 403, 472 | 53.5 |

Among the 134 patients who did not receive analgesia in the ED:

- 49 declined analgesia
- 48 had no analgesia charted
- 16 had already received adequate analgesia from paramedics
- Nine had taken analgesia at home immediately prior to presentation
- Six left the ED before notifying staff
- Five self-discharged against medical advice

### 4.3. Nurse- and Doctor-Initiated Analgesia

Of the 146 patients who received analgesia:

- 46 patients (31.5%) received nurse-initiated analgesia (NIA)
- 100 patients (68.5%) received analgesia prescribed by a doctor
- Median TTA for NIA patients: 40 minutes (range: 8 - 294 min)
- Median TTA for doctor-initiated analgesia: 83.5 minutes (range: 17 - 621 min)

These data are illustrated in Figure 8.

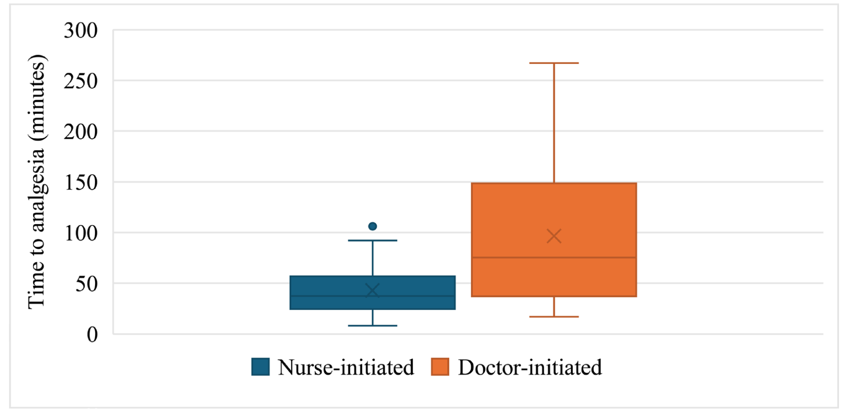


Figure 8. Time to analgesia for patients when analgesia is initiated by a nurse or doctor (statistical outliers excluded).

Analgesia initiated by nurses included:

- PO paracetamol
- PO ibuprofen
- PO oxycodone
- PO aspirin
- IM ketorolac
- IV morphine
- Tetracaine eye drops

Doctor-prescribed analgesia included the above, plus:

- PO tapentadol
- PO Panadeine Forte
- SC morphine
- IV paracetamol
- IV pantoprazole
- IV fentanyl
- Inhaled methoxyflurane
- PR indometacin

## 5. Discussion

Our retrospective audit explored pain assessment and management practices at this hospital's ED, with a particular focus on the relationship between pain documentation, TTA and patterns of analgesic prescribing. The findings reinforce existing concerns regarding variability in pain assessment and the downstream effects this has on timely analgesia [9].

A key observation was the substantial inconsistency in pain score documentation at triage, with pain scores recorded for only 24% of patients (n = 67). This variation appeared to be influenced by individual triage nurses, with some consistently documenting a pain score (even when zero), while others rarely did. This suggests a lack of standardisation in triage workflows for pain assessment. Furthermore, in some cases, pain scores were typed in the free-text 'Triage Comment' rather than within the structured 'Between the Flags (BTF) Vital Signs' section, meaning the score did not populate in FirstNet. This highlights a digital system design issue that may inadvertently reduce clinician visibility of documented pain scores. Examples of these scenarios are shown in Figure 9 and Figure 10.

Consistent with prior studies [3], we found that the presence of a correctly documented pain score was associated with faster TTA. Our audit demonstrated that patients with a documented pain score had a median TTA of 49 minutes, compared to 70 minutes in those without. This supports the premise that early

*Triage Visit Reason BNK:* Pain, eye
*Triage Comment - BNK:* BIB self.
?metal in rt eye.was cleaning gutter without goggles. Teary eye + pain since last night.
Hx. nil
OE. speaks in full sentences. rt eye slightly red, pain 10/10, nil vision changes

Figure 9. Incorrect documentation of pain score within the "Triage Comment" section.

BTF Vital Signs

*i* Indicates Reference Text exists for this field. To access, right click in the field and select 'Reference Text'

Respiratory Rate: 18 br pm — Respiratory Distress: Nil — *i* Document most severe symptom

O2 Saturation: 98 % — SpO2 Probe Change

O2 Delivery Mode: ☑ Room air (no device) ☐ Nasal prongs ☐ Hudson mask ☐ Venturi mask ☐ Partial non-rebreather mask ☐ Non-rebreather mask ☐ High flow nasal cannula ☐ Nebuliser ☐ T-piece ☐ T-bag ☐ Swedish nose / HME ☐ Tracheostomy mask ☐ Non-invasive ventilation ☐ Mechanical ventilation ☐ Manual ventilation ☐ Bag valve mask

Oxygen Flow Rate: L/min — FiO2: %

Humidifier: ○ Yes ○ No — Humidifier Temperature: degC

Peripheral Pulse Rate: 90 bpm ◉ Regular ○ Irregular

Apical Heart Rate: 90 bpm ◉ Regular ○ Irregular

ECG Rhythm — ECG Change Type

Blood Pressure: 131 mmHg / 77 mmHg — Mean Arterial Pressure: 95 mmHg *i*

Blood Pressure Invasive: mmHg / mmHg — Mean Arterial Pressure *i*

Capillary Refill Time: ◉ Less than 3 seconds ○ Greater than or equal to 3 seconds

ACVPU: ◉ Alert (normal behaviour) ○ Changed behaviour ○ New confusion ○ Verbal ○ Pain ○ Unresponsive

Sedation Score: ○ 3 - Difficult to rouse or unresponsive ○ 2 - Constantly drowsy, unable to stay awake ○ 1 - Easy to rouse ○ 0 - Wide awake

Temperature: Tympanic 36.6 degC — Axilla degC — Core degC — Oral degC — Skin degC

Pain Score - Rest — Pain Score - Movement

Blood Glucose Level: 5.4 mmol/L — Or, if out of testing equipment range ○ High ○ Low

Blood Glucose Level Type: ○ Pre-meal ○ Post-meal ○ Random (Other) *i*

Blood Ketone Level: mmol/L — Or, if out of testing equipment range ○ High

Weight: kg

Figure 10. Correct location to document the pain score within the BTF vital signs window.

identification and documentation of pain at triage can prompt a timely clinical response. We support recommendations made in prior research for mandatory triage pain score documentation [9], as a simple and low-cost intervention for quality improvement of care for our patients experiencing pain.

Despite these findings, only 52% of all patients presenting with pain received any analgesia during their ED presentation (n = 146). While a portion of this cohort declined analgesia (n = 49, 36.6%), had received adequate analgesia with paramedics (n = 16, 11.9%) or took analgesia at home immediately prior to presentation (n = 9, 6.7%), a significant number had no analgesia charted at all (n = 48, 35.8%). Additionally, 11 patients left the department prior to receiving analgesia (8.2%)—either by self-discharge or leaving without notifying staff—suggesting missed opportunities for early pain management. Notably, this occurred more fre-

quently during overnight periods, when limited doctor staffing may have delayed review.

The use of NIA protocols appeared to improve TTA, with a median time of 40 minutes compared to 83.5 minutes for doctor-prescribed analgesia. While encouraging, this pathway was underutilised for many patients experiencing pain while in the waiting room. There also appeared to be greater uptake of NIA overnight, with a median TTA of 40 minutes between 00:00-07:59 compared to 91 minutes between 08:00-15:59, despite more medical staff being present during the day. Although staff autonomy was not directly measured in our audit, one possible explanation is that nursing staff may exercise greater autonomy in initiating analgesia overnight when doctor availability is reduced. This suggests that empowering nursing staff through NIA protocols, especially in high-volume or low-staffing settings, could further optimise early TTA.

During data collection, we observed that adherence to ECAT protocols for pain was variable [5] [6]. While protocols were appropriately employed in certain presentations (e.g., chest pain, abdominal pain, back pain, eye pain, isolated limb injury), many patients who would have qualified did not receive protocol-based care. This underscores the need for improved compliance with ECAT pathways and regular staff re-education to promote consistency.

We observed a broad range of analgesic prescribing practices, with some clinicians appropriately applying the stepwise WHO analgesic ladder [10], while others deviated from standard pain management principles. In many cases, clinicians escalated to strong opioids without considering simple analgesics or overlooked adjuvant therapies for neuropathic pain. In one instance, a teenage boy presenting with a mild ankle sprain and no neurovascular compromise was charted IV morphine for pain rated 6/10, without a trial of simple analgesics such as paracetamol or a non-steroidal anti-inflammatory drug. This points to the value of targeted education in pain pharmacotherapy for both nurses and doctors, especially in cases of complex or mixed pain presentations.

Our study was strengthened by its data capture over a full 7-day period, including nights and weekends, ensuring that variations in staffing and patient flow were accounted for. Inclusion of both adult and paediatric patients improved generalisability, and the diversity of cultural and linguistic backgrounds among patients makes the findings applicable to other multicultural, metropolitan EDs. Our detailed TTA data, analysed in terms of demographic and clinical subgroups, provide unique insights that may guide targeted QI strategies. Furthermore, our comparison of nurse-initiated versus doctor-initiated analgesia prompts tangible actions in pain management pathways and opportunities to promote nurse-led models of care.

However, our study had notable limitations. We used numeric pain scores as the sole measure of pain assessment, which may be unreliable or inappropriate in very young children and non-verbal patients, potentially underrepresenting some experiences of pain. Our study also did not evaluate pain reassessment practices

or explore the impact of TTA on patient outcomes such as satisfaction or length of stay. Lastly, in the absence of a qualitative or prospective research design, we were unable to explore staff-reported barriers to pain score documentation and NIA utilisation, which could further inform future interventions.

Future research should explore the impact of targeted education programs on triage pain scoring for nursing staff. A more detailed characterisation of ECAT protocol adherence would help identify specific barriers to utilisation. Finally, a pre- and post-intervention study evaluating the impact of education and protocol reinforcement could offer valuable insights to inform future QI initiatives.

## 6. Conclusion

In summary, our audit highlights significant variability in pain assessment and management at this ED. Documenting pain scores at triage appears to be a key enabler of timely analgesia. Future QI projects should advocate for mandatory pain score documentation at triage, increased utilisation of NIA pathways and ECAT protocols, and improved prescribing of analgesia regimens. Additionally, empowering triage nurses to proactively approach doctors to prescribe analgesia may further reduce time to treatment. These practical strategies, supported by targeted staff education and system-level interventions, may contribute to equitable and effective pain management in the emergency care setting.

## Acknowledgements

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## Contributors

Both authors contributed equally to the conception and design of the study, formal analysis of the data and preparation of the manuscript.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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