Screening major trauma patients for prevalence of illicit drugs

Jonathan Knott, Celene Yap, Biswadev Mitra, Marie Gerdtz, Catherine Daniel, George Braitberg

1. Emergency Department, Royal Melbourne Hospital, Melbourne, Australia
2. Department of Nursing, Faculty of Medicine, Dentistry and Health Sciences, The University of Melbourne, Melbourne, Australia
3. Emergency Department, Alfred Hospital, Melbourne, Australia
4. Department of Medicine, Royal Melbourne Hospital, Melbourne, Australia

Jonathan Knott PhD, Director of Emergency Research, Celene Yap PhD, Research Fellow, Biswadev Mitra PhD, Head of Clinical Research, Marie Gerdtz PhD, Professor and Head of Department of Nursing, Catherine Daniel PhD, Lecturer Mental Health Nursing, George Braitberg MHLthServMt, Executive Director of Strategy, Quality, and Improvement.

Correspondence to: Assoc Prof Jonathan Knott, Royal Melbourne Hospital, Grattan St, Parkville, Victoria 3050, Australia. Email: Jonathan.knott@mh.org.au

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Abstract

Introduction: Australasian emergency departments routinely test patient alcohol levels following major trauma, but assessment for illicit drugs is uncommon.

Methods: A prospective cross-sectional study of major motor vehicle related trauma patients attending both adult major trauma centres in Victoria, Australia. All eligible patients had point-of-care saliva testing to determine the prevalence of common illicit drugs.

Results: Over 12 months, 1411 patients were screened, 36 refused (2.6%) and 63 were excluded. Of the final 1312 cases included, 173 (13.2%; 95% CI 11.5, 15.1) tested positive to at least one illicit substance, with 133 (76.9%; 69.7, 82.8) positive for meth/amphetamines. One in five had more than one illicit substance detected. Patients testing positive were most frequently in motor vehicles (91.9% vs 85.6%) and least frequently cyclists (2.3% vs 4.2%) or pedestrians (5.2% vs 10.3%), compared to those testing negative. They were younger (mean age 35.4 v 43.1 years), more likely to arrive overnight (27.2% vs 12.1%) or after single vehicle crashes (54.3% vs 42.3%). Although the initial disposition from ED did not differ, those testing positive were more likely to re-present within 28 days (13.9% vs 5.4%).

Discussion and Conclusions: A high prevalence of potentially illicit substances among patients presenting with suspected major trauma supports the need for urgent preventive strategies. The low rate of patient refusal and large numbers screened by ED staff suggests that point-of-care testing for illicit substances in major trauma is acceptable and feasible. This study and ongoing surveillance may be used to inform driver education strategies.

Key Words: illicit drugs, point-of-care testing, emergency, traffic accidents
Introduction

Road traffic crashes are a dominant cause of severe injury. Globally they account for 1.35 million deaths and 50 million injuries and remain the leading cause of death for children and young people aged 5-29 years of age [1]. The 2015 Victorian Road Trauma report stated that approximately 10% of deaths and 12% of the serious injuries incurred on roads in Victoria, Australia were associated with alcohol and illicit drug driving [2]. Drugs and alcohol were suspected to be involved in half of the fatalities of 16 to 17-year-old passengers [2]. However, these figures are estimates based on preliminary findings from police members first on scene, and not formal toxicological reports. There is reported to be a substantial overlap between illicit drug use and high risk behaviours associated with alcohol consumption [3].

In Australia, population level data collected in 2016 demonstrated that illicit drug use continued to increase with up to 43% of the population aged 14 years or older having used at least one of 16 classes of illicit drugs in their lifetime [4]. The four most commonly used illicit drugs are cannabis (10.4%), cocaine (2.5%), 3,4-Methylenedioxy-methylamphetamine (MDMA, often known as ecstasy) (2.2%) and methamphetamine (often known as ICE) (1.4%) [4]. There is evidence to suggest that these illicit substances, alone, or with alcohol, are capable of causing impairment and increase the risk of motor vehicle crashes [5-8]. Baldock and Lindsay have reported that illicit drugs are now more common than alcohol among South Australian crash-involved drivers and riders [9]. Testing in that study was restricted to drivers and motorcyclists and did not include other motor vehicle related trauma victims. The blood alcohol concentration was over the legal limit of 0.05g/100ml in 11% of drivers whilst methamphetamine was detected in 9.7% and tetrahydrocannabinol in 6.3% of drivers respectively.

In current emergency medicine practice, the detection of illicit substances is limited to urine and blood sample testing. These typically take many hours to days to return results. In Victoria, under section 56(2) of the Road Safety Act 1986, c5, a compulsory blood sample is required for drug testing all drivers hospitalised as a result of a motor vehicle crashes [10]. However, the blood sample needs to be collected and transported for laboratory processing at an external reference laboratory. In most cases, drug screening results are not known by
the clinical staff at any time in the patient admission episode [11,12]. This is particularly relevant in the assessment of patients with impaired consciousness who are unable to provide a history at the time of presentation. There is currently no requirement for testing of other victims of motor vehicle related trauma including cyclists, pedestrians and passengers.

In this study, we aimed to determine the prevalence of illicit substance use among patients at the time of presentation to the emergency department (ED) with suspected major trauma. In addition, we aimed to describe the epidemiology of these major trauma patients and assess the feasibility and acceptability of point-of-care saliva testing for illicit drugs.

Methods

Setting

The Royal Melbourne Hospital and The Alfred Hospital EDs are the two adult major trauma referral centres in Victoria, Australia, both are based near the centre of Melbourne, the state capital. They have a combined overall annual attendance rate of approximately 130,000 and an admission rate of 50%. There are approximately 4000 major trauma call outs, and 40% of these are related to motor vehicles [13].

Study type and design

This was a prospective cross-sectional study of prevalence. Additionally, the processes of care for patients who screened for one or more pre-determined illicit substances were mapped. Participants were screened using the Securetec DrugWipe® 5S. This is an immunological rapid screening test for the detection of cannabis, amphetamine-type stimulants, cocaine and specific opiates (heroin, morphine, codeine, oxycodone and pholcodine, but not fentanyl). The drug reactivities are available on request from Pathtech™ but this is commercially restricted and not published publicly (www.pathtech.com.au/home). DrugWipe® 5S was chosen because of high reliability, short collection time and small volume of saliva (20 µL) required. Sensitivity is reported at 100% for cannabis, amphetamine-type stimulants and cocaine, and 80% for the specific opiates.
Specificity is reported at 100% for cocaine, amphetamine-type stimulants, cannabis and opiates [15]. This test was found to have good performance characteristics in studies conducted in nightlife [16-18], roadside [19, 20] and ED screening [11].

Saliva testing is sufficiently reliable (sensitive and specific) and feasible to be conducted by appropriately trained and skilled clinicians while the patient is in the ED [11, 12]. It should be noted that the concentration of tetrahydrocannabinol peaks in saliva at 1-2 hours but then rapidly declines after 3-4 hours [21, 22]. Cocaine and morphine may be detected in saliva up to 6 hours after use and meth/amphetamines up to 24 hours [22]. Based on previous studies at the Royal Melbourne Hospital ED [11], it was expected that testing would be feasible in the first 30 to 60 minutes after arrival. Therefore, the vast majority of trauma patients arriving from the roadside would be within the detection windows. Trauma transfers from other institutions were excluded due to the anticipated delay in testing.

Participants

Patients presenting to the ED at each major trauma centre with motor-vehicle related trauma requiring a local trauma response (see Appendix A) were enrolled. Drivers, cyclists, passengers and pedestrians were included. The study was planned to run for 12 months at each site but allowed for an introductory period to facilitate staff education.

Inclusion criteria

- All patients for whom a trauma response was initiated (See Appendix A for Trauma call out criteria);
- Mechanism of injury involved a motor vehicle; and
- 18 years of age or older.

Exclusion criteria

- Public transport passengers (e.g. train, tram, bus passengers);
- Cycling trauma unrelated to a motor vehicle;
- Pedestrian trauma unrelated to a motor vehicle; and
- Trauma transfers from other institutions.
All patients meeting inclusion criteria were assessed by the clinical lead of the trauma team for their suitability to participate. Nursing staff employed at the study sites were trained to perform the saliva test and interpret the results. For conscious patients, nurses provided a verbal explanation of the testing. For those unconscious, a waiver of consent and explanation had been obtained from the Institutional ethics committees at each site. A saliva test was conducted by wiping the saliva from the tongue using the sample collector. The test result was interpreted and documented by nursing staff on the designated case report form immediately following the development of the result. Samples were collected in the ED as early as practicable without compromising patient care. The aim of our study was to assess feasibility and determine prevalence of illicit drugs, hence results were not recorded in the patient’s clinical record or discussed with the patient or treating clinicians.

**Outcome**

The primary outcome measure for the study was the prevalence of illicit drug use among participants using point-of-care saliva testing.

Secondary outcomes were to describe the characteristic of the population involved in the motor vehicle crashes, the nature of the crashes, and the timelines and disposition from the ED. Data on outcomes at hospital discharge and re-presentations for any reason to the same hospital within 28 days after discharge were collected from medical records.

**Data collection**

Demographics, mechanism and severity of injury were extracted from the patients’ medical records or the trauma registries at each trauma centre using explicit chart review. Alcohol intoxication was defined as a blood alcohol concentration greater than 0.05% (g/100ml), obtained from a breath analyser calibrated by Victorian Police, or from a laboratory blood test. Ambulance Victoria records were examined to determine if pre-hospital opiates had been administered by ambulance paramedics. Several research assistants were employed to obtain the data (see acknowledgments). Potential variation between data collectors was not assessed.
Ethics approval

Ethics approval for this study was obtained from Melbourne Health Research and Ethics Committee (2018.041) and The Alfred Health Research and Ethics Committee (160/18). All eligible participants who were conscious were provided with a verbal explanation of the study. A waiver of consent was approved for unconscious patients.

Statistical analysis

Patient demographics and baseline characteristics were analysed descriptively and reported as frequencies and percentages. Categorical variables were compared using the chi-square test or Fisher’s exact test, as appropriate. Differences between means were assessed using Student’s t-test and difference between medians were assessed using Wilcoxon Rank Sum test. The level of significance was a \( P \)-value of < 0.05. Analyses were performed using IBM SPSS® Statistics, Version 23.0 (IBM Corp, 2015).

Results

During the study period, 1411 individuals were screened by the trauma response team for enrolment. Of the screened population, 36 [2.6%; 95% confidence interval (CI) 1.8, 3.5] refused to provide saliva samples (Figure 1). The median time from arrival to testing was 52 minutes (interquartile range 29, 101).

Of the 1312 saliva tests included in the final analysis, 271 patients had a positive test result (20.6%; 95% CI 18.5, 23.0). Of these, 131 had been administered morphine by paramedics pre-hospital. If these patients were opiate positive only, it was assumed the result was due to the morphine administration and therefore they were deemed negative for potentially illicit drug use. There were 98 patients reclassified as negative and 33 patients who tested positive for an additional drug and so remained positive.

The revised number of positive test results was 173 (13.2%; 95% CI 11.4, 15.1). Among those who tested positive, 20% were positive for two or more illicit substances and amphetamine-type stimulants were detected in 133 (76.9%; 95% CI 69.7, 82.8) samples.
The demographics and presentation characteristics for the 1312 individuals who provided saliva samples based on test outcomes (negative or positive for meth/amphetamine, cannabis, cocaine and opiates) are shown in Table 1.

More than half (67%) the people tested were male, with a mean age of 42 years (range 18 to 101). Overall, approximately 12% of people tested were alcohol intoxicated on presentation. A significantly higher proportion of individuals who tested positive for illicit substances had a Glasgow Coma Scale < 9 (9.8% versus 5.8%). Those testing positive were more likely to be assigned a triage category of 1 (ATS 1; immediate medical treatment) (15.7%) than those who tested negative (7.0%), with a corresponding decrease in triage category 3 (ATS 3; time to medical treatment < 30 minutes). The time of presentation was significantly different for those who tested positive for illicit substances. Trauma patients testing positive for illicit substances were more likely to arrive between 00:00 and 06:59 hours (28.9% versus 13.8%).

Over the whole cohort, more than half of the tested individuals were drivers (Table 2). Among the 964 patients driving or riding a motor vehicle, the prevalence of illicit drugs was 13.4% (95% CI 11.3, 15.7), with lower prevalence among cyclists and pedestrians. In terms of accident characteristics, multiple-vehicle collision represented more than 70% of crashes. However, a higher proportion of individuals who tested positive for illicit substances was involved in a single-vehicle collision (54.3%) than those who tested negative (42.3%).

Table 3 shows the treatment outcomes for the individuals who provided saliva samples. There was no significant difference for the ED disposition between those who tested positive for illicit substances and those who tested negative. More than half of the tested individuals were admitted to inpatient wards. Notably, significantly more individuals (13.9%) who tested positive had re-presented to the ED within 28 days after discharge from the hospital than those who tested negative (5.5%).
Discussion

The prevalence of potentially illicit drugs among patients with suspected major trauma arriving at the two adult trauma centres in Melbourne was high at 13%. Amphetamine-type stimulants were the most common illicit substances detected. The patients who tested positive were younger compared to those testing negative and arrived overnight. Together with the type of illicit substances detected, these results provide valuable additional data to inform prevention strategies aimed at drug-related motor vehicle trauma.

A few publications have previously reported illicit substance use in motor vehicle drivers presenting to Australian hospitals [23-27]. Of interest was the higher prevalence of amphetamine-type stimulants in this study compared to other studies published before 2010 [23, 25, 27]. Our finding is consistent with results reported by DiRago et al. (2019), where methamphetamine and MDMA were the most common illicit drugs found in the blood samples from drivers injured and transported to hospitals [26]. The rising use of methamphetamines, which has been well documented, is likely to be responsible for at least some of the increased prevalence compared with pre-2010 studies. Although there has been an overall decrease in stimulant use, amongst people aged over 14 years, from a peak in 2001 of 3.4% to 1.3% in 2019, the crystal form of methamphetamine remains the most common [28].

Overall, the population studied had high clinical acuity based upon triage scale, arrival by ambulance, low Glasgow Coma Scale and need for hospitalisation and intensive care unit admission. The sub-group who tested positive for alcohol and/or potentially illicit substances had lower Glasgow Coma Scale, were triaged to require more urgent care and were also more likely to arrive in the hours between midnight and 0600. This is a time of relatively low resources, even in trauma centres. The increasing prevalence of amphetamine use in society may have ramifications for after-hours hospital resourcing if it results in sicker, high acuity, trauma patients.

Novel to our approach was the use of point-of-care saliva testing in this population. Past studies have used blood samples or urinalysis to provide objective estimates of prevalence [5-7, 23, 26]. However, in practical terms, blood analysis using gas chromatography–mass...
spectrometry or urinalysis can be challenging due to the need to send a blood or urine sample to a laboratory for toxicological screening. Conversely, point-of-care saliva tests are relatively quick, non-intrusive and easy to conduct by trained clinical staff. The high level of nursing engagement in patient testing during the study supports the feasibility of point-of-care saliva testing in the ED setting. The low refusal rate by patients also suggests point-of-care saliva testing is feasible and acceptable. It is possible that those who refused (n=36) did so because they had used illicit substances, and this may have contributed to an underestimation of illicit substance use. However, it should be noted that although nursing staff explained how the test would be undertaken, and what it was looking for, it is not certain how clearly major motor vehicle trauma patients would have understood this. In previous studies of high-risk populations, namely those undergoing a security code for agitated behaviour or being admitted to a behavioural assessment unit, there were similarly high rates of acceptability and feasibility [11, 12].

An important finding was that only 26 patients tested positive for both drugs and alcohol (see Table 1). This sub-group is 15% of those testing positive for drugs and 16% of those testing positive for alcohol. These data support roadside testing for illicit substances, in addition to testing for alcohol, in order to ensure potentially impaired drivers are detected.

Significantly more individuals who tested positive presented to the ED within 28 days after discharge from the hospital compared to those who tested negative. While the specific reasons for returning were not explored, these findings suggest a window for intervention in which clinicians may provide education regarding risks of illicit substance use and implement harm minimisation strategies during their hospital stay, including early referral to drug and alcohol services. Several studies have shown that an injury episode can facilitate substance abuse intervention as the injured patients acknowledge that an injury episode increased their acceptance of intervention and referral for treatment [7, 29]. However, it is unknown how many of this patient group received addiction medicine referral and assessment. Further research is required to evaluate the effectiveness of these interventions in patients who are being identified early after arrival to hospital.
One limitation of this study is that we are unable to accurately report the incidence of opiate use by the motor vehicle trauma population given that prehospital care in this cohort is likely to include the provision of opioids for pain relief. Although the provision of morphine by paramedics was accounted for, there remains the possibility of self-administered opioids. However, the impact of this is small; if all detected opioids were assumed to be secondary to therapeutic indications it would affect 1.4% of the positive results.

A further limitation is that the time from ingestion to testing is unknown. Given that the peak concentrations for each of the illicit toxins detected in point-of-care testing differed it is possible that some substances were not detected. In particular, the prevalence of tetrahydrocannabinol and cocaine may be under-reported due to their shorter detection windows, with a relative increase in the proportion of detected drugs being amphetamines. Further research is required and might include testing at the scene by paramedics. It should also be noted that detection of drugs cannot be correlated with a specific degree of impairment [30].

Although this study was based in the two major trauma referral centres in Victoria and does include primary rural and regional transfers from the scene of a crash, it does not include fatalities or secondary transfers and so may not represent overall illicit drug use amongst major motor vehicle trauma. Finally, there are several other illicit drugs that were not detectable with the device used. However, those most abused in the community can be detected.

Conclusion

The low rate of patient refusal and large numbers screened by ED staff suggests that point-of-care testing for illicit substances in major trauma is acceptable and feasible. This study and ongoing surveillance can inform public health initiatives targeted at driver education strategies and hospital referral and discharge processes, particularly addressing the high representation rate of our patients.
Acknowledgements

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Conflict of Interest

The authors have no conflict of interest to declare.

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Table 1. Patient demographics and presentation characteristics

<table>
<thead>
<tr>
<th>Patient variable</th>
<th>Test positive (n=173)</th>
<th>Test negative (n=1139)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years, mean (95% CI)</td>
<td>35.4 (33.5, 37.3)</td>
<td>43.1 (42.0, 44.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>120 (69.4)</td>
<td>757 (66.5)</td>
<td>0.70</td>
</tr>
<tr>
<td>GCS &lt; 9 on arrival, n (%)</td>
<td>17 (9.8)</td>
<td>66 (5.8)</td>
<td>0.042</td>
</tr>
<tr>
<td>ISS, median, IQR</td>
<td>5 (1-14)</td>
<td>5 (1-12)</td>
<td>0.06</td>
</tr>
<tr>
<td>ATS category, n (%)</td>
<td></td>
<td></td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>1 (to be seen immediately)</td>
<td>27 (15.6)</td>
<td>80 (7.0)</td>
<td></td>
</tr>
<tr>
<td>2 (to be seen within 10 minutes)</td>
<td>106 (61.3)</td>
<td>702 (61.6)</td>
<td></td>
</tr>
<tr>
<td>3 (to be seen within 30 minutes)</td>
<td>40 (23.1)</td>
<td>354 (31.1)</td>
<td></td>
</tr>
<tr>
<td>4 (to be seen within 60 minutes)</td>
<td>0 (0.0)</td>
<td>3 (0.3)</td>
<td></td>
</tr>
<tr>
<td>Time of arrival, n (%)</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>00:00-05:59</td>
<td>47 (27.2)</td>
<td>138 (12.1)</td>
<td></td>
</tr>
<tr>
<td>06:00-11:59</td>
<td>35 (20.2)</td>
<td>286 (25.1)</td>
<td></td>
</tr>
<tr>
<td>12:00-17:59</td>
<td>49 (28.3)</td>
<td>443 (38.9)</td>
<td></td>
</tr>
<tr>
<td>18:00-23:59</td>
<td>42 (24.3)</td>
<td>272 (23.9)</td>
<td></td>
</tr>
<tr>
<td>Mode of arrival, n (%)</td>
<td></td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td>Road ambulance</td>
<td>154 (89.0)</td>
<td>938 (82.3)</td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>17 (9.8)</td>
<td>167 (14.7)</td>
<td></td>
</tr>
<tr>
<td>Self-present</td>
<td>2 (1.2)</td>
<td>34 (3.0)</td>
<td></td>
</tr>
<tr>
<td>Alcohol exposed on arrival*, n (%)</td>
<td>26 (15.0)</td>
<td>132 (11.6)</td>
<td>0.20</td>
</tr>
</tbody>
</table>

*based on self-report, blood alcohol level, breath analyser test, or clinical observation.
ATS, Australasian Triage Scale; CI, confidence interval; GCS, Glasgow Coma Score; IQR, interquartile range; ISS, Injury Severity Score.
Table 2: Accident characteristics

<table>
<thead>
<tr>
<th>Patient variable</th>
<th>Test positive (n=173)</th>
<th>Test negative (n=1139)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient status, n (%)</strong></td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Driver</td>
<td>99 (57.2)</td>
<td>617 (54.2)</td>
<td></td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>32 (18.5)</td>
<td>223 (19.6)</td>
<td></td>
</tr>
<tr>
<td>Cyclist</td>
<td>4 (2.3)</td>
<td>48 (4.2)</td>
<td></td>
</tr>
<tr>
<td>Passenger</td>
<td>28 (16.2)</td>
<td>134 (11.8)</td>
<td></td>
</tr>
<tr>
<td>Passenger</td>
<td>28 (16.2)</td>
<td>134 (11.8)</td>
<td></td>
</tr>
<tr>
<td>Pedestrian</td>
<td>9 (5.2)</td>
<td>117 (10.3)</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (0.6)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Type of incident, n (%)</strong></td>
<td></td>
<td></td>
<td>0.007</td>
</tr>
<tr>
<td>Single</td>
<td>94 (54.3)</td>
<td>482 (42.3)</td>
<td></td>
</tr>
<tr>
<td>Multiple</td>
<td>74 (42.8)</td>
<td>633 (55.6)</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>5 (2.9)</td>
<td>24 (2.1)</td>
<td></td>
</tr>
<tr>
<td>Patient variable</td>
<td>Test positive (n=173)</td>
<td>Test negative (n=1139)</td>
<td>P value</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td>------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>ED discharge destination, n (%)</td>
<td></td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>Wards (medical, trauma, psychiatry, surgical, orthopaedic, plastic surgery)</td>
<td>95 (54.9)</td>
<td>644 (56.5)</td>
<td></td>
</tr>
<tr>
<td>ED short stay observation</td>
<td>22 (12.7)</td>
<td>216 (19.0)</td>
<td></td>
</tr>
<tr>
<td>Intensive care unit</td>
<td>22 (12.7)</td>
<td>107 (9.4)</td>
<td></td>
</tr>
<tr>
<td>Direct to theatre</td>
<td>16 (9.2)</td>
<td>76 (6.7)</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>16 (9.2)</td>
<td>79 (6.9)</td>
<td></td>
</tr>
<tr>
<td>Other hospital</td>
<td>2 (1.2)</td>
<td>15 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>0 (0.0)</td>
<td>2 (0.2)</td>
<td></td>
</tr>
<tr>
<td>ED length of stay, hours, median, IQR</td>
<td>5.1 (3.6, 9.0)</td>
<td>4.9 (3.5, 8.1)</td>
<td>0.33</td>
</tr>
<tr>
<td>ED re-presentation 28 days from discharge, n (%)</td>
<td>24 (13.9)</td>
<td>62 (5.4)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

ED, emergency department; IQR, interquartile range.
Figure 1: Patient flowchart

1411 patients screened for enrolment

36 refused to be tested

1375 enrolled and tested

63 excluded
40 invalid tests
9 no vehicle involved
4 age < 18 years
5 did not fulfil trauma criteria
5 transferred from other hospitals

1312 cases

618 analysed from the RMH (22 May 2018 – 3 June 2019)

84 positive tests*

53 methamphetamines only
6 opiates only
5 cannabis only
4 cocaine only
5 meth* + opiates
3 meth + cocaine
2 cannabis + meth
1 cannabis + cocaine
1 cocaine + opiates
1 cannabis + opiates
1 meth + cocaine + opiates

694 analysed from The Alfred (1 August 2018 - 1 September 2019)

89 positive tests*

51 methamphetamines only
12 opiates only
6 cocaine only
2 cannabis only
5 meth + opiates
5 meth + cocaine
2 cannabis + meth
1 cannabis + cocaine
1 cocaine + opiates
1 meth + cocaine + opiates

* 98 patients who tested positive only for opiates and had opiates administered pre-hospital by paramedics were reclassified as negative. Meth, methamphetamines; RMH, Royal Melbourne Hospital.
References


Appendix A: Trauma call out criteria

Mechanism

- MBC or cyclist impact > 30 kph
- Pedestrian impact > 30 kph
- Vehicle rollover
- Fatality in same vehicle
- Ejection from vehicle
- Fall > 3 m
- Explosion

Injuries

- Significant blunt trauma to thorax or abdomen
- Penetrating trauma to head, neck or trunk
- Suspected spinal cord injury
- Amputation proximal to carpus/tarsus
- Pelvic fracture
- Ischaemic limb due to trauma
- Severe crush injury
- Burns >20% TBSA

Signs

- Systolic blood pressure < 90 mmHg
- Pulse > 130 b/min
- GCS < 14
- \( \text{SpO}_2 < 90\% \)

Other

- Three simultaneous trauma arrivals
- Inter-hospital trauma transfer < 24 hours from incident
- Pregnancy

* Compiled from The Alfred and Royal Melbourne Hospital trauma protocols. GCS, Glasgow Coma Scale; MBC, motorbike crash; \( \text{SpO}_2 \), blood oxygen saturation; TBSA, total body surface area.
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Author/s:
Knott, J; Yap, C; Mitra, B; Gerdtz, M; Daniel, C; Braitberg, G

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