Queensland Injury Surveillance Unit

QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent urban, rural and remote areas of Queensland. QISU publications and data are available on request for research, prevention and education activities.

INJURY BULLETIN

No. 112 **December 2011**

"Cocktails in the ED: an analysis of presentations due to substance and alcohol co-use in youth aged 12-24 years"

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Summary

- There are an estimated 1600 alcohol-related injury presentations to Queensland emergency departments (EDs) per annum in people aged 12 to 24 years , representing 39% of all alcohol related injury presentations in those aged 12 years and over.
- Substance co-use with alcohol was identified in 12.5% of all alcohol-related presentations in this age group, representing an estimated 200 presentations per annum.
- Substance co-use was more commonly identified in alcohol -related presentations for youth aged 12-17 years (17%) compared to those aged 18-24 years (11%).
- Substance and alcohol co-use presentations were more common on the weekend, with almost half of all presentations recorded on a Saturday or Sunday.
- Intentional self-harm was the most common category of injury cause amongst those aged 12 to 24 years, accounting for almost half of all substance and alcohol co-use cases in this age group.
- Approximately 23% of substance and alcohol co-use presentations required immediate or emergency attention.
- Illicit or controlled prescription substances were identified in one quarter of injury presentations related to substance and alcohol co-use. Prescription substances were identified in one third of presentations and over the counter (OTC) substances or other unregulated substances were identified in 22% of cases.
- Multiple-substance co-use with alcohol was identified in 19% of cases.

Background

The issue of substance use among children and youth is raising significant public and political concern. The National Drug Strategy Household Survey reported that approximately 30% of all Australians who used illicit substances in 2007 were aged between 14 -29 years [1]. Under the National Drug Strategy for 2010-2015, the Commonwealth government highlighted the following priorities: monitoring and response to the changing pattern of risky alcohol use, illicit substance use, pharmaceutical substance misuse and multiple substance use [2].

Alcohol and Substance use potentially increases the risk of injury through altered patterns of behaviour and judgement. For young people, this risk may be compounded by the risky environments in which they use these substances. Injuries due to substance use encompass both the direct toxic effects of the substances, as well as the injuries that arise as a consequence of substance and alcohol use. In Australia, several methods have been used to identify substance and alcohol-related injury presentations in ED patients. These methods include patient screening and survey, medical record review, and analysis of routinely collected ED data [3-6]. The approach of identifying substance and alcohol related injuries recorded in ED routine data allows researchers to investigate patterns over a long period without the need for costly and time-consuming primary data collection. Application of this method however is limited by the inadequacy of substance and alcohol-related coding in ED data [7]. Triage text mining is an additional technique used to capture cases of interest which are not captured through diagnostic codes. In studies using text mining of routinely collected ED data (EDIS) for all ages (not just

HOSPITALS

Atherton	*Clermont*	*Moranbah*	*Proserpine*	*Queen Elizabeth II*	*Logan*	*Mackay Base*	*Mount Isa*
Mareeba	*Sarina*	*Mackay Mater*	*Dysart*	*Innisfail*	*Robina*	*Royal Children's*	*Mater Children's*
Bundaberg	*Marybourgh*	*Warwick*	*Collinsville*	*Yeppoon*	*Gatton*	*Tully*	*Cherbourg*

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youth) in order to quantify alcohol-related presentations, 90% of the final case yield was identified using text mining, compared to 25% using diagnostic codes alone. [8]. A previous QISU bulletin using a similar methodology to search injury surveillance (IS) data, had similar results with only 44% % of the final case yield identified using the more detailed IS coded fields [9]. It is still likely that this is a significant underestimate of the true burden of alcohol-related injury and disease in an ED cohort, as text mining relies on the quality and quantity of documentation at the point of triage and this data quality hasn't been systematically evaluated in an Australian context for any age group. The capture of data regarding the involvement of other substances in addition to alcohol in ED presentations was also not examined in either of these studies, and has not been systematically examined in any Australian study to date.

The aim of this study was to identify the characteristics and types of substance co-use in a cohort of ED patients aged 12 to 24 years who had been identified using injury surveillance data as having presented with alcohol-related injury (this method was described in detail in QISU Bulletin No.111 [9]).

Method

QISU currently manages data obtained from a convenience sample of 33 hospital emergency departments throughout Queensland which include metropolitan (Brisbane), regional (Mackay and Moranbah Health Districts), tropical northern coast (Atherton, Mareeba, Tully and Innisfail) and remote (Mt Isa) areas[10].Not all hospitals have contributed for the full 11.5 year study period. Data is collected using one of 3 methods at each site: an injury surveillance module within EDIS, modified text collection of IS data within HBCIS or a paper collection system. It is estimated that the QISU data represents approximately one fifth of all adult emergency injury presentations in the state during the study period. Data are collected at the point of triage in the emergency department. QISU data includes a brief text description that may contain the circumstances of the patient's injury or presentation, date and time of injury, demographic information, coded fields according to the NDS-IS requirements (intent, activity, sub-activity, place, part of place, major injury factor, external cause and mechanism of injury), triage score and International Classification of Disease (ICD) code.

Within the QISU data set, all injury presentations related to alcohol were identified using a combined text and coded field search strategy for the period January 1999 – June 2010 (9460 cases). Secondary data analysis was conducted on patients aged 12 to 24 years (3735 cases), with two age groups of interest: 12-17 year olds (below the legal drinking age) and 18-24 year olds. While these age groups do not represent even numbers of single-age years, comparisons of findings are presented in terms of proportions within age groups, rather than comparisons of frequencies across age groups.

Additional analysis was conducted by QISU staff to extract specific substance terms (trade names, generic names and colloquial names) from within the injury description text field.

Table 1 - Therapeutic Goods Administration Schedules

Group	TGA Poisons Standard Schedules
	Schedule 1 Not currently in use
Over-the-counter Substances	Schedule 2 Pharmacy Medicine
Pharmacist Only	Schedule 3 Pharmacist Only Medicine
Prescription Substances	Schedule4 Prescription Only Medicine OR Prescription Animal Remedy
Non-medicine	Schedule 5 Caution
Non-medicine	Schedule 6 Poison
Non-medicine	Schedule 7 Dangerous Poison
Prescription controlled-substances	Schedule 8 Controlled Prescription Drug
Illicit substances	Schedule 9 Prohibited Substance

A total of 468 cases were identified where substance co-use was documented in the injury presentation or ICD code. This cohort was used for secondary data analysis. Substance terms were analysed where possible using MIMS to obtain the associated generic names and then classified based on the International Classification of Diseases, 10th revision, Australian Modification (ICD-10-AM) substance classification. The Therapeutic Goods Administration (TGA) drug schedule was also used to categorise the substance identified in the data based on their consumer availability and legal status as outlined in Table 1.

Where specific drug names were not available in the triage text, ICD codes were analysed and presentations were categorised according to substance group . Different ICD versions and subsets were used during the 11.5 year study period. Patient presentations between January 1999 and June 2001 were coded using ICD-9, whereas cases from July 2001 onward were coded using ICD-10. Within this cohort, ICD-9 codes were mapped to ICD-10 codes to facilitate data analysis.

Results

Gender & Age

From January 1999 to June 2010, a total of 3735 alcohol-related ED presentations in people aged 12 to 24 years were identified in the QISU data set, representing 2.8% of all QISU injury presentations within that age range and time period and 39% of all alcohol related presentations in people over 12 years of age. Almost a quarter (n=922) of the alcohol-related injuries in the child and youth sample occurred among children aged below the legal drinking age of 18 years. Males accounted for 67% (n=2489) of all alcohol-related presentations. This male predominance was consistent across all single-year groups within the age range.

Substance co-use with alcohol was identified in 12.5% (n=468) of all alcohol-related presentations for the age (12-24 years) and time period. Substance co-use was more commonly identified in alcohol-related presentations for youth aged 12-17 years (17%) compared to those aged 18-24 years (11%). Substance co-use was more commonly

identified amongst females across the age range. Over one quarter (26.7%) of young females presenting with alcohol related injuries aged 12-17 years were identified as being substance co-users compared to 21.2% of older females aged 18-24 years. For males, the relative proportion documented as substance co-users were 9.6% and 6.7% respectively.

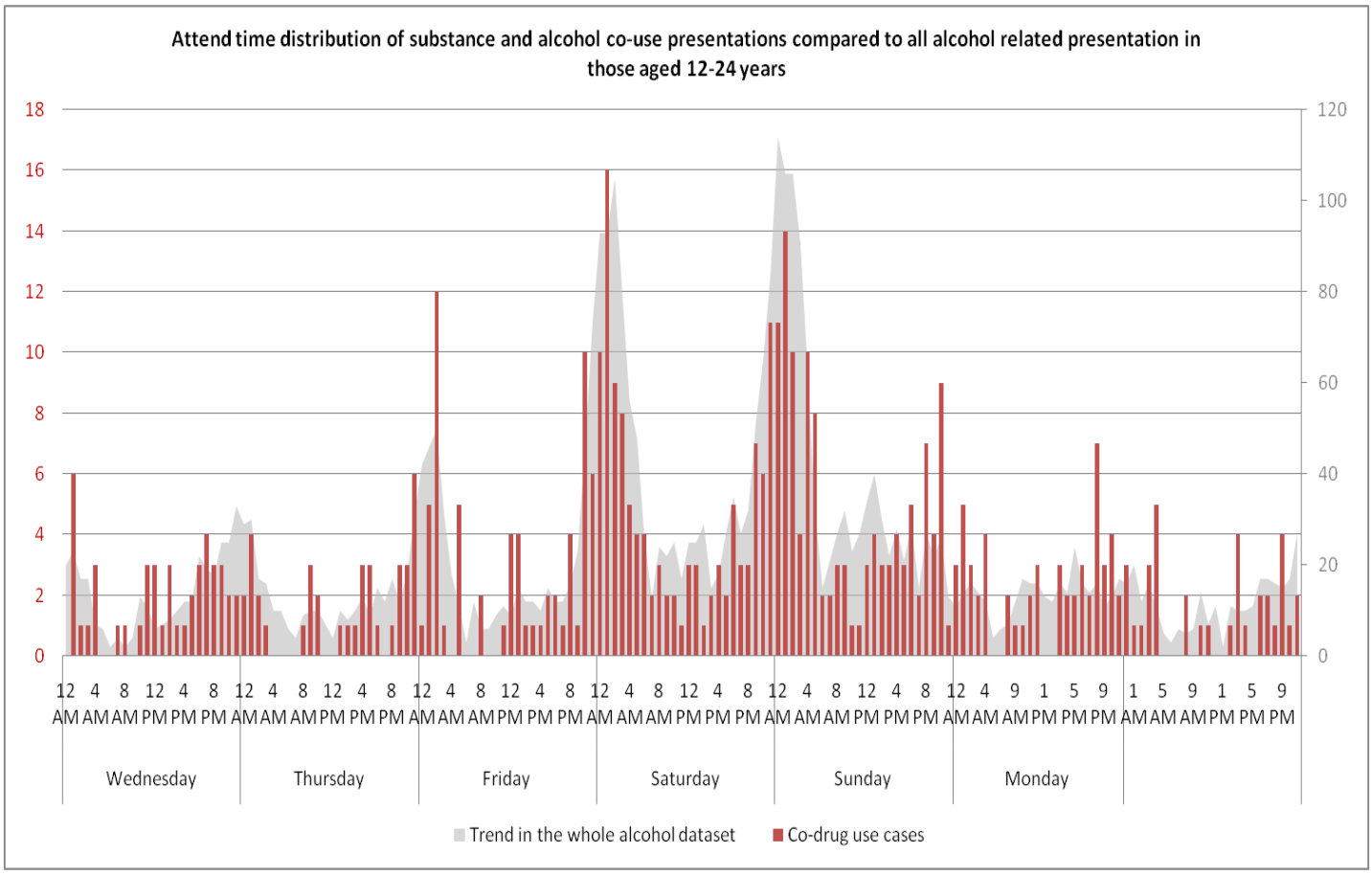
Table 2 - Substance Co- Use within those presenting with alcohol related injuries analysed by gender and age

Substance co-Use Documented	12 – 17						18 – 24						Grand Total	
	Female		Male		Total		Female		Male		Total			
	n	%)	n	%	n	%	n	%	n	%	n	%	n	%
No	302	73.3%	461	90.4%	763	82.8%	657	78.8%	1847	93.3%	2504	89.0%	3267	87.5%
Yes	110	26.7%	49	9.6%	159	17.2%	177	21.2%	132	6.7%	309	11.0%	468	12.5%
Grand Total	412	100.0%	510	100.0%	922	100.0%	834	100.0%	1979	100.0%	2813	100.0%	3735	100.0%

Day and Time of Presentation

Substance and alcohol co-use presentations were more common on the weekend, with almost half of all presentations recorded on a Saturday or Sunday (49.6%). Figure 1 shows the variation in the number of presentations by weekend day and time. Attendance time at ED is accurately captured by the triage nurse. The majority of co-drug use related injury presentations (58%) attended the ED between 18:00 on a Friday and 0559 on Monday, with 25% attending on a Friday night or Saturday night between the hours of 22:00 and 0259. Overall, the trend of attendance time among substance and alcohol co-use cases (Figure 1 - red bars) is similar to the trend of all alcohol-related presentation in those aged 12-24 years (Figure 1 – grey area).

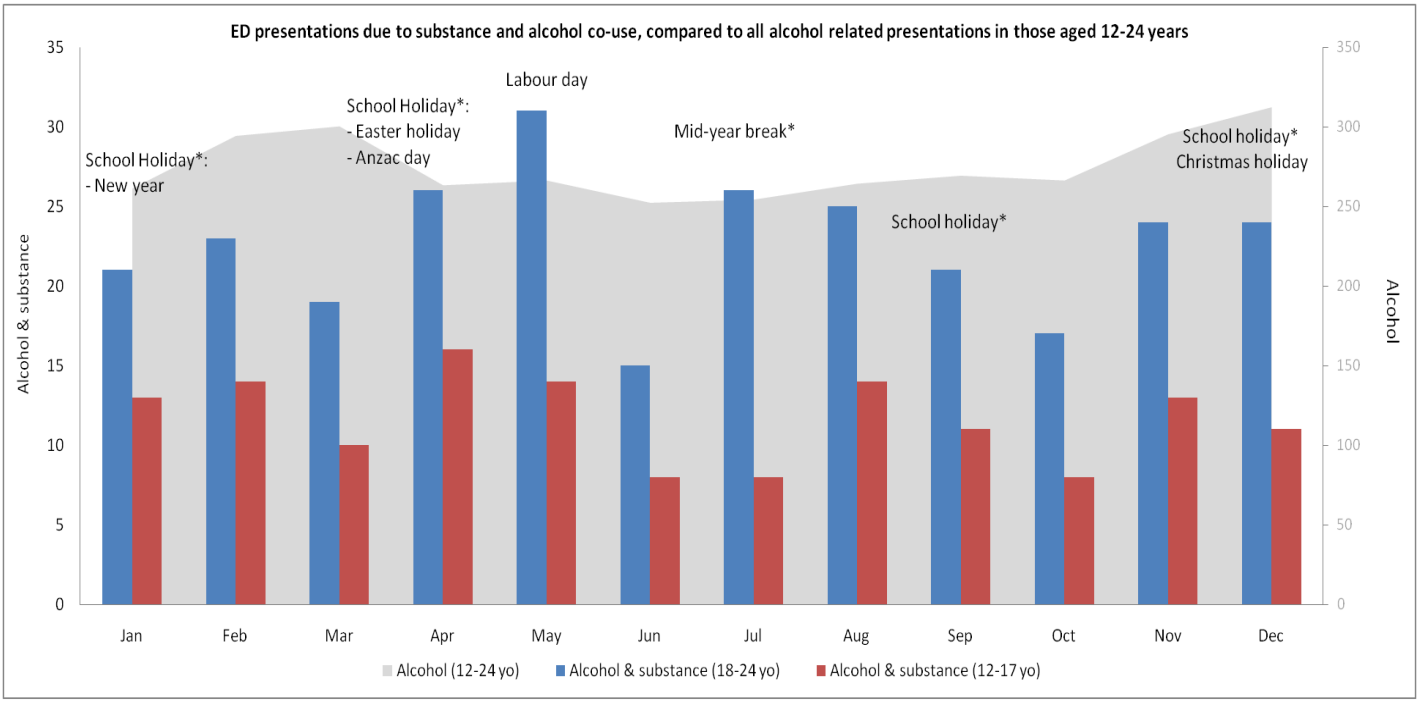
Figure 1—Attend time distribution of substance and alcohol co-use presentations compared to all alcohol related presentation in those aged 12-24 years



Presentations by month

The ED presentations of substance and alcohol co-use were examined for the 11 year (1999-2009) period where data was available for the full year. Overall, the monthly variation in presentations due to alcohol and substance co use is similar to the pattern for all alcohol-related cases in those aged 12-24 years. For both age groups 12-17 and 18-24 years, a high number of substance and alcohol co-use presentations is noted around November (9%) and December (8%) with more than one third of all co-use presentations occurring between November and January (35%). Other peaks occurred in during the Easter break in April (10%) and mid-year break in July (8%) (see Figure 2). The correlation between school holidays and substance and alcohol co-use related ED presentations demonstrated in the graph is approximate only as the precise timing of holidays varied over the 11 year period.

Figure 2—ED presentations due to substance and alcohol co-use, compared to all alcohol related presentations in those aged 12-24 years



* This graph displays 11 years of data and holidays vary slightly each year

Mechanism of Injury

Injury presentations related to substance and alcohol co-use were categorised using the same methodology as described in the earlier alcohol bulletin [9]. As shown in Table 3 for substance and alcohol co-users, intentional self-harm was the most common category of injury cause across age and gender, accounting for almost half of all cases (48.9%). This was followed by intoxication due to a substance or alcohol (18.6%) and assault (18.4%). Other substance and alcohol injury presentations accounted for 12.8% and road traffic crashes accounted for just 1.3% of all substance and alcohol co-use presentations. Self harm was more common in female substance and alcohol co-users (55.8%) compared to males, particularly in younger females aged 12-17 years (62.7%). The proportion of alcohol and substance co-users attending the ED following an assault increased across the age groups, with older males aged 18-24 years the most likely age group to present with an assault-related injury (27.3%).

Table 3 - Type of substance and alcohol co-use related Injury by Age and Gender

Analysis of Injury Type	Female						Male						Grand Total	
	12 - 17		18 - 24		Total		12 - 17		18 - 24		Total			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Intentional self harm	69	62.7%	91	51.4%	160	55.8%	18	36.7%	51	38.6%	69	38.1%	229	48.9%
Ingestion of substance & alcohol	16	14.6%	33	18.6%	49	17.1%	16	32.7%	22	16.7%	38	21%	87	18.6%
Assault	12	10.9%	32	18.1%	44	15.3%	6	12.2%	36	27.3%	42	23.2%	86	18.4%
Substance & alcohol - related injury - Other	13	11.8%	20	11.3%	33	11.5%	7	14.3%	20	15.2%	27	14.9%	60	12.8%
Road traffic crash			1	0.6%	1	0.4%	2	4.1%	3	2.3%	5	2.7%	6	1.3%
Grand Total	**110**	**100.0%**	**177**	**100.0%**	**287**	**100.0%**	**49**	**100.0%**	**132**	**100.0%**	**181**	**100.0%**	**468**	**100.0%**

Severity

Triage scores and ED discharge status are often used as a proxy measure of the severity or complexity of an injury. Overall, approximately 23% of presentations were deemed to have high acuity injuries and were triaged as requiring immediate or emergency attention (within 0- 10 minutes). One quarter of girls aged 12-17 years were triaged as high acuity compared to older males (14%). Nearly 75% of patients were assigned a triage category of 3 or 4 requiring attention within half to one hour upon arrival at ED (See Table 4).

Table 4 - Substance Co- Use within those presenting with alcohol related injuries analysed by gender and age

Triage		Female						Male						Grand Total	
		12 - 17		18 - 24		Total		12 - 17		18 - 24		Total			
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	Resuscitation (immediate)		0.00%	6	3.43%	6	2.11%	2	4.08%	5	3.79%	7	3.87%	13	2.79%
2	Emergency (10 minutes)	28	25.45%	37	21.14%	65	22.81%	9	18.37%	19	14.39%	28	15.47%	93	19.96%
3	Urgent (30 minutes)	63	57.27%	85	48.57%	148	51.93%	26	53.06%	65	49.24%	91	50.28%	239	51.29%
4	Semi urgent (60 minutes)	17	15.45%	42	24.00%	59	20.70%	12	24.49%	40	30.30%	52	28.73%	111	23.82%
5	Non urgent (120 minutes)	2	1.82%	5	2.86%	7	2.46%		0.00%	3	2.27%	3	1.66%	10	2.15%
Grand Total		**110**	**100.00%**	**175**	**100.00%**	**285**	**100.00%**	**49**	**100.00%**	**132**	**100.00%**	**181**	**100.00%**	**466**	**100.00%**

* Two cases with unspecified triage

As shown in Table 5, approximately 34% (n=160) of patients with substance and alcohol co-use injuries were admitted to hospital or transferred after presenting at ED. Thirty eight out of these 160 cases were involved in multiple substance and alcohol co-use.

Table 5 - Separation status of substance and alcohol co-use cases: 12-24 years

Separation	Female						Male						Grand Total	
	12 - 17		18 - 24		Total		12 - 17		18 - 24		Total			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
ED service event completed - Discharged	61	55.5%	105	59.3%	166	57.8%	30	61.2%	78	59.1%	108	59.7%	274	58.6%
Admitted(excl.ED Bed)	38	34.6%	58	32.8%	96	33.5%	17	34.7%	32	24.2%	49	27.1%	145	31 %
Left after treatment commenced	4	3.6%	3	1.7%	7	2.4%	1	2.0%	10	7.6%	11	6.1%	18	3.9%
Did not wait	1	0.9%	5	2.8%	6	2.1%	1	2.0%	9	6.8%	10	5.5%	16	3.4%
Transfer to another hospital	6	5.5%	6	3.4%	12	4.2%			3	2.3%	3	1.7%	15	3.2%
Grand Total	**110**	**100.0%**	**177**	**100.0%**	**287**	**100.0%**	**49**	**100.0%**	**132**	**100.0%**	**181**	**100.0%**	**468**	**100.0%**

Place of Injury

As shown in Table 6, approximately 50% of substance and alcohol co-use related injury events occurred at home, with trade or service areas being another common place of injury (14.7%). Place of injury was 'unspecified' in 17.7% of cases. The proportion of injury incidents occurring in a home was higher (69.1%) for young females aged between 12 and 17 years, when compared to males aged 12-24 years (39.8%) and older females aged 18-24 years (49.7%).

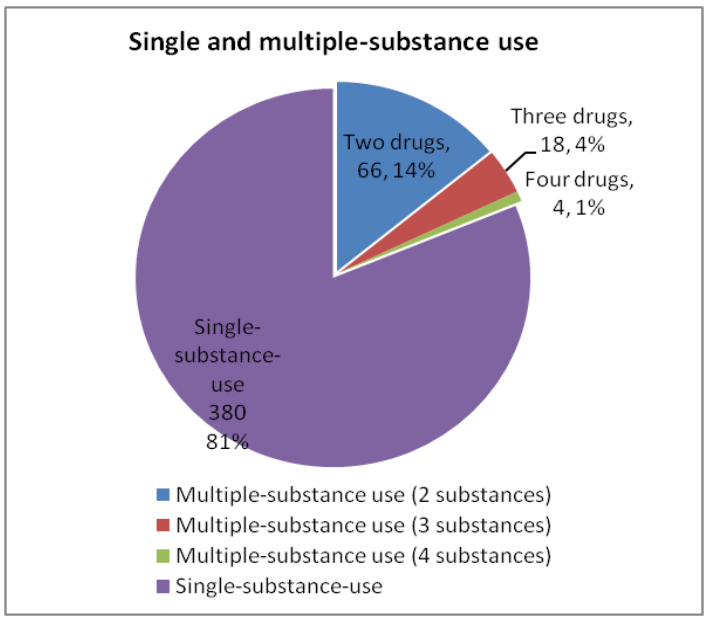
Table 6 - Type of Place where substance and alcohol co-use related injury incident occurred by age group and gender: 12-24 years

Type of Place	Female						Male						Grand Total	
	12 - 17		18 - 24		Total		12 - 17		18 - 24		Total			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Home(includes farm house)	76	69.1%	88	49.7%	164	57.1%	17	34.7%	55	41.7%	72	39.8%	236	50.4%
Unspecified place	20	18.2%	22	12.4%	42	14.6%	17	34.7%	24	18.2%	41	22.7%	83	17.7%
Trade or service area	1	0.9%	40	22.6%	41	14.3%	3	6.1%	25	18.9%	28	15.5%	69	14.7%
Other specified place	5	4.6%	12	6.8%	17	5.9%	3	6.1%	11	8.3%	14	7.7%	31	6.6%
Recreation area (place mainly for informal recreational activity	4	3.6%	9	5.1%	13	4.5%	4	8.2%	5	3.8%	9	5 %	22	4.7%
Street or highway (Public road)	1	0.9%	5	2.8%	6	2.1%	4	8.2%	11	8.3%	15	8.3%	21	4.5%
School, other institution, or public administrative area	3	2.7%			3	1.1%	1	2.0%			1	0.6%	4	0.9%
Industrial or construction area			1	0.6%	1	0.4%							1	0.2%
Hospital or other health service									1	0.7%	1	0.6%	1	0.2%
Grand Total	**110**	**100.0%**	**177**	**100.0%**	**287**	**100.0%**	**49**	**100.0%**	**132**	**100.0%**	**181**	**100.0%**	**468**	**100.0%**

Number of substances used

As shown in Figure 3, 81% of injury presentations associated with substance and alcohol co-use involved use of one substance. Multiple-substance co-use with alcohol was identified in 19% (n=88) and involved between 2 and 4 different substances.

Figure 3—Number of non-alcohol substances identified in cases of substance and alcohol co-use: 12-24 years: n= 468



Substance Group

Using the triage text and ICD coded fields, presentations due to substance and alcohol co-use were classified by substance group (table 1) using the Therapeutic Goods Administration (TGA) schedule: Controlled or Illicit Substances, Prescription substance and Over-the-counter substance (OTC). Other non-pharmaceutical substances that are feely available were grouped as 'non-medicine'. Within this group , use of volatile substances (e.g. chroming, glue, paint, petrol etc) was more commonly identified in substance and alcohol co-users aged 12-17 years (2.2%), compared to those aged 18 - 24 years (0.1%).

Overall, in 166 or 35% of cases it was not possible to identify the specific substance or substance category. The remainder of the cases with substance terms specified in the data (n=302) contained 118 cases where Illicit or controlled prescription substances were identified. Prescription substances were identified in 150 presentations and OTC substances or other unregulated substances were identified in 101 cases. There were 63 injury cases where alcohol use was associated with use of substances from more than one substance group. The overlap by substance group is shown in Figure 3. Illicit and/or controlled prescription substances are most frequently used simultaneously with other substances in the same group (n=11) and other substances in the prescription group (n=10). The most common

substances used in these combinations are Cannabis, Ecstasy and Methamphetamine/Amphetamine.
Other substances involved in multiple illicit substance use include GHB, Morphine and Cocaine. Substance and alcohol co-users aged 18-24 were more likely to have documentation to indicate unintentional substance exposure with "drink spiking" (drug spiking) (2.7%) compared to those cases aged 12-17 years (1.7%). Spiking substances were not able to be identified within the dataset.

There were 413 specific substances identified among the 302 cases of substance and alcohol co-use where specific substances could be identified. Overall, a total of 162 prescription substances were identified, with 133 illicit or controlled prescription substances and 108 different OTC substances. There were 10 different generic non-medicine substances identified (Figure 5).

Type of substances used

All substance terms extracted from the text field were re-coded into their relevant generic names using MIMS where applicable and classified using ICD-10-AM chapter 19 substance codes and then grouped using the TGA poison schedule [11] (See Table 7).

Figure 4— Substance Categorisation by TGA group: number of cases = 468

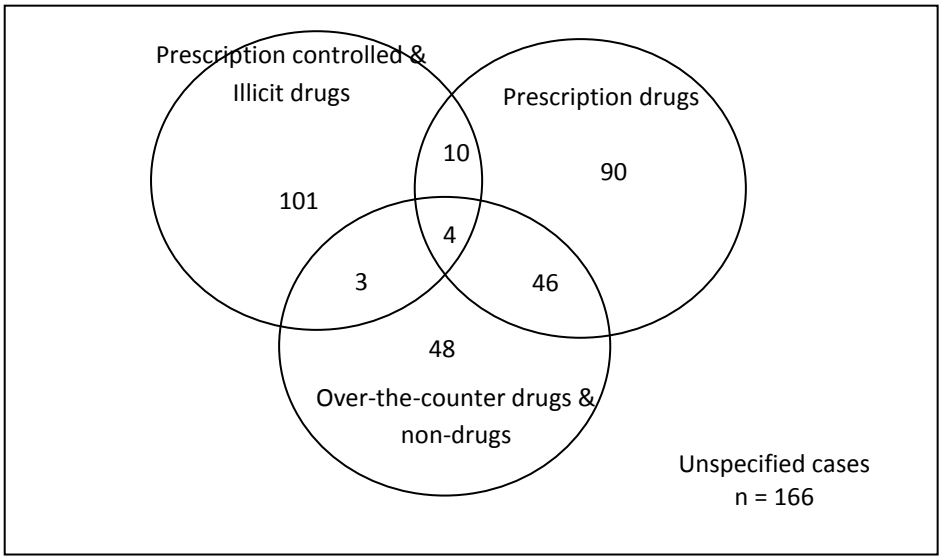
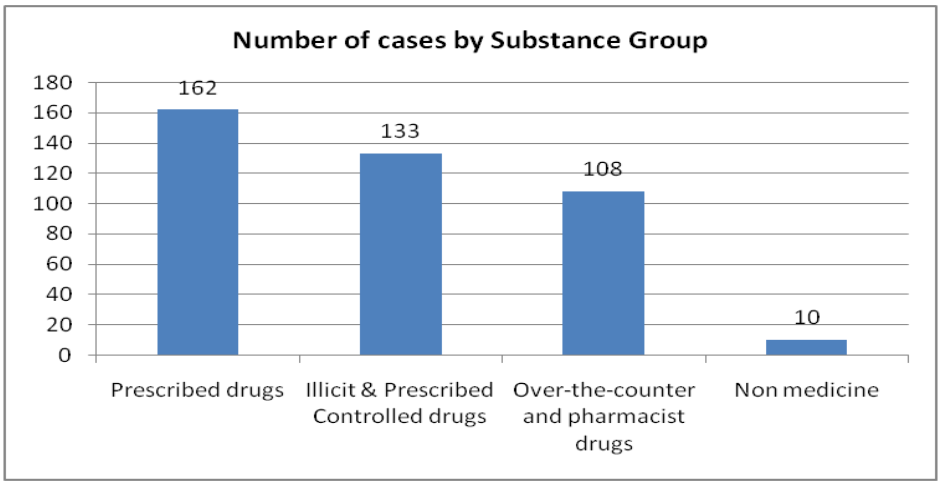


Figure 5— Number of substances used by group (Including multiple substance use): number of substances = 413



Discussion:

The current study used a text extraction approach to investigate a subset of patients identified in the QISU database as presenting with substance and alcohol co-use. Text extraction has been widely use by researchers in injury prevention. It has been shown that text extraction techniques capture more cases than identification of injury cases using only coded fields [6, 12]. In a previous bulletin [9] and similar study conducted by Indig et al (2009) [6], extraction of triage text data identified 2.2 to 4 times more cases of alcohol-related injury than using coded fields alone . Using a similar approach but focused specifically on youth (12-24 years of age), the current study has successfully generated a range of substance terms that co-occurred with alcohol-related injury cases. These terms can be used to inform larger text mining studies to capture the prevalence of substance -related injury within injury surveillance datasets and in broader population data (such as the data collected in the EDIS systems utilised by a large number of hospitals nationally). Given that substance and alcohol involvement are not routinely coded in ED data nationally, this approach provides an avenue to gain a better understanding of the harms associated with substance misuse and the impact on emergency health services.

Following the identification of alcohol and drug-related injury cases, recoding of identified substances was conducted to classify and standardise the drug groups and names. The use of ICD-10-AM poison codes provides a standardised categorisation to facilitate statistical analysis of patterns of drug and alcohol use. The results showed frequent use of cannabis (n=48), ecstasy (n=41), Aminophenol derivative substances (n=62), benzodiazepines (n=41) and anti-depressant substances (n=40) in the data which mirrors the current trends reported by ABS [13] and other Australian studies [4, 8, 14]. The findings regarding the types of substances used are consistent with the previous 10 years findings (1991-2001) by the ABS which reported high numbers of drug-induced deaths related to these 5 groups of substances (aminophenol derivatives, narcotics and hallucinogens (including cannabis), psycho stimulants (including ecstasy), benzodiazepines and anti-depressants). [13]

The classification of substances using TGA schedules which was performed in this study illustrated the legal status and consumer availability of the identified substances. This categorisation showed that more than half of the substance use within the co-use

Table 7 - Frequency of cases where substances identified by Schedule, Type of substance and generic name: number of substances identified = 413

Substance Category	Type of substance	Generic Name	N
Illicit sub-stances	Narcotics	Narcotics	1
	Heroin	Heroin	3
	Cannabis (derivatives)	**Cannabis**	**48**
	Lysergide (LSD)	Lysergic acid diethylamide (LSD)	7
	Intravenous anaesthetics	Phencyclidine	1
	Gamma hydroxybutyrate (GHB)	Gamma-Hydroxybutyric acid	3
	Methylenedioxy methamphetamine	**Ecstasy**	**41**
		Total	**104**
Controlled prescription Substance	Opioids	Morphine	3
	Methadone	Codeine	1
	Cocaine	Cocaine	2
	Benzodiazepines	flunitrazepam	1
	Methylamphetamine	Methamphetamine	13
	Other psychostimulants with potential for use disorder	Amphetamine, Dexamphetamine	9
		Total	**29**
Prescription substances	Penicillins	Amoxycillin - Clavulanic acid	1
	Cephalosporins and other ß-lactam antibiotics	Cefaclor monohydrate	1
	Rifamycins	Clarithromycin	1
	Tetracyclines	Doxycycline, Tetracyclines	3
	Other systemic antibiotics	Clindamycin	1
	Insulin and oral hypoglycaemic drugs	Metformin	2
	Salicylates	Aspirin - Codeine	1
	4-Aminophenol derivatives	Codeine - Doxylamine succinate – Paracetamol, Paracetamol - Codeine - Doxylamine succinate, Paracetamol - Pseudoephedrine - Codeine	5
	Other nonsteroidal anti-inflammatory drugs [NSAID]	Diclofenac, Ibuprofen, Naproxen	5
	Nonopioid analgesic, antipyretic and antirheumatic	Analgesic	2
	Other synthetic narcotics (Pethidine)	Dextropropoxyphene hydrochloride – Paracetamol, Tramadol	5
	Benzodiazepines	**Alprazolam, Clonazepam, Diazepam, Oxazepam, Temazepam**	**41**
	Other antiepileptic and sedative-hypnotic drugs	Gabapentin, Valproate, Zolpidem	10
	Antiepileptic and sedative-hypnotic drugs, unspecified	Sleeping draught or pill	3
	Monoamine-oxidase-inhibitor antidepressants	Moclobemide	1
	Other and unspecified antidepressants	**Citalopram, Citalopram hydrobromide, Desvenlafaxine, Duloxetine, Escitalopram, Fluoxetine, Paroxetine, Sertraline, Venlafaxine**	**40**
	Phenothiazine antipsychotics and neuroleptics	Chlorpromazine hydrochloride, Prochlorperazine	2
	Butyrophenone and thioxanthene neuroleptics	Haloperidol	1
	Other and unspecified antipsychotics and neuroleptics	Aripiprazole, Olanzapine, Quetiapine fumarate, Risperidone	12
	ß-Adrenoreceptor antagonists	Atenolol	2
	Drugs primarily affecting the autonomic nervous system	Ephedrine	1
	Antiallergic and antiemetic drugs	Metoclopramide	7
	Iron and its compounds	Iron	1
	Calcium-channel blockers	Amlodipine	1
	Angiotensin-converting-enzyme inhibitors	Perindopril	1
	Other antihypertensive drugs	Clonidine hydrochloride, Methyldopa	3
	Mineralocorticoids and their antagonists	Spironolactone	1
	Appetite depressants	Phentermine	4
	Antidotes and chelating agents	Disulfiram	1
	Drugs, medicaments and biological substances	Atomoxetine	1
	Other metals	Lithium	2
		Total	**162**
Pharmacist	Phenothiazine antipsychotics and neuroleptics	Promethazine	5
	Antiallergic and antiemetic drugs	Doxylamine	3
		Total	**8**
Over-the-counter Substances	Anthelminthics	Pyrantel embonate	1
	Salicylates	Aspirin	3
	4-Aminophenol derivatives	**Paracetamol, Paracetamol – Codeine**	**42**
	Other nonsteroidal anti-inflammatory drugs [NSAID]	Ibuprofen	16
	Other psychostimulants with potential for use disorder	Caffeine	4
	Predominantly a-adrenoreceptor agonists	Phenylephrine	2
	Antiallergic and antiemetic drugs	Fexofenadine, Loratadine	4
	Vitamins	Vitamins	3
	Anticoagulants	Chlorpheniramine	
	Expectorants	Expectorants	
	Anti-common-cold drugs	Anti common cold drugs	5
		Total	**100**
Non-pharmaceu-tical unregu-lated	Inhaled anaesthetics	Nitrous Oxide	1
	Petroleum products	Petrol	1
	Other organic solvents	Turpentine	2
	Organic solvent, unspecified	Solvent	3
	Paints and dyes, not elsewhere classified	Paint	3
		Total	**10**
		Grand Total	**413**

cases in this study were classed as illicit use and/or potential prescription misuse. The pattern and trends of multiple substance and alcohol co-use (which represented almost 20% of all cases) was also explored using TGA schedules. These findings verified the priority areas mentioned in the current National Drug strategy [2] and also highlighted the potential use of injury surveillance and emergency data to inform the process of alcohol and drug-related policy making.

Another potential opportunity in the use of injury surveillance and emergency data is to provide early identification of children and youth with mental health problems. The National Mental Health Survey reported that in 2007 out of the 16 million Australians aged 16–85 years, 819,800 people were diagnosed with substance use disorder (drug dependence, harmful use of alcohol and alcohol dependence) [15]. Data recorded on ED presentations involving alcohol and drug use can be used as a tool to detect mental health disorders related to substance use. A study by Indig (2010) using the same text mining technique combined with mental health-related codes discovered that 39% of all ED presentations where illicit substance use was identified had ICD diagnoses that fell in the mental health range . [8] . Detection of mental health issues in EDIS data can be difficult as patients with drug use are more likely to be assigned poisoning diagnosis codes. Using text mining techniques, ongoing surveillance of emergency presentations due to substance or alcohol use and co-use can be utilised to advocate for early intervention services within EDs and to measure outcomes following instigation of such services.

Despite the potential opportunities highlighted by these findings, there is clear need for additional improvement to gain a more thorough understanding of this important issue. Data completeness is an issue given the numbers of presentations with specific substances not recorded in the data. Various factors contribute to this data quality issue such as patient inability to provide full information (e.g. level of consciousness, willingness to declare substances used, drink spiking or leaving the ED before treatment being commenced) and lack of documentation training for ED staff [16].

Moreover, even though studies have found that substance and alcohol use are often documented in emergency injury presentations [7, 17], it is likely that substance and alcohol use are factors in other emergency presentations. This study only focused on alcohol-related injuries with concurrent substance co-use in patients aged 12 to 24 years of age. Further analysis using this piloted search strategy in a broader emergency dataset would identify a more complete picture of substance-related presentations and will provide an important evidence base for policy decisions in this field.

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