



## ORIGINAL ARTICLE

## Addressing adolescent substance use in a paediatric health-care setting

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**Aim:** The aim of this study is to review the operation of a specialist adolescent drug and alcohol consultation liaison service in a tertiary paediatric hospital.

**Method:** A retrospective review of patient records was conducted to identify patient characteristics and assess service utilisation.

**Results:** Two hundred adolescents were referred over 4 years. Most presented during mid-adolescence (14–16 years). Alcohol, cannabis and nicotine were the most frequently reported substances, and almost half of referrals involved polysubstance use. Mental health diagnoses and behavioural problems were commonly reported. Almost two-thirds (63.5%) attended an appointment for drug and alcohol assessment and intervention ( $n = 92$ ) or were referred to appropriate services ( $n = 35$ ). Adolescents more likely to engage and attend an appointment with the specialist adolescent addiction medicine service included those with amphetamine use, polysubstance use, chronic illness, any mental health diagnosis and mood disorder. Indigenous Australians and those with a history of aggression were more difficult to engage.

**Conclusions:** Adolescents present to paediatric health settings with drug- and alcohol-related issues, including associated harms. These comprise, but are not limited to, physical and sexual assault, family conflict, mood and behavioural concerns (including psychosis), and forensic issues. Early intervention aims to reduce long-term risks such as dependence in adulthood. Specialist adolescent drug and alcohol services may assist in identifying and engaging these high-risk and often complex young people in developmentally appropriate treatment.

**Key words:** adolescent; alcohol; cannabis; drug abuse; early intervention; treatment.

### What is already known on this topic

- 1 Adolescence is a time of increased risk-taking behaviour with as many as 15% of adolescent presentations to Australian emergency departments involving acute intoxication, overdose or poisoning, and an even greater proportion presenting with injury associated with substance misuse.
- 2 Hospital presentations associated with adolescent substance use provide a unique opportunity for brief and early interventions, reducing associated harms and the risk of drug and alcohol addiction. Many of these opportunities to intervene are missed, however, due to the paucity of specialist adolescent drug and alcohol services in the hospital setting.
- 3 Adolescent drug and alcohol services work within a developmental framework, understand the impact of substance use on the developing adolescent brain, engage adolescents in treatment, and involve both parents and family in assessment and treatment. Many other issues are unique to adolescent services including consent of minors, confidentiality, child protection issues and holistic management, accounting for the various systems which uniquely influence the adolescent, such as family, peer, school and community.

### What this paper adds

- 1 This study presents novel descriptive data from a specialist adolescent drug and alcohol service that exists within an independent tertiary paediatric acute care hospital.
- 2 Service engagement for this younger age group (early to mid-adolescence) is at least as effective as conventional adult services, which is a positive finding for such a service that aims at early intervention in young adolescents.
- 3 The incidence and prevalence of problematic use of alcohol and other drugs (primarily cannabis) occur frequent enough to justify an expert service within a paediatric hospital.

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Adolescent substance use is a public health concern, with as many as 29% of Australian teenagers aged 12–18 admitting to drinking to the point of intoxication,<sup>1</sup> 38% reporting lifetime illicit drug use<sup>2</sup> and 20% reporting polysubstance use.<sup>3</sup> The mean age at which adolescents start using alcohol and cannabis is as low as 13 years old, with rates of use increasing steadily through adolescence and young adulthood.<sup>4</sup>

Adolescence is an important period of brain maturation, particularly of the pre-frontal regions, responsible for executive functions, such as the ability to evaluate the potential risks and adverse consequences of one's actions. During adolescence, individuals are more prone to engage in risky behaviours,<sup>5,6</sup> including the use of alcohol and other substances known to disrupt normal neural development.<sup>7</sup> Moreover, adolescent substance use is associated with multiple acute and long-term health risks. Many present to hospital emergency departments (EDs), with acute intoxication, overdose and injury,<sup>8</sup> aggressive behaviour, deliberate self-harm,<sup>9</sup> or risky sexual behaviours.<sup>10</sup> Heavy substance use during adolescence also increases the likelihood of dependence in adulthood.<sup>11,12</sup>

Despite this emerging health issue, adolescent-specific drug and alcohol services are scarce.<sup>13</sup> Adolescents may be turned away from adult services, which lack the necessary youth-specific expertise and facilities. Brief interventions, such as motivational interviewing, have been found to be effective in reducing substance use in adolescents aged 12 years and older, as have longer-term interventions such as cognitive behavioural therapy and family therapy.<sup>14</sup> Clinician-delivered brief intervention is effective in reducing the number of individuals re-presenting to the ED and improving psychological well-being.<sup>15,16</sup> This may be further facilitated through education of ED staff on the recognition and management of alcohol misuse.<sup>17</sup>

Paediatricians have a well-recognised and important role in prevention, detection and management of paediatric issues including tobacco, alcohol and other drug use among children and adolescents. The American Academy of Paediatrics has developed a policy statement on Substance use screening, brief intervention and referral to treatment which outlines developmentally appropriate tools and strategies for alcohol and other drug use in adolescence.<sup>18</sup> Research has demonstrated that paediatricians report a lack of knowledge and confidence in delivering brief interventions for tobacco and other substances.<sup>19</sup> Once adolescents have been identified as being at risk of substance abuse and/or dependence, referral to an adolescent-specific drug and alcohol service is preferable. As such, a specialist adolescent drug and alcohol service was established within an Australian paediatric hospital, where adolescent substance use had not previously been regarded as core business. The aim of this study was to perform a retrospective review of patient records to describe the profile of the adolescents referred and assess service utilisation by these young people.

## Method

### Setting

The Service of Addiction Medicine for Youth (SAMY) was established in 2008 as a specialist adolescent drug and alcohol consultation liaison service within a public tertiary paediatric

teaching hospital, The Children's Hospital at Westmead, Sydney, Australia. The service is located within the Department of Adolescent Medicine, a multidisciplinary ambulatory care service.

### Staff

The service operates on a part-time basis and is comprised of a 0.4 full-time equivalent (FTE) staff specialist in paediatrics and addiction medicine and a 0.3 FTE psychologist who provide clinical assessment and on-going management to adolescents with problems related to substance use.

### Aims

As an early intervention service, SAMY aims to prevent or reduce both short- and long-term biological and psychosocial consequences associated with acute and chronic substance use.

### Model of care

#### Clients

New referrals are accepted for adolescents aged 10–16 years; however, patients known to the hospital may be referred to SAMY until the age of 18 years. There is no requirement for their substance use to have progressed to a certain threshold or stage. The majority present with 'problematic use' defined by the American Academy of Pediatrics as use in high-risk situations or associated with a problem such as violence, unwanted sexual experiences, arrests, school suspensions or for emotional regulation.<sup>18</sup> A smaller proportion present with experimental use, and given the age at which adolescents are referred (i.e. early to mid-adolescence), few present with substance abuse or addiction.

#### Referrals to SAMY

Referrals are received from the ED, inpatient wards, medical, surgical and subspecialty departments, or external to the hospital including general practitioners, juvenile justice, youth and community services.

Where possible, adolescents are seen as inpatients, true to the consult liaison model. However, as adolescents with substance use often present to hospital after hours or on weekends, they are followed up by SAMY staff after discharge by phone contact and then seen in an outpatient setting.

#### Intake

Staff make phone contact with the adolescent, their family or carer. Engagement begins at first contact and continues at the initial assessment. Occasionally, an adolescent is engaged with another service provider and re-referral is facilitated.

#### Assessment

An initial 1 h assessment is undertaken jointly by the psychologist and paediatrician. This includes the young person, parent/carer and, occasionally, siblings, friends, case workers or other health professionals. The adolescent is seen alone for some of this appointment. The parents are also given opportunity to interview alone.

A comprehensive assessment is performed in an adolescent health framework. This includes developmental history, Home,

Education and employment, Eating, Activities with peers, Drugs, Sexual Activity, Suicide and depression, and Safety assessment,<sup>20</sup> psychological assessment, drug and alcohol history, and family assessment. Clinical staff adopt an eclectic, less structured approach sensitive to the developmental stage of the adolescent, their family and interpersonal dynamics.

Medical assessment includes review of general growth and development, nutritional status, immunisation review, sexual health assessment, and mental health review for co-morbidities.

### Treatment

Intervention begins at the initial assessment, including brief intervention, motivational interviewing and psychoeducation regarding the effects of adolescent substance use. Parental education is also offered in the form of verbal and written communication.

A treatment plan is developed, including drug and alcohol counselling, cognitive behaviour therapy, harm minimisation strategies, and family therapy. Pharmacotherapy is prescribed as required, managing withdrawal symptoms and co-morbidities including depression and anxieties.

School liaison is an important role of the SAMY service, as many adolescents are disengaged from school and have school avoidance, significant learning and behavioural difficulties. Child protection issues require liaison with child protection services.

The duration of engagement ranges from one appointment to 12 months. In some cases, minimal intervention is required, and after one session, the young person is discharged with parental support. For those that do not return for a second-planned appointment, three attempts are made to try to engage the adolescent and their family.

### Referral to other services

Adolescents may be referred to medical sub-specialists within the hospital for medical or mental health assessment and management. Inpatient admissions for drug and alcohol withdrawal are rare in the paediatric age group; however, older adolescents are referred to residential drug and alcohol rehabilitation if required. Referrals to external services include family therapy, social supports, drug and alcohol day programmes, educational support, housing, financial and employment support (i.e. Centrelink), adult mental health, and drug and alcohol services for parents or the older adolescent (over 16 years) needing transition into adult care.

### Retrospective review procedure

A retrospective review of patient medical files and hospital databases was conducted for all referrals made to SAMY during the 4-year period between July 2008 and June 2012. Data collected included referral characteristics, patient demographics, details of the ED presentation, clinical characteristics recorded in patient medical files or reported by patients and their families, SAMY service involvement, and whether there was a re-presentation to the ED related to substance use within 3 months following the initial referral. Substance use was ascertained through clinical assessment which involved a combination of self-report, parent/carer report and urine drug screen. Aggression was reported at referral or recorded in

ED/ambulance reports. Engagement in treatment was defined as attending at least one appointment with SAMY.

Where sample size limited analyses, categorical variables were collapsed due to too few cases in each group. The following variables were recoded into dichotomous variables: Indigenous status, main language spoken at home, country of birth, referral source, polysubstance (two or more substances excluding nicotine), any mental health diagnosis, more than one mental health diagnosis and chronic illness.

### Statistical analysis

Analyses were performed using SPSS 19 (IBM Corp., Armonk, NY, USA). Level of significance was set at  $\alpha = 0.05$ , and all tests were two tailed. Nonparametric tests were employed on analyses involving continuous variables due to the skewed distribution of the data. Simple descriptive statistics were conducted. Where patients were referred more than once, only the first referral was analysed. Missing data were coded as 'other'. Group comparisons were analysed using  $\chi^2$  test for categorical variables and Mann-Whitney *U*-test for continuous variables. Adolescents who were referred to or already involved with another relevant service were excluded from analyses comparing individuals who were seen by SAMY with those who were not. Approval was obtained from the Sydney Children's Hospital Network Human Research Ethics Committee.

### Results

Two hundred adolescents were referred to SAMY over the 4-year study period. Patient referral, demographic and clinical characteristics are presented in Table 1. Referrals were primarily from the ED (73.5%). Eight of these patients were referred more than once. Figure 1 illustrates the monthly referral rate for both ED and non-ED (inpatient, outpatient and external) referrals, with an average of four referrals per month.

Gender distribution was similar (*F* 51.0%). The mean age at first presentation was 15.0 years (standard deviation, 1.01; range 10.8–18.0 years), with the majority of individuals presenting during middle adolescence (83.0%). Most were born in Australia (83.0%), followed by New Zealand/Pacific Islands (4.5%), Africa (4.0%) and United Kingdom (2.5%). The main language spoken at home was English (92.0%). Other languages included Asian, Persian, African languages, Spanish and Russian. Indigenous Australians were over-represented (7.5%) compared with Australian population estimates of approximately 2%. A total of 149 (74.5%) adolescents were living with parent(s), 33 (16.5%) were living in out-of-home care under the care and control of a government department, nine (4.5%) were with another family member, four (2.0%) were living independently or with a friend or partner, three (1.5%) were incarcerated in juvenile detention centres and two (1.0%) were homeless.

The most frequently identified drug was alcohol, in 165 (82.5%) cases, followed by cannabis 114 (57.0%). Approximately a quarter of the sample were using both alcohol and cannabis 51 (25.5%). Less common drugs used included nicotine in 91 (45.5%), ecstasy in 23 (11.5%), amphetamines (including methamphetamines) in 21 (10.5%), inhalants in 11 (5.5%), opioids in seven (3.5%), and cocaine and

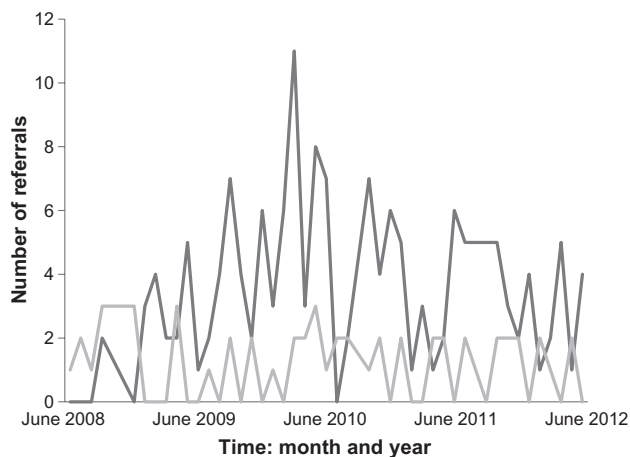
**Table 1** Patient referral, demographic and clinical characteristics

	<i>n</i>	%
<b>Referral source</b>		
Emergency department	147	73.5
Inpatient	17	8.5
Outpatient	16	8.0
External	20	10.0
<b>Gender</b>		
Male	98	49.0
Female	102	51.0
<b>Age (years)</b>		
Early adolescence (10–13)	29	14.5
Mid-adolescence (14–16)	166	83.0
Late adolescence (17–19)	5	2.5
<b>Country of birth</b>		
Australia	166	83.0
Other	34	17.0
<b>Language</b>		
English	184	92.0
Other	16	8.0
Indigenous Australians	15	7.5
<b>Drug use</b>		
Alcohol	165	82.5
Cannabis	114	57.0
Alcohol and cannabis	51	25.5
Polysubstance	91	45.5
<b>Mental health</b>		
At least one diagnosis	89	44.5
More than one diagnosis	29	14.5
Aggression	37	18.5
Self-harm	61	30.5
<b>Childhood sexual assault</b>		
Yes	12	6.0
Suspected	5	2.5
Chronic illness	30	15.0

Alcohol and drug use does not add up to 100% due to adolescents using more than one substance; polysubstance use was defined as one or more substances including alcohol, cannabis and other substances but excluding nicotine.

benzodiazepines, with six cases each. Ninety-one (45.5%) were considered to have polysubstance use. No gender differences were found. Just under half of the sample reported some form of mental illness. Mood disorders were the most common and were more frequent in females ( $\chi^2 (1, 200) = 5.57, P = 0.02$ ). Chronic illness was reported in 30 (15.0%) adolescents, including asthma and other atopic conditions, allergy, epilepsy and other seizure disorders, traumatic brain injury, cardiac abnormalities, diabetes, obesity, autoimmune thyroiditis, pancreatitis, inflammatory bowel disease, haemophilia, autoimmune hepatitis, chronic renal failure, neurofibromatosis, and osteogenesis imperfecta.

Figure 2 illustrates the service involvement for all adolescents referred to SAMY. Of the 200 adolescents, 32 (16.0%) declined services or could not be contacted to arrange an appointment. An additional seven (3.5%) adolescents missed their referral,



**Fig. 1** Monthly referral rate for emergency department and non-emergency department (i.e. inpatient, outpatient and external) referrals for the period June 2008 to June 2012. —, ED; - - -, non-ED.

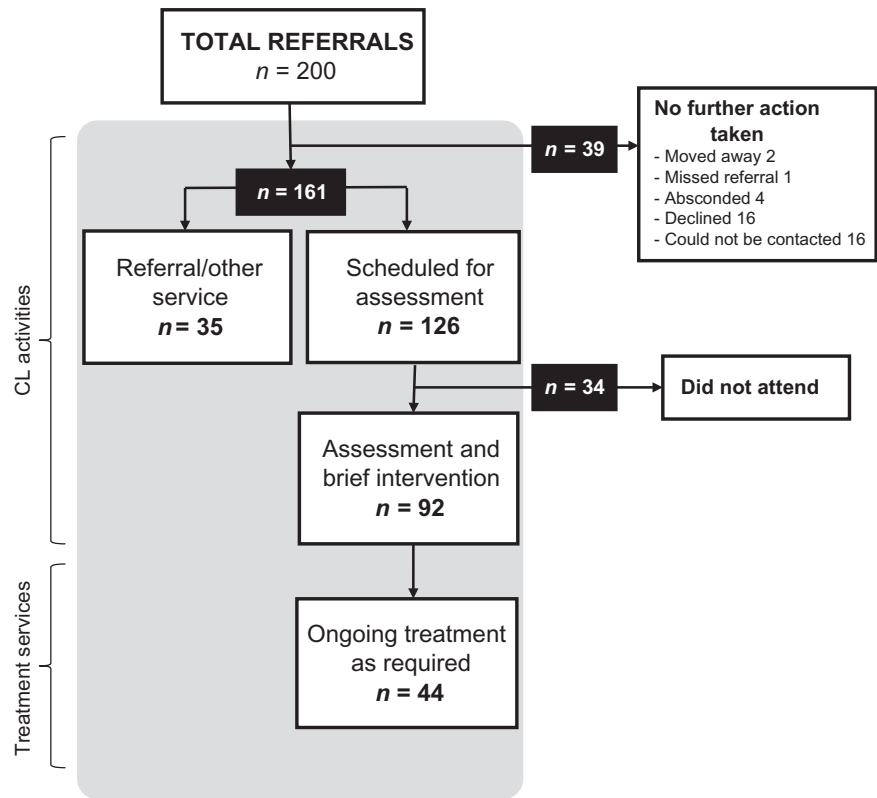
moved away or absconded from the ED. A total of 35 (17.5%) adolescents were referred on by SAMY or were already involved with appropriate services. An appointment with SAMY was made for 126 (63.0%) individuals, and 92 of these (73.0%) attended; however, 14 of these were seen as inpatients during their stay on the hospital wards. The number of appointments attended ranged from one to 16 (median = 1), with approximately half of these attending one appointment only (52.2%) and the remaining families attending between two and 16 appointments. Thirty-six (18.0%) of the 200 adolescents re-presented to the ED for problems related to substance use in the 3 months following referral to SAMY.

The  $\chi^2$  analyses indicated that the groups more likely to engage and attend an appointment with SAMY included those with polysubstance use ( $\chi^2 (1, 165) = 4.79, P = 0.03$ ), amphetamine use (Fisher's exact test,  $P = 0.01$ ), chronic illness ( $\chi^2 (1, 165) = 10.02, P = 0.002$ ), any mental health diagnosis ( $\chi^2 (1, 165) = 3.87, P = 0.05$ ) and a mood disorder ( $\chi^2 (1, 165) = 12.88, P < 0.001$ ). Those less likely to engage in treatment were individuals referred from the ED ( $\chi^2 (1, 165) = 12.78, P < 0.001$ ), Indigenous Australians ( $\chi^2 (1, 165) = 4.76, P = 0.03$ ) and those with a history or presentation of aggression ( $\chi^2 (1, 165) = 4.51, P = 0.03$ ).

## Discussion

This research presents the first detailed description of a novel drug and alcohol service in a paediatric health-care setting, which describes demographic and clinical characteristics of adolescents referred and the uptake of a designated treatment service. The data presented highlight the need for early intervention services within a paediatric hospital. Over 30% of adolescents referred to the SAMY service were aged 14 years or younger, supporting previous research documenting the early initiation age for adolescents using alcohol and other drugs.<sup>4</sup>

The ED remains the largest referral source of adolescents at risk of alcohol and drug-related problems with most presenting



**Fig. 2** Flow diagram of all referrals ( $n = 200$ ) made to the Service of Addiction Medicine for Youth (SAMY) describing service involvement and attendance at follow-up outpatient assessment and treatment.

after hours, making timely assessment and follow-up logistically difficult in the paediatric setting. No more than 20% of adolescents presenting to the ED with alcohol and other drugs are reported to have consultation with psychiatry.<sup>9,21</sup> A comparative Australian ED study showed that while 50% of adolescents with mental health problems were referred, none with substance use were.<sup>22</sup> Many adult drug and alcohol services do not have the youth-specific expertise or facilities to service this high-risk group. Services such as SAMY bridge this gap, offering drug and alcohol assessment and management for adolescents, and support the implementation of routine screening and brief interventions for high-risk adolescents who present to any ED.

In the current study, approximately two-thirds (63.5%) of the sample were initially followed up by SAMY staff and referred to appropriate services or provided outpatient assessment and treatment. This specialist adolescent drug and alcohol service was found to facilitate engagement and attendance in treatment for 46% of all referrals compared with the 25–29% reported in other studies, including those targeting adolescents presenting to EDs, where specialist services are usually located external to the hospital and not situated within paediatric health-care settings.<sup>15,16,23</sup> Nevertheless, the current study indicated that adolescent referred from the ED to SAMY were less likely to attend follow-up treatment than those referred from inpatient and outpatient services. This may be due to the nature of the referral process, the after hours timing of ED presentation, parental or care giver presence, the insight of the patients and/or their family to the importance of follow-up, and the reason for referral. Inpatients are seen by the SAMY team to assess, build

rapport and offer brief intervention. This process of engagement likely supports the young person to attend follow-up. Those referred from outpatient services are usually self-selecting and may be more accustomed to engage in treatment than those referred from the ED. Improving the referral pathway from the ED to SAMY may be facilitated by training of clinicians and maintaining a strong profile within the ED.

In agreement with previous research, alcohol, cannabis and nicotine were the most frequently used substances in this age group.<sup>3,21</sup> Co-morbid mental health conditions such as mood disorders, ADHD and behavioural disturbance were also found to be high in this population, consistent with the literature.<sup>24,25</sup> Such disorders increase the risk of engaging in substance use.<sup>26,27</sup> Nevertheless, such individuals were generally easier to engage in treatment, as were those with a chronic illness. This may be because they are familiar with attending hospital appointments and having regular interaction with medical staff. Indigenous adolescents were more difficult to engage, as were adolescents with a history of aggression. Having an Indigenous youth worker as part of the drug and alcohol team would assist engagement and management of this group.

Frequent presentations to the ED are common for adults with drug and alcohol dependence, and one aim of adult drug and alcohol treatment is to decrease the frequency of these emergency presentations. In this study, adolescents who attended ED treatment were no more or less likely to re-present to the ED for reasons relating to substance use. It is unknown how many of these may have re-presented to an adult ED. Long-term follow-up for these adolescents would help answer this question.

There are a number of limitations to this paper. As a retrospective review, there were no consistent measures of nicotine dependence, substance use was often reliant on self-report or parent/carer report, mental health diagnoses were from history and self-report only, and outcome measures were often difficult to ascertain. Further, detailed information on the nature and frequency of substance use, associated harms, and socio-economic status could not be adequately and consistently reported. Future research using a prospective design could examine patient outcomes such as reduction in substance use, attitudes towards substance use, reduction in risk-taking behaviour and changes in mood.

In conclusion, assessment and management of adolescents with drug and alcohol concerns require a developmental, holistic approach, which includes parents and care givers. The goal is to support behavioural and environmental change so that the opportunities and the reasons for substance use might be attenuated. Such an early intervention/prevention approach is important as the adolescent age group with earlier initiation provides the 'teachable moment' when behaviours can change. This is in contrast to adult addiction medicine models where the focus is on established substance dependence and its control, and where pharmacological treatment is common. Addiction medicine services and models of care are well established in adult medicine. This study provides important information to further inform addiction medicine services for adolescents.

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