



Addressing adolescent substance use in a paediatric health care setting

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Original Article

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Abstract

Aim: 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 four years. Most presented during mid-adolescence (14-16years). 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.

Keywords: Adolescent, Alcohol, Substance Use Disorders, Drug Abuse, Cannabis, Prevention, Early Intervention, Treatment.

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55 **What is already known on this topic**

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

72 **What this paper adds**

- 73 1. This study presents novel descriptive data from a specialist adolescent drug and
74 alcohol service that exists within an independent tertiary paediatric acute care
75 hospital.
- 76 2. Service engagement for this younger age group (early to mid-adolescence) is at
77 least as effective as conventional adult services, which is a positive finding for
78 such a service that aims at early intervention in young adolescents.
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4 79 3. The incidence and prevalence of problematic use of alcohol and other drugs
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6 80 (primarily cannabis) occurs frequent enough to justify an expert service within a
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8 81 paediatric hospital.
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For Peer Review

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4 101 Adolescent substance use is a public health concern, with as many as 29% of Australian
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6 102 teenagers aged 12 to 18 admitting to drinking to the point of intoxication,¹ 38%
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8 103 reporting lifetime illicit drug use,² and 20% reporting poly-substance use.³ The mean
9
10 104 age at which adolescents start using alcohol and cannabis is as low as 13 years old, with
11
12 105 rates of use increasing steadily through adolescence and young adulthood.⁴

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14
15 106 Adolescence is an important period of brain maturation, particularly of the pre-
16
17 107 frontal regions, responsible for executive functions, such as the ability to evaluate the
18
19 108 potential risks and adverse consequences of one's actions. During adolescence,
20
21 109 individuals are more prone to engage in risky behaviours,^{5,6} including the use of alcohol
22
23 110 and other substances known to disrupt normal neural development.⁷ Moreover,
24
25 111 adolescent substance use is associated with multiple acute and long-term health risks.
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27 112 Many present to hospital emergency departments (ED), with acute intoxication,
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29 113 overdose and injury,⁸ aggressive behaviour, deliberate self-harm,⁹ or risky sexual
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31 114 behaviours.¹⁰ Heavy substance use during adolescence also increases the likelihood of
32
33 115 dependence in adulthood.^{11,12}

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37 116 Despite this emerging health issue adolescent-specific drug and alcohol services
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39 117 are scarce.¹³ Adolescents may be turned away from adult services, which lack the
40
41 118 necessary youth-specific expertise and facilities. Brief interventions, such as
42
43 119 motivational interviewing, have been found to be effective in reducing substance use in
44
45 120 adolescents aged 12 years and older, as have longer-term interventions such as cognitive
46
47 121 behavioural therapy and family therapy.¹⁴ Clinician delivered brief intervention is
48
49 122 effective in reducing the number of individuals re-presenting to the ED and improving
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51 123 psychological wellbeing.^{15,16} This may be further facilitated through education of ED
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53 124 staff on the recognition and management of alcohol misuse.¹⁷
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4 125 Paediatricians have a well-recognised and important role in prevention, detection
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6 126 and management of paediatric issues including tobacco, alcohol and other drug use
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8 127 among children and adolescents. The American Academy of Paediatrics has developed
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10 128 a policy statement on Substance use screening, Brief Intervention and Referral to
11
12 129 Treatment (SBIRT) which outlines developmentally appropriate tools and strategies for
13
14 130 alcohol and other drug use in adolescence¹⁸. Research has demonstrated that
15
16 131 paediatricians report a lack of knowledge and confidence in delivering brief
17
18 132 interventions for tobacco and other substances.¹⁹ Once adolescents have been identified
19
20 133 as being at risk of substance abuse and/or dependence, referral to an adolescent specific
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22 134 drug and alcohol service is preferable. As such, a specialist adolescent drug and alcohol
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24 135 service was established within an Australian paediatric hospital, where adolescent
25
26 136 substance use had not previously been regarded as core business. The aim of this study
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28 137 was to perform a retrospective review of patient records to describe the profile of the
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30 138 adolescents referred and assess service utilisation by these young people.
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139 140 **Method**

141 **Setting**

142 The Service of Addiction Medicine for Youth (SAMy) was established in 2008 as a
143 specialist adolescent drug and alcohol consultation liaison service within a public
144 tertiary paediatric teaching hospital; The Children's Hospital at Westmead, Sydney,
145 Australia. The service is located within the Department of Adolescent Medicine, a
146 multi-disciplinary ambulatory care service.
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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 to 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 regulation¹⁸.

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.

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4 173 Where possible, adolescents are seen as inpatients, true to the consult liaison
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6 174 model. However, as adolescents with substance use often present to hospital after hours
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8 175 or on weekends, they are followed up by SAMY staff after discharge by phone contact
9
10 176 and then seen in an outpatient setting.

11 Intake

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15 178 Staff make phone contact with the adolescent, their family or carer. Engagement begins
16
17 179 at first contact and continues at the initial assessment. Occasionally an adolescent is
18
19 180 engaged with another service provider and re-referral is facilitated.

20 Assessment

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23
24 182 An initial one hour assessment is undertaken jointly by the psychologist and
25
26 183 paediatrician. This includes the young person, parent/carer and occasionally siblings,
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28 184 friends, case workers or other health professionals. The adolescent is seen alone for
29
30 185 some of this appointment. The parents are also given opportunity to interview alone.

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33 186 A comprehensive assessment is performed in an adolescent health framework.
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35 187 This includes developmental history, HEEADSSS assessment²⁰, psychological
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37 188 assessment, drug and alcohol history and family assessment. Clinical staff adopt an
38
39 189 eclectic, less structured approach, sensitive to the developmental stage of the adolescent,
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41 190 their family and interpersonal dynamics.

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44 191 Medical assessment includes review of general growth and development,
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46 192 nutritional status, immunisation review, sexual health assessment and mental health
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48 193 review for co-morbidities.

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4 197 Treatment

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6 198 Intervention begins at the initial assessment, including brief intervention, motivational

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8 199 interviewing and psychoeducation regarding the effects of adolescent substance use.

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10 200 Parental education is also offered in the form of verbal and written communication.

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12 201 A treatment plan is developed including drug and alcohol counselling, cognitive

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14 202 behaviour therapy, harm minimisation strategies and family therapy. Pharmacotherapy

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16 203 is prescribed as required, managing withdrawal symptoms and co-morbidities including

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18 204 depression and anxieties.

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20 205 School liaison is an important role of the SAMY service, as many adolescents

21
22 206 are disengaged from school, have school avoidance, significant learning and

23
24 207 behavioural difficulties. Child protection issues require liaison with child protection

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26 208 services.

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28 209 The duration of engagement ranges from one appointment to 12 months. In

29
30 210 some cases, minimal intervention is required and after one session, the young person is

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32 211 discharged with parental support. For those that do not return for a second planned

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34 212 appointment three attempts are made to try to engage the adolescent and their family.

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36 213 Referral to other services

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38 214 Adolescents may be referred to medical sub-specialists within the hospital for

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40 215 medical or mental health assessment and management. Inpatient admissions for drug

41
42 216 and alcohol withdrawal are rare in the paediatric age group, however older adolescents

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44 217 are referred to residential drug and alcohol rehabilitation if required. Referrals to

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46 218 external services include family therapy, social supports, drug and alcohol day

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48 219 programs, educational support, housing, financial and employment support (i.e.

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4 220 Centrelink), adult mental health and drug and alcohol services for parents or the older
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6 221 adolescent (over 16 years) needing transition into adult care.
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8 222 **Retrospective Review Procedure**

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10 223 A retrospective review of patient medical files and hospital databases was conducted for
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12 224 all referrals made to SAMY during the four-year period between July 2008 and June
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14 225 2012. Data collected included referral characteristics, patient demographics, details of
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16 226 the ED presentation, clinical characteristics recorded in patient medical files or reported
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18 227 by patients and their families, SAMY service involvement, and whether there was a re-
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20 228 presentation to the ED related to substance use within three months following the initial
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22 229 referral. Substance use was ascertained through clinical assessment which involved a
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24 230 combination of self-report, parent/carer report, and urine drug screen. Aggression was
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26 231 reported at referral or recorded in emergency department/ambulance reports.
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30 232 Engagement in treatment was defined as attending at least one appointment with
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32 233 SAMY.
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35 234 Where sample size limited analyses, categorical variables were collapsed due to
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37 235 too few cases in each group. The following variables were recoded into dichotomous
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39 236 variables: Indigenous status; main language spoken at home; country of birth; referral
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41 237 source; polysubstance (two or more substances excluding nicotine); any mental health
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43 238 diagnosis; more than one mental health diagnosis; and chronic illness.
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46 47 239 **Statistical Analysis**

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49 240 Analyses were performed using SPSS 19. Level of significance was set at $\alpha = 0.05$ and
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51 241 all tests were two-tailed. Nonparametric tests were employed on analyses involving
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53 242 continuous variables due to the skewed distribution of the data. Simple descriptive
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55 243 statistics were conducted. Where patients were referred more than once, only the first
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4 244 referral was analysed. Missing data was coded as 'other'. Group comparisons were
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6 245 analysed using χ^2 test for categorical variables and Mann-Whitney U test for continuous
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8 246 variables. Adolescents who were referred to or already involved with another relevant
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10 247 service were excluded from analyses comparing individuals who were seen by SAMY
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12 248 with those who were not. Approval was obtained from the Sydney Children's Hospital
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14
15 249 Network Human Research Ethics Committee.

18 250 **Results**

20 251 Two hundred adolescents were referred to SAMY over the four-year study period.
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22 252 Patient referral, demographic and clinical characteristics are presented in Table 1.
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24 253 Referrals were primarily from the ED (73.5%). Eight of these patients were referred
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26 254 more than once. Figure 1 illustrates the monthly referral rate for both ED and non-ED
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28 255 (inpatient, outpatient and external) referrals, with an average of four referrals per month.

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31 256 Gender distribution was similar (F 51%). The mean age at first presentation was
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33 257 15.0 years (SD, 1.01; range 10.8 – 18.0 years) with the majority of individuals
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35 258 presenting during middle adolescence (83%). Most were born in Australia (83.0%),
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37 259 followed by New Zealand/Pacific Islands (4.5%), Africa (4.0%) and United Kingdom
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39 260 (2.5%). The main language spoken at home was English (92.0%). Other languages
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41 261 included Asian, Persian, African languages, Spanish, and Russian. Indigenous
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43 262 Australians were over-represented (7.5%) compared with Australian population
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45 263 estimates of approximately 2%. A total of 149 (74.5%) adolescents were living with
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47 264 parent(s), 33 (16.5%) were living in out of home care under the care and control of a
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49 265 government department, nine (4.5%) were with another family member, four (2.0%)
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51 266 were living independently or with a friend or partner, three (1.5%) were incarcerated in
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53 267 juvenile detention centres and two (1.0%) were homeless.
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4 268 The most frequently identified drug was alcohol, in 165 (82.5%) cases, followed
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6 269 by cannabis 114 (57.0%). Approximately a quarter of the sample were using both
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8 270 alcohol and cannabis 51 (25.5%). Less common drugs used included nicotine in 91
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10 271 (45.5%), ecstasy in 23 (11.5%), amphetamines (including methamphetamines) in 21
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12 272 (10.5%), inhalants in 11 (5.5%), opioids in seven (3.5%), and cocaine and
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14 273 benzodiazepines, with six cases each. Ninety one (45.5%) were considered to have
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16 274 polysubstance use. No gender differences were found. Just under half of the sample
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18 275 reported some form of mental illness. Mood disorders were the most common, and were
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20 276 more frequent in females ($\chi^2(1, 200) = 5.57, p = 0.02$). Chronic illness was reported in
21
22 277 30 (15.0%) adolescents, including asthma and other atopic conditions, allergy, epilepsy
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24 278 and other seizure disorders, traumatic brain injury, cardiac abnormalities, diabetes,
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26 279 obesity, autoimmune thyroiditis, pancreatitis, inflammatory bowel disease, haemophilia,
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28 280 autoimmune hepatitis, chronic renal failure, neurofibromatosis and osteogenesis
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35 282 Figure 2 illustrates the service involvement for all adolescents referred to
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37 283 SAMY. Of the 200 adolescents, 32 (16.0%) declined services or could not be contacted
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39 284 to arrange an appointment. An additional seven (3.5%) adolescents missed their referral,
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41 285 moved away or absconded from the ED. A total of 35 (17.5%) adolescents were referred
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43 286 on by SAMY, or were already involved with appropriate services. An appointment with
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45 287 SAMY was made for 126 (63.0%) individuals and 92 of these (73.0%) attended,
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47 288 however, 14 of these were seen as inpatients during their stay on the hospital wards. The
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49 289 number of appointments attended ranged from one to 16 (median = 1), with
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51 290 approximately half of these attending one appointment only (52.2%), and the remaining
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53 291 families attending between two and 16 appointments. Thirty six (18%) of the 200
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4 292 adolescents re-presented to the ED for problems related to substance use in the three
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6 293 months following referral to SAMY.
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9 294 Chi square analyses indicated that the groups more likely to engage and attend
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11 295 an appointment with SAMY included those with polysubstance use ($\chi^2(1, 165) = 4.79$,
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13 296 $p = 0.03$), amphetamine use (Fisher's exact test, $p = 0.01$), chronic illness ($\chi^2(1, 165) =$
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15 297 $10.02, p = 0.002$), any mental health diagnosis ($\chi^2(1, 165) = 3.87, p = 0.05$), and a mood
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17 298 disorder ($\chi^2(1, 165) = 12.88, p < 0.001$). Those less likely to engage in treatment were
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19 299 individuals referred from the ED ($\chi^2(1, 165) = 12.78, p < 0.001$), Indigenous
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21 300 Australians ($\chi^2(1, 165) = 4.76, p = 0.03$) and those with a history or presentation of
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23 301 aggression ($\chi^2(1, 165) = 4.51, p = 0.03$).
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29 303 Discussion

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31 304 This research presents the first detailed description of a novel drug and alcohol
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33 305 service in a paediatric health care setting, which describes demographic and clinical
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35 306 characteristics of adolescents referred, and the uptake of a designated treatment service.
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37 307 The data presented highlight the need for early intervention services within a paediatric
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39 308 hospital. Over 30% of adolescents referred to the SAMY service were aged 14 years or
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41 309 younger, supporting previous research documenting the early initiation age for
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43 310 adolescents using alcohol and other drugs.⁴
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47 311 The ED remains the largest referral source of adolescents at risk of alcohol and
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49 312 drug related problems with most presenting after hours, making timely assessment and
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51 313 follow up logistically difficult in the paediatric setting. No more than 20% of
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53 314 adolescents presenting to the ED with alcohol and other drug are reported to have
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55 315 consultation with psychiatry.^{9,21} A comparative Australian ED study showed that while
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4 316 50% of adolescents with mental health problems were referred, none with substance use
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6 317 were.²² Many adult drug and alcohol services do not have the youth specific expertise or
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8 318 facilities to service this high risk group. Services such as SAMY bridge this gap,
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10 319 offering drug and alcohol assessment and management for adolescents and support the
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12 320 implementation of routine screening and brief interventions for high risk adolescents
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14 321 who present to any ED.

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17 322 In the current study, approximately two thirds (63.5%) of the sample were
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19 323 initially followed up by SAMY staff and referred to appropriate services or provided
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21 324 outpatient assessment and treatment. This specialist adolescent drug and alcohol service
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23 325 was found to facilitate engagement and attendance in treatment for 46% of all referrals
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25 326 compared with the 25% to 29% reported in other studies, including those targeting
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27 327 adolescents presenting to EDs, where specialist services are usually located external to
28
29 328 the hospital and not situated within paediatric health care settings^{15, 16, 23}. Nevertheless,
30
31 329 the current study indicated that adolescent referred from the ED to SAMY were less
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33 330 likely to attend follow up treatment than those referred from inpatient and outpatient
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35 331 services. This may be due to the nature of the referral process, the after hours timing of
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37 332 ED presentation, parental or caregiver presence, the insight of the patients and/or their
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39 333 family to the importance of follow up and the reason for referral. Inpatients are seen by
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41 334 the SAMY team to assess, build rapport and offer brief intervention. This process of
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43 335 engagement likely supports the young person to attend follow up. Those referred from
44
45 336 outpatient services are usually self-selecting and may be more accustomed to engage in
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47 337 treatment than those referred from the ED. Improving the referral pathway from ED to
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49 338 SAMY may be facilitated by training of clinicians and maintaining a strong profile
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51 339 within ED.
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4 340 In agreement with previous research, alcohol, cannabis and nicotine were the
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6 341 most frequently used substances in this age group.^{3,21} Co-morbid mental health
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8 342 conditions such as mood disorders, ADHD, and behavioural disturbance were also
9
10 343 found to be high in this population, consistent with the literature.^{24,25} Such disorders
11
12 344 increase the risk of engaging in substance use.^{26,27} Nevertheless, such individuals were
13
14 345 generally easier to engage in treatment, as were those with a chronic illness. This may
15
16 346 be because they are familiar with attending hospital appointments and having regular
17
18 347 interaction with medical staff. Indigenous adolescents were more difficult to engage, as
19
20 348 were adolescents with a history of aggression. Having an Indigenous youth worker as
21
22 349 part of the drug and alcohol team would assist engagement and management of this
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24 350 group.

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28 351 Frequent presentations to the ED are common for adults with drug and alcohol
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30 352 dependence and one aim of adult drug and alcohol treatment is to decrease the
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32 353 frequency of these emergency presentations. In this study, adolescents who attended
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34 354 treatment were no more or less likely to re-present to ED for reasons relating to
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36 355 substance use. It is unknown how many of these may have represented to an adult ED.
37
38 356 Long term follow up for these adolescents would help answer this question.

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40
41 357 There are a number of limitations to this paper. As a retrospective review, there
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43 358 were no consistent measures of nicotine dependence, substance use was often reliant on
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45 359 self-report or parent/carer report, mental health diagnoses were from history and self-
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47 360 report only and outcome measures were often difficult to ascertain. Further, detailed
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49 361 information on the nature and frequency of substance use, associated harms and
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51 362 socioeconomic status could not be adequately and consistently reported. Future research
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53 363 using a prospective design could examine patient outcomes such as reduction in
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4 364 substance use, attitudes towards substance use, reduction in risk taking behaviour, and
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6 365 changes in mood.
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9 366 In conclusion, assessment and management of adolescents with drug and alcohol
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11 367 concerns require a developmental, holistic approach, which includes parents and
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13 368 caregivers. The goal is to support behavioural and environmental change so that the
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15 369 opportunities and the reasons for substance use might be attenuated. Such an early
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17 370 intervention/prevention approach is important as the adolescent age group with earlier
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19 371 initiation provides the 'teachable moment' when behaviours can change. This is in
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21 372 contrast to adult addiction medicine models where the focus is on established substance
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23 373 dependence and its control, and where pharmacological treatment is common. Addiction
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25 374 medicine services and models of care are well established in adult medicine. This study
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27 375 provides important information to further inform addiction medicine services for
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29 376 adolescents.
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45
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26 466 **Figure legends**

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29 467 **Figure 1.** Monthly referral rate for emergency department and non-emergency
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31 468 department (i.e. inpatient, outpatient and external) referrals for the period June 2008 to
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33 469 June 2012.

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36 470 **Figure 2.** Flow diagram of all referrals ($n=200$) made to the Service of Addiction
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38 471 Medicine for Youth (SAMY) describing service involvement and attendance at follow
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40 472 up outpatient assessment and treatment.

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Table 1. Patient referral, demographic and clinical characteristics

	<i>n</i>	%
Referral Source		
Emergency Department	147	73.5
Inpatient	17	8.5
Outpatient	16	8.0
External	20	10.0
Gender		
Male	98	49.0
Female	102	51.0
Age		
Early Adolescence (10-13 years)	29	14.5
Mid Adolescence (14 -16 years)	166	83.0
Late Adolescence (17 to 19 years)	5	2.5
Country of Birth		
Australia	166	83.0
Other	34	17.0
Language		
English	184	92.0
Other	16	8.0
Indigenous Australians	15	7.5
Drug use		
Alcohol	165	82.5
Cannabis	114	57.0
Alcohol & Cannabis	51	25.5
Polysubstance	91	45.5
Mental Health		
At least 1 diagnosis	89	44.5
More than 1 diagnosis	29	14.5
Aggression	37	18.5
Self-harm	61	30.5
Childhood Sexual Assault		
Yes	12	6.0

Suspected	5	2.5
Chronic Illness	30	15.0

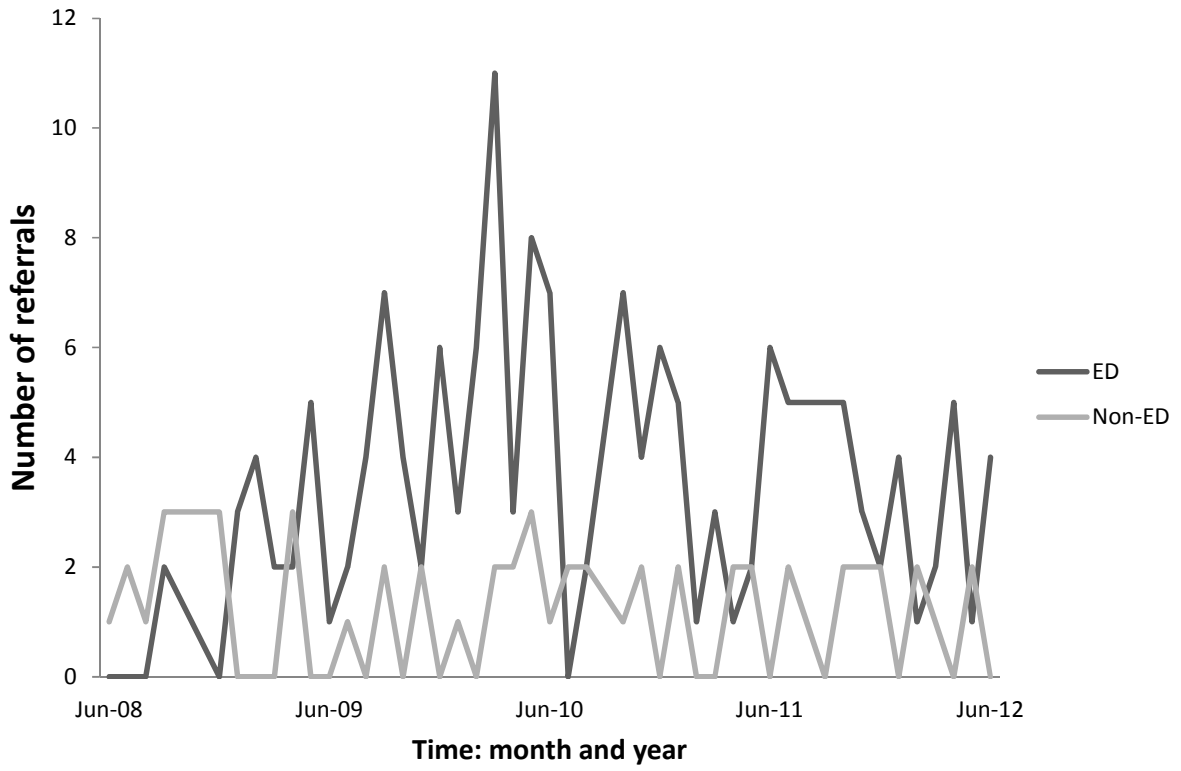
Note. Alcohol & drug use does not add up to 100% due to adolescents using more than one

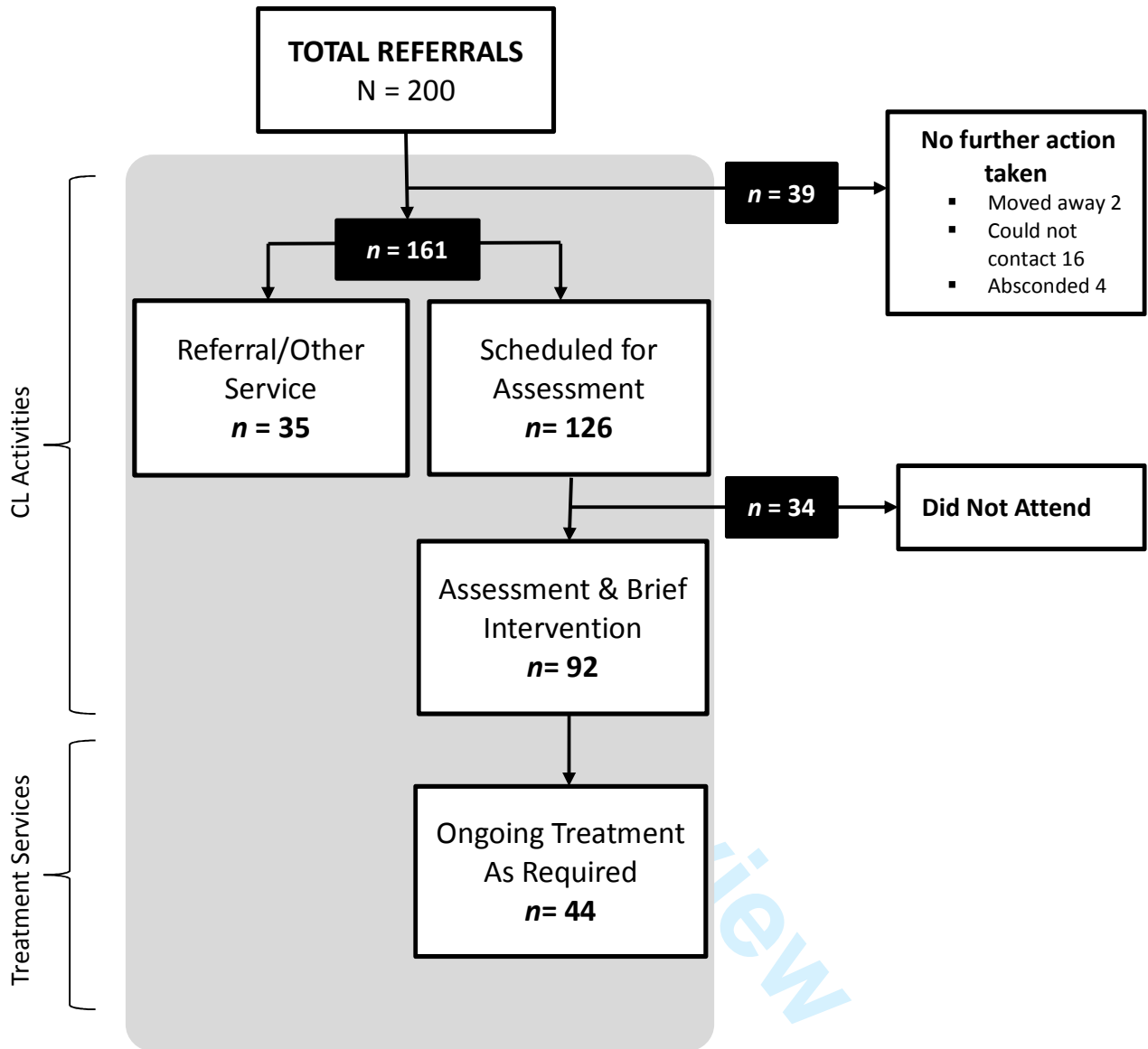
substance; Polysubstance use was defined as one or more substances including alcohol,

cannabis and other substances, but excluding nicotine;

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