

A Description of Emergency Care Received by Children and Youth with Mental Health Presentations for Alcohol and Other Drug use in two Alberta Emergency Departments

Andrea Y. Yu, BSc¹; Nicole Ata, MD²; Kathryn Dong, MD, MSc, FRCP(C)³; Amanda S. Newton, PhD, RN^{2,4}

Abstract

Objective: This paper describes patient and treatment characteristics of pediatric mental health Emergency Department (ED) visits associated with alcohol and other drug (AOD) use. **Method:** A medical record and administrative database review was conducted. Proportional allocation random stratified sampling identified a representative sample of pediatric (≤ 18 years) mental health presentations to two tertiary care EDs between April 2004 and March 2006. Descriptive statistics were used to summarize data from 161 patients with associated AOD use. **Results:** More females (56.5%) and youth aged 15 to 18 years (70.8%) attended the ED for mental health complaints associated with AOD use. Alcohol (48.4%) and over-the-counter or prescription medications (25.5%) were the most commonly used substances. Twenty-four percent of patients had a documented psychiatric history. The most common psychiatric assessments provided were for suicidality (31.1%) and mood (18.0%). Brief counselling was provided in 31.7% of visits. Consultation with psychiatry occurred less than 20% of the time. Most patients were discharged from the ED (65.2%). Sixty-eight percent of patient records did not have documented discharge planning. **Conclusions:** When youth present to the ED for mental health concerns related to AOD use, mental health assessments and follow-up care are not occurring in all cases and reasons for this oversight need to be explored.

Key words: alcohol and other drug use, pediatrics, emergency care

Résumé

Objectif: Définir les caractéristiques des patients qui se sont présentés à une Urgence psychiatrique; présenter les traitements qu'ils reçoivent pour alcoolisme et toxicomanie. **Méthodologie:** Étude des dossiers médicaux et d'une base de données administratives. Répartition proportionnelle de l'échantillon aléatoire pédiatrique parmi les strates. Les sujets (=18 ans) se sont présentés à l'Urgence de deux unités de soins de troisième ligne entre avril 2004 et mars 2006. Les données relatives à 161 patients alcooliques ou toxicomanes ont été traduites en statistiques descriptives. **Résultats:** 56,5 % de filles et 70,8 % de sujets âgés de 15 à 18 ans présentaient des symptômes liés à l'alcool et à la toxicomanie. Les substances les plus courantes étaient l'alcool (48,4 %) et les médicaments avec ou sans ordonnance (25,5 %). Vingt-quatre pour cent des patients avaient des antécédents psychiatriques. Les troubles les plus courants, d'après les évaluations, étaient la suicidalité (31,1 %) et les troubles de l'humeur (18 %). Les patients ont reçu de brefs conseils dans 31,7% des visites. Il y a eu consultation en psychiatrie dans moins de 20 % des cas. La majorité des patients (65,2 %) ont reçu leur congé de l'Urgence. Soixante-huit pour cent des dossiers des patients ne comportaient aucune note sur le congé. **Conclusions:** L'évaluation et le suivi ne sont pas systématiques lorsque des adolescents se présentent à une Urgence psychiatrique suite à la consommation d'alcool ou de drogues; les raisons de cet oubli doivent être étudiées.

Mots clés: alcoolisme, toxicomanie, Urgence

¹ Faculty of Medicine, University of Calgary, Calgary, Alberta

² Department of Pediatrics, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta

³ Department of Emergency Medicine, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta

⁴ Women and Children's Health Research Institute, Edmonton, Alberta

Corresponding email: mandi.newton@ualberta.ca

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Introduction

Alcohol and other drug (AOD) use typically increases during adolescence and peaks during early adulthood. Recognized as an important health concern, early AOD use is regarded a strong predictor of later dependence or abuse (Grant & Dawson, 1997; Bonomo et al., 2004; Viner & Taylor, 2007; D'Amico, 2005) and persistent dysfunction (Rohde et al., 2007; Marmorstein et al., 2010). By grade 12, up to 57% of Canadian and American youth report having consumed 5 or more drinks on one occasion (Statistics Canada, 2006–07; Johnston et al., 2005) with age 12 reported for first time use of alcohol by Canadian boys and girls (Statistics Canada, 2006–07). Other drugs including stimulants (i.e., cocaine, amphetamines) and hallucinogens (i.e., cannabis, ecstasy) were reported as first tried between the ages of 13 and 14 years (Statistics Canada, 2006–07), and may be used throughout adolescence (Johnston et al., 2005). Morbidities associated with AOD use include unintentional accidents and injury (Hingson et al., 2000; Hingson & Zha, 2009), traumatic stress (Clark & Neighbors, 1996; Edwards et al., 2006), antisocial behaviours (Lewis & Bucholz, 1991), depression and anxiety (Schwinn et al., 2010), and intentional self-harm (Cherpitel et al., 2004). In 2002, 2% of hospitalizations in Canada for morbidity associated with illicit drug use were by youth under the age of fourteen. This statistic increased eight-fold for young persons aged 15 to 29 years (Popova et al., 2007). Morbidities associated with alcohol use can also be fatal; between 2001 and 2003, 16% of all in-hospital youth deaths in Canada (National Trauma Registry, 2009) and 6% of 2001 youth deaths in the US (MMWR, 2004) resulted from alcohol-related trauma.

Unanticipated treatment and care for AOD associated morbidities are often sought in hospital Emergency Departments (EDs) (D'Onofrio & Degutis, 2002; D'Onofrio & Degutis, 2004–2005; Burke et al., 2005). A primary access point to health care, the ED plays an important role in providing early identification of hazardous and harmful behaviours and brief intervention. While Canada-wide statistics have not been published, mental health morbidities associated with AOD use represents a significant proportion of pediatric mental health visits across Alberta's EDs. In the largest Canadian study conducted to date, visits for mental health care related to AOD use increased by 36% from 2002 to 2006, and represented 30% of the total emergency pediatric mental health visits across the province (Newton et al., 2009). Further, these visits represented almost one third of all repeat ED visits for pediatric mental health (Newton et al., 2009). While evidence- and consensus-based guidelines for assessment and treatment of children and youth with hazardous and harmful AOD use are available (Bukstein, 1997; American

Psychiatric Association, 1995), routine assessment, treatment, and follow-up guidelines are lacking in the ED (Woolfenden et al., 2002). Further, little is known about emergency assessment of treatment of mental health morbidities associated with AOD use. The objectives of this study were to describe patient and treatment characteristics of children and youth who presented with mental health needs associated with AOD use to two tertiary level EDs in Edmonton, Alberta. Based on previous research, we hypothesized that deficits in the mental health management of AOD presentations would be observed. To our knowledge, this is the first Canadian ED-based study with this focus.

Methods

A medical record and administrative database review was conducted using proportional allocation random stratified sampling to identify a representative sample of all pediatric (≤ 18 years) mental health presentations between April 2004 and March 2006 to two tertiary centre EDs (one general ED with 66,000 patient visits per year and one pediatric ED which sees all patients ≤ 16 years and has 23,000 patient visits per year) ($n=580$). The study's protocol was based on published methodological guidelines for medical record reviews (Gearing et al., 2006; Gilbert et al., 1996; Worster & Haines, 2004; Wu & Ashton, 1997). Data were abstracted by two blinded, independent reviewers. Both data entries were checked for discrepancies and consensus (100%) for any discrepancies between reviewers was achieved through third party adjudication that included independently reviewing the patient's medical record. The study reported in this paper analyzed mental health associated AOD presentations ($n=161$) as a sub-population of this review. This group was worthy of further study due to the high prevalence of these visits in Alberta EDs, and a lack of data on clinical management. Patients diagnosed with a mental or behavioural disorder associated with AOD use (International Classification of Diseases [ICD] codes; ICD-10 F10 to F19 codes) (World Health Organization, 2007) were included in this study. Patients with presentations primarily focused on trauma (i.e., major accidents and injuries secondary to AOD use) were excluded as care would not primarily reflect our focus on mental health management. This study was approved by the Health Research Ethics Board at the University of Alberta.

Abstracted data included health care visit and demographic variables of interest. Health care visit data included ED accompaniment and mode of arrival, presentation season, triage level (coded according to the Canadian Emergency Department Triage and Acuity Scale [CTAS]) (Beveridge et al., 1999; Murray et al., 2004), disposition and length of stay

Table 1. Characteristics of pediatric patients with emergency mental health presentations for AOD use (n=161), %

Age group (M=15.9, SD=1.5)	≤14 years	29.2	
	15–18 years	70.8	
Gender	Male	42.9	
	Female	56.5	
	Unclear	0.6	
Household SES	<30 000	2.5	
	\$30 000 – \$49 999	18.6	
	\$50 000 – \$69 999	47.8	
	\$70 000 – \$89 999	9.3	
	≥ \$90 000	6.2	
	Unclear	15.5	
Current mental health care provider	Psychiatric care provider	8.7	
	Social services	6.2	
	Unclear	85.1	
Medical history [†]	Behavioural or emotional disorder/syndrome	9.3	
	Affective or mood disorder	11.8	
	Schizophrenia or other psychotic illness	1.2	
	Personality traits/disorder	1.8	
	Substance use	11.2	
	Physical disease/disorder	11.2	
	Intentional self-harm	9.3	
	Victim of assault/abuse	1.2	
	None/unremarkable	53.4	
	Unclear	7.5	
	Current medications [‡]	Antidepressant	9.3
		Benzodiazepine	3.1
		Psychostimulant	3.1
Psychotropic		7.5	
Unclear		79.5	

[†] Total > 100%; some patients had multiple notations for medical history and current medications

(LOS; defined as the time from triage to discharge), as well as documented clinical assessments, medical and psychiatric care, consultative services assessment, ancillary testing, and discharge planning/follow-up recommendations. Demographic data included age, gender, substance used and clinical diagnosis (ICD-10 code), medical or psychiatric co-morbidities, current psychiatric care and medications, as well as forward sortation area data which were used to estimate socioeconomic status (SES) using Statistics Canada 2006 data for median household income (Statistics Canada, 2006). Missing data were broadly categorized as ‘unclear’ (unable to locate in the patient’s medical record, or not documented, or not available). Descriptive statistical analyses were performed using SPSS Version 17.0 statistical software.

Results

Of the 580 pediatric mental health visits in the original study, 161 visits (27.7%) were related to AOD use at the two study sites. Of these presentations, most patients were between the ages of 15 to 18 years, female, and from a moderate household income. Patient characteristics and medical histories are presented in Table 1. Twenty-four percent of patients were noted as having a medical history of a psychiatric illness; of those patients, 61.5% had no identifiable mental health care provider.

As seen in Table 2, there were no notable seasonal trends in presentation. More than half of children and youth presented to the pediatric ED (57.8%). Alcohol (48.4%) or over-the-counter (OTC) or prescription medications (25.5%) were the most commonly used substances. Children and youth were commonly accompanied by family (43.5%) or alone but with Emergency Medical Services (EMS) personnel (37.3%). The majority of children and youth arrived by EMS transport (72.7%) and received a CTAS score of urgent or higher (≤ 3) at triage. LOS varied with the majority of patients spending 5 or more hours in the ED (52.6%). Most patients were discharged from the ED (65.2%).

Table 3 details the assessments and treatment received while in the ED. The majority of children and youth were provided standard ED care by an emergency physician and nurse. Assessment of suicidality or mood was conducted in 31.1% and 18.0% of visits, respectively. Brief counselling was provided in 31.7% of visits; medical treatment for toxic ingestion was the most commonly provided care (48.7%). A small percentage of patients required crisis intervention (e.g., restraint use, hospital security involvement). Ancillary diagnostic procedures such as lab work were commonly ordered, while consultation with psychiatry occurred in less than 1 in 5 presentations (17.4%). Discharge plans and/or follow-up

Table 2. Documented visit features of pediatric emergency mental health presentations for AOD use (n=161), %

ED Classification	
Pediatric	57.8
General	42.2
Presentation season	
Autumn (September to November)	29.2
Winter (December to February)	26.1
Spring (March to May)	23.0
Summer (June to August)	21.7
ED accompaniment	
Alone	1.2
Family	43.5
Friend	5.0
Guardian/social services worker	6.2
Emergency Medical Services (EMS) Personnel	37.3
Unclear	6.8
Substance used at presentation	
Alcohol	48.4
Hallucinogen (i.e., LSD, ecstasy)	1.2
Cannabis	9.3
Stimulant (i.e., cocaine, crack, meth)	8.1
OTC or prescription medication	25.5
Other (inhalant)	0.6
Polysubstance†	6.2
Unknown	0.6
Arrival by	
EMS	72.7
Police	1.2
Walk-In	19.9
Unclear	6.2
Triage level	
Resuscitation (level 1)	1.2
Emergency (level 2)	35.4
Urgent (level 3)	36.6
Semi-urgent (level 4)	22.4
Non-urgent (level 5)	3.7
Unclear	0.6
Total Time in ED (hours)	
≤1	12.4
2–4	36.0
5–8	28.0
>8	23.6
Disposition	
Discharged	65.2
Admitted	14.9
Transferred	7.5
*LAMA/LWBS	5.6
Unclear	6.8
OTC=over-the-counter; †Any combination of listed, known substances; * LAMA=Left Against Medical Advice; LWBS=Left Without Being Seen	

care were not documented in 67.7% of medical records. Of those records with documentation, the most notable recommendations were referral to outpatient or community-based mental health services (13.0%) and social services (6.8%).

Discussion

This study describes the treatment and care of children and youth who presented with mental health needs associated with AOD use to two tertiary level EDs in Edmonton, Alberta. Notable demographic trends are generalizable reflecting those reported by other studies including the proportion of AOD use by children and youth aged 14 years or younger (Monshower et al., 2005; Perkonig et al., 2006; Statistics Canada, 2006–07), male:female patient ratio (Woolfenden et al., 2002), the predominance of the involvement of alcohol and OTC and prescription medication use (Hulse et al., 2001), and medical histories that included psychiatric disorders (Clark & Neighbors, 1996; Edwards et al., 2006; Lewis & Bucholz, 1991; Cherpitel et al., 2004; Gilvarry, 2000; Renaud et al., 1999; Clark et al., 1997a, 1997b; Schwinn et al., 2010). While prevention strategies are needed to address the majority of these findings, the reality that psychiatric co-morbidity accompanies AOD presentations to the ED draws attention to the need to provide both emergency medical and mental health care in this acute care setting.

Deficits in the assessment and management of mental health needs were observed in this study and highlight the need to explore new approaches for assessing and treating this population. In this study, assessment consisted primarily of physical examinations and lab and diagnostic work. This approach to ED management may be influenced, in part, by how children and youth are triaged. Currently, CTAS regards AOD use as independent of mental health and psychosocial issues (Beveridge et al., 1999; Murray et al., 2004), which may encourage a more medicalized approach to treatment while underemphasizing the mental health component associated with AOD use. This clinical care gap may also be due, in part, to inadequate training in substance use disorders in medical school (Cape et al., 2006). At this time, it is unclear whether mental health assessments and treatment are either not occurring or not being documented in the medical record. Similar uncertainties exist for ED discharge planning. While many children and youth in this study did not have a written follow-up plan (even when they had a history of risk factors, such as past mental health problems, documented in their medical records), whether these findings reflect lack of planning or documentation is unknown. Prospective evaluations are needed to more clearly articulate what mental health

services and discharge planning is being provided to children and youth with AOD use presentations, and to determine the impact of a lack of mental health services referral has on patient outcomes and subsequent ED use.

Evidence- and consensus-based guidelines for assessment and treatment of children and youth with suspected substance use disorders exist (Bukstein, 1997; American Psychiatric Association, 1995) and need to be adapted for widespread ED use. Brief ED interventions have been shown to reduce AOD use behaviours, injuries, and health care utilization (Spirito et al., 2004; Monti et al., 1999; Tait & Hulse, 2003; Tait & Hulse, 2005), and increase post-ED attendance in community-based treatment (Tait et al., 2004). Although several barriers exist to implementing ED-based programs (predominantly after-hours presentation, lack of time and resources, and staff perception that youth are just “experimenting”) (Woolfenden et al., 2002; Coffman et al., 2007; Lamminpaa & Vilkska, 1990; Andersson & Magnusson, 1998), evaluation of these approaches to emergency care merits further exploration. While the demonstrated use of EMS, urgent or higher triage scores, and modest admission rates in this study points to the ED as the appropriate place for medical stabilization, the management of mental health needs associated with AOD use in the ED may provide a more substantial impact on child and youth outcomes.

On a final note, in our study, the percentage of those patients that left without being seen (LWBS) or against medical advice (5.6%) are similar to trends reported in an Edmonton-based study of non-AOD related presentations with lower acuity (CTAS levels 3 or 4) (Rowe et al., 2006); however, our patients’ LOS was typically more than 5 hours in the ED (52.6%) significantly longer than the 3 to 4 hours published by Canadian (Goldman et al., 2006) and US/Canadian (Shaw et al., 2003) studies. With the LWBS rate and LOS in the pediatric ED being two highly ranked performance indicators by Canadian pediatric emergency medicine (PEM) programs (Hung & Chalut, 2008) acceptable parameters for AOD use presentations need to be defined. These presentations are one of the most costly mental health presentations, second only to intentional self-harm (Newton et al., 2009), and establishment of these performance indicators will no doubt have an impact on clinical management and practice guidelines.

This study had several limitations. Subject identification relied on correct ICD-10 coding of the children and youth when they presented to the ED. Differences in coding may have underestimated the true number of children and youth with mental health presentations associated with AOD use because they may have been primarily coded as having toxic effects of non-medicinal substances or physical health or

Table 3. Documented care of pediatric emergency mental health presentations for AOD use (n=161), %

ED care provider	Mental health crisis team	3.1
	Standard ED care: medicine, nursing	96.3
	Unclear	0.6
Clinical assessments‡	Suicidality	31.1
	Homicidality	9.3
	Mood	18.0
	Anxiety/Stress	3.1
	Reality testing (orientation, thought patterns)	1.9
	Physical examination	84.5
Care‡	Unclear	8.7
	Brief counselling	31.7
	Crisis intervention	6.9
	Pharmacological	5.0
	General medical	2.5
	Medical treatment for toxic ingestion	48.7
	Unclear	30.4
ED consultations‡	Medical specialty (e.g., orthopaedics, internal medicine)	0.6
	Psychiatry/mental health	17.4
	Social services	6.8
	Unclear	75.8
Ancillary testing‡	Radiology	28.6
	Lab work	60.2
	None	37.3
Discharge/ follow-up plan	Crisis mental health team	1.2
	Outpatient psychiatry/community mental health services	13.0
	Social services	6.8
	Paediatrician/Family MD	3.7
	Penal system	3.1
	Return to ED if condition worsens	4.3
	Unclear	67.7

‡ Total > 100%; a presenting child/youth may have had more than one documented care feature

trauma needs (i.e., injuries) versus recognition of the child/youth's mental health needs. The decision was made to focus on pediatric patients who presented to the ED with mental health needs associated with AOD use, and to not include trauma presentations as the focus on medical care would obfuscate our findings on mental health management and patient presentation characteristics (i.e., CTAS, LOS, admission rates). A Canadian report of traumas secondary to AOD use has been reported by others (Lea et al., 2009). In this study, it is also possible that co-morbidities and current psychiatric management were underreported in medical records given the emphasis on medical management. Further, the retrospective nature of this review and poor documentation in the ED medical record limited the comprehensive evaluation of clinical management and presentation characteristics. These reporting limitations are not unique to this study (O'Dwyer et al., 1991), but do point out important considerations for how the treatment and care of mental health presentations are documented.

Conclusion

This study offers evidence of the need to fill a clinical care gap for children and youth who present to the ED with AOD use associated mental health issues. This study demonstrated that when a child or youth presents to the ED for mental health concerns related to AOD use, mental health assessments and recommended follow-up are not occurring in all cases and reasons for this oversight need to be explored. Additional Canadian study of this clinical area is needed to increase our understanding of clinical care provided in different emergency care settings and to document AOD use presentations as drug mix can vary by geographic location. From a clinical care perspective, prospective evaluations are needed to determine the impact of absence/presence of care on patient outcomes and subsequent ED use. The benefits of early intervention in this group have been clearly documented and clear ED policies and guidelines for assessment, management, and documentation should be established. To encourage adoption by ED staff, these guidelines need to be practical, user-friendly, tailored to clinical practice barriers, and mutually agreed on by emergency, pediatric, and mental health professionals.

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References

- American Psychiatric Association, 1995. Practice guidelines for the treatment of patients with substance use disorders: Alcohol, cocaine, opioids. *American Journal of Psychiatry*, 152(suppl 11), 5S-59S.
- Andersson, T., & Magnusson, D., 1998. Drinking habits and alcohol intoxication/self-poisoning among young men: A prospective longitudinal study. *Journal of Studies on Alcohol and Drugs*, 49, 245-52.
- Beveridge, R., Clarke, B., Janes, L., Savage, N., Thompson, J., Dodd, G., et al. 1999. Canadian Emergency Department Triage and Acuity Scale: Implementation guidelines. *Canadian Journal of Emergency Medicine*, 1(3 suppl), S1-S24.
- Bonomo, Y. A., Bowes, G., Coffey, C., et al. 2004. Teenage drinking and the onset of alcohol dependence: A cohort study over seven years. *Addiction*, 99(12), 1520-8.
- Bukstein, O. 1997. Practice parameters for the assessment and treatment of children and adolescents with substance use disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36(suppl 10), 140S-156S.
- Burke, P. J., O'Sullivan, J., & Vaughan, B. L. 2005. Adolescent substance use: Brief interventions by emergency care providers. *Pediatric Emergency Care*, 21, 770-6.
- Cape, G., Hannah, A., & Sellman, D. 2006. A longitudinal evaluation of medical student knowledge, skills and attitudes to alcohol and drugs. *Addiction*, 101, 841-9.
- Cherpitel, C. J., Borges, G., & Wilcox, H. 2004. Acute alcohol use and suicidal behavior: A review of the literature. *Alcoholism: Clinical and Experimental Research*, 28, 18-28S.
- Clark, D. B., Lesnick, L., & Hegedus, A. M. 1997. Traumas and other adverse life events in adolescents with alcohol intoxication/self-poisoning and dependence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1744-51.
- Clark, D. B., & Neighbors, B. 1996. Adolescent substance abuse and internalizing disorders. *Child and Adolescent Psychiatric Clinics of North America*, 5(1), 45-57.
- Clark, D. B., Pollock, N. B., & Buckstein, O. G. 1997. Gender and comorbid psychopathology of adolescents with alcohol dependence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1196-1203.
- Coffman, D. L., Patrick, M. E., Palen, L. A., Rhoades, B. L., & Ventura, A. K. 2007. Why do high school seniors drink? Implications for a targeted approach to intervention. *Prevention Science*, 8(4), 241-8.
- D'Amico, E. J., Ellickson, P. L., Collins, R. L., Martino, S. C., & Klein, D. J. 2005. Processes linking adolescent problems to substance use problems in late young adulthood. *Journal of Studies on Alcohol and Drugs*, 66, 766-75.
- D'Onofrio, G., & Degutis, L. C. 2004-2005. Screening and brief intervention in the emergency department. *Alcohol Research & Health*, 28 (2), 63-72.
- D'Onofrio, G., & Degutis, L. C. 2002. Preventive care in the emergency department: Screening and brief intervention for alcohol problems in the emergency department: A systematic review. *Academic Emergency Medicine*, 9 (6), 627-38.
- Edwards, C., Dunham, D., Ries, A., & Barnett, J. 2006. Symptoms of traumatic stress and substance use in a non-clinical sample of young adults. *Addictive Behaviours*, 31(11), 2094-104.

- Gearing, R. E., Mian, I. A., Barber, J., & Ickowicz, A. 2006. A methodology for conducting retrospective chart review research in child and adolescent psychiatry. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 15(3), 126-34.
- Gilbert, E. H., Lowenstein, S. R., Koziol-McLain, J., Barta, D. C., & Steiner, J. 1996. Chart reviews in emergency medicine research: Where are the methods? *Annals of Emergency Medicine*, 27(3), 305-8.
- Gilvarry, E. 2000. Substance abuse in young people. *Journal of Child Psychology and Psychiatry*, 41, 55-86.
- Goldman, R. D., Amin, P., & Macpherson, A. 2006. Language and length of stay in the pediatric emergency department. *Pediatric Emergency Care*, 22, 640-3.
- Grant, B. F., & Dawson, D. A. 1997. Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse*, 9, 103-10.
- Hingson, R. W., Heeren, T., Jamanka, A., & Howland, J. 2000. Age of drinking onset and unintentional injury involvement after drinking. *Journal of the American Medical Association*, 284(12), 1527-33.
- Hingson, R. W., & Zha, W. 2009. Age of drinking onset, alcohol use disorders, frequent heavy drinking, and unintentionally injuring oneself and others after drinking. *Pediatrics*, 123(6), 1477-84.
- Hulse, G. K., Robertson, S. I., & Tait, R. J. 2001. Adolescent emergency department presentations with alcohol- or other drug-related problems in Perth, Western Australia. *Addiction*, 96(7), 1059-67.
- Hung, G. R., & Chalut, D. 2008. A consensus-established set of important indicators of pediatric emergency department performance. *Pediatric Emergency Care*, 24, 9-15.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. 2005. Monitoring the Future: National Survey Results on Drug Use, 1975-2004. Volume I: Secondary School Students. Bethesda, MD: National Institute on Drug Abuse.
- Lamminpaa, A., & Vilska, J. 1990. Alcohol intoxication and psychosocial problems among children. *Acta Psychiatrica Scandinavica*, 81, 468-71.
- Lea, S., Black, K., & Ashbridge, M. 2009. An overview of injuries to adolescents and young adults related to substance use: Data from Canadian emergency departments. *Canadian Journal of Emergency Medicine*, 11(4), 330-6.
- Lewis, C. E., & Bucholz, K. K. 1991. Alcoholism, antisocial behavior and family history. *British Journal of Addictions*, 86(2), 177-94.
- Marmorstein, N.R., Iacono, W. G., & Malone, S. M. 2010. Longitudinal associations between depression and substance dependence from adolescence through early adulthood. *Drug and Alcohol Dependence*, 107, 154-60.
- Morbidity and Mortality Weekly Report. 2004. Alcohol-Attributable Deaths and Years of Potential Life Lost — United States, 2001. *Morbidity and Mortality Weekly Report*, 53(37), 866-70.
- Monshower, K., Smit, F., de Graaf, R., van Os, J., & Vollebergh, W. 2005. First cannabis use: Does onset shift to younger ages? Findings from 1988 to 2003 from the Dutch National School Survey on Substance Use. *Addiction*, 100(7), 963-70.
- Monti, P. M., Colby, S. M., Barnett, N. P., Spirito, A., Rohsenow, D. J., Myers, M., Woolard, R., & Lewander, W. 1999. Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *Journal of Consulting and Clinical Psychology*, 67(6), 989-94.
- Murray, M., Bullard, M., Grafstein, E. for the CTAS and CEDIS National Working Groups 2004. Revisions to the Canadian Emergency Department Triage and Acuity Scale implementation guidelines. *Canadian Journal of Emergency Medicine*, 6, 421-7.
- National Trauma Registry. [Accessed 2009 July 25]. Available: http://secure.cihl.ca/cihlweb/dispPage.jsp?cw_page=media_22jun2005_e
- Newton, A. S., Ali, S., Johnson, D. W., Haines, C., Rosychuk, R. J., Keaschuk, R. A., Jacobs, P., & Klassen, T. P. 2009. A 4-year review of pediatric mental health emergencies in Alberta. *Canadian Journal of Emergency Medicine*, 11, 447-54.
- O'Dwyer, F. G., D'Alton, A., & Pearce, J. B. 1991. Adolescent self-harm patients: audit of assessment in an accident and emergency department. *British Medical Journal*, 303, 629-30.
- Perkonig, A., Pfister, H., Hofler, M., Frohlich, C., Zimmermann, P., Lieb, R., & Wittchen, H. U. 2006. Substance use and substance use disorders in a community sample of adolescents and young adults: Incidence, age effects and patterns of use. *European Addiction Research*, 12(4), 187-96.
- Popova, S., Rehm, J., Patra, J., Baliunas, D., & Taylor, B. 2007. Illegal drug-attributable morbidity in Canada 2002. *Drug and Alcohol Review*, 26(3), 251-63.
- Renaud, J., Brent, D. A., Birmaher, B., Chiappetta, L., & Bridge, J. 1999. Suicide in adolescents with disruptive disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 846-50.
- Rohde, P., Lewinsohn, P. M., Seeley, J. R., Klein, D. N., Andrews, J. A., & Small, J. W. 2007. Psychosocial functioning of adults who experienced substance-use disorders as adolescents. *Psychology of Addictive Behaviours*, 21, 155-64.
- Rowe, B. H., Channan, P., Bullard, M., Blitz, S., Saunders, L. D., Rosychuk, R. J., Lari, H., Craig, W. R., & Holroyd, B. R. 2006. Characteristics of patients who leave emergency departments without being seen. *Academic Emergency Medicine*, 13, 848-52.
- Schwinn, T. M., Schinke, S. P., & Trent, D. N. 2010. Substance use among late adolescent urban youths: Mental health and gender influences. *Addictive Behaviours*, 35, 30-4.
- Shaw, K. N., Ruddy, R. M., & Gorelick, M. H. 2003. Pediatric emergency department directors' benchmarking survey: Fiscal year 2001. *Pediatric Emergency Care*, 18, 143-7.
- Spirito, A., Monti, P. M., Barnett, N. P., Colby, S. M., Sindelar, H., Rohsenow, D. J., Lewander, W., & Myers, M. 2004. A randomized clinical trial of a brief motivational intervention for alcohol-positive adolescents treated in an emergency department. *Journal of Pediatrics*, 145(3), 396-402.
- Statistics Canada. Profile for Canada, Provinces, Territories, and Forward Sortation Areas, 2006 Census. See: <http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=94-581-X2006003&lang=eng>
- Statistics Canada. Youth smoking survey 2006-07. Ottawa: Author.
- Tait, R. J., & Hulse, G. K. 2003. A systematic review of the effectiveness of brief interventions with substance using adolescents by type of drug. *Drug and Alcohol Review*, 22(3), 337-46.
- Tait, R. J., & Hulse, G. K. 2005. Adolescent substance use and hospital presentations: A record linkage assessment of 12-month outcomes. *Drug and Alcohol Dependence*, 79, 365-71.
- Tait, R. J., Hulse, G. K., & Robertson, S. I. 2004. Effectiveness of a brief-intervention and continuity of care in enhancing attendance for treatment by adolescent substance users. *Drug and Alcohol Dependence*, 74, 289-96.
- Viner, R. M., & Taylor, B. 2007. Adult outcomes of binge drinking in adolescence: Findings from a UK national birth cohort. *Journal of Epidemiology and Community Health*, 61(10), 902-7.
- Woolfenden, S., Dossetor, D., & Williams, K. 2002. Children and adolescents with acute alcohol intoxication/self-poisoning presenting to the emergency department. *Archives of Pediatrics & Adolescent Medicine*, 156(4), 345-8.
- World Health Organization. International Statistical Classification of Diseases and Related Health Problems (10th Revision). [Accessed 2007 February 5]. Available: <http://www.who.int/classification/icd/en/>
- Worster, A., & Haines, T. 2004. Advanced statistics: understanding medical record review (MRR) studies. *Academic Emergency Medicine*, 11(2), 187-92.
- Wu, L., & Ashton, C. M. 1997. Chart review. A need for reappraisal. *Evaluation and the Health Professions*, 20(2), 146-63.