Substance use among adolescents: Causes, comorbidities and innovative approaches

Symposium Presenters:

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Nominated Chair: Professor Leanne Hides

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Aim of Abstract: This symposium aims to explore the causes and comorbidities of adolescent substance use, and to present innovative approaches to identifying and addressing substance use, and related issues, in youth.

This session will examine a number of comorbidities including between disordered eating and substance use, trauma and substance use and relationships between social media, parental monitoring and alcohol use. Innovative prevention and intervention approaches will also be discussed including how to improve targeted prevention interventions, effectiveness of school-based prevention programs, and the importance of integrated treatments.
Presentation 1 – The relationship between problematic substance use and disordered eating behaviours among Australian adolescents

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Introduction and Aims: Adolescence is a developmental period characterised by significant biological, neurobiological and social changes and distinct susceptibility to the impact of health risk behaviours, such as disordered eating patterns and substance use. Substances including alcohol and tobacco are often used to suppress appetite and self-medicate negative affective mood states. Likewise, disordered eating patterns have been linked to the development and maintenance of substance-related problems. We aim to explore these complex relationships and their associated harms during the formative period of adolescence when symptom patterns first emerge.

Design and Methods: This study is a secondary data analysis of data collected as part of the Australian Child and Adolescent Survey of Mental Health and Wellbeing (2015). Data obtained from 2,967 adolescents recruited from the general population, will be analysed to explore relationships between disordered eating patterns and problematic substance use.

Results: Previous analysis has demonstrated that up to one-third (32%) of adolescents aged 11-17yrs were in an unhealthy weight range; 18% drunk alcohol, 7% smoked tobacco and 5% used cannabis in the last 30 days. Further analysis will be conducted to examine the relationship between these behaviours.

Conclusions: This study will be the first to examine relationships between disordered eating patterns and problematic substance use among Australian adolescents. It is hoped that bringing these data to the attention of clinicians will result in deeper understanding of the relationships between these prevalent conditions, informing better treatment through integrated clinical approaches for this vulnerable population.
Presentation 2 – Parenting in the tech age: The relationship between social media, alcohol use and parent monitoring across adolescence

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Introduction and Aims: Australian teens spend an average of 3+ hours per day on social networking sites (SNS) (APS, 2017). More time spent on SNS has been linked to problem drinking, with peer alcohol-related content named as a critical factor in this relationship. The potentially protective effect of parent monitoring of social media remains largely overlooked. The aim of this study is to examine the effect of time on SNS and peer-generated alcohol content on problem drinking in early adolescence, and the effect of parent monitoring on this relationship.

Design and Methods: The present sample comprised the control group (n=432; 71% female) of the Climate and Preventure (CAP) study (Newton et al., 2012), a longitudinal cohort of Sydney secondary school students. SNS habits and parent monitoring were assessed via teen self-report. Logistic regression analysis was used to assess the effect of social media habits at baseline on drinking and binge drinking across adolescence.

Results: Preliminary analyses revealed that time spent on social media and seeing images of peers drinking at baseline were associated with increased odds of drinking over time (p < 0.001), while parent monitoring of social media use was associated with decreased odds (p < 0.001). Mediation analyses will be conducted with results presented.

Conclusions: This study provides support for previous findings that time spent on SNS, and seeing images of peer substance use, are associated with an increased likelihood of drinking over time. Furthermore, parent monitoring of social media use was associated with decreased odds of drinking.

Implications for Practice or Policy: These findings have encouraging implications for practice given that 60% of Australian parents report never monitoring their child’s social media use (APS, 2017).
Presentation 3 – Predicting future alcohol use in adolescents using machine learning approaches

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Introduction and Aims: Identifying risk factors associated with alcohol use does not necessarily lead to accurate predictions about who will use or abuse alcohol. Here, we apply machine learning techniques to longitudinal data from a large-scale cluster randomised trial, to predict future alcohol use in Australian adolescents.

Design and Methods: 6,411 participants (mean age 13.5 years) from 71 schools completed questionnaires about their alcohol use, mental health, and personality. Machine learning models including elastic net regression and random forests used baseline measures to predict drinking and binge drinking at final follow-up 2 years later.

Results: Results showed that elastic net regression models achieved the greatest prediction accuracy (AUC 0.761 for classifying participants who had recently had a full standard drink, and AUC 0.782 for participants recently binge drinking). Higher sensitivity was achieved when using resampling methods that accounted for the imbalance in outcomes in the sample (fewer drinkers than non-drinkers). The most important predictors in these models were baseline alcohol use measures, peer substance use and personality measures such as sensation seeking, impulsivity and hyperactivity.

Discussions and Conclusions: With the collection of larger data sets in the drug and alcohol field we have the opportunity to use powerful statistical techniques such as machine learning to achieve more accurate prediction. This is one of the first applications of these techniques in Australian prevention research, and demonstrates its potential to predict outcomes by combining information from multiple predictors.

Implications for Practice or Policy: Targeted prevention interventions for high-risk individuals could be improved using machine learning techniques to more accurately identify those at risk, making use of all available information to capture complex relationships between predictors.
**Presentation 4 – Comparing the effectiveness of universal, selective and combined prevention for alcohol misuse: Three year outcomes from the CAP (Climate and Preventure) study.**

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**Introduction and Aims:** Alcohol use is a leading cause of disease burden among youth, highlighting the need for effective prevention. The Climate and Preventure (CAP) study was the first trial of a comprehensive alcohol use prevention approach which combined a universal intervention (delivered to all) with a personality-targeted selective intervention (high-risk students only).

**Design and Methods:** A cluster randomized controlled trial was conducted in 26 high schools (n=2190, $M_{age}=13.3$yrs). Participants were randomized to one of four conditions; universal prevention for all (Climate); selective prevention for high-risk students (Preventure); combined universal and selective prevention (Climate and Preventure; CAP); or health education as usual (Control). All students were assessed over 3 years and a longer-term follow-up is currently underway.

**Results:** Analyses up to 3-years demonstrate the effectiveness of universal, selective and combined approaches in preventing harmful alcohol use among both low- and high-risk adolescents, as well as reducing mental health symptoms in the high-risk students. Compared to controls, effect sizes for the universal, selective and combined interventions ranged from $d=-0.21$ to -0.56 (p<0.05), and Number Needed to Treat values ranged from 6 to 12. These compare favourably to other alcohol prevention programs.

**Discussion and Conclusions:** Universal, selective and combined approaches to alcohol prevention were effective up to 3 years post-baseline. As very little is currently known about the effectiveness of school-based prevention beyond age 17, the longer-term follow-up of this cohort will address a crucial knowledge gap.

**Implications for Practice or Policy:** Findings from the 7-year follow-up will indicate which prevention approaches are most sustainable long-term, vital information to inform policy nationally and internationally, as economic modelling suggests substantial societal benefit can be gained from even modest reductions in alcohol use.

**Implications for Translational Research:** Our findings provide support for the dissemination of universal, selective and combined alcohol interventions in Australian schools.
Presentation 5 – Treating trauma and substance use in adolescents

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Introduction and Aims: Up to 80% of adolescents have experienced trauma and one-in-seven suffer from post-traumatic stress disorder (PTSD), a chronic, debilitating psychiatric disorder. For 50% of these adolescents, the course of their illness is further complicated by a co-occurring substance use disorder, which often develops from repeated self-medication of PTSD symptoms. Once established, both disorders serve to maintain and exacerbate the other leading to extensive social, educational, physical and psychological impairments and a chronic course of illness. It is imperative to intervene early in the trajectory in order to prevent the severe and long lasting burden associated with this common comorbidity. In this presentation we provide an overview of the evidence regarding treatment options available for co-occurring PTSD and substance use, and promising new early interventions for adolescents.

Design and Methods: A review of the peer-reviewed literature regarding treatment of PTSD and substance use was undertaken, and best practice approaches for the treatment of adolescents identified.

Results: International guideline recommendations have shifted away from traditional sequential models of treatment for these disorders towards integrated models where both disorders are treatment simultaneously. There is however, limited research regarding integrated treatment for adolescents. Based on the evidence-base surrounding the treatment of adults, and recommendations for the treatment of each disorder singularly among adolescents, we have developed and are currently trialing a new integrated treatment for adolescents called COPE-A.

Discussion and Conclusions: There is growing evidence for the integrated treatment of PTSD and SUD among adults, but the research pertaining to adolescents is in its infancy. Our current trial examining the efficacy of COPE-A will provide much needed evidence as to how these conditions may best be treated in adolescence before they become chronic disabling conditions.
Symposium Discussion Section
The symposium brings together leading experts and early career researchers in the substance use and mental health fields. It will be of particular interest to researchers, clinicians and educators working with adolescent populations and those interested in an integrative approach to substance use and mental health problems.

Those attending the symposium will gain an understanding of the causes and comorbidities of substance use among adolescents along with developing an understanding of the cutting edge innovative approaches that are available to address this important issue.

A panel discussion will be facilitated by Professor Hides to answer audience questions and discuss several key themes:

1. How can research help inform our understanding of the comorbidities and causes of problematic substance use in adolescents?
2. What are the gaps in our knowledge?
3. How can we achieve effective translation of prevention and early intervention strategies for substance use and its comorbidities in adolescents?

Active participation by attendees will be encouraged.

Disclosure of Interest Statement:
MT and NN are two of the developers on the Climate Schools student program in Australia which is distributed on a cost recovery basis through CLIMATESCHOOLS PTY LTD. The other authors declare that they have no competing interests.