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A Review to Identify Gaps in Research and Service Delivery for Substance Use Prevention among At-risk Adolescents Involved in Child Welfare System: The Promises of Targeted Interventions

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Abstract:

Adolescents involved with the child welfare system are at a high risk of early initiation of substance use and development of substance use disorders. However, there is an enormous gap between the needs and availability of the intervention programmes for prevention and treatment of substance use problems in at-risk adolescents involved in the child welfare system. In the present article, we first review the prevalence of substance use problems and risk and protective factors for substance misuse among adolescents in the child welfare system. We then discuss the available interventions for reducing substance use problems in these populations, and the promises of personality-targeted interventions for reducing substance use problems in adolescents involved in the child welfare system, and the gap in research and practice.

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Introduction

Substance use problems are major concern in adolescents involved in child welfare system (e.g., Braciszewski & Stout, 2012; Narendorf & McMillen, 2010; Traube, James, Zhang, & Landsverk, 2012; Wekerle, Leung, Goldstein, Thornton, & Tonmyr, 2009). Several factors, such as exposure to child maltreatment, parental substance use, multiple placement changes, and lack of family support when transitioning into independent living situations, contribute to the increased risk of substance use problems in youth involved in child welfare system (Aarons et al., 2008; McCoy, McMillen, & Spitznagel, 2008; Walsh, MacMillan, & Jamieson, 2003). While child welfare services are structured in order to assure that children are provided with an environment that promotes appropriate social, emotional and physical development, previous studies reported that adolescents who receive chid welfare services are at increased risk of substance use problems (Pilowsky & Wu, 2006). In addition, early targeted prevention programmes that specifically address the risk of substance use among this group are not often implemented in this system, and even more rarely rigorously studied.

The prevalence of substance use among adolescents involved in child welfare system may vary based on several factors, such as the method used for measuring substance use, the population studied, and the age and location of the sample (Young, Boles, & Otero, 2007). Some studies estimated that 1 in 5 adolescents involved in child welfare system struggle with a substance use problem (Aarons, Brown, Hough, Garland, & Wood, 2001). In addition, living in foster homes increases the likelihood of substance abuse by five times compared to no history of removal (Pilowsky & Wu, 2006). Findings from the Canadian Incidence Study of Reported Child Abuse and Neglect-2003 (Trocmé et al., 2005) indicated that around 14% of all 10-15 year old individuals investigated for maltreatment and 16% of individuals with substantiated cases had substance abuse problem (Singh, Thornton, & Tonmyr, 2011). In addition, they tend to show more problems with drugs than alcohol (Singh et al., 2011). Results from another Canadian study of youth involved in child welfare system found a higher rate of cannabis and other drug use among this population compared to non-involved youth (Wekerle et al., 2009). Other studies confirmed these results showing youth involved in child welfare system have problems with drugs more than alcohol and indicated that the use of "hard" drugs, such as lifetime use of amphetamines, opiates, crack/cocaine, and hallucinogens is considerably higher in youth currently and formerly cared for in foster homes compared to peers in general population (see a systematic review by (Braciszewski

& Stout, 2012). In addition, the diagnosis of substance use disorders (particularly lifetime) is substantially higher among youth in child welfare system compared to youth in the general population (e.g., Aarons et al., 2001; Aarons et al., 2008; Braciszewski & Stout, 2012; Narendorf & McMillen, 2010; Pilowsky & Wu, 2006; Vaughn, Ollie, McMillen, Scott, & Munson, 2007; Wall & Kohl, 2007).

In addition to problems with substance use, adolescents involved in child welfare system seem to lag behind their peers from the general population and suffer from difficulties in several areas. A systematic review of 32 studies assessing the outcomes of youth who leave foster care indicated that they show several disadvantages compared to their peers from the general population, including lower educational outcomes, employment rate and income, and higher rates of homelessness, mental health problems, substance use problems, and criminal justice involvement (Gypen, Vanderfaeillie, De Maeyer, Belenger, & Van Holen, 2017). Importantly, the high prevalence of mental health disorders in this population is very concerning. A recent systematic review and meta-analysis of the epidemiological studies assessing the prevalence of mental disorders in children and adolescents in the child welfare system indicated that nearly half of children or adolescents (49%) in the child welfare system meet the criteria for a current mental disorder with the externalising disorders as the primary main problem (Bronsard et al., 2016). The most common mental disorders were disruptive disorder (27%; including conduct disorder (20%) and oppositional defiant disorder (12%)), following by anxiety and depressive disorders (18% and 11%, respectively), and attention-deficit/hyperactivity disorder (ADHD; 11%). These disorders are additional risk factors for developing substance use disorders (e.g., Brinkman, Epstein, Auinger, Tamm, & Froehlich, 2015; Bukstein, 2000) and subsequent involvement in delinquency, juvenile justice system, and homelessness, each possess additional risk factors for substance use disorders (Desai, Lam, & Rosenheck, 2000; Doria, Antoniuk, Assumpcao Junior, Fajardo, & Ehlke, 2015).

Despite the evidence of elevated risk of substance use problems among adolescents involved in child welfare system, relatively little attention has been devoted to research and practice related to the assessment, prevention, and treatment of these problems (Braciszewski & Stout, 2012; Casanueva, Stambaugh, Urato, Fraser, & Williams, 2011; Cheng & Lo, 2010; Ringeisen, Casanueva, Urato, & Stambaugh, 2009). The aim of the present article is to review the risk and protective factors for substance use among adolescents involved in the child welfare system and discuss the efficacy of available intervention strategies as well as the promises of and to discuss targeted interventions for reducing the risk of substance use problems in these populations.

Risk and Protective Factors for Substance Use among Youth in Child Welfare System

Although not an exhaustive overview of risk and protective factors, below we highlight some of the most important factors which confer risk and resilience to substance use disorders among youth in child welfare system.

Risk Factors

Earlier research has identified several risk factors including demographic, psychosocial, and contextual risk factors for substance use among youth in child welfare system (Aarons et

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al., 2008; Vaughn et al., 2007). For example, maltreatment history, peer and sibling substance use, multiple placement changes, and later entry into child welfare system (Aarons et al., 2008), conduct disorder, history of physical abuse, and lower level of caregiver relatedness and monitoring (Wall & Kohl, 2007) and delinquency (Aarons et al., 2008; Traube et al., 2012) have been reported to increase the odds of substance use and related problems. In older youth, diagnosis of conduct disorder and post traumatic stress disorder (PTSD), Caucasian race, and living in congregate care or more independent placements (Vaughn et al., 2007), and having friends who used substances and skipping school (Thompson & Auslander, 2007) were associated with a higher risk of substance use problems. Findings from the Canadian Incidence Study of Reported Child Abuse and Neglect-2003 (Trocmé et al., 2005) indicated that the severity of the experienced maltreatment and other factors, such as older age, physical harm, negative peer involvement, caregiver substance abuse, running away, and irregular school attendance, were associated with substance abuse in adolescents aged 10–15 year old (Singh et al., 2011).

History of child maltreatment, number of out-of-home placements, and age at entry into the child welfare system are risk factors for substance use unique to youths in the child welfare system (Aarons et al., 2008). Exposure to childhood maltreatment is particularly an important risk factor for adolescent substance abuse (Edalati, Doucet, & Conrod, in press). There is evidence that exposure to childhood maltreatment during the critical periods of development can cause permanent alterations in the brain structure and function which consequently increases the risk of initiation of substance misuse and development of substance use disorders (Andersen & Teicher, 2009; Edalati & Krank, 2016). It has been indicated that young adults with histories of child maltreatment are more likely to expect positive effects from drinking alcohol and using substances to cope with negative emotions (i.e., anxiety, depression) and enhance positive affect (Goldstein, Flett, & Wekerle, 2010). In addition, experience of childhood maltreatment is associated with a heightened sensitivity to the effects of stress (Young-Wolff, Kendler, & Prescott, 2012), and continuing exposure to stressful life experiences and victimisation during adolescence (Cole, Nolen-Hoeksema, Girgus, & Paul, 2006; Shields & Cicchetti, 2001) which can additionally increase the risk of substance abuse as a way of emotion regulation and tension reduction (Edalati & Krank, 2016; Shields & Cicchetti, 2001).

Another important risk factor for vulnerability to substance use among youth involved in child welfare system is parental substance use. Parental substance use not only plays a direct role in child's involvement in the welfare system, but also creates several risk factors for adolescents' substance use, such as genetic risk factors, impact on neurocognitive development, inappropriate modeling, impaired parental control, neglect, lower socio-economic status and increased opportunities for access to substances (e.g., Dick et al., 2007; Enoch, 2013; Fisher et al., 2011; Van Der Vorst et al., 2013; Wekerle, Wall, Leung, & Trocme, 2007). In addition, parents with substance use problems are more likely to maltreat their children (Walsh et al., 2003) and these children tend to show more substance use problems (J. A. Stein, Leslie, & Nyamathi, 2002). Ultimately, all the factors that put children in contact with the child welfare system may create increased vulnerabilities to substance use and misuse in youth involved in child welfare system, and require additional attention and support to address these risk factors for substance use problems.

Protective Factors

While adolescents involved in child welfare system often demonstrate higher risk for substance use problems, many build and develop resilience. In this context, resilience is defined as effective adaptation in the face of adversity, maltreatment, and trauma and often characterised as showing age-appropriate developmental competencies, effective self-regulation, and low rates of externalising (e.g., substance use, conduct problems) and internalising (e.g., anxiety, depression) problems (e.g., Afifi & Macmillan, 2011; Jaffee, Caspi, Moffitt, Polo-Tomas, & Taylor, 2007). A study of an adolescent sample in an out-of-home care service in Ontario, Canada revealed that having a higher-quality relationship with the female caregiver, a greater number of close friendships, and a higher self-esteem are positively associated with better psychological adjustment defined as lower levels of anxiety and physical aggressive behaviours. Lower level of physical aggression was additionally related to having a smaller number of primary caregivers, and using more approach coping strategies (e.g., problem-solving skills), and less avoidant coping strategies (Legault, Anawati, & Flynn, 2006). In young adults who had been placed in out-of-home care as children, a better social support system, a sense of competence, setting goals for the future, and involvement in community service activities were related to increased resilience, measured by levels of caring relationships, autonomy, and social competence (Hass & Graydon, 2009). Few studies, however, have investigated resilience in the context of substance use outcomes in this population. It has been found that avoiding foster care placement and connectedness to caregiver (Traube et al., 2012), and perceived quality of the youth–caregiver relationship and participation in extracurricular activities (Guibord, Bell, Romano, & Rouillard, 2011) are important protective factors for substance use in youth involved in child welfare system. However, a notable and concerning finding from these studies was the small impact of protective factors on the growth of substance use and use of hard substances in this population (Traube et al., 2012) which requires further investigations.

Interventions for Substance Use Prevention and Treatment in Adolescents Involved in Child Welfare Services

There is an enormous gap between the needs and availability of intervention for youth with substance use problems with less that 10% of adolescents and young adults in need receiving such interventions (Substance Abuse and Mental Health Services Administration, 2009). Although it may appear that involvement in child welfare system would provide access to substance abuse intervention services for at-risk adolescents, some studies have shown that these adolescents do not have adequate access to intervention resources and support services for these problems (Geenen & Powers, 2007; Wells, Chuang, Haynes, Lee, & Bai, 2011). For example, one study, which followed up the use of mental health and substance use services for 5–7 years among 1400 adolescents (aged 11–15 years at baseline) involved in child welfare system who reported using illicit substances, showed that by the last follow-up, only 21.5% of young adults using illicit substances received outpatient specialty services compared to the 69.1% who received these services at baseline (Casanueva et al., 2011). In addition, in contrast to the beginning of the study when illicit substances users were more likely to receive outpatient and inpatient specialty services compared to non-user adolescents, no significant

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difference in receiving specialty services was found between two groups by the last follow-up when transiting to adulthood (Casanueva et al., 2011). There are several reasons for this gap between the needs and receipt of the intervention programs in this group. Many adolescents involved in child welfare services are not willing to share information regarding their substance use for fear of negative consequences for themselves and their families, or lack of trust and connections to service providers or case managers (Braciszewski, Moore, & Stout, 2014). In addition, most child welfare services do not provide interventions for substance use and behavioural problems and refer adolescents to other service providers, such as outpatient or residential substance abuse treatment services, which may additionally result in barriers in receiving treatment (Burns et al., 1995; Wells et al., 2011). Moreover, substance abuse intervention services for at-risk adolescents involved in child welfare system are not often properly tailored and targeted to this age group and toward their specific needs (Wekerle et al., 2009). It is not surprising that the negative impact of adverse childhood experiences on social, emotional, and behavioural outcomes persists in this population even after receiving mental health services (Garcia, Gupta, Greeson, Thompson, & DeNard, 2017). The gap between the need and access to intervention services for substance use problems is even broader for foster youth who age out and leave the system (Casanueva et al., 2011). We are not aware of any intervention programme which specifically addresses the risk of substance use among this group. It is particularly important as leaving care has been shown to be associated with increased substance use in these youth, especially in the year after leaving care (Narendorf & McMillen, 2010).

Trauma-focused Interventions

There are several interventions designed to reduce the emotional and behavioural problems and to improve the outcomes of adolescents involved in child welfare system (for review, see (Fratto, 2016; Leve et al., 2012). Some examples include Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) (Cohen, Mannarino, & Deblinger, 2006), Cognitive Behavioral Intervention for Trauma in Schools (CBITS) (Kataoka et al., 2003; B. D. Stein et al., 2003), Eye Movement Desensitization and Reprocessing (EMDR) (Adler-Tapia & Settle, 2009), Structured Psychotherapy for Adolescents Responding to Chronic Stress (SPARCS) (Habib, Labruna, & Newman, 2013), Prolonged Exposure Therapy for Adolescents (PE-A) (Foa, Chrestman, & Gilboa-Schechtman, 2009), Trauma Affect Regulation: Guide for Education and Therapy (TARGET) (Frisman, Ford, Lin, Mallon, & Chang, 2008; Marrow, Knudsen, Olafson, & Bucher, 2012), and Attachment, Self-Regulation, and Competency (ARC) (Blaustein & Kinniburgh, 2010). Most of these interventions focus on improving the process of exposure to traumatic memories, alleviating the symptoms of complex trauma, and learning how to cope with negative emotions associated with the traumatic experience. However, a group of epidemiological studies have indicated that externalising behaviours are the primary problems of youth involved in child welfare system, while posttraumatic stress disorder (PTSD) had the lowest prevalence (4%) of all mental health problems of these youth (see a systematic review and meta-analysis by Bronsard et al., 2016). Although, externalising problems and substance misuse may, in part, appear in responding to the histories of maltreatment and trauma, interventions that specifically target a range of externalising behaviours as well as problems with substance misuse in this group are vastly lacking.

Interventions to Reduce Substance Use and Externalising Behaviours

Among few promising approaches to reduce substance use and externalising behaviours, ARC intervention has been shown to reduce externalising and internalising behaviours and PTSD symptoms, and use of restraints post-treatment in traumatized youth in residential treatment settings (Hodgdon, Kinniburgh, Gabowitz, Blaustein, & Spinazzola, 2013). The ARC framework is designed based on the effects of trauma on each stage of development of children and adolescents (e.g., intellectual, social, psychological/emotional, and physical) (Blaustein & Kinniburgh, 2010).

Another intervention called Multidimensional Treatment Foster Care for Adolescents (MTFC-A) is a multicomponent programme which includes delivering coordinated services to adolescents, foster parents, and adolescent long-term placement resources. MTFC-A consists of 6 to 9 months placement with community foster parents who are intensively trained, supervised, and supported to provide positive adult support and mentoring, close supervision, and setting consistent limits (Leve, Fisher, & Chamberlain, 2009). The results from MTFC-A trials in the USA and Sweden have indicated its effectiveness in reducing internalising and externalising behaviours in high-risk youth involved in child welfare services (e.g., Kerr, Leve, & Chamberlain, 2009; Leve et al., 2009; Westermark, Hansson, & Olsson, 2011). In addition, boys with serious and chronic delinquency problems who received MTFC-A (14.9 years old on average at baseline:) reported lower levels of drug use at 12-month and lower levels of tobacco, marijuana, and other drug use at 18-month follow-ups (Smith, Chamberlain, & Eddy, 2010).

A third intervention, called 'Middle School Success (MSS)', is a derivative of 'Keeping Foster Parents Trained and Supported (KEEP)' and involves both foster caregivers and youth for 6 sessions over the summer prior to middle school entry and ongoing weekly sessions over the first year of middle school, and is oriented toward behaviour management for caregivers and skill building for youth (Kim & Leve, 2011). Adolescent girls in foster care (11.54 years old on average at baseline) receiving MSS indicated decreased externalising and internalising problems at a 6-month follow-up (Smith, Leve, & Chamberlain, 2011) and at 12- to 24-month follow-ups (Kim & Leve, 2011). The lowered symptoms then served as a mediating pathway to reduced substance use (specifically tobacco and marijuana use) assessed at 36-month follow-up (Kim & Leve, 2011) compared to those in foster care services-as-usual control group. Finally, a novel technology-driven intervention for preventing problematic substance use seeks to facilitate service delivery among youth receiving foster care services (Braciszewski et al., 2016): iHeLP (Interactive Healthy Lifestyle Preparation) and consists of a specific computerized screening and brief intervention (SBI) (Ondersma, Chase, Svikis, & Schuster, 2005; Ondersma, Svikis, & Schuster, 2007) targets substance misuse by incorporating components from Motivational Interviewing (MI) (Miller & Rollnick, 2013) and the FRAMES approach to brief interventions (Miller & Sanchez, 1994). iHeLP extends the utility of this computerized SBI by adding a text message-based booster which is dynamically tailored to each participant's level of motivation to reduce or change their substance use behaviour. This approach can be particularly beneficial for youth who leave foster services; however, the efficacy of this intervention has not been reported

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yet (Braciszewski et al., 2016). In addition, previous studies have indicated that the effects of computerized SBIs decrease over time, even after adding the booster sessions (Moore, Fazzino, Garnet, Cutter, & Barry, 2011; Rooke, Thorsteinsson, Karpin, Copeland, & Allsop, 2010).

Despite these efforts, there are significant limitations in the current research and practice of substance use prevention for adolescents involved in child welfare system. Results from several of these intervention studies show generally small effect sizes with effects that do not last over time (Leve et al., 2012). Other important limitations include the lack of evidence of generalizability to other outcome measures and populations, limited baseline (pre-intervention) and long-term follow-up data, and methodological issues regarding the study design and blindness to study conditions (see (Leve et al., 2012). In addition, these interventions generally require substantial resources, efforts, and time in many cases, their impact are affected by the experience, training, and supports of foster caregivers in the research process (Dorsey et al., 2008). Finally, trauma-focused interventions are rarely evaluated for the impact on substance use outcomes – and drawing from the literature on trauma-focused therapies for adults with PTSD and substance use disorders, interventions must integrate a dual focus on both sets of issues in order to dually impact on substance use and mental health outcomes (Conrod & Stewart, 2006).

There is a pressing need for evidence-based targeted substance use prevention strategies that address the special needs and risks of these adolescents at earlier ages before their vulnerabilities become severe. The current universal approach for substance use prevention, such as school drug education programs, targets substance use behaviours in all adolescents and is based on delivering intervention components (e.g., knowledge and skills) that are more generic and suitable for the general populations of adolescents. Several literature reviews and meta-analyses have shown that most universal approaches have small or no effects in reducing substance use among adolescents (e.g., Cuijpers, 2002; Foxcroft & Tsertsvadze, 2011; Tobler et al., 2000). These approaches may be less effective for those most at risk of transitioning to substance use disorders, and those who have already started using substances. Moreover, current universal approaches are not sufficient to address the needs of adolescents who have been maltreated and live in vulnerable context and are most at risk of engaging in substance use and transitioning to substance use disorders. Shifting the focus of prevention efforts away from the universal approaches to more selective and indicated intervention programmes which target the potential risk factors underlying substance misuse in at-risk adolescents would also benefit adolescents living in vulnerable context or exposed to maltreatment, but are not involved in child welfare services. These programmes not only aim at reducing the risk of substance misuse, but also improve decision-making capacity, promote better coping and problem-solving strategies, and enhance self-esteem and positive peer interactions in order to enhance resilience (see (Brochu, 2007).

Personality Risk Profiles as Targets for Reducing Substance Use Problems in Adolescents Involved in Child-welfare System

Specific personality profiles have been identified as strong risk factors for substance use disorders, to mediate the genetic predisposition to substance misuse, to predict specific

patterns of substance misuse and psychiatric comorbidity, and to explain the motivation for substance misuse (see Conrod & Nikolaou (2016) for review). These findings suggest that personality risk profiles are potentially suitable targets for prevention and treatment of substance misuse (Conrod, 2016).

Exposure to adverse childhood experiences and trauma is associated with development of maladaptive personality patterns (Kim, Cicchetti, Rogosch, & Manly, 2009; Nakao et al., 2000). The relationship between childhood adversity and clinically important aspects of personality factors, including neuroticism, negative affect, and behavioural inhibition, has been indicated in a longitudinal study of 7485 individuals in the age ranges of 20–24, 40–44 and 60–64 years (Rosenman & Rodgers, 2006). Cross-sectional (Edalati & Krank, 2015) and longitudinal (Oshri, Rogosch, & Cicchetti, 2013) studies have indicated that personality risk profiles mediate the association of childhood maltreatment with subsequent substance use and psychopathology in adolescents. A recent longitudinal study of a large sample of adults (N = 2947) aged 18–65 indicated that the severity of childhood maltreatment predicts higher initial levels of psychological distress and that this effect was mediated by maladaptive personality types characterized by a high neuroticism in combination with low extraversion, agreeableness and conscientiousness. Moreover, individuals with varying levels of childhood maltreatment showed significant differences in trajectories of distress over time (Spinhoven, Elzinga, Van Hemert, de Rooij, & Penninx, 2016). Similarly, personality traits, such as impulsivity and sensation seeking, mediate the relationship between adverse childhood experiences (e.g., violence, sexual abuse) and alcohol and drug misuse in community samples of adolescents (Bailey & McCloskey, 2005; Edalati & Krank, 2015).

In adolescents receiving child protection services, personality traits of hopelessness, sensation seeking, and impulsivity were all associated with higher drinking levels and more alcohol problems, whereas, anxiety sensitivity was positively correlated with difficulties at stopping drinking (Stewart, McGonnell, Wekerle, Adlaf, & et al., 2011). Personality risk profiles also explain the motivation underlying substance use behaviours in youth receiving child protection services. For example, Using the Substance Use Risk Profile Scale (SURPS) (Woicik, Stewart, Pihl, & Conrod, 2009), Hudson and colleagues (2015) demonstrated that personality traits of hopelessness and impulsivity were related to drinking to cope with negative emotions, whereas, anxiety sensitivity was linked to drinking to conform in a sample of at-risk youth receiving child protection services. These findings suggest that these at-risk youths may primarily drink alcohol for negative reinforcement (e.g., to cope with negative feelings, to relieve stress). Individuals who grow up in an unfavorable environment (e.g., exposure to abuse and neglect, dysfunctional family environment) are more sensitised to the effects of stress, show more negative self-concept, use more dysfunctional tension reduction behaviours, and struggle to effectively regulate emotions and to cope with negative affects (see (Edalati & Krank, 2016). Their negative experiences and ongoing trauma symptoms may excessively activate negative reinforcement and encourage compulsive substance use in response to stressful context in vulnerable adolescents (see Edalati et al., in press).

The observed links between anxiety sensitivity and difficulties at stopping drinking, and sensation seeking and enhancement motives for drinking (i.e., drinking to enhance positive mood) in other studies with adolescents receiving child welfare services (Stewart

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et al., 2011) might be explained by external motivations, such as overcoming social anxiety for adolescents with high anxiety sensitivity (Gilles, Turk, & Fresco, 2006) and affiliating with deviant peer groups in youth with high sensation seeking (Wang et al., 2016). If specific personality profiles predict the subsequent substance misuse and its underlying motivation in child welfare-involved adolescents, then efforts to prevent the emergence of substance use problems in this population will be more effective if they include targeted interventions toward these personality profiles.

The Preventure programme is a selective substance use prevention programme which was designed to target known personality risk factors for substance misuse based on the evidence from cross-sectional and longitudinal studies which connect these personality risk factors to early initiation and escalation of substance misuse in adolescents (for a review of Preventure trials and their results, see Conrod 2016). This personality-targeted approach targets four personality-specific motivational pathways to substance misuse: Hopelessness, Anxiety Sensitivity, Impulsivity and Sensation Seeking. After selection on personality scales (often using the SURPS (Woicik et al., 2009)), those who scored one standard deviation above the mean on one of the SURPS measures (i.e., high-risk individuals) are invited to participate in brief individual- or group-based intervention sessions which target their dominant personality profile. Interventions generally involve two 90-minutes sessions, with one week separating sessions. The interventions are conducted using manuals that incorporate psycho-educational, motivational enhancement therapy (MET) and cognitive behavioural therapy (CBT) components and include real life 'scenarios' shared by local youth with similar personality profiles (see Conrod 2016). This personality-targeted approach has been evaluated in eight randomised trials in Canada, United Kingdom, and Australia, with additional trials in progress. The findings from these trails have indicated that the Preventure programme is successful in reducing the rates of illicit drug use and binge drinking by approximately 50% in high-risk adolescents, with the effects last for up to three years (Conrod, 2016). In addition, these interventions were associated with a 25% reduced likelihood of transitioning to significant mental health problems, such as anxiety, depression, suicidal ideation and conduct problems (O'Leary-Barrett, Castellanos-Ryan, Pihl, & Conrod, 2016). Figure 1 (following page) displays the logic model developed for the Preventure programme.

We suggest that the Preventure programme can help reducing the substance use and mental health problems in adolescents involved in child welfare services by targeting these four specific personality risk profiles. It offers multiple advantages over more traditional universal prevention or generic intervention approaches which target substance use behaviours more directly. It helps reducing existing barriers in delivering effective substance use services to adolescents involved in child welfare system in several ways; first, within Preventure approach, substance use is not directly discussed. It has been shown that adolescents involved in child welfare system may not be willing to share information regarding their substance use for fear of negative consequences for themselves and their families, or general mistrust of service providers and institutions (Braciszewski et al., 2014). In addition, within Preventure approach, participants are primarily selected based on their personality profiles. Preventure uses psycho-educational strategies to teach participants

Table 1: Implications of the Review for Research, Practice, and Policy.

• Additional research is needed in relation to the assessment, prevention, and treatment of substance use disorders and related problems among adolescents involved in child welfare system.
• Researchers should explore the mediating and moderating processes in the link between the history of adverse childhood experiences and the risk of subsequent substance use disorders and further identify risk and protective factors of substance use patterns among adolescents involved in child welfare system.
• Additional work is needed to develop and implement evidence-based targeted substance use prevention strategies that address the special needs and risks of these adolescents at earlier ages before their vulnerabilities become severe.
• Delivering early-targeted prevention is particularly critical for youth involved in child welfare system before they exit care. There is also a need for access to intervention services which specifically address the risk of substance use among youth who age out and leave the system.
• It is essential to integrate substance use prevention programmes with trauma-focused interventions in order to have a dual impact on substance use and mental health outcomes.
• There is a need for widespread implementation of selective and targeted intervention programmes, such as personality-targeted approach, at school level to benefit both youth involved in child welfare system and those living in vulnerable context or exposed to maltreatment, but are not known to child welfare services as well as those most at risk of transitioning to substance use disorders, and those who have already started using substances.
• Additional education and training is required for child welfare workers, health practitioners, foster parents, group home staff, and school personnel to better identify vulnerable youth at-risk for substance use disorders.
• There is a need to support and promote the early screening for substance use problems in child welfare system, and to improve efficient communication and collaboration among services.
• Additional research is required for investigating the effectiveness of substance use intervention programmes with youth involved in child welfare system in Canadian context.

about the target personality profile and associated problematic coping behaviours, such as avoidance, interpersonal dependence, aggression, risky behaviours and substance misuse. Thus, substance use is only discussed as one of the problematic coping behaviours within a personality-focused context. Second, Preventure is generally delivered in group format with adolescents with similar personality profiles which can help increasing the bond and empathy among adolescents and providers, as many adolescents involved in child welfare system have difficulties or are reluctant to make close relationships and bond with others (Braciszewski et al., 2014). Third, sensitivity to the developmental needs, cultural values, and attitudes of the target group applied to every new implementation of the Preventure programme and intervention materials, it is more effective and relevant as reported by adolescents (Comeau et al., 2005; Midford, Munro, McBride, Snow, & Ladzinski, 2002). Forth, adolescents involved in child welfare system also suffer from a range of concurrent psychiatric symptoms and disorders (Bronsard et al., 2016; Oswald, Heil, & Goldbeck, 2010). The cognitive–behavioural strategies used in the Preventure programme are designed based on the evidence-based therapeutic approaches for major psychiatric disorders relevant to each of the personality traits (e.g., CBT for depression in the case of Hopelessness (e.g., Beck & Young, 1985), CBT for panic disorder in the case of Anxiety Sensitivity (e.g., (Barlow, 1985; Barlow & Craske, 1988) or CBT for ADHD in the case of Impulsivity (e.g., Kendall & Braswell, 1985). Thus, this Programme can also be helpful in reducing other psychiatric symptoms that are common in adolescents receiving child welfare services, as it has proven effective in preventing mental health problems in youth attending mainstream schools (O'Leary-Barrett et al., 2016). Fifth, because Preventure targets personality traits that are associated with risk for substance use initiation and escalation of substance misuse, it can be helpful in the context of both prevention and early intervention for those who have already started using substance, so can be delivered to heterogeneous groups of youth, at different developmental stages. Such trials

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also include substance use onset as an additional eligibility criterion and showed that the programme was effective in reducing such use (e.g., Conrod, Stewart, Comeau, & Maclean, 2006; Lammers et al., 2015). Three studies involving secondary analyses of Preventure trials reported that the programme is particularly effective for youth with more significant risk profiles, such as youth attending vocational schools in the Netherlands (Lammers et al., 2017), youth reporting clinically significant levels of externalising problems at baseline (Perrier-Menard, Castellanos-Ryan, O'Leary-Barrett, Girard, & Conrod, 2017) and youth reporting previous victimization experiences (Edalati et al., 2017). Finally, the Preventure programme is very brief and inexpensive compared to many previously used approaches for substance use problems of these populations, which can reduce the burden regarding the program delivery on resource-strapped systems. While the Preventure programme is primarily designed to reduce the risk of substance misuse and related problems within the general populations of at-risk youth, it can be easily modified and adapted for populations with larger and more specific needs, such as youth involved in child welfare services and foster care system, and to fill the gap in service delivery for these vulnerable populations.

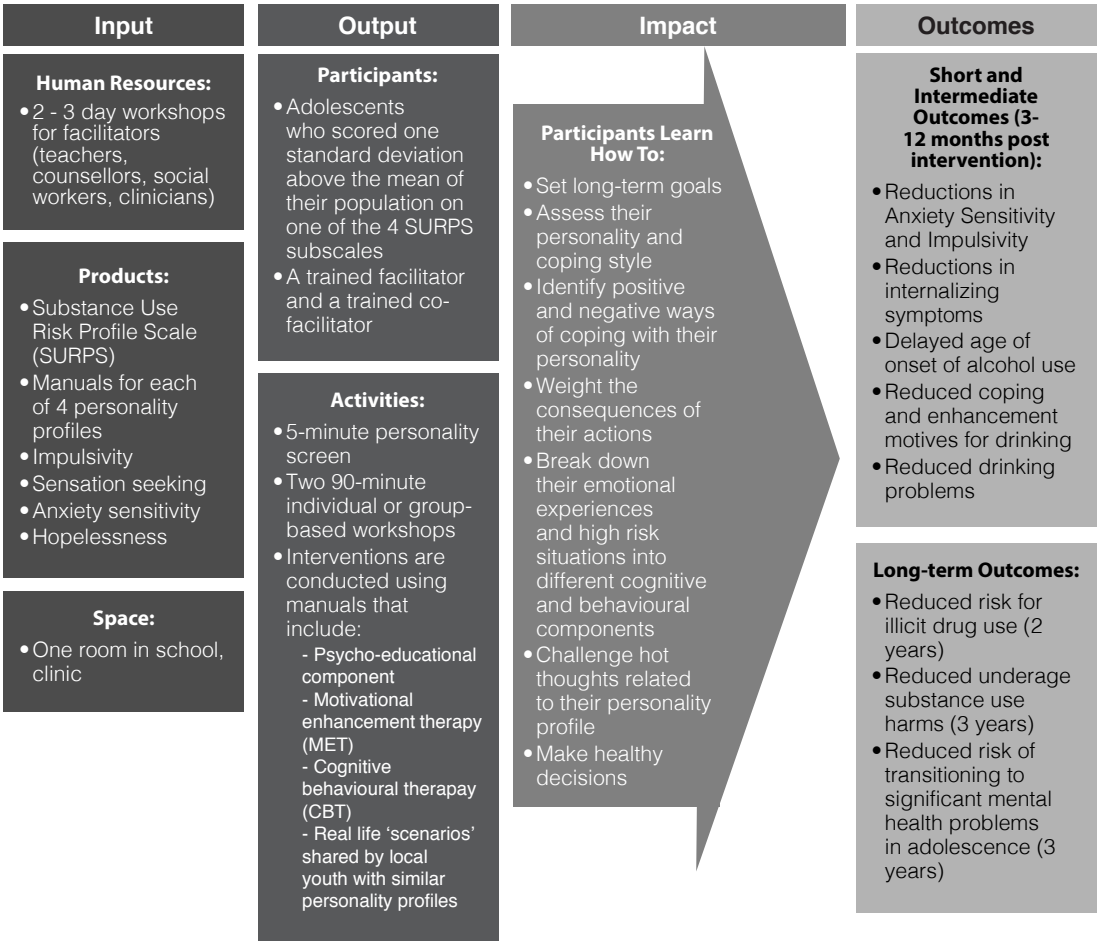
Collectively, these findings point to the importance of targeted interventions for improving personality risk profiles associated with higher risk of initiation and development of substance use disorders in adolescents who have experience childhood adversity and trauma, including those involved in child welfare system.

Conclusion

Table 1 summarises the gaps in research, practice, and policy for substance use disorders among at-risk adolescents involved in child welfare system. Adolescence is a critical period for the prevention of substance use disorders in this population. Despite evidence of elevated risk of substance use during this period, few systematic studies have been performed on the patterns of substance use and the unique environmental and social context of adolescents involved in child welfare system across development. There is also a pressing need to study the substances mostly used by this population (e.g., cannabis, hard drugs) and further identify risk and protective factors of substance use patterns among adolescents involved in child welfare system. A better understanding of biological, social, environmental, and psychological factors underlying substance use problems in this population will largely benefit the intervention efforts.

The findings reviewed here suggest that additional work is needed to develop and implement evidence-based interventions tailored to the specific needs of adolescents involved in child welfare system at risk for substance abuse. Interventions should start with services aimed at substance use prevention and extend beyond existing substance use prevention designed for general populations of adolescents (e.g., universal approaches). Delivering early targeted prevention is particularly critical for youth involved in child welfare system before they exit care. Selective and targeted prevention programmes for reducing the risk of substance use in at-risk adolescents offer great advantages over universal approaches and create the opportunity for more widespread implementation at schools to benefit both youth involved in child welfare system and those living in vulnerable context or exposed

Figure 1: The Logic Model for Preventure Programme



to maltreatment, but are not known to child welfare services. Moreover, it is essential to integrate substance use prevention programmes with trauma-focused interventions in order to have a dual impact.

In Canada, practitioners working for child welfare system have reported that they struggle to address the needs of this population (Smyth & Eaton-Erickson, 2009). In addition, evaluation of service effectiveness has been identified as the main priority for child welfare research in Canadian context (Flynn & Bouchard, 2005). Additional research investigating the effectiveness of evidence-based substance use intervention programmes with pre-specified outcome measures is required with youth in Canadian child welfare system. The child welfare system is an important gateway for providing early screening, targeted prevention, and multi-level treatment services for substance use problems of at-risk youth. Findings suggest the need for additional education and training for child welfare workers, health practitioners, foster parents, group home staff, and school personnel for a better understanding of the youth involved in child welfare system with substance use problems,

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to support the early screening for substance use, to promote and develop selective and tailored substance use prevention programmes, and to improve efficient communication and collaboration among services.

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