

**ORIGINAL ARTICLE**

# Enhancing prevention and intervention for youth concurrent mental health and substance use disorders: The Research and Action for Teens study

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**Background:** Concurrent mental health and substance use disorders among youth are associated with functional impairment in developmentally salient domains, yet research on prevention and intervention for this vulnerable population is sparse. This paper describes the rationale and design of the Research and Action for Teens study, an initiative designed to strengthen the evidence base for prevention, screening, treatment and service delivery for youth concurrent mental health and substance use concerns.

**Methods:** Four sub-studies were developed: (1) a cohort study examining the emergence of mental health and substance use concerns from early to mid-adolescence; (2) a screening and diagnosis study validating screening tools with a diagnostic interview; (3) a treatment study examining the feasibility and effectiveness of dialectical behaviour therapy skills training interventions for youth and family members; and (4) a systems study implementing cross-sectoral collaborative networks of youth-serving agencies using a common screening tool.

**Results:** Multiple stakeholders, including service providers from youth-serving agencies across sectors, consumer groups and family members participated in an initial consultation, and in the implementation of 4 sub-studies.

**Conclusions:** Collaboration with community stakeholders across sectors and disciplines throughout the research process is challenging but feasible, and is important for the production of applicable knowledge across the continuum of care.

**KEYWORDS**

adolescent, dual diagnosis, mental health, service system, substance-related disorders

## 1 | INTRODUCTION

This paper describes the rationale and design of the Research and Action for Teens (RAFT) study, a research initiative to strengthen the evidence base for effective prevention, screening, treatment and service delivery for youth concurrent mental health and substance use disorders. Mental health and substance use concerns are a leading cause of disability among youth (Erskine et al., 2015). Significantly, 29% of children and youth with mental health problems are estimated to have more than 1 disorder (Waddell, Shepherd,

Schwartz, & Barican, 2014). Substance use disorders commonly co-occur with youth mental health disorders (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Kessler et al., 2012; Merikangas et al., 2010; Roberts, Roberts, & Xing, 2007).

Concurrent mental health and substance use disorders (concurrent disorders; CDs) are associated with poor outcomes including HIV infection, homelessness, incarceration and violence, and for youth, with academic problems, relationship difficulties and increased risk of suicide attempts and completions (Grella, Hser, Joshi, & Rounds-Bryant, 2001; Lewinsohn, Rohde, & Seeley, 1995). Notably,

co-morbidity of mental health and substance use concerns appears to be greater among youth than among adults (Grisso, Vincent, & Seagrave, 2005; Lewinsohn et al., 1995; Roberts et al., 2007).

CDs pose particular challenges for intervention and service delivery because of their greater severity, poorer prognosis, increased treatment challenges and greater unmet need for treatment compared to single mental health or substance use disorders (Clark, Power, Le Fauve, & Lopez, 2008; Kessler, Chiu, Demler, & Walters, 2005; Priester et al., 2016; Smelson et al., 2012; Sterling, 2010; Urbanoski, Cairney, Bassani, & Rush, 2008; Vida et al., 2009). These challenges underscore the need for evidence-informed approaches to prevention, identification, treatment and models of service delivery for this population.

Prevention of CDs and early intervention require greater knowledge of developmental trajectories of mental health and substance use problems. Mental health disorders typically begin in late childhood (Crowley, 2006; Kim-Cohen et al., 2003; Nock, Kazdin, Hiripi, & Kessler, 2006; Young et al., 2002). Children with emotional or behavioural disorders initiate substance use earlier and are at increased risk of developing problematic substance use or substance use disorders (Armstrong & Costello, 2002; Harford, Yi, Chen, & Grant, 2015). The transition from childhood to adolescence, the period of most dramatic increase in substance use (Boak, Hamilton, Adlaf, & Mann, 2015; MacArthur et al., 2012; Wittchen et al., 2008), represents a critical turning point when occasional substance use often becomes regular use and, if not interrupted, can become abuse and dependence (Wittchen et al., 2008). Although comorbid substance use and mental health disorders have been examined in longitudinal samples (Goodwin, Fergusson, & Horwood, 2004; Pardini, White, & Stouthamer-Loeber, 2007), few have tracked the development of CDs from early adolescence (Cerdá, Sagdeo, & Galea, 2008).

Routine and effective screening for mental health and substance use concerns among youth is needed, particularly in service delivery settings (Elster & Kuznets, 1994; Health Canada, 2002; National Treatment Strategy Working Group, 2008). The Global Appraisal of Individual Needs-Short Screener (GAIN-SS) (Dennis, 1999; Dennis, Feeney, Stevens, & Bedoya, 2006) is one of the few screeners that include both substance use and mental health (Rush, Castel, & Desmond, 2009). This instrument has been used in youth populations but has not been validated against a gold standard psychiatric interview with youth under age 16.

The interactions between problematic substance use and mental health symptoms require integrated treatment approaches that address mental health and substance use concerns simultaneously (Clemishaw, Shepler, & Newman, 2005; McKee, Harris, & Cormier, 2013; Ziedonis, 2004). Unfortunately, effective, developmentally informed, integrated interventions for youth are yet to be established as evidence-based treatments (Chow, Wieman, Cichocki, Qvicklund, & Hiersteiner, 2013), despite emerging evidence supporting the potential of integrated treatments in engaging participants over treatments for mental health and substance use concerns delivered separately (Wüsthoff, Waal, & Gräwe, 2014). Skills-based interventions targeting emotional regulation difficulties, which are associated with both mental health and substance use concerns, show promise as part of integrated treatments (Miller, Rathus, & Linehan, 2006).

In addition, the needs of families of adolescents struggling with CDs have received little attention, despite the substantial emotional, financial and social burdens that they face (Drake, Mueser, & Brunette, 2007; Health Canada, 2002; Pringle, Emptage, & Hubbard, 2006). Promising approaches include psychoeducation with peer involvement and leadership (Alberta Alcohol and Drug Abuse Commission, 2006; Lucksted, Stewart, & Forbes, 2008; Mueser & Fox, 1998, 2002).

The gaps in evidence-informed treatments for youth with CDs are mirrored by coordination difficulties in the service system. Youth with mental health disorders and/or problematic substance use often do not experience specialized treatments, due in part to service system limitations (Chaim, Henderson, & Brownlie, 2013; Mental Health Commission of Canada, 2009; Merikangas et al., 2011; National Treatment Strategy Working Group, 2008; Sterling, 2010; Waddell et al., 2014).

Adolescents with CDs are high-needs youth who are typically involved in multiple service systems, highlighting the need for collaboration and coordination of services (Ungar, Liebenberg, & Ikeda, 2014). Indeed, the call for a "no wrong door" approach to service provision has been issued loudly, repeatedly and across service sectors (Mental Health Commission of Canada, 2009; National Treatment Strategy Working Group, 2008). Notably, youth with CDs often present to other service systems such as primary care, emergency services or juvenile justice system (Reid et al., 2006; Waddell, McEwan, Shepherd, Offord, & Hua, 2005), thus collaboration needs to extend beyond mental health and addictions systems, which themselves have often operated separately, to include other youth-serving sectors (Catchpole & Brownlie, 2016; Chaim & Henderson, 2009; Hawkins, 2009; National Treatment Strategy Working Group, 2008; Pecora, Jensen, Romanelli, Jackson, & Ortiz, 2009).

In summary, integrated models of service delivery across the continuum of care, supported by evidence, and addressing prevention, screening and assessment, treatment planning and service delivery, are desperately needed to improve outcomes and reduce the high individual and societal costs associated with youth CDs (Chaim et al., 2013; DiNitto, Webb, & Rubin, 2002; Ungar et al., 2014).

## 2 | THE RAFT STUDY

In the context of the gaps in knowledge and practice for youth with CDs outlined above, and following extensive consultation with stakeholders (Henderson, Brownlie, Rosenkranz, Chaim, & Beitchman, 2013) the RAFT study was launched. The RAFT study, an inter-professional collaborative research initiative, had the overall goal of providing knowledge to inform prevention, screening and assessment, treatment planning and service delivery to better meet the needs of youth with CDs. This programme of research was funded through an Emerging Team Grant from the Canadian Institutes of Health Research. The multi-disciplinary research team (representing psychiatry, clinical and developmental psychology, social work, epidemiology and public health) included early, mid and late career members from various departments of a large academic research hospital as well as leaders of community-based clinical services. The team combined

research expertise in youth engagement, large longitudinal and panel cross-sectional studies, treatment of CDs and knowledge translation. The project was informed and guided by an advisory committee consisting of academics, researchers and clinicians from community mental health and addictions agencies.

### 3 | PROGRAMME PRINCIPLES

The RAFT programme of research was designed to accord with the following principles: (1) community engagement and collaboration—ongoing consultation with stakeholders and community partners to insure the relevance, usability and generalizability of study findings; (2) continuum of care—addressing development and identification of youth CDs, access to services, service utilization, treatment and cross-sectoral collaboration to improve services for youth with CDs and families; (3) widespread applicability—producing knowledge applicable both to youth seeking services and youth in the broader community, and increasing capacity, knowledge and collaboration with service providers across youth-focused service settings and (4) inter-professional teamwork across epidemiology, nursing, psychiatry, psychology, social work and health administration disciplines and community-based services across youth-serving sectors.

### 4 | PROGRAMME OF RESEARCH

The RAFT study consists of 4 sub-studies developed with stakeholder consultations (Henderson et al., 2013): a cohort study from elementary school through secondary school, a screening tool validation study, a feasibility study of 2 treatment components and a demonstration project promoting evidence-based practice and cross-sectoral collaboration (Table 1).

#### 4.1 | Community consultation and engagement

During the consultation phase, diverse stakeholders (consumer representatives, community-based and hospital-based service providers and decision-makers and policy-makers from 6 youth-serving sectors and from consumer organizations) participated in a consultation group ( $N = 10$ ) or survey ( $N = 216$ ) to provide guidance on research

questions, methods and collaboration strategies (Henderson et al., 2013). Ongoing stakeholder participation included advisory committee or research team membership ( $N = 28$ ) and collaboration on research implementation (see Table 2).

#### 4.2 | Ethics

The 4 sub-studies were reviewed by the institutional research ethics board and were conducted in accordance with the ethical principles of the Declaration of Helsinki. Informed consent (or parental consent and participant assent) was obtained from all participants.

#### 4.3 | Sub-study 1: cohort study

Longitudinal research is essential to trace onset, etiological processes and developmental trajectories of CDs to inform prevention and early intervention (Armstrong & Costello, 2002; Cerdá et al., 2008; Crome & Bloor, 2005). Evidence is sparse on the development of substance use disorders especially under age 16. Accordingly, we initiated a cohort study starting in late childhood/early adolescence that included both school-based and clinic-involved youth. We aimed to discover the rates of substance use, substance use-related problems and mental health concerns in early adolescence; patterns of comorbidity between substance use and mental health concerns from early to mid adolescence, and patterns of service utilization to address mental health and substance use concerns.

The cohort study was designed as a longitudinal extension of the Ontario Student Drug Use and Health Survey (OSDUHS), one of the longest running cross-sectional studies of student substance use and mental health in North America (Boak et al., 2015). Whereas the OSDUHS study provides information on trends over time, the RAFT cohort study was designed to examine mental health and substance use concerns and their co-occurrence from early to mid adolescence. The purpose of the cohort study was to address the following goals: (1) describe the mental health and substance use concerns among early adolescents; (2) identify the most common trajectories in the development of concurrent mental health and substance use concerns from early to middle adolescence and (3) examine the extent

**TABLE 1** Research and Action for Teens (RAFT) study: overview

Component	Knowledge aims and youth CDs	Participants	Collaborations
Preliminary	<ul style="list-style-type: none"> <li>Client's CDs-related problems</li> <li>CDs services offered</li> <li>Research priorities, preferred participation and knowledge use</li> </ul>	<ul style="list-style-type: none"> <li>Programme managers, youth mental health and addictions agencies</li> <li>Consumer/family advocacy groups</li> </ul>	<ul style="list-style-type: none"> <li>Participating programme managers/agencies/groups</li> </ul>
Cohort study	<ul style="list-style-type: none"> <li>Emergence and development of CDs from early to mid-adolescence</li> </ul>	<ul style="list-style-type: none"> <li>School-based youth, grade 7, 8</li> <li>Service seeking youth, age 11-14</li> </ul>	<ul style="list-style-type: none"> <li>Large population study (OSDUHS)</li> <li>School boards and schools</li> <li>Mental health and addictions agencies</li> </ul>
Screening	<ul style="list-style-type: none"> <li>Validity of screening tool</li> </ul>	<ul style="list-style-type: none"> <li>Cohort study sample (see above)</li> </ul>	<ul style="list-style-type: none"> <li>Cohort study sample (see above)</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>Feasibility of treatment approaches for youth CDs</li> </ul>	<ul style="list-style-type: none"> <li>Clinic-based youth, age 17-19</li> <li>Family members of youth with CDs</li> </ul>	<ul style="list-style-type: none"> <li>Mental health agencies</li> <li>Participating youth and family members</li> </ul>
Service systems	<ul style="list-style-type: none"> <li>Feasibility of common screening tool</li> <li>Youth CDs-related concerns across sectors</li> </ul>	<ul style="list-style-type: none"> <li>Service providers</li> <li>Service seeking youth, age 16-24</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies (cross-sectoral networks) and participating youth</li> </ul>

Abbreviations: CD, concurrent disorders; OSDUHS, Ontario Drug Use and Health Survey.

**TABLE 2** Engagement by sub-study

	Consultation	Cohort	Screening <sup>a</sup>	Treatment	Systems
Networks					
Communities involved	–	–	–	3	6
Demonstration networks	–	–	–	–	6
Consumer groups	–	–	–	1	–
Youth-serving organizations					
Mental health/addictions agencies	–	16	16	4	12
Agencies—other sectors	–	–	–	–	11
Service providers/managers	216 <sup>b</sup>	–	–	–	255
Consumers/family members	33 <sup>c</sup>	–	–	5 <sup>d</sup>	–
Schools	–	28	28	–	–
School boards	–	7	7	–	–
Research participants					
Service-involved youth	–	101	48	87	1073
School-based youth	–	1460	402	–	–
Family members	–	–	–	95	–
DBT groups (youth)	–	–	–	3	–
Family groups	–	–	–	3	–

Abbreviation: DBT, dialectical behaviour therapy.

<sup>a</sup> Also participated in cohort study.

<sup>b</sup> N = 188 survey participants and 28 in consultation and/or advisory groups.

<sup>c</sup> N = 28 survey participants and 5 in consultation or advisory groups.

<sup>d</sup> Peer facilitators of family group intervention.

and correlates of unmet need for mental health and substance use services in early to mid adolescence.

The sampling frame, data collection procedures and measures of the sub-study were adapted from the OSDUHS. At the initial wave, two-thirds of survey questions were adapted from the OSDUHS. In subsequent waves, the overlapping items were retained but additional measures were added to collect more detailed information on mental health and substance use concerns and service utilization.

A school-based sample of grade 7 and 8 students was sampled from the 4 regions of Ontario, Canada, as defined in the OSDUHS (Boak et al., 2014). Two school boards from each region were selected to include urban, suburban, rural and northern urban communities. Schools were randomly selected within school board. Consistent with the OSDUHS sampling frame, schools in First Nations reserves, military bases or youth justice facilities were excluded from the sampling frame and specialized classes (eg, learning support; English as a second language classes) were also excluded (Boak et al., 2014). One grade 7 and 1 grade 8 classrooms were randomly selected within each school. Students in selected classrooms were eligible to participate if they had returned a consent form with signed parental consent and participant assent. There were no exclusionary criteria for students within selected classrooms except consent form unreturned or declining participation.

A clinic-based sample of 101 children in grade 7 or 8 or aged 11 to 14 was recruited from 16 children's mental health centres, psychiatric clinics, addictions treatment agencies and similar agencies providing services addressing mental health and substance use in Ontario in order to include youth with increased risk of developing CDs. Presenting youth were not required to fulfil diagnostic criteria

or receive services to participate. The study was described and consent was obtained by a research assistant not connected to the youth's clinical care. Inclusion criteria were: (1) presenting for services at a youth mental health or addictions agency and (2) literacy in English. Youth received a \$20 gift card for participating.

The sample size initially planned was 700 school-based youth and a slightly larger sample of 800 clinic-based youth, as attrition was expected to be higher in the clinic-based cohort. The estimate for the number of clinic-based youth was based on provincial records of youth from the target age range who had received services in previous years. However, clinic-based youth enrolled in the study at a rate much slower than anticipated, such that the planned sample was no longer feasible. Therefore, a second panel of school-based youth was enrolled in 2013, to allow for a similar level of power but with focus instead on school-based youth and the development of concurrent mental health and substance use difficulties in the general population. The clinical cohort provides information on service-seeking youth, for comparison of levels of mental health concerns of youth engaging and not engaging with services, and to provide context for analysis of service utilization.

At Panel 1 (2011), 7 of 8 selected school boards agreed to participate at Panel 1 (2011); 6 boards agreed to participate at Panel 2 (2013). In the regional stratum in which 1 of the 2 school boards declined to participate, additional schools were selected from the participating school board. Participating youth received a gift card for \$15 or \$20, depending on school board policy on remuneration for research participation. A total of 1461 youth (1360 school-based and 101 clinic-based) participated (see Table 2). Participation rates in the school-based sample ranged from 57.85% to 74.07% in the 4 regions,

with an overall participation rate of 63.43%, with 27.71% declining and 8.86% absent on the survey date. Participation rates were not attainable in the clinic-based sample as the information was not tracked in community agencies.

Students in the school-based sample completed the questionnaire in their classrooms during class time. Clinic-based participants completed the survey at the agency where they were seeking or receiving services. The questionnaire was developed with two-thirds of items overlapping with the OSDUHS study in order to allow comparison with a large representative sample. Among those items adapted from the OSDUHS were items on service utilization including a question on the number of times the youth had spoken to a mental health professional, physician or other professional about their mental health in the past 12 months, and whether they had consulted a crisis phone line or website. Additional measures including the GAIN-SS, a screener for mental health and substance use concerns were also incorporated in the questionnaire. Measures were selected to be consistent across RAFT sub-studies, where feasible and appropriate (see Table 3).

Two follow-up waves were conducted. Participants in Panel 1 of the school-based and the clinic-based sample were invited to participate in in-person follow-up assessments approximately 2 years after the initial data collection. The assessment included the initial survey, additional measures of health and wellbeing including a diagnostic interview, and a more detailed measure of service utilization which included types of services used for various types of mental health and/or substance use concerns, and unmet need for services. Participation rates were impacted by logistical challenges due to dispersion of participants across Ontario and the need for in-person appointments to complete a diagnostic interview. Overall participation rates were 450 (50.58%); 403 (51.21%) among Panel 1 school-based participants and 47 (46.53%) of clinic-based participants. Of the 391 youth who were eligible but did not participate in the first follow-up, 139 (15.65%) were lost to follow-up, 100 (11.26%) were willing but unavailable during data collection sessions; 14 (1.58%) were not invited due to distance from data collection sites of their residence at follow-up and 185 (20.83%) declined or did not respond.

The second follow-up was conducted in 2015; all participants were invited. The follow-up was an online survey that included the mental health measures used at wave 2, excluding the diagnostic interview. Among the school-based cohort, 940 (69.07% participated), 213 (15.65%) were lost to follow-up and 208 (15.28%) did

not respond or declined to participate. Among the clinic-based cohort, 57 (56.44% participated), 24 (23.76%) were lost to follow-up and 20 (19.80%) did not respond or declined to participate. Data analytic strategies involving follow-up data use wave 1 data to reduce participation bias (Graham, 2009).

#### 4.4 | Sub-study 2: screening and diagnosis

Early intervention for youth CDs requires identification with screening tools validated for youth. The screening and diagnosis sub-study was designed to investigate the performance of the GAIN-SS in an adolescent sample in Canada in comparison with other candidate screeners. The GAIN-SS was selected based on a review of mental health and substance use screening tools for adolescents (Rush et al., 2009).

The objectives of this sub-study were: (1) to examine the criterion validity of the GAIN-SS with respect to (a) any psychiatric diagnoses and (b) specific diagnostic clusters including substance use disorders, defined using a gold standard psychiatric interview; and (2) to compare the psychometric properties of the GAIN-SS with other mental health and substance use screeners administered at follow-up.

A subset of 450 participants in the cohort study (sub-study 1), including 402 of the Panel 1 school-based students (51%) and 48 (48%) of clinic-based participants from the cohort study completed the Computerized Diagnostic Interview Scale for Children (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) as well as mental health and substance use screening tools and questionnaires, approximately 2 years after the initial survey (see Table 2).

#### 4.5 | Sub-study 3: treatment feasibility and effectiveness studies

This sub-study evaluates the feasibility and effectiveness of: (1) a skills training group for youth, and (2) a psychoeducational skills training group for family members. Both interventions were based on dialectical behaviour therapy (DBT), a broad-based cognitive behavioural treatment that incorporates a focus on teaching effective coping strategies to address emotional and behaviour dyscontrol (Linehan et al., 2006). Deficits in emotional regulation are theorized to underlie the problem of CDs (Wüsthoff et al., 2014). For the present study, the intervention for CD youth involved an abbreviated,

**TABLE 3** Common measures used in multiple sub-studies

Measure	Cohort	Screening	Treatment	System
Global Assessment of Individual Needs-Short Screener (GAIN-SS)	✓	✓	✓	✓
Computerized Diagnostic Scale for Children	✓ <sup>a</sup>	✓ <sup>a</sup>	✓	
Strengths and Difficulties Questionnaire	✓ <sup>a</sup>	✓ <sup>a</sup>	✓	
Youth Self Report	✓ <sup>a</sup>	✓ <sup>a</sup>	✓	
Child Behaviour Checklist	✓ <sup>a</sup>	✓ <sup>a</sup>	✓	
Alcohol Use Disorder Identification Test (AUDIT)	✓	✓	✓	
Car, Relax, Alone, Forget, Friends, Trouble (CRAFFT) drug use screen	✓	✓	✓	
Severity of Dependence Scale	✓	✓	✓	

<sup>a</sup> Measure added in cohort study follow-up, not used in wave 1 survey.

stand-alone DBT skills training group. The skills training for families was based on the Family Connections manual developed by Hoffman and Fruzzetti (Hoffman, Fruzzetti, & Buteau, 2007; Linehan, 1993). To our knowledge, there are no studies of abbreviated DBT skills training for CD youth or studies of Family Connections skills training programme adapted to families of CD youth; therefore, first generation studies are needed to test the feasibility and effectiveness of these interventions. Feasibility was assessed towards the goal of 3 DBT groups for youth with 72 to 120 participants and 3 groups for family members with 36 to 45 participants. Effectiveness was assessed with a one-group pre-post design. Since DBT skills training and the Family Connections skills training programme are delivered in a group format, they have obvious economic and resource advantages (Rajalin, Wickholm-Pethrus, Hursti, & Jokinen, 2009).

#### 4.5.1 | Youth study

For the present study, DBT group skills training group was based on the manualized approach developed by Linehan (1993) and Linehan et al. (2006) adapted to a 12-week curriculum in which groups meet for 2 hours weekly. The DBT skills training was an open group with clients enrolled on a rolling basis. The group covered 4 modules: mindfulness, emotion regulation, distress tolerance and interpersonal effectiveness. Group facilitators geared the skills training to a range of presenting clinical problems including substance use, anger, anxiety, depression and self-harm. Before attending the initial skills group, participants attended an individual treatment session that focused on orientation to treatment and a focus on enhancing motivation and commitment to work on specific goals.

The treatment sample included 87 youth across 3 regions in Ontario, Canada: Toronto ( $n = 54$ ), Ottawa ( $n = 25$ ) and Thunder Bay ( $n = 8$ ) (see Table 2). Participants were between the ages of 14 and 17 years of age. Inclusionary criteria were: (1) literacy in English, (2) substance abuse problems, indicated by a score on either the Alcohol Use Disorder Identification Test (4 or above) or the Drug Abuse Screening Test (DAST-A; 6 or above), (3) significant mental health problems, indicated by a score in the clinical range on at least 1 subscale of the Youth Self Report (T-score 65 or over), and (4) as skills training for youth was conceptualized as a potentially useful adjunctive treatment to treatment as usual, the youth were required to be receiving case management or counselling 2 times or more per month, (5) they were also expected to have a signed letter of agreement from the designated primary therapist or case manager who agreed to provide crisis act as the primary contact in the event of a crisis (eg, risk of suicidal behaviour). Exclusionary criteria were: (1) history of schizophrenia or other psychotic disorder, (2) evidence of an organic brain syndrome or mental retardation, and (3) family members participating in the Family Connections intervention.

Feasibility was evaluated based on the target of implementation of 3 youth groups in 3 communities over 2 years. To assess the effectiveness of the intervention, the primary outcomes assessed substance use and mental health status using a one-group pre-post

design with no control group. Outcomes were assessed at baseline, 2 weeks (pre group), 8 weeks, 14 weeks (post group) and at 28 weeks. Therapists were all master's level clinicians who had extensive experience treating youth with CD. Therapists received formal DBT training and ongoing consultation from a DBT certified clinician (S.M.).

#### 4.5.2 | Family study

A 12-week DBT skills-based programme was offered for family members of youth with CDs between the ages of 14 and 17 in 3 regions of Ontario. The group programme was based on the Family Connections model (Hoffman et al., 2007; Linehan, 1993; Rajalin et al., 2009), adapted for family members of youth with CDs. The Family Connections group (FC; Fruzzetti & Hoffman, 2004) focuses on provision of information on mental health and family functioning, DBT coping skills, family skills and social support (Hoffman et al., 2007). The Family Connections programme manual was largely adopted with few adaptations other than providing psychoeducation on the aetiology of CDs rather than the biosocial theory of borderline personality disorder.

The family treatment sample included 95 participants from across the 3 regional sites: Toronto ( $n = 37$ ), Thunder Bay ( $n = 23$ ) and Ottawa ( $n = 35$ ). Participants were recruited through flyers distributed to clinicians and posted on notice boards at the 3 sites, as well as through relevant practitioner Listservs. Inclusion criteria were as follows: (1) 18 years of age or older, (2) literacy in English, (3) family members of an adolescent scoring in the clinical range on at least 1 subscale of the Child Behavior Checklist as reported by the participating family member. There was no overlap or connection between family group and youth treatment participants.

The Family Connections model is generally delivered by family members to family members. In the adaptation for the present study, a mix of service providers and peer facilitators delivered the services in 1 community, service providers only in 1 community and peer facilitators only in 1 community. These configurations were based on the resources and availability of facilitators at each site. All original group facilitators (service providers and peer facilitators) received intensive training and/or attended training workshops in Family Connections, and participated in regular consultation with the senior therapists intensively trained in the Family Connections model. As per the Family Connections model, peer facilitators are often family members who have graduated from the Family Connections group themselves. Thus, at sites where peer facilitators were running groups (Toronto and Ottawa), groups were co-led with family members who themselves had participated in the Family Connections programme.

Feasibility and effectiveness were evaluated based on the following targets, respectively: (1) implementation of 3 family groups in 3 communities over 2 years; and (2) primary outcomes of caregiver burden and parenting stress. Assessments were conducted at baseline, mid-skills training (6 weeks), post-intervention (after 12-week skills training) and at a 12-week follow-up.

#### 4.6 | Sub-study 4: service system enhancement through collaboration

This sub-study aimed to enhance service provider CDs capacity and to improve pathways to care for youth and families. To strengthen collaboration and coordination, demonstration service networks were formed to pilot the use of a common screening tool and to strengthen processes for within- and inter-agency referrals based on youth needs. Using a convenience sample of interested cross-sectoral youth-serving organizations in 6 demonstration communities from across Ontario, collaborating networks were formed with 3 to 7 organizations. Agencies from justice, child welfare, health, mental health, addictions, housing, outreach, support, recreation organizations and other youth-serving sectors were eligible; participating agencies were selected based on the needs of each community.

Over a period of 6 months, collaborating network member agencies administered the GAIN-SS screening tool to all youth aged 12 to 24 years upon presentation for services (Henderson, Chaim, & Brownlie, in press). With youth consent, these were shared with the research team, who compiled and shared with the networks information on the mental health and substance use needs of youth seeking services in their agencies. Youth within the target age group who presented for services and completed consent forms were eligible. Exclusionary criteria were: (1) immediate suicide risk; (2) psychotic symptoms; cognitive limitations that precluded completing the instrument; (3) about to be discharged or (4) GAIN-SS already completed. Collaborative data analyses and report development processes were used with community partners to generate tailored reports for each site. A total of 1073 youth participated (see Table 2).

Additionally, capacity-building training was provided on youth CDs and the use of screening tools. Service providers were surveyed about their use and perception of the GAIN-SS implementation, and on their attitudes and knowledge about youth CDs, before and after capacity-building training (Henderson et al., 2015). However, due to the extent of staff turnover and a lack of overlap in the samples before and after training, change attributable to the training could not be directly assessed.

This initiative was evaluated based on the following goals: (1) establishment of at least 4 networks of service providers representing 3 or more sectors in separate communities in the province of Ontario, and (2) implementation of the GAIN-SS as a common screening tool in participating agencies (Henderson et al., in press). The first goal was exceeded; 6 networks were implemented because of interest expressed by community agencies in multiple communities; the second goal was met; the GAIN-SS was implemented as a common screening tool in 23 participating agencies.

## 5 | DISCUSSION

This programme of research underscores the feasibility and benefits of involving stakeholders in complex mental health studies from the research planning stage through to data analyses. Indeed, without stakeholder partnerships, this research would not have been possible. Across the sub-studies and for the project as a whole, stakeholders

refined our research questions and methods, facilitated access to youth accessing CD services and other youth from the community to engage in research, collected data and tracked youth participation rates, participated in research as respondents, coordinated data collections with other community agencies and led treatment groups. In almost all cases, our initial implementation targets were met.

The project also benefited from the emerging multi-disciplinary research team. Collaboration and adherence to common principles across the team was essential in ensuring the efforts were integrated, and that all sub-studies were respectful of stakeholders and relevant to clinical and service system realities. Collaboration also facilitated methodological coordination. For example, age groups in the cohort and treatment sub-studies were selected to be non-overlapping to address youth CD across various ages and avoid duplicating recruitment efforts. Common measures were used where possible, particularly the GAIN-SS. In the cohort study, the GAIN-SS was used to estimate prevalence of CD-related problems in community-based and clinic-based samples. The screening and diagnosis sub-study investigated the psychometrics of this instrument in clinical and non-clinical populations. The treatment sub-study used the GAIN-SS as an index of severity. Finally, the systems sub-study used the GAIN-SS to build capacity in the service system for cross-sectoral communication and collaboration, while also examining CDs across sectors and ages.

### 5.1 | Challenges and limitations

Despite the affordances and successes of the emerging research team, there were some practical challenges. In particular, recruitment of youth for the clinic-based sample of the cohort study fell short of expectations, despite the cooperation of 16 community mental health, addictions or multiservice youth-serving agencies. This was likely due to the substantial burden faced by these agencies in engaging youth in a longitudinal study, and the lack of research staff at the agencies to manage the administrative burden. The systems sub-study was considerably more successful in recruitment. This may be related to the fact that the "ask" was more limited, as the research was embedded in clinical services, thus the youth needed to consent to include their questionnaire in the study, rather than complete a separate, more lengthy survey at a separate session. In addition, in both the systems and treatment studies, the agencies received training and could implement the screening and interventions into their clinical work to enhance identification and early intervention. In contrast, the payoffs to the clinical sector for epidemiological research are much more indirect, uncertain and delayed. Providing on-site research staff or support for additional staff time could facilitate greater participation.

In addition, although follow-up rates were acceptable in sub-study 1, maintaining contact with some participants was challenging. Whereas school-based data collection allows efficient engagement of a community sample, direct contact with parents is not normally part of the consent process, resulting in an attenuated connection of the family in the research project. This presents a challenge for longitudinal studies, in which a stronger connection with the study may facilitate continued participation. An extended introduction to the study,

either with more information sent to families or an in-person meeting may enhance study engagement and ongoing participation.

## 5.2 | Implications

This body of work was designed to add to the evidence base and advance the clinical research field in youth CDs. Programmes specific to CDs have been emerging (Catchpole & Brownlie, 2016; Chaim & Henderson, 2009; Henderson, Chaim, & Rush, 2005). However, expanded awareness about youth CDs and CD-informed approaches to meet the needs of youth with CDs are still needed in child and adolescent mental health agencies, youth addiction services and other health and social services. Because of the degree of overlap between mental health and substance-related concerns among youth, effective collaboration is essential across sectors and developmental stages (Chaim & Henderson, 2009; Chaim et al., 2013; Henderson et al., 2015). This set of studies provides insight into a range of approaches that can be used to address this continuing practice gap. The demonstrated feasibility of the treatment groups for youth and families and the cross-sectoral networks, which have the potential to increase coordination and improve system response, suggests that new ways of working with existing resources can be achieved. As well, the validation of the GAIN-SS has the potential to strengthen the evidence base of a screening tool for youth CDs that requires minimal resources, can be implemented broadly and easily across sectors, and can be used cross-sectorally to improve identification, communication, referral and treatment planning with this vulnerable population. Finally, as part of a general move towards evidence-informed services, this project demonstrates that there is interest in and capacity for supporting relevant clinical research within community-based agencies and in collaboration with multiple stakeholders in order to better understand the range and types of services required to meet the needs of youth with CDs and their families.

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