

# Examining the mental health indicators and service needs of children living with foster families

Shannon L. Stewart<sup>a</sup>, Alana A. Graham<sup>a,\*</sup>, Jeffrey W. Poss<sup>b</sup>

<sup>a</sup> Faculty of Education, Western University, London, ON, Canada

<sup>b</sup> School of Public Health Sciences, University of Waterloo, 200 University Ave W, Waterloo, ON N2L 3G5, Canada

## ARTICLE INFO

### Keywords:

Foster children  
Mental healthcare  
Trauma  
Behavioural problems

## ABSTRACT

There is a paucity of recent research examining the mental health needs of treatment-seeking foster children and youth within the Canadian context. The present data utilized 101,182 archived assessments from the comprehensive interRAI data set to examine the mental health indicators and service needs of children living with foster families who are seeking mental health services. It was predicted that children living with foster families (compared to non-foster children) would demonstrate higher acuity levels across mental health indicators and greater service care requirements. Results indicated that children living with foster families experienced significantly greater trauma (across domains), externalizing symptoms, risky or problematic sexual behaviour, greater service urgency, and resource intensity requirements, compared to clinically referred children who were not in foster families. A strong, positive relationship was found between the number of trauma types experienced and foster placement, with foster children seven times more likely to experience four types of trauma. Clinical implications stress the importance of trauma-informed interventions, given the specific needs of foster children, including the high acuity and intensity of service needs.

## 1. Introduction

There are approximately 78,000 foster children and youth (hereafter referred to as children) in Canada (Kovarikova, 2017), with estimates that 32% are diagnosed with at least one psychiatric disorder, nearly twice the rate of children from a community sample (Burge, 2007). True rates are thought to be significantly higher, with some studies of comparable populations reporting prevalence of mental health concerns among foster children closer to 50% (Bronsard et al., 2016; Larsen, Baste, Bjorknes, Myrvold, & Lehmann, 2018). In particular, foster children experience significantly higher rates of posttraumatic stress disorder, attention-deficit hyperactivity disorder, developmental disorders (e.g., fetal alcohol spectrum disorder; FASD), attachment disorders, externalizing and internalizing disorders, behavioural disorders, substance abuse disorders, and comorbidity (Burge, 2007; Larsen et al., 2018; Lehmann et al., 2013, 2015; Narendorf & McMillen, 2010; Oswald, Heil, & Goldbeck, 2009).

There are a number of risk factors that predispose foster children to

develop psychiatric disorders. First, the majority of foster children report multiple adverse childhood experiences (ACEs), including exposure to violence, abuse, neglect, and (while in-utero) drugs/alcohol (Bruskas & Tessin, 2013; Dorsey et al., 2012; Oswald et al., 2009; Tenenbaum et al., 2020). Meaningfully, these traumatic experiences – of which nearly three-quarters of foster children have two or more types (i.e., are polyvictims) – are directly associated with the consequent development and high acuity levels of psychiatric disorders (Greeson et al., 2011; Morton, 2018). Expectedly, for each additional trauma type experienced, children (irrespective of foster status) are more likely to experience problems with interpersonal conflict, attachment, substance use, social support, harm to others, and self-harm (Stewart, Lapshina, & Semovski, 2021). Second, they experience a greater frequency of disruptions and transitions in their lives (i.e., different homes, schools, treatment programs) (Bruskas & Tessin, 2013). In addition to experiencing the trauma that led to their foster placement, these children must also undertake the additional – though typically lesser – trauma of foster placement shortly thereafter, which exposes them to the risks of

*Abbreviations:* FASD, fetal alcohol spectrum disorder; ChYMH-S, Child and Youth Mental Health – Screener; ChYMH, Child and Youth Mental Health; ChYMH-DD, Child and Youth Mental Health – Developmental Disabilities; PSS, Positive Symptoms Scale; RiSSk, Risk of Suicide and Self-Harm in Kids; RIO, Risk of Injury to Others; ChAMhPS, Children's Algorithm for Mental Health and Psychiatric Services; RiChY, Resource Intensity for Children and Youth.

\* Corresponding author at: 90 Valleyview Crescent, Dorchester, ON N0L 1G3, Canada.

E-mail address: [agraha89@uwo.ca](mailto:agraha89@uwo.ca) (A.A. Graham).

<https://doi.org/10.1016/j.chilyouth.2023.106833>

Received 7 April 2022; Received in revised form 21 January 2023; Accepted 23 January 2023

Available online 27 January 2023

0190-7409/© 2023 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).

polyvictimization (Fisher, Stoolmiller, Mannering, Takahashi, & Chamberlain, 2011; Horn, Roos, Beauchamp, Flannery, & Fisher, 2018; Vanderwill et al., 2020).

Research also suggests that foster children receive inconsistent and inadequate access to mental health services, leading to a higher degree of unmet needs compared to the general population (Larsen et al., 2018). Factors associated with greater need for urgent/emergent services include duration of symptoms, psychological distress, disability status, comorbidity, panic symptoms, impulsiveness, emotional problems, victimization, and aggressive behaviour (Fleury, Ngui, Bamvita, Grenier, & Caron, 2014; Klassen, Stewart, & Lapshina, 2021; Lapshina & Stewart, 2018; Roberts et al., 2018; Stewart & Hamza, 2017; Stewart, Falah Hassani, Poss, & Hirdes, 2017). All of these factors, as well as the severity, complexity, and variability of foster children's mental health challenges, make it significantly more difficult to identify and treat problems, thereby requiring specialized care practices (Bergström et al., 2019; Hambrick, Oppenheim-Weller, N'zi, & Taussig, 2016; Leve et al., 2012) and multi-modal services (Stewart, Leschied, den Dunnen, Zelmanowitz, & Baiden, 2012). As a likely result of these aforementioned risk factors and barriers to care, children who grow up in a foster family in Ontario are more likely to experience low academic achievement, unemployment, housing insecurity, criminal justice system involvement, and poor mental health outcomes once they age out of the system (Kovarikova, 2017).

To our knowledge, there are few contemporary studies that have rigorously examined the relationship between foster placement and mental health indicators, polyvictimization, psychosocial factors, and resource needs in children seeking mental health services in Canada utilizing a large data set. As mental health is essential to improving resilience and outcomes upon emancipation (Fowler, Marcal, Zhang, Day, & Landsverk, 2017; Shpiegel, Simmel, Sapiro, & Ramirez Quiroz, 2021), scales and algorithms drawn from standard care assessments within select mental health agencies in Ontario, Canada were utilized in order to examine the multi-faceted implications of foster status in a large sample of treatment-seeking children. With greater mental health needs, poorer outcomes, and limited recent, national data, a greater understanding of factors associated with treatment-seeking foster children is required to better support them. Based on the extant literature, it was predicted that children living with foster families, compared to non-foster children, would demonstrate high acuity levels across mental health indicators, greater service urgency and resource intensity requirements.

## 2. Methods

### 2.1. Sample

Assessment data was obtained from 71 mental health agencies across the Province of Ontario, Canada as part of regular clinical practice. There were 82,203 children assessed with the ChYMH-S, 17,228 with the ChYMH and 751 with the ChYMH-DD, for a total of 101,182 observations from 71 service organizations. Children were assessed by trained professionals with either the interRAI Child and Youth Mental Health Screener (ChYMH-S; 82.2% of the sample), the Child and Youth Mental Health Assessment (ChYMH; 17% of the sample) or Child and Youth Mental Health – Developmental Disabilities (ChYMH-DD; 0.7% of the sample) assessments, described below. 8.7% of the ChYMH instrument respondents were inpatients and 2.1% were outpatients. Overall, 1.5% of the observations resided in foster care. For further demographic descriptors stratified by living arrangement as foster family see Table 1. Coded assessment responses were entered using secure on-line computer systems. Assessments between September 2015 and March 2021 were used, and if an individual was assessed more than once during this time the first assessment was used.

**Table 1**

Living arrangement is foster family.

N (%)	no	yes	p-value	effect size
all	99,697 (98.5%)	1,485 (1.5%)		
male	49,336 (49.5%)	735 (49.5%)	0.995	0.00
age: mean (SD)	11.9 (3.71)	12.0 (3.51)	0.302	0.03
3 to 7	16,145 (16.2%)	214 (14.4%)	0.064	0.05
8 to 11	26,190 (26.3%)	384 (25.9%)	0.721	0.01
12 to 14	26,291 (26.4%)	426 (28.7%)	0.045	0.05
15 to 18	31,071 (31.2%)	461 (31.0%)	0.920	0.00
Area HH median income below \$55,845	24,758 (24.8%)	354 (23.8%)	0.378	0.02
Area HH median income above \$79,541	24,751 (24.8%)	298 (20.1%)	<0.0001	0.11
Primary language: English	95,353 (95.7%)	1451 (97.7%)	<0.0001	0.11
French	1,830 (1.8%)	22 (1.5%)	0.312	0.02
Other	2,502 (2.5%)	12 (0.8%)	<0.0001	0.14

Note: Demographics, by foster family living arrangement.

### 2.2. Measures

#### 2.2.1. interRAI ChYMH Screener

The interRAI ChYMH Screener (interRAI ChYMH-S) is a 99 item, initial screening assessment used for the purpose of assisting in decision-making related to triaging and the prioritization of services (Stewart & Babcock, 2020; Stewart et al., 2017). The ChYMH-S has been adapted from the ChYMH and uses semi-structured interviews to provide a snapshot of the various aspects of the child's functioning and aids in determining if a more comprehensive assessment is needed (Stewart & Babcock, 2020). The screener demonstrated strong inter-item reliability on all measured scales and good convergent validity with the Behaviour Assessment System for Children (Stewart & Babcock, 2020).

#### 2.2.2. interRAI ChYMH and ChYMH-DD

The interRAI Child and Youth Mental Health Assessment (interRAI ChYMH) as well as the similar ChYMH Developmental Disabilities (interRAI ChYMH-DD) are comprehensive assessments which include over 400 items used to evaluate and identify children's mental health needs, risks, and inform care-planning (Stewart et al., 2017, 2015, 2016). Trained assessors obtain information from multiple sources including information from the children, their caregivers, teachers, and clinicians, as well as available medical and education records. Assessors were required to have at least two years of experience in mental health care provision, a degree or diploma in children's mental health and developmental services in addition to the completion of a rigorous 3-day training program which incorporated competency training for each of: ChYMH, ChYMH-DD, and the interRAI Early Years.

These assessments provide a variety of scales and algorithms embedded within the instrument to support clinicians in obtaining a data-driven picture of the child's strengths, needs, functioning, and areas of risk. Most computed outputs are common to both the ChYMH and the ChYMH-DD and have robust psychometric properties (Lau et al., 2019, 2021; Li, Babcock, Stewart, Hirdes, & Schwan, 2021; Stewart & Babcock, 2020; Stewart & Hamza, 2017; Stewart et al., 2019, 2020, 2019, 2021, 2021, 2021). The scales and algorithms within the assessment instruments have been found to have strong construct, concurrent, face and content validity, and predictive validity as well as internal consistency (Cronbach's alpha higher than 0.70) and inter-rater reliability (weighted kappa for core items common to all instruments was

0.75 and the kappa of the specialized mental health items was 0.64) (Hirdes et al., 2002, 2020). Findings provide support to a larger body of research which show consistent psychometric rigour of the interRAI Child and Youth suite of instruments (Stewart, Celebre, Semovski, Vadeboncour, Hirdes, & Poss, 2022).

### 2.2.3. Externalizing scale

The interRAI Child and Youth Mental Health Externalizing Scale is a psychometrically sound measure of the frequency and severity of both proactive and reactive aggression, violence, and impulsivity. These constructs are assessed through twelve items which are scored from 0 to 4 (0 = not present to 4 = exhibited daily in the last 3 days, three or more episodes or continuously) based on the time since the most recent occurrence: stealing, bullying peers, impulsivity, verbal abuse, violence to others, violent ideation, intimidation of others, and threatened violence (Lau, Stewart, Saklofske, & Hirdes, 2021). With values ranging from 0 to 48, a value of 17 or more is used here to denote high levels of externalizing behaviours.

### 2.2.4. Internalizing scale

The interRAI Child and Youth Mental Health Internalizing Subscale is a psychometrically sound (Lau, Stewart, Saklofske, & Hirdes, 2019) measure of the frequency and severity of symptoms of depressed mood, anxiety, and anhedonia. It consists of 12 items rated on a 5-point ordinal scale (0 = not present to 4 = exhibited daily in last 3 days, 3 or more episodes or continuously). Scores in this measure range from 0 to 48, with higher scores revealing greater frequency and severity of internalizing symptoms.

### 2.2.5. Positive symptoms scale (PSS)

The PSS is a four-item scale which measures the presence of positive symptoms including hallucinations, command hallucinations, delusions, and abnormal thought process/form (0 = not present to 4 = exhibited daily in last 3 days, 3 or more episodes or continuously). The scores from each of these four items is summed to reveal final scores ranging from zero to twelve, with higher scores representing heightened levels of positive psychotic symptomology (Hirdes et al., 2020). The PSS demonstrated high internal consistency (Cronbach's alpha of 0.72) and criterion validity (Hirdes et al., 2020).

### 2.2.6. Risk of suicide and Self-Harm in Kids (RiSsK) algorithm

The RiSsK algorithm uses a decision tree composed of six items reflecting the risk of suicide and self-harm in children. These items include attempt to kill, self-harm without intent to kill, considered self-injury, others concerned about self-injury, family overwhelmed, and any self-injurious behaviours. Levels of risk range from zero to six, with a cut-point of 2 + indicating risk of suicide and self-harm among clinically-referred child populations; this cut-point provided a sensitivity of 93% and a specificity of 61% (Stewart, Celebre, Hirdes, & Poss, 2020).

### 2.2.7. Risk of injury to others (RIO) algorithm

The RIO algorithm measures the risk of harm to others and is a psychometrically sound instrument in clinically-referred child populations (Stewart, Celebre, Hirdes, & Poss, 2021). The algorithm uses nine items including violent ideation, threatened violence, violence to others, verbal abuse, socially inappropriate or disruptive behaviour, family overwhelmed, impulsivity, and physical abuse. It includes an empirically based decision tree designed to indicate risk levels, with higher risk levels indicating greater risk of injury to others. Levels of risk range from zero to six; here a cut-point of 3 + indicating severe risk of injury to others was used (Hirdes et al., 2020).

### 2.2.8. Children's algorithm for mental health and psychiatric services (ChAMhPS)

ChAMhPS (Stewart et al., 2017) is an empirically based decision-

support tool that can be used to inform the need and urgency of timing for a comprehensive, face to face mental health assessment. The ChAMhPS score is computed and applied to each case utilizing items from the interRAI ChYMH-S. The algorithm has been noted to have strong psychometric properties and demonstrated prediction of higher triaging and prioritization needs (Stewart, Poss, Thornley, & Hirdes, 2019).

### 2.2.9. Resource intensity for children and Youth (RICHY) algorithm

The RICHY (Stewart et al., 2019) algorithm is an empirically based decision-support tool composed of 25 individual items, three scales (i.e., Anxiety, Parenting Strengths, Family Functioning), and two decision-support algorithms (i.e., Self-Harm, Harm to Others) from the ChYMH assessment. The terminal nodes of the RICHY decision tree range from zero to five, where higher nodes are indicative of higher service intensity need. The algorithm is highly predictive of increased resource needs and more intensive services (Stewart et al., 2019, 2021).

## 2.3. Procedure

As part of routine clinical practice, trained assessors such as nurses, psychologists, psychiatrists, social workers, child and youth workers, case managers, occupational therapists, and speech language pathologists administered the ChYMH, ChYMH-DD and ChYMH-S in the majority of mental health service agencies in Ontario. At each agency, informed consent was obtained from all individual participants and/or guardians as part of standard of care. Data was obtained through 60–90 min semi-structured interviews with the children, their caregivers, teachers, and/or clinicians, as well medical and education records. Each complete ChYMH and ChYMH-S assessment was given a case number and stored on a secure server with no identifying information, to ensure anonymity.

Neighbourhood median income was assigned by linking the first three digits of the client's home postal code to public-use 2016 Canadian census tables (Statistics Canada, 2017). They were subsequently assigned to quartiles based on distribution in these data.

Ongoing access to the data server for research purposes has been approved by the University of Western Ontario Ethics Board (REB #106741) and all procedures were in accordance with the ethical standards of the institution. All analyses used in this study were conducted on SAS version 9.4 software (SAS Institute, Cary, NC, USA).

## 3. Analysis

Demographic and area income proportions, stratified by living arrangement, were calculated. Proportions of demographics and other selected characteristics were produced, stratified by this measure. Items with significant correlation ( $p < .05$ ) with foster family living arrangement were identified through exploratory analysis and subsequently selected for reporting based on effect size and clinical relevancy. Differences were assessed using chi-square tests, and for the continuous measure of age, student  $t$ -test. Standardized differences were calculated to present effect sizes using Cohen's  $d$  for continuous measures and Cohen's  $h$  for proportions; rules of thumb suggest values of at least approximately 0.2 represent a small effect size, 0.5 a medium effect size and 0.8 a large effect size, although caution is advised that these values are guidelines only.

## 4. Results

Table 1 presents results of available demographic descriptors stratified by living arrangement as foster family. Males were of similar proportions and mean age did not differ, with a slight distribution difference in the foster family strata having more representation in the 12 to 14 year age group. Of note is that among assessed children who resided in higher income neighbourhoods, there was a significantly

lower proportion who resided with foster families. Among language groups, children whose primary language was English were more likely to reside with foster families, and those with a language other than English or French were less likely.

Table 2 shows selected items with residing with a foster family, including sexual knowledge or family concerns about sexual behaviour, parent addiction, difficulty with abstract thinking, referred because the individual was a threat to others, elopement, smoking, and lying. Computed scales that use multiple items show those residing with foster families had higher anxiety, externalizing and internalizing behaviours, positive symptoms and were at greater risk of harm to themselves and others. In keeping with this, those who were assessed with the ChYMH-S and residing with a foster family were more likely to urgently require further assessment, and those assessed with the ChYMH or ChYMH-DD and residing with a foster family were less likely to reflect a simple service utilization profile and more likely to reflect one involving a high degree of complexity. The single domain where those in foster care showed slightly lower symptomatology was depression.

Fig. 1 uses 4 items, available in all assessments, that record any experience of traumas during the child's lifetime: physical abuse or assault, sexual abuse or assault, emotional abuse, or having witnessed domestic violence. Those residing with a foster family are over twice as likely to have experienced one or more of these traumas, and they are

**Table 2**  
Living arrangement is foster family.

N (%)	no	yes	p-value	effect size
evidence of highly inappropriate sexual knowledge or excessive preoccupation with sex in last 90 days <sup>a</sup>	763 (4.4%)	70 (15.8%)	<0.0001	0.39
family, others express concern about highly risky or problematic sexual behaviour	5,103 (5.1%)	263 (17.7%)	<0.0001	0.41
parent addiction or substance abuse (ever)	18,192 (18.3%)	865 (58.3%)	<0.0001	0.85
difficulty with abstract thinking <sup>b</sup>	2,030 (19.9%)	94 (38.7%)	<0.0001	0.42
reason for referral: threat or danger to others <sup>a</sup>	3,999 (22.6%)	180 (40.7%)	<0.0001	0.39
elopement threat/attempt – lifetime <sup>a</sup>	4,274 (24.4%)	190 (42.9%)	<0.0001	0.40
daily tobacco smoker <sup>a</sup>	907 (5.2%)	54 (12.2%)	<0.0001	0.25
repetitive lying <sup>a</sup>	5,675 (32.4%)	242 (54.6%)	<0.0001	0.45
Scale measures, dichotomized:				
High externalizing symptoms (sum 17 +)	8,322 (8.4%)	273 (18.4%)	<0.0001	0.30
High internalizing symptoms (sum 11 +)	6,921 (6.9%)	144 (9.7%)	<0.0001	0.10
Positive symptoms, any (PSS 1 +)	10,608 (10.6%)	218 (14.7%)	<0.0001	0.12
High risk of harm to self (RiSSk 2 +)	40,801 (40.9%)	685 (46.1%)	<0.0001	0.15
High risk of harm to others (RIO 3 +)	26,475 (26.6%)	608 (41.0%)	<0.0001	0.39
High urgency (ChAMhPS 3 +) <sup>c</sup>	21,029 (25.6%)	362 (34.7%)	<0.0001	0.20
Service intensity/complexity (RICHY) <sup>a</sup> :				
0 - low	4,747 (27.1%)	60 (13.5%)	<0.0001	0.34
6 - very high	1,456 (8.3%)	82 (18.5%)	<0.0001	0.30

Note: Selected characteristics and scale, by foster family living arrangement.

<sup>a</sup> ChYMH and ChYMH-DD only, denominators are 17,731 and 443, respectively;

<sup>b</sup> ChYMH age 12 and over only, denominators are 10,178 and 243, respectively;

<sup>c</sup> ChYMH-S only, denominators are 82,161 and 1,042, respectively.

nearly seven times more likely (13.2% compared to 2.0%) to have experienced all four of these. Effect sizes of the proportion differences by foster living arrangement in Fig. 1 range between 0.44 (sexually abused) and 0.99 (any of the four traumas).

## 5. Discussion

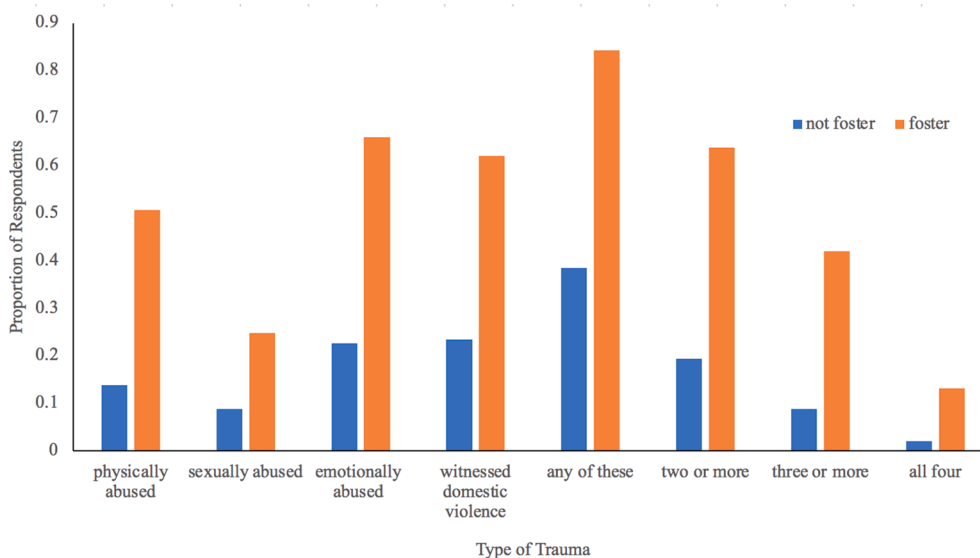
This study utilized a large sample of treatment-seeking children across Ontario to compare children living with a foster family to non-foster children, across a number of psychosocial, care needs, and demographic variables. The results expand upon existing literature to identify specific behavioural concerns, populations, and mental healthcare requirements. As expected, children living with foster families had higher acuity levels across mental health indicators, greater service urgency, and resource intensity requirements compared to non-foster children.

It is not surprising that children living with foster families require more intense resources and urgent service, as there is evidence of greater and more complex mental healthcare needs for children in the foster care system (Bilaver, Havlicek, & Davis, 2020; Steenbakkers, Van Der Steen, & Grietens, 2018). Indeed, many of these children exhibit key factors predictive of resource intensity and service urgency, namely: traumatic life events, polyvictimization, child protection agency guardianship, comorbidity, intellectual disability, intimidation and threats of violence, parenting problems, suicide or self-harm, risk of harming others, family dysfunction, and safety risk (Lapshina & Stewart, 2018; Semovski, King, & Stewart, 2021; Stewart et al., 2019).

Critically, we found that rates of abuse/assault of children living with foster families averaged three times higher compared to non-foster children and there was a strong, positive linear relationship between the number of trauma types experienced and foster placement and moderate to very strong effect sizes for the differences between the two groups. While there is a strong background of literature to support the hypothesis that foster placement is causally linked to trauma exposure, there is limited information regarding rates of polyvictimization in foster children compared to their non-foster peers (Brend & Sprang, 2020; Haselgruber, Knefel, Sölva, & Lueger-Schuster, 2021; Riebschleger, Day, & Damashek, 2015). That said, greater cumulative trauma in foster children is directly linked to comorbidity, severity of psychiatric illness, and care needs (Haselgruber et al., 2021; Lehmann, Havik, & Heiervang, 2013; Marshall, Semovski, & Stewart, 2020). Thus, it is likely that trauma exposure in these children is the greatest reason for greater care needs.

Among the various scales embedded in the interRAI instruments, children living with foster families were found to have a greater prevalence of positive symptoms (i.e., hallucinations, delusions, abnormal thought process/form), which may be the result of higher rates of psychosis among children traumatized in childhood (Dvir, Denietolis, & Frazier, 2013; Longden, Sampson, & Read, 2016). With higher rates of harm to self, harm to others, and service urgency among children experiencing psychosis, it is also possible that positive symptoms moderate the relationship between these factors and the experience of living with a foster family (Anderson, Fuhrer, & Malla, 2010; Moe et al., 2021). This all said, the effect size for this portion of the analysis was small (Cohen's  $d = 0.12$ ).

Higher prevalence of harm to others is well-documented in the literature when considering relational aggression and disruptive behaviour disorders (Linares, 2006; Perry & Price, 2017; Pilowsky & Wu, 2006; Stinson, Quinn, Menditto, & LeMay, 2021). History of interpersonal trauma, particularly as the victim of physical violence/trauma, is thought to increase the risk of becoming a perpetrator in later childhood and adolescence (Keene & Epps, 2015; Suchting, Gowin, Green, Walss-Bass, & Lane, 2018). While research has been conducted on self-harm in foster children (Gabrielli, Tunno, Jackson, Spangler, & Kanine, 2014; Jennings & Evans, 2020), it is unclear if rates of self-injurious behaviour differ between foster and non-foster children



**Fig. 1.** This is a two-column fitting image, in colour. *Note:* Proportions with lifetime trauma, by foster family living arrangement, are presented. They are organized by trauma type and number of trauma types (1 to 4).

outside of the sample we studied. Rates of suicidality, however, have been documented as higher among foster children, compared to non-foster children (Evans et al., 2017; Katz et al., 2011).

High internalizing and externalizing symptoms were also more frequently reported by children living with foster families, with varied, small effect sizes. This is consistent with the extant literature, as is the higher ratio of externalizing problems to internalizing problems (Horn et al., 2018; Leathers, Spielfogel, Gleeson, & Rolock, 2012; Vanschoonlandt, Vanderfaeillie, Van Hoken, De Maeyer, & Robberechts, 2013). For example, Perry and Price (Perry & Price, 2018) found that 21.6% and 34.2% of foster children scored in the clinical range for internalizing problems and externalizing problems, respectively.

In relation to externalizing disorders, a variety of conduct-related difficulties were also noted in foster children, compared to other treatment-seeking children. Specifically, these children were more likely to exhibit a variety of behavioural problems including aggression and threats toward others, running away, smoking and engaging in deceitful behaviours (e.g., lying; with small to moderate effect sizes). Notably, Braciszewski and Colby (Braciszewski & Colby, 2015) found that foster children smoke daily at four times the rate of non-foster children, while Lindquist and Santavirta (Lindquist & Santavirta, 2014) observed more than double the rate of delinquent behaviour. The regularity of behavioural problems found in our sample is likely related to the high frequency of foster children involvement in criminal activities and with the youth justice system (Dworsky, Wulczyn, & Huang, 2018; Lindquist & Santavirta, 2014; Yang, McCuish, & Corrado, 2021).

Findings also revealed that foster children exhibited highly inappropriate sexual knowledge or excessive preoccupation with sex more than three times as frequently when compared to non-foster children. Furthermore, family members were concerned about highly risky or problematic sexual behaviour significantly more often with foster, than non-foster children. Both of these distinctions demonstrated moderate Cohen's *d* values. Given that these children are more likely to be exposed to sexual exploitation and abuse before entering the foster care system (Ramseyer Winter, Brandon-Friedman, & Ely, 2016), it is possible that engagement in and preoccupation with risky sexual behaviours are related to mechanisms of coping with trauma (Abajobir, Kisely, Maravilla, Williams, & Najman, 2017; Homma, Wang, Saewyc, & Kishor, 2012). Further investigations of age and gender differences in the associations between these variables may prove fruitful in discussions and interventions concerning at-risk foster youth.

Residing with a foster family was also associated with difficulty with

abstract thinking, a finding consistent with other research that has shown that children with developmental and intellectual difficulties are more often placed in foster care (Goemans, van Geel, van Beem, & Vedder, 2016; Marcellus & Badry, 2021). Slayter and Springer (Slayter & Springer, 2011) found that neglect was the greatest reason for an intellectually-disabled child's removal from the family home, at 58.5% of cases, with rates of neglect and relinquishment nearly twice as likely compared to a control population. Several factors may contribute to the greater prevalence of neglect disabled children, including financial burden (e.g., need to work full-time, high cost of special needs resources) and lack of family support (e.g., single parenthood) (Ellem, Wilson, & Chenoweth, 2015).

Certain family indicators were significantly more prevalent among children living with foster families including substance related issues in parents. Specifically, findings reported herein indicated that these children were significantly more likely to be exposed to parent addiction or substance abuse compared to other treatment-seeking children, with the analysis yielding a large effect size. Consistent with the extant literature, Meinhofer and Angleró-Díaz (Meinhofer & Angleró-Díaz, 2019) found that more than 36% of home removals were attributable to parental drug use. This greater prevalence likely reflects a key contributor to placement with a foster family in Canada as well (Agency, 2010).

As seen in Table 1, children living with foster families were less likely to reside in high-income neighbourhoods, compared to treatment-seeking children who were not in foster care. Though we were unable to find comparative data, the known associations between poverty and maltreatment are significant (Font & Maguire-Jack, 2020), and may aid in explaining the elevated scores for measures concerning problematic sexual knowledge and behaviour, specifically as in relates to history of sexual trauma in foster youth. It is concerning that foster children are at heightened risk for continuing to face the disadvantages of lower-income living when they may be in greater need of supports to counter the effects of potential trauma and transition challenges (Leathers, Geiger, Barnett, & Vande Voort, 2019). Results of this study indicated that children living with foster families were more likely to speak English as their primary language. It is possible that those with dual languages may have less impoverished environments (e.g., French Immersion), that immigrant children may be less likely to be in foster care or it is possible that Children's Aid Societies have greater difficulty assigning placements to children who do not speak English if their foster parents cannot communicate with them. It is relevant to note that the demographic variables featured in Table 1 demonstrated nil to small

effect sizes.

## 6. Limitations and clinical implications

While our measures of trauma and internalizing/externalizing support previous findings related to foster children mental health, our findings of specific problem behaviours (e.g., difficulty with abstract thinking, repetitive lying) may support clinicians and policy analysts in tailoring interventions to better accommodate this vulnerable population. Particularly, as trauma appears to be the common denominator across most significant findings, trauma-informed care practices may aid the alleviation of other problematic mental health symptoms. Although this research study has several strengths, it is not without its limitations. By not accounting for foster children who are not recipients of mental healthcare, however, our study may risk its generalizability to the broader population of children living with foster families. Furthermore, while our findings are specific and novel to Canada, further study would benefit from comparing country (or jurisdictional) populations of foster youth to determine if there are differences between cultures or legal systems. Additionally, though we sampled a comprehensive, validated assessment tool data set, the use of archival data is less preferable when compared to an experimental design, in which control of variables would strengthen one's findings. Of the potential confounding variables that could affect the increased negative outcomes of foster children, socio-economic status is the most likely, and should be further explored or controlled for in future analyses. In future studies, it may be prudent to assess if there is any variability in specific behaviours between sub-populations of foster children (e.g., by type of foster placement, number of transitions, etc.) and if there are specific social practices that buffer the acuity of mental health needs (e.g., involvement in structured activities). Continued, detailed investigation may support the development of more tailored interventions for foster children.

## 7. Summary

Global studies demonstrate that children in foster care exhibit significantly greater and more severe mental health challenges and poorer life outcomes both before and after emancipation, largely related to trauma exposure. However, despite the greater need for support, foster children are less likely to receive consistent and adequate access to mental healthcare services, and typically require specialized care to properly address their unique needs (e.g., trauma-informed care). There is also a paucity of recent large-scale studies examining the needs of treatment-seeking foster children within the Canadian context. Utilizing a large data set of interRAI assessments, it was predicted that children living with foster families, compared to non-foster children, would demonstrate higher acuity levels across mental health indicators and greater care requirements. Results indicated that children living with foster families experienced significantly greater trauma (across domains), internalizing symptoms (including anxiety), externalizing symptoms, positive symptoms, risky or problematic sexual behaviour, difficulty with abstract thinking, elopement, smoking, and lying behaviours. These children also demonstrated greater risk of harm to themselves and others, parent addiction, and greater service urgency/complexity and resource intensity requirements. A strong, positive relationship was found between the number of trauma types experienced and foster placement, with foster children nearly seven times more likely to experience four types of trauma (physical, emotional, sexual, witness of domestic violence). Trauma is the most likely mediator of the relationship between foster status and the majority of our significant results, as externalizing behaviours are thought to be used as mechanisms of coping. Our identification of specific mental health problems further aid in our understanding of how foster children differ from their non-foster peers. Clinical implications stress the importance of trauma-informed interventions tailored to the specific needs of foster children, especially given the high acuity and intensity of service needs.

Further assessment of sub-populations and specific behavioural concerns may aid in this development.

### Funding

This work was partially supported by the Public Health Agency of Canada under Grant #1617-HQ-000050.

### Ethics Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by Western University's ethics review board (REB ##106741).

### Informed Consent

For this study, consent was obtained from all individual participants and/or guardians as part of standard of care at each agency.

### Author Agreement

All authors have seen and approved the final version of the manuscript being submitted. They warrant that the article is the authors' original work, hasn't received prior publication, and isn't under consideration for publication elsewhere.

### CRedit authorship contribution statement

**Shannon L. Stewart:** Methodology, Formal analysis, Visualization, Supervision. **Alana A. Graham:** Writing – original draft, Writing – review & editing, Visualization, Project administration. **Jeffrey W. Poss:** Formal analysis.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

The authors do not have permission to share data.

### Acknowledgements

We wish to thank the children, youth, and families, as well as the trained assessors and clinicians in the field, for their participation in the research process. We also wish to thank the Public Health Agency of Canada for supporting the interRAI lab's research initiatives.

### References

- Abajobir, A. A., Kisely, S., Maravilla, J. C., Williams, G., & Najman, J. M. (2017). Gender differences in the association between childhood sexual abuse and risky sexual behaviours: A systematic review and meta-analysis. *Child Abuse & Neglect*, *63*, 249–260.
- Public Health Agency of Canada (2010). Canadian incidence study of reported child abuse and neglect – 2008: Major findings. [http://www.phac-aspc.gc.ca/cm-vee/csa-ecve/2008/assets/pdf/cis-2008\\_report\\_eng.pdf](http://www.phac-aspc.gc.ca/cm-vee/csa-ecve/2008/assets/pdf/cis-2008_report_eng.pdf).
- Anderson, K., Fuhrer, R., & Malla, A. (2010). The pathways to mental health care of first-episode psychosis patients: A systematic review. *Psychological Medicine*, *40*(10).
- Bergström, M., Cederblad, M., Håkansson, K., Jonsson, A. K., Munthe, C., Vinnerljung, B., et al. (2019). Interventions in Foster family care: A systematic review. *Research on Social Work Practice*, *30*(1), 3–18.
- Bilaver, L. A., Havlicek, J., & Davis, M. M. (2020). Prevalence of special health care needs among foster youth in a nationally representative survey. *JAMA Pediatrics*, *174*(7), 727.
- Braciszewski, J. M., & Colby, S. M. (2015). Tobacco Use among Foster Youth: Evidence of Health Disparities. *Children and Youth Services Review*, *58*, 142–145.
- Brend, D. M., & Sprang, G. (2020). Trauma-informed care in child welfare: An imperative for residential childcare workers. *International Journal of Child and Adolescent Resilience*, *7*(1), 154–165.
- Bronsard, G., Alessandrini, M., Fond, G., Loundou, A., Auquier, P., Tordjman, S., et al. (2016). The prevalence of mental disorders among children and adolescents in the child welfare system: A systematic review and meta-analysis. *Medicine*, *95*(7), e2622.

- Bruskas, D., & Tessin, D. H. (2013). Adverse childhood experiences and psychosocial well-being of women who were in foster care as children. *The Permanente Journal*, 17(3), e131–e141.
- Burge, P. (2007). Prevalence of mental disorders and associated service variables among Ontario children who are permanent wards. *Canadian Journal of Psychiatry*, 52(5), 305–314.
- Dorsey, S., Burns, B. J., Southerland, D. G., Cox, J. R., Wagner, H. R., & Farmer, E. M. (2012). Prior trauma exposure for youth in treatment foster care. *Journal of Child and Family Studies*, 21(5), 816–824.
- Dvir, Y., Denietolis, B., & Frazier, J. A. (2013). Childhood trauma and psychosis. *Child and Adolescent Psychiatric Clinics of North America*, 22(4), 629–641.
- Dworsky, A., Wulczyn, F., & Huang, L. (2018). Predictors of running away from out-of-home care: Does county context matter? *Cityscape*, 20(3), 101–116.
- Ellem, K., Wilson, J., & Chenoweth, L. (2015). When families relinquish care of a child with a disability: Perceptions from Birthmothers. *Australian Social Work*, 69(1), 39–50.
- Evans, R., White, J., Turley, R., Slater, T., Morgan, H., Strange, H., et al. (2017). Comparison of suicidal ideation, suicide attempt and suicide in children and young people in care and non-care populations: Systematic review and meta-analysis of prevalence. *Children and Youth Services Review*, 82, 122–129.
- Fisher, P. A., Stoolmiller, M., Mannering, A. M., Takahashi, A., & Chamberlain, P. (2011). Foster placement disruptions associated with problem behavior: Mitigating a threshold effect. *Journal of Consulting and Clinical Psychology*, 79(4), 481–487.
- Fleury, M. J., Ngui, A., Bamvita, J. M., Grenier, G., & Caron, J. (2014). Predictors of healthcare service utilization for mental health reasons. *International Journal of Environmental Research and Public Health*, 11(10), 10559–10586.
- Font, S. A., & Maguire-Jack, K. (2020). It's not "Just poverty": Educational, social, and economic functioning among young adults exposed to childhood neglect, abuse, and poverty. *Child Abuse & Neglect*, 101.
- Fowler, P. J., Marcal, K. E., Zhang, J., Day, O., & Landsverk, J. (2017). Homelessness and aging out of foster care: A national comparison of child welfare-involved adolescents. *Children and Youth Services Review*, 77, 27–33.
- Gabrielli, H. EP., Tunno, A. M., Jackson, Y., Spangler, A., & Kanine, R. M. (2014). Longitudinal assessment of self-harm statements of youth in foster care: Rates, reporters, and related factors. *Child Psychiatry and Human Development*, 46(6), 893–902.
- Goemans, A., van Geel, M., van Beem, M., & Vedder, P. (2016). Developmental outcomes of foster children. *Child Maltreatment*, 21(3), 198–217.
- Greeson, J. K. P., Fairbank, J. A., Pynoos, R. S., Howard, M. L., Steinberg, A. M., Gerrity, E. T., et al. (2011). Facts for policymakers: Complex trauma and mental health of children placed in foster care: Highlights from the National Center for Child Traumatic Stress (NCCTS) core data set. *Child Welfare*.
- Hambrick, E. P., Oppenheim-Weller, S., N'zi, A. M., & Taussig, H. N. (2016). Mental health interventions for children in foster care: A systematic review. *Children and Youth Services Review*, 70, 65–77.
- Haselgruber, A., Knefel, M., Sölvä, K., & Lueger-Schuster, B. (2021). Foster children's complex psychopathology in the context of cumulative childhood trauma: The interplay of ICD-11 complex PTSD, dissociation, depression, and emotion regulation. *Journal of Affective Disorders*, 282, 372–380.
- Hirdes, J. P., Smith, T. F., Rabinowitz, T., Yamauchi, K., Perez, E., Telegdi, N. C., et al. (2022). The Resident Assessment Instrument-Mental Health (RAI-MH): Inter-rater reliability and convergent validity. *The Journal of Behavioral Health Services & Research*, 29(4), 419–432.
- Hirdes, J. P., van Everdingen, C., Ferris, J., Franco-Martin, M., Fries, B. E., Heikkilä, J., et al. (2020). The interRAI suite of Mental Health Assessment Instruments: An integrated system for the continuum of care. *Frontiers in Psychiatry*, 10.
- Hirdes, J. P., van Everdingen, C., Ferris, J., Franco-Martin, M., Fries, B. E., Heikkilä, J., et al. (2020). The interRAI suite of mental health assessment instruments: An integrated system for the continuum of care. *Frontiers in Psychiatry*, 10, 926.
- Homma, Y., Wang, N., Saewyc, E., & Kishor, N. (2012). The relationship between sexual abuse and risky sexual behavior among adolescent boys: A meta-analysis. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 51(1), 18–24.
- Horn, S. R., Roos, L. E., Beauchamp, K. G., Flannery, J. E., & Fisher, P. A. (2018). Polyvictimization and externalizing symptoms in foster care children: The moderating role of executive function. *Journal of Trauma & Dissociation*, 19(3), 307–324.
- Jennings, S., & Evans, R. (2020). Inter-professional practice in the prevention and management of child and adolescent self-harm: Foster carers' and residential carers' negotiation of expertise and professional identity. *Sociology of Health & Illness*, 42(5), 1024–1040.
- Katz, L. Y., Au, W., Singal, D., Brownell, M., Roos, N., Martens, P. J., et al. (2011). Suicide and suicide attempts in children and adolescents in the child welfare system. *Canadian Medical Association Journal*, 183(17), 1977–1981.
- Keene, & Epps, J. (2015). Childhood physical abuse and aggression: Shame and narcissistic vulnerability. *Child Abuse & Neglect*, 51, 276–283.
- Klassen, J. A., Stewart, S. L., & Lapshina, N. (2021). School disengagement and mental health service intensity need among clinically referred students utilizing the interRAI Child and Youth Mental Health Assessment instrument. *Frontiers in Psychiatry*, 12, Article 690917.
- Kovarikova J (2017). Exploring youth outcomes after aging-out of care. Ontario Office of the Provincial Advocate for Children and Youth. <https://cwpr.ca/publications/exploring-youth-outcomes-after-aging-out-of-care>.
- Lapshina, N., & Stewart, S. L. (2018). Examining service complexity in children with intellectual disability and mental health problems who receive inpatient or outpatient services. *Journal of Intellectual & Developmental Disability*, 44(4), 464–473.
- Larsen, M., Baste, V., Bjorknes, R., Myrvold, T., & Lehmann, S. (2018). Services according to mental health needs for youth in foster care? – A multi-informant study. *BMC Health Services Research*, 18(1).
- Lau, C., Stewart, S. L., Saklofske, D. H., & Hirdes, J. (2019). Scale development and psychometric properties of internalizing symptoms: The interRAI Child and Youth Mental Health internalizing subscale. *Psychiatry Research*, 278, 235–241.
- Lau, C., Stewart, S. L., Saklofske, D. H., & Hirdes, J. (2021). Development and psychometric validation of the interRAI ChYMH externalizing subscale. *Clinical Child Psychology and Psychiatry*, 26(1), 295–305.
- Leathers, S. J.E., Geiger, J., Barnett, J., & Vande Voort, B. L. (2019). Placement disruption in foster care: Children's behavior, foster parent support, and parenting experiences. *Child Abuse & Neglect*, 91, 147–159.
- Leathers, S. J., Spielfogel, J. E., Gleeson, J. P., & Rolock, N. (2012). Behavior problems, foster home integration, and evidence-based behavioral interventions: What predicts adoption of foster children? *Children and Youth Services Review*, 34(5), 891–899.
- Lehmann, H. O.E., Havik, T., & Heiervang, E. R. (2013). Mental disorders in foster children: A study of prevalence, comorbidity and risk factors. *Child and Adolescent Psychiatry and Mental Health*, 7(1), 39, 39.
- Lehmann, B. K., Heiervang, E. R., Havik, T., & Havik, O. E. (2015). Reactive attachment disorder and disinhibited social engagement disorder in school-aged foster children - A confirmatory approach to dimensional measures. *Journal of Abnormal Child Psychology*, 44(3), 445–457.
- Leve, L. D., Harold, G. T., Chamberlain, P., Landsverk, J. A., Fisher, P. A., & Vostanis, P. (2012). Practitioner review: Children in foster care - vulnerabilities and evidence-based interventions that promote resilience processes. *Journal of Child Psychology and Psychiatry and Allied Disciplines (Cambridge)*, 53(12), 1197–1211.
- Li, Y., Babcock, S. E., Stewart, S. L., Hirdes, J. P., & Schwan, V. L. (2021). Psychometric evaluation of the depressive severity index (DSI) among children and youth using the interRAI child and youth mental health (CHYMH) assessment tool. *Child & Youth Care Forum*.
- Linares, L. O. (2006). An understudied form of intra-family violence: Sibling-to-sibling aggression among foster children. *Aggression and Violent Behavior*, 11(1), 95–109.
- Lindquist, M. J., & Santavirta, T. (2014). Does placing children in foster care increase their adult criminality? *Labour Economics*, 31, 72–83.
- Longden, E., Sampson, M., & Read, J. (2016). Childhood adversity and psychosis: Generalised or specific effects? *Epidemiology and Psychiatric Sciences*, 25(4), 349–359.
- Marcellus L & Badry D (2021). Infants, children, and youth in foster care with prenatal substance exposure: A synthesis of two scoping reviews. *International Journal of Developmental Disabilities* 1–26.
- Marshall, C., Semovski, V., & Stewart, S. L. (2020). Exposure to childhood interpersonal trauma and mental health service urgency. *Child Abuse & Neglect*, 106, Article 104464.
- Meinhofer, A., & Angleró-Díaz, Y. (2019). Trends in foster care entry among children removed from their homes because of parental drug use, 2000 to 2017. *JAMA Pediatrics*, 173(9), 881.
- Moe, A. M., Llamocca, E., Wastler, H. M., Steelesmith, D. L., Brock, G., Bridge, J. A., et al. (2021). Risk factors for deliberate self-harm and suicide among adolescents and young adults with first-episode psychosis. *Schizophrenia Bulletin*.
- Morton, B. M. (2018). The grip of trauma: How trauma disrupts the academic aspirations of foster youth. *Child Abuse & Neglect*, 75, 73–81.
- Narendorf, S. C., & McMillen, J. C. (2010). Substance use and substance use disorders as foster youth transition to adulthood. *Children and Youth Services Review*, 32(1), 113–119.
- Oswald, S. H., Heil, K., & Goldbeck, L. (2009). History of maltreatment and mental health problems in foster children: A review of the literature. *Journal of Pediatric Psychology*, 35(5), 462–472.
- Perry, K. J., & Price, J. (2017). The role of placement history and current family environment in children's aggression in foster care. *Journal of Child and Family Studies*, 26(4), 1135–1150.
- Perry, K. J., & Price, J. M. (2018). Concurrent child history and contextual predictors of children's internalizing and externalizing behavior problems in foster care. *Children and Youth Services Review*, 84, 125–136.
- Pilowsky, D. J., & Wu, L. T. (2006). Psychiatric symptoms and substance use disorders in a nationally representative sample of American adolescents involved with foster care. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 38(4), 351–358.
- Ramsayer Winter, V., Brandon-Friedman, R. A., & Ely, G. E. (2016). Sexual health behaviors and outcomes among current and former foster youth: A review of the literature. *Children and Youth Services Review*, 64, 1–14.
- Riebschleger, J., Day, A., & Damashek, A. (2015). Foster care youth share stories of trauma before, during, and after placement: Youth Voices for building trauma-informed systems of care. *Journal of Aggression, Maltreatment & Trauma*, 24(4), 339–360.
- Roberts, T., Miguel Esponda, G., Krupchanka, D., Shidhaye, R., Patel, V., & Rathod, S. (2018). Factors associated with health service utilisation for common mental disorders: A systematic review. *BMC Psychiatry*, 18(1).
- Semovski, V., King, C. B., & Stewart, S. L. (2021). *Mental health service urgency in children's mental health: Factors impacting the need for expedited services*. Child Psychiatry Hum Dev.
- Shpiegel, S., Simmel, C., Sapiro, B., & Ramirez Quiroz, S. (2021). Resilient outcomes among youth aging-out of foster care: Findings from the National Youth in Transition Database. *Journal of Public Child Welfare*, 1–24.
- Slyater, E., & Springer, C. (2011). Child welfare-involved youth with intellectual disabilities: Pathways into and placements in foster care. *Intellectual and Developmental Disabilities*, 49(1), 1–13.

- Statistics Canada. (2017). *Census Profile—Age, Sex, Type of Dwelling, Families, Households, Marital Status, Language, Income, Immigration and Ethnocultural Diversity, Housing, Aboriginal Peoples, Education, Labour, Journey to Work, Mobility and Migration, and Language of Work for Canada and Forward Sortation Areas, 2016 Census*. Ottawa ON, Canada: Government of Canada. Reference No.: 98-401-X2016046.
- Steenbakkers, A., Van Der Steen, S., & Grietens, H. (2018). The needs of foster children and how to satisfy them: A systematic review of the literature. *Clinical Child and Family Psychology Review*, 21(1), 1–12.
- Stewart, S. L., & Babcock, S. E. (2020). InterRAI Child and Youth Mental Health-Screener (ChYMH-S): A psychometric evaluation and validation study. *Child Psychiatry and Human Development*, 51(5), 769–780.
- Stewart, S. L., Celebre, A., Hirdes, J. P., & Poss, J. (2020). Risk of Suicide and Self-Harm in Kids: The development of an algorithm to identify high-risk individuals within the children's mental health system. *Child Psychiatry and Human Development*, 51, 913.
- Stewart, S. L., Celebre, A., Hirdes, J. P., & Poss, J. W. (2021). Risk of injury to others: The development of an algorithm to identify youth at high-risk of violence perpetration within the mental health system. *Journal of Psychopathology and Behavioral Assessment*.
- Stewart, S. L., Celebre, A., Iantosca, J. A., & Poss, J. W. (2021). Autism spectrum screening checklist (ASSC): The development of a scale to identify high-risk individuals within the children's Mental Health System. *Frontiers in Psychiatry*, 12.
- Stewart, S. L., Theall, L. A., Morris, J. N., Berg, K., Björkgren, M., Declercq, A. et al (2016). interRAI Child and Youth Mental Health Collaborative Action Plans (CAPs) for use with the interRAI Child and Youth Mental Health Developmental Disability (ChYMH-DD) Assessment Instrument. Version 1, Standard Edition. Washington, DC: interRAI.
- Stewart, S. L., Celebre, A., Semovski, V., Vadeboncour, C., Hirdes, J. P., & Poss, J. (2022). The interRAI Child & Youth Suite of Mental Health Assessment Instruments: An Integrated Approach to Mental Health Service Delivery. *Frontiers in Psychiatry*.
- Stewart, S. L., Falah Hassani, K., Poss, J., & Hirdes, J. (2017). The determinants of service complexity in children with intellectual disabilities. *Journal of Intellectual Disability Research*, 61(11), 1055–1068.
- Stewart, S. L., & Hamza, C. A. (2017). The Child and Youth Mental Health Assessment (ChYMH): An examination of the psychometric properties of an integrated assessment developed for clinically referred children and youth. *BMC Health Services Research*, 17(82), 1–10.
- Stewart, S. L., Hirdes, J. P., Curtin-Telegdi, N., Perlman, C. M., McKnight, M., MacLeod, K., et al. (2017). interRAI Child and Youth Mental Health (ChYMH). *Assessment Form and user's manual. Version, 9.3. interRAI*.
- Stewart, S. L., Lapshina, N., & Semovski, V. (2021). Interpersonal polyvictimization: Addressing the care planning needs of traumatized children and youth. *Child Abuse & Neglect*, 114, Article 104956.
- Stewart, S. L., LaRose, L., Gleason, K., Nicolson, R., McKnight, M., Knott, W., et al. (2015). *interRAI Child and Youth Mental Health – Developmental Disabilities (ChYMH-DD) Assessment Form and User's Manual*. Washington, DC: interRAI.
- Stewart, S. L., Leschied, A., den Dunnen, W., Zalmanowitz, S., & Baiden, P. (2012). Treating mental health disorders for children in child welfare care: Evaluating the outcome literature. *Child & Youth Care Forum*, 42(2), 131–154.
- Stewart, S. L., Morris, J. N., Asare-Bediako, Y. A., & Toohey, A. (2019). Examining the structure of a new pediatric measure of functional independence using the interRAI child and youth mental health assessment system. *Developmental Neurorehabilitation*, 23(8), 526–533.
- Stewart, S. L., Poss, J. W., Thornley, E., & Hirdes, J. P. (2019). Resource intensity for children and youth: The development of an algorithm to identify high service users in children's mental health. *Health Services Insights*, 12, 1–11.
- Stewart, S. L., Toohey, A., & Poss, J. W. (2021). ICCareD: The development of an algorithm to identify factors associated with distress among caregivers of children and youth referred for Mental Health Services. *Frontiers in Psychiatry*, 12.
- Stinson, J. D., Quinn, M. A., Menditto, A. A., & LeMay, C. C. (2021). Adverse childhood experiences and the onset of aggression and criminality in a forensic inpatient sample. *International Journal of Forensic Mental Health*, 20(4), 374–385.
- Suchting, R., Gowin, J. L., Green, C. E., Walss-Bass, C., & Lane, S. D. (2018). Genetic and psychosocial predictors of aggression: Variable selection and model building with component-wise gradient boosting. *Frontiers in Behavioral Neuroscience*, 12.
- Tenenbaum, A., Mandel, A., Dor, T., Sapir, A., Sapir-Bodnar, O., Hertz, P., et al. (2020). Fetal alcohol spectrum disorder among pre-adopted and foster children. *BMC Pediatrics*, 20(1).
- Vanderwill, L. A., Salazar, A. M., Jenkins, G., Larwelle, J., McMahon, A. K., Day, A., et al. (2020). Systematic literature review of foster and adoptive caregiver factors for increasing placement stability and permanency. *Journal of Public Child Welfare*, 15(4), 487–527.
- Vanschoonlandt, F., Vanderfaeillie, J., Van Hoken, F., De Maeyer, S., & Robberechts, M. (2013). Externalizing problems in young foster children: Prevalence rates, predictors and service use. *Children and Youth Services Review*, 35(4), 716–724.
- Yang, J., McCuish, E., & Corrado, R. (2021). Is the foster care-crime relationship a consequence of exposure? Examining potential moderating factors. *Youth Violence Juv Justice*, 19(1), 94–112.