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Correlates of child mental health and substance use related emergency department visits in Ontario: A linked population survey and administrative health data study

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Abstract

Introduction
Knowledge of the sociodemographic, behavioural, and clinical characteristics of children visiting emergency departments (EDs) for mental health or substance use concerns in Ontario, Canada is lacking.

Objectives
Using data from a population-based survey linked at the individual level to administrative health data, this study leverages a provincially representative sample and quasi-experimental design to strengthen inferences regarding the extent to which children's sociodemographic, behavioural, and clinical characteristics are associated with the risk of a mental health or substance use related ED visit.

Methods
9,301 children aged 4–17 years participating in the 2014 Ontario Child Health Study were linked retrospectively (6 months) and prospectively (12 months) with administrative health data on ED visits from the National Ambulatory Care Reporting System. Modified Poisson regression was used to examine correlates of mental health and substance use related ED visits among children aged 4-17 years over a 12-month period following their survey completion date, adjusting for ED visits in the 6 months prior to their survey completion date. Subgroup analyses of youths aged 14-17 years who independently completed survey content related to peer victimisation, substance use, and suicidality were also conducted.

Results
Among children aged 4–17 years, older age, parental immigrant status, internalising problems, and perceived need for professional help were statistically significant correlates that increased the risk of a mental health or substance use related ED visit; low-income and suicidal ideation with attempt were statistically significant only among youths aged 14-17 years.

Conclusions
Knowledge of the sociodemographic, behavioural, and clinical characteristics of children visiting EDs for mental health and substance use related concerns is required to better understand patient needs to coordinate effective emergency mental health care that optimises child outcomes, and to inform the development and targeting of upstream interventions that have the potential to prevent avoidable ED visits.

Highlights

- Growing rates of child mental health and substance use related ED visits have been observed internationally.
- A population-based survey linked at the individual level to administrative health data was used to examine the extent to which children's sociodemographic, behavioural, and clinical characteristics are associated with the risk of a mental health or substance use related ED visit in Ontario, Canada.
- Older age, low-income, parental immigrant status, perceived need for professional help, internalising problems, and suicidality increase the risk of an ED visit.
- Knowledge of the characteristics of children visiting EDs can be used to coordinate effective emergency mental health care that optimises child outcomes, and to inform the development and targeting of upstream interventions that have the potential to prevent avoidable ED visits.

Keywords
children; mental disorder; substance use disorder; emergency medicine; mental health services; correlates; data linkage

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Introduction

Mental and substance use disorders are the leading cause of disability among children worldwide [1, 2]. Emergency departments (EDs) often serve as the point of first contact with the healthcare system for children seeking crisis management and treatment for mental health concerns [3], and a large proportion (45%) of all visits are repeat visits [4]. Growing rates of child mental health and substance use related ED visits have been observed internationally [5–7], with reported increases ranging from 6–10% per year over the last decade [5].

Mental health and substance use related ED visits are resource intensive [8] and costly [9]. Furthermore, there is considerable variation in the availability of mental health care across EDs [10], with some children not receiving adequate treatment or care plans [9], which may in turn exacerbate pathology and contribute to repeat visits [11]. A better understanding of factors associated with the use of EDs for mental health and substance use concerns may help to coordinate emergency services for children with urgent care needs, develop clinical pathways that optimise child outcomes, and inform the development and targeting of upstream interventions that have the potential to prevent avoidable ED visits.

Knowledge of the characteristics that distinguish between children presenting to EDs for mental health and substance use concerns and those who do not is lacking. Most of the existing evidence does not use prospective methodology and relies almost exclusively on administrative health data [4]. Despite covering entire populations, administrative health data are restricted to children in contact with ED services, and contain very little patient information to measure exposures and confounders beyond basic sociodemographic characteristics. These limitations can be addressed by linking administrative health data to population-based surveys.

Using the 2014 Ontario Child Health Study (2014 OCHS) [12], a large provincially representative epidemiological survey, linked retrospectively (6 months) and prospectively (12 months) to administrative health data at the individual level, the objectives of this study are to estimate the extent to which children's sociodemographic, behavioural, and clinical characteristics are associated with the risk of a mental health or substance use related ED visit. The 2014 OCHS includes a wide range of sociodemographic (e.g., low-income, single parent status, immigrant status), behavioural (e.g., substance use, peer victimisation), and clinical variables (e.g., internalising and externalising problems, self-harm, suicidality) measured at the household-level and child-level, many of which have not been examined as correlates of children's mental health and substance use related ED visits in Canada. The retrospective and prospective data linkage provided the opportunity to use a quasi-experimental design whereby children's sociodemographic, behavioural, and clinical characteristics measured in the 6 months prior to their survey completion date were examined as correlates of mental health or substance use related ED visits over a 12-month follow-up period, adjusting for children's ED visits in the corresponding 6 months prior to survey completion.

Methods

Study design

The 2014 OCHS [12] is a province-wide, cross-sectional, epidemiological survey of child health and mental disorders administered by Statistics Canada and linked retrospectively (6 months) and prospectively (12 months) at the individual-level with administrative data held by the Ontario Ministry of Health (MOH; formerly the Ministry of Health and Long-Term Care at the time of data linkage in 2018). This includes the National Ambulatory Care Reporting System (NACRS) database [13], which documents diagnostic and procedural information from all emergency-based services delivered to eligible residents (>96% of the population) as part of the province's public health care system.

Study procedures were approved by the Hamilton Integrated Research Ethics Board at McMaster University, and informed consent was received from all study participants. Additional details about the sample design, survey content, measurement, and data collection are presented elsewhere [14].

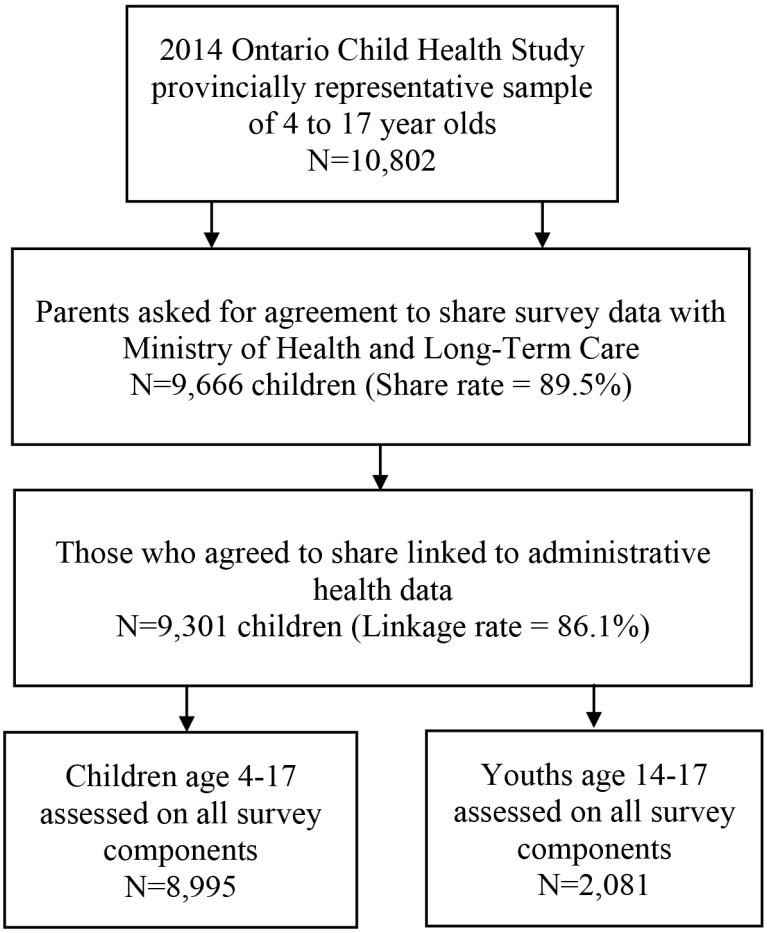
Study population

Households for the 2014 OCHS were selected from the Canadian Child Tax Benefit file (a benefit to all parents of children under 18 years of age administered through the tax system) using cluster sampling of residential areas stratified by residency (urban vs. rural) and income ($<20^{\text{th}}$, 20^{th} to 80^{th}, and $>80^{\text{th}}$ percentiles). A provincially representative sample of 6,537 households (50.8% response rate) with 10,802 children aged 4–17 years participated. Trained interviewers administered questionnaires to the person most knowledgeable (PMK; 98.6% were parents) of all children aged 4-17 years. Computer-assisted, self-administered questionnaires were used to ask youths aged 14–17 years about peer victimisation, substance use, and suicidality. PMKs were asked for consent to link their child's data with the MOH administrative data and 89.5% (n = 9,666 children) agreed. Of those, 96.2% (n = 9,301 children) were successfully linked with the NACRS. Figure 1 illustrates the sample selection process. The final samples for analysis were restricted to children with complete survey data: age 4–17 (n = 8,995) and age 14–17 (n = 2,081).

Measurement

Mental health and substance use related ED visits – Our outcome is a binary variable (0 = no, 1 = yes) that identifies children who had at least one mental health or substance use related ED visit during the 12-month period following their survey completion date. Moreover, our analyses adjust for a binary variable (0 = no, 1 = yes) that identifies children who had at least one mental health or substance use related ED visit during the 6-month period prior to their survey completion date. Following established criteria [15], mental health and substance use related visits were identified according to the main diagnosis at discharge, classified using the Canadian version of the International Statistical Classification of Diseases and Related Health Problems,

Figure 1: Sample selection flow chart



Tenth Revision (ICD-10-CA). Table 1 outlines the ICD-10-CA diagnostic codes used to classify ED visits.

Clinical characteristics

Internalising and externalising disorders

PMKs provided symptom ratings referencing the 6-month period prior to the child's survey completion date using the Ontario Child Health Study Emotional Behavioural Scales, a checklist of 52 items with three response options (0 = never/not true, 1 = sometimes/somewhat true, 2 = often/very true). Items were summed and, using DSM-5 [16] criteria, children were classified as having either internalising disorders (major depressive disorder, generalised anxiety disorder, social anxiety disorder/social phobia, and separation anxiety) or externalising disorders (attention-deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder). Both the externalising and internalising scales have excellent internal consistency (Cronbach's alpha $\geq$ 0.7), test-retest reliabilities (Pearson's $r \geq 0.7$), and classify disorders with the same reliability and validity as the Mini International Neuropsychiatric Interview for Children and Youth [17].

Perceived need for professional help

PMKs were asked if they thought their child had emotional or behavioural problems over the past 6 months and, if so, whether they thought professional help was needed for these problems. Affirmative responses to both questions constitute endorsement of perceived need for professional help (0 = no, 1 = yes).

Non-emergency mental health service contacts

PMKs were asked whether their child visited specific service providers (family doctor, pediatrician, other regular health care provider, psychiatrist, psychologist, social worker, other type of counsellor, spiritual or alternative health care provider) and service settings (specialised mental health or addiction agency, walk-in clinic, urgent care facility, hospital emergency department, school) over the past 6 months for mental health concerns. PMKs were provided with a list of community agencies within their municipality to increase recall accuracy [18] and could report having contact with more than one service provider or service setting. After excluding emergency and urgent care settings, we created a binary measure of any non-emergency mental health service contacts (0 = no; 1 = yes).

Suicidal ideation with attempt

Youths aged 14–17 years were asked: "In the past 12 months, did you ever seriously consider taking your own life or killing yourself?" Among those who responded affirmatively, suicidal attempt was assessed by asking: "In the past 12 months, how many times did you actually try to take your own life?" Youths

Table 1: Diagnostic codes used to ascertain mental health and substance use related emergency department visits

Diagnostic grouping	ICD-10-CA Codes
1- Overall, any mental health or substance use disorder	Primary diagnosis field = F06−F99 (which excludes dementia), or secondary diagnoses fields = X60−X84, Y10−Y19, Y28 when primary diagnosis is not F06–F99
2- Substance-related and addictive disorders	F10–F19, F55
3- Schizophrenia spectrum and other psychotic disorders	F20 (excluding F20.4), F22, F23, F24, F25, F28, F29, F53.1
4- Mood disorders	F30, F31, F32, F33, F34, F38, F39, F53.0
5- Anxiety disorders	F40, F41, F42, F43, F48.8, F48.9, F93.1, F93.2
6- Deliberate self-harm	Secondary diagnosis fields = X60–X84, Y10–Y19, Y28 when primary diagnosis is not F06–F99
7- Other: personality and behaviour disorders, intellectual disorders, developmental disorders, hyperkinetic disorders, conduct disorders, emotional disorders, disorders of social functioning, tic disorders, and mental disorders otherwise unspecified	All other diagnostic codes from diagnostic grouping 1 that are not included in the specific diagnostic groupings (2–6)

who responded affirmatively to the first question and reported trying to take their own life at least once were classified as endorsing suicidal ideation with attempt (0 = no; 1 = yes).

Non-suicidal self-injury

Youths aged 14–17 years were asked the following question: "Sometimes people deliberately harm themselves but they do not mean to take their life. In the past 12 months, did you ever deliberately harm yourself but not mean to take your life?" (0 = no, 1 = yes).

Behavioural characteristics

Tobacco use

Youths aged 14–17 years were asked: "Have you tried or smoked cigarettes or cigars in the past 6 months" (0 = no, 1 = yes).

Cannabis or illicit drug use

A binary classification of any substance use (0 = no, 1 = yes) was derived based on the responses of youths aged 14–17 years to a series of questions regarding the consumption of cannabis, illicit drugs, or prescription drug use without the advice of a doctor in the past 6 months.

Heavy episodic drinking

Youths aged 14–17 years were classified as having an episode of heavy drinking if they reported having 5 or more drinks of alcohol on a least one occasion in the past four weeks (0 = no; 1 = yes).

Peer victimisation

An abbreviated version of the 2009 School Crime Supplement to the US National Crime Victimisation Survey [19] was administered to youths aged 14–17 years to assess the frequency of physical, verbal, or relational peer victimisation. Following established coding procedures [20, 21], youths who experienced at least one form of victimisation at least once or twice during the month of their survey interview met criteria for peer victimisation (0 = no, 1 = yes).

Sociodemographic characteristics

Sociodemographic questions were administered to PMKs to assess their child's age in years; sex (0 = female; 1 = male); household income (before tax) below Statistics Canada's Low Income Measure (LIM) [22], a poverty measure based on household size (0 >LIM; 1 ≤ LIM); parental immigrant status (0 = both parents born in Canada, 1 = one or both parents born outside of Canada); lone parent status (0 = two parent household; 1 = lone parent household); and urbanicity (0 = large urban, 1 = small-medium urban and rural) determined on the basis of population density and size [23].

Statistical analyses

Descriptive statistics were calculated using frequencies and percentages for categorical variables and means and standard deviations (SDs) for continuous variables. Modified Poisson regression with robust variance estimators was used to examine correlates of mental health and substance use related ED visits among children aged 4–17 years in the 12 months following their survey completion date. The results are presented as risk ratios with accompanying 95% confidence intervals (95% CI). Subgroup analyses were also conducted for youths aged 14–17 years who independently completed survey content related to peer victimisation, substance use, and suicidality. We present unadjusted (each variable is estimated separately) and fully adjusted models (all variables are estimated simultaneously) for both age groups. In the fully adjusted models, we control

Table 2: Percentage of valid cases and missing data on study variables

	Valid cases	%Missing
Emergency department visits (n = 9,301)	9,301	0.00
6 months before survey date	9,301	0.00
12 months after survey date	9,301	0.00
Age 4–17 (n = 9,301)	8,995[a]	3.29
Sex		
Male	9,301	0.00
Female	9,301	0.00
Age	9,301	0.00
Household income below LIM	9,201	1.08
Lone parent household	9,232	0.74
Parental immigrant status	9,195	1.14
Rural or small-med urban residency	9,301	0.00
Internalising problems	9,221	0.86
Externalising problems	9,246	0.59
Perceived need for professional help	9,232	0.74
Non-emergency service contacts	9,285	0.17
Age 14–17 (n = 2,442)	2,081[a]	14.78
Peer victimisation	2,195	10.11
Tobacco use	2,309	5.45
Heavy episodic drinking	2,304	5.65
Cannabis or illicit drug use	2,288	6.31
Suicidal ideation with attempt	2,286	6.39
Non-suicidal self-injury	2,289	6.27

LIM: Low Income Measure.
[a]sample size of complete case analysis.

for mental health and substance use related ED visits in the 6 months prior to children's survey completion date. Therefore, we test the prospective influence of correlates on future ED visits conditional on prior ED visits, and the correlates are interpreted as contributing to the risk of an ED visit over and above the child's baseline risk. The number of valid cases and percentage of missing data for each variable are reported in Table 2. Missing data was handled using listwise deletion because complementary analyses based on multiple imputation produced similar estimates with consistently higher standard errors, thus was ineffective at improving power and reducing bias [24]. All analyses were conducted using STATA (version 14) and we applied sampling weights for the linked 2014 OCHS that were generated by Statistics Canada. Mean bootstrap weights were applied with a correction factor to account for the complex survey design of the 2014 OCHS and produce accurate standard errors.

Results

Table 3 presents descriptive statistics on mental health and substance use related ED visits, and the sociodemographic, behavioural, and clinical characteristics of children. In the 12 months following survey completion, 54 (0.58%) children aged 4–17 years had at least one ED visit. Among youths aged 14–17 years, 37 (0.18%) had at least one ED visit in the 12-month follow-up period. The corresponding weighted frequencies were 11,208 among children aged 4–17 years, and 7,677 among youths aged 14–17 years.

Table 4 presents results from unadjusted and fully adjusted modified Poisson regression models that examine correlates of ED visits during the 12-month follow-up period, separately for both age groups. In the fully adjusted model for children aged 4–17 years, significant correlates included older age (RR = 1.31; 95% CI = 1.14–1.50), parental immigrant status (RR = 3.14; 95% CI = 1.11–8.90), internalising problems (RR = 1.08; 95% CI = 1.02–1.13), and perceived need for professional help (RR = 14.69; 95% CI = 3.84–56.16). In the fully adjusted model for youths aged 14–17 years, statistically significant correlates included household income below the LIM (RR = 2.55; 95% CI = 1.08–6.02), parental immigrant status (RR = 2.72; 95% CI = 1.18–6.23), perceived need for professional help (RR = 8.93; 95% CI = 2.48–32.16), and suicidal ideation with attempt (RR = 23.75; 95% CI = 7.61–74.14).

Discussion

We assessed the extent to which a wide range of sociodemographic, behavioural, and clinical characteristics are associated with children's risk of a mental health or substance use related ED visit, some of which have not been previously considered in the Canadian context (e.g., single parent status, peer victimisation, community- and school-based mental health service contacts). We identify older age, clinical need (internalising problems, perceived need for professional help, and suicidal ideation with attempt), and indicators of social disadvantage (low-income and parental

Table 3: Sociodemographic, behavioural, and clinical characteristics of children, age 4–17 years (n = 8,995) and 14–17 years (n = 2,081)

	N	% or Mean [SD]
Emergency department visits (n = 9,301)		
6 months before survey completion date		
At least one visit	40	0.43
More than one visit	5	0.05
12 months after survey completion date		
At least one visit	54	0.58
More than one visit	12	0.13
Age 4–17 (n = 8,995)		
Sex		
Male	4,651	51.71
Female	4,344	48.29
Age (mean [SD])	8,995	10.63 [0.07]
Household income below LIM	1,671	18.58
Lone parent household	1,761	19.58
Parental immigrant status	3,842	42.71
Rural or small-med urban residency	2,778	30.88
Internalising problems (mean [SD])	8,995	5.84 [6.37]
Externalising problems (mean [SD])	8,995	4.57 [5.32]
Perceived need for professional help	1,025	11.40
Non-emergency service contacts	1,168	12.99
Age 14–17 (n = 2,081)		
Peer victimisation	992	47.67
Tobacco use	294	14.14
Heavy episodic drinking	220	10.59
Cannabis or illicit drug use	303	14.55
Suicidal ideation with attempt	97	4.68
Non-suicidal self-injury	174	8.37

LIM: Low Income Measure; SD: standard deviation.

immigrant status) measured in the 6 months prior to children's survey completion date as the most important factors that may increase the risk of a mental health or substance use related ED visit in the 12-months following their survey completion date. The data linkage used in this study provided the opportunity for a quasi-experimental design, whereby the effects of correlates are conditional on children's ED visits in the corresponding 6-month period before their survey completion date, thus represent a prospective effect over and above the child's baseline risk.

Our finding that older age is associated with ED visits for mental health or substance use concerns is consistent with previous research [5, 25] and descriptive statistics for this study demonstrating that 37 of the 54 (68.5%) ED visits in the 12-month follow-up period occurred among youths aged 14–17 years. A separate study from the 2014 OCHS demonstrates that older children (age 12–17) are more likely to have contact with physician (e.g., primary care, hospitals, and EDs) vs. non-physician (e.g., community- or school-based) services for mental health concerns [25], and our findings suggest this may be partly attributable to more ED visits. Household income below the LIM was also an important factor that may increase the risk of mental health and substance use related ED visits among 14–17 year olds. Previous studies find that children living in poor neighbourhoods are more likely to have a first contact or repeat visit to the ED for mental health concerns [3–5], but aggregate poverty measures may not accurately reflect the socioeconomic status of the child's household. We measured low-income at the household level and found comparable evidence. Suicidal ideation with attempt was the clinical characteristic most strongly correlated with a mental health or substance use related ED visit among youths aged 14-17 years. Although a relatively rare event (0.2% of youths who present to the ED for mental health or substance use concerns), previous research indicates that the median time to death by suicide among youths following a mental health related ED visit is 5.2 years [28], thus represents a chronic risk requiring cross-sectoral mental health care to ensure surveillance and follow-up after discharge from the ED.

Parental immigrant status was associated with mental health and substance use related ED visits for all children regardless of age. Inequities in access to mental health services for children with immigrant parents are well-documented [25, 26], and our findings are consistent with evidence demonstrating that EDs often serve as a first point of contact with mental health care among this population [27]. Together with previous evidence, our findings highlight an urgent need

Table 4: Correlates of child mental health and substance use related emergency department visits in Ontario, age 4–17 years (n = 8,995) and 14–17 years (n = 2,081)

	Age 4–17 unadjusted	Age 4–17 fully adjusted	Age 14–17 unadjusted	Age 14–17 fully adjusted
	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
ED visit in 6 months prior to survey date	27.22*** (9.60–77.20)	0.62 (0.06–6.17)	11.58*** (3.32–40.36)	0.67 (0.03–18.71)
Sex (ref = male)	0.56 (0.25–1.25)	0.55 (0.28–1.11)	0.36 (0.12–1.05)	0.49 (0.18–1.33)
Age	1.34*** (1.18–1.52)	1.31*** (1.14–1.50)	1.43* (1.03–1.98)	1.30 (0.90–1.87)
Household income below LIM	2.15 (0.95–4.85)	1.58 (0.67–3.75)	1.89 (0.68–5.21)	2.55* (1.08–6.02)
Lone parent household	1.82 (0.82–4.02)	0.81 (0.29–2.24)	1.14 (0.46–2.86)	0.59 (0.23–1.51)
Parental immigrant status	1.23 (0.56–2.73)	3.14* (1.11–8.90)	1.06 (0.40–2.84)	2.72** (1.18–6.23)
Rural or small-med urban residency	1.64 (0.80–3.40)	1.70 (0.74–3.90)	1.65 (0.65–4.15)	1.45 (0.46–4.59)
Internalising problems	1.14*** (1.11–1.16)	1.08** (1.02–1.13)	1.13*** (1.09–1.16)	1.09 (1.00 -1.19)
Externalising problems	1.12*** (1.08–1.16)	1.00 (0.93–1.07)	1.09*** (1.05–1.12)	0.96 (0.89–1.04)
Perceived need for professional help	26.49*** (13.17–53.27)	14.69*** (3.84–56.16)	24.30*** (11.06–53.38)	8.93*** (2.48–32.16)
Non-emergency service contacts	5.32*** (2.47–11.46)	0.63 (0.18–2.19)	6.32*** (2.44–16.37)	0.53 (0.10–2.74)
Peer victimisation	–	–	3.06* (0.99–9.48)	0.93 (0.43–2.03)
Tobacco use	–	–	3.93** (1.36–11.36)	0.18 (0.02–1.44)
Heavy episodic drinking	–	–	2.04 (0.84–4.97)	1.61 (0.49–5.24)
Cannabis or illicit drug use	–	–	5.95*** (2.35–15.09)	3.00 (0.62–14.51)
Suicidal ideation with attempt	–	–	21.66*** (8.37–56.05)	23.75*** (7.61–74.14)
Non-suicidal self-injury	–	–	6.91*** (2.77–17.25)	0.41 (0.15–1.07)

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
CI: confidence interval; LIM: Low Income Measure; RR: risk ratio; Ref: reference category.

to address inequities in access to mental health care across service sectors and settings.

To improve the coordination of emergency mental health care and promote optimal outcomes for children following discharge from the ED, clinical pathways [29] emphasise partnering with primary care providers and community agencies to ensure timely and appropriate follow-up care and a seamless transition between ED and outpatient services. More research is needed to better understand the outcomes of children who are older, have greater clinical needs, or who live in low-income or immigrant households in the period following a mental health or substance use related ED visit to inform evidence-based clinical pathways. Upstream preventative interventions targeted at children at greater risk for a mental health or substance use related ED visit may reduce the need for urgent care and increase equitable access to services across sectors and settings for high-risk groups in Ontario. Additional research is needed to identify barriers to accessing mental health care in non-urgent settings.

Strengths and limitations

Using a Population Data Science approach [30], this study leverages a sizeable provincially representative sample of children linked with administrative health data at the individual level and prospective methodology to assess a wide range of factors associated with the risk of an ED visit for mental health concerns. Our results strengthen inferences to support evidence informed clinical and policy decision-making to improve children's mental health and access to services.

Limitations include provincial differences in publicly funded health care systems in Canada and approaches to diagnostic coding in administrative health data [31, 32], which may restrict the generalisability of our results outside of Ontario. Moreover, given sample size restrictions due to the relatively low number of children visiting EDs for mental health care in Ontario, our estimates produced wide confidence intervals and may lack precision. Replication of our findings is required. Relatedly, the frequency of ED visits was not large enough to distinguish between presentations that constitute a repeat or first encounter with mental health care, discharge diagnosis types, or to test for statistical interactions. Our use of sampling weights, and bootstrap replicate weights to produce accurate standard errors, allow for population-level inferences despite the low number of mental health and substance use related ED visits in our sample. The opportunity to pursue this type of study is unique given that the 2014 OCHS is the only Canadian child epidemiological survey linked with

administrative health data, which is a defining feature of Population Data Science [30]. Our findings advance the field and have the potential to inform future research on child mental health and substance use related ED visits. Sustained investment in routine population-based data collection on the mental health needs of children with regular linkage to administrative health data is required to overcome these limitations related to sample size [33].

Conclusion

Knowledge of the sociodemographic, behavioural, and clinical characteristics of children visiting EDs for mental health and substance use related concerns is required to better understand patient needs to manage the adequacy of emergency mental health care, develop clinical pathways that optimise child outcomes, and inform the development and targeting of upstream interventions that have the potential to prevent avoidable ED visits.

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Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this manuscript. The funding agencies that supported this research were not involved in any aspect of the study design, collection, analysis, and interpretation of data, or decision to submit the manuscript for publication. The views expressed within this manuscript are those of the authors and do not necessarily reflect the policies or positions of the funding agencies.

Ethical standards

The work described in this article conforms to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for research involving humans and the Uniform Requirements for manuscripts submitted to biomedical journals.

Data access

The 2014 Ontario Child Health Study is available through Statistics Canada Research Data Centres. The linked dataset is not publicly available due to data sharing agreements with Statistics Canada and the Ministry of Health in Ontario.

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