An Examination of Child and Youth Mental Health Service Urgency in Ontario

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Abstract

Ontario’s capacity to treat children and adolescents in mental health crisis is outweighed by the number and needs of individuals requiring treatment. A lack of standardized assessments for prioritizing individuals has contributed to long wait times for treatment and a paucity of information to help prioritize those requiring urgent services. This study examined whether sector (e.g., school, hospital), sex, age, legal guardianship, interpersonal and school conflict, intellectual disability and comorbid health conditions predicted greater mental health service urgency in 61,448 children (ages 4 to 18 years) assessed using the interRAI Child and Youth Mental Health Screener. Additionally, differences in mental health state indicators across sectors were examined. Binary logistic regression revealed that all predictors, except for sector, showed a significant effect on service urgency. Kruskal-Wallis testing supported differences in mental health states across sectors. Findings are instrumental in prioritization, reducing the likelihood that children with acute needs remain on waitlists.

Keywords: child, adolescent, mental health, service urgency, prioritization, binary logistic regression, interRAI
Summary for Lay Audience

Many children and adolescents experience mental health problems. However, only approximately 25% who actually need services receive them. Evidence-based approaches to triaging and prioritizing mental health services for children and adolescents are desperately needed, but it is unclear which children and adolescents are being properly prioritized due to the lack of standardized evaluations in Ontario. Current practices in the province are resulting in long wait times to be connected to mental health services, which has a negative impact on children’s well-being. Using an assessment developed to assist with prioritizing children and adolescents for mental health services, this study explores characteristics associated with a greater need for urgent mental health services. This study also compares the rates of common mental health problems across schools, hospitals, Local Health Integration Networks, and mental health agencies. The results of this study provide the opportunity to better understand the character profiles of children and adolescents currently receiving services and the factors influencing urgency for mental health services. In turn, this could change current practices in the Ontario mental health care system and improve the lives of children and adolescents who require resources and are being placed on ever-growing wait-lists.
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1. Introduction

1.1. Child and Adolescent Mental Health

The World Health Organization has defined mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (Galderisi et al., 2015, p.231). This is often accomplished through the fulfillment of cognitive, social, and emotional developmental milestones. Across the life span, children and adolescents may experience mental health concerns due to deviations from these expected milestones. Despite mental health concerns being possible at any given time throughout an individual’s lifetime (Hirdes et al., 2020), approximately 50-75% have an onset in childhood or adolescence (Anderson et al., 2017; Stewart & Hamza, 2017; MHASEF Research Team, 2017).

In Ontario, recent estimates have suggested that 18% of children and youth have clinically significant mental disorders, serious enough to warrant services and supports. This number is only expected to rise at an alarming rate (Bor et al., 2014; CMHO, 2020; Millar et al., 2013; Schraeder & Reid, 2015) due to increasing rates of mental health needs and inadequate service capacity. At present, estimates of children and adolescents receiving services for their mental health concerns range from 16-25% (Duncan et al., 2018; Schwean & Rodger, 2013; Stewart & Hamza, 2017; Stewart & Hirdes, 2015), resulting in roughly 75% of our most vulnerable individuals who receive no services at all. Strong scientific support has indicated that early, responsive, and evidence-based treatment of mental health problems has several benefits (Stewart & Hamza, 2017; Tolan & Dodge, 2005). A failure to treat mental health problems early, has a significant negative impact on the child’s quality of life. Children and adolescents who go untreated are at a greater risk of an array of maladaptive outcomes such as school drop-out, involvement with the criminal justice system, and underemployment as they get older (Stewart & Hamza, 2017).

The disparity between the number of children requiring services compared to those receiving services, raises many questions as to the barriers preventing appropriate service use and the characteristics of children and adolescents being prioritized (Barwick et al., 2013; MHASEF Research Team, 2017). To improve the responsivity of mental
health services catered to children and adolescents, it is important to understand the unique needs of those individuals who require mental health supports. Integrating a biopsychosocial approach to care is needed to fully understanding mental health problems. This model, originally advanced by George Engel in 1977, underscores the importance of recognizing biological, psychological, and social influence on overall health (Borrell-Carió et al., 2004).

Over the years, child and adolescent mental health researchers have explored a variety of variables driving mental health service need: interpersonal and school conflict, legal guardianship, intellectual disability, comorbid health condition(s), age, sex of the child and the service sector in which the child was assessed. In addition to these risk factors, mental health state indicators such as distractibility/hyperactivity, social disengagement, risk of injury to others, risk of suicide and self-harm, internalizing and externalizing symptoms are commonly discussed as drivers of mental health service need. The body of literature highlighting these risk factors and mental health state indicators is briefly reviewed below.

1.1.1. Indicators of Mental Health Needs

Interpersonal and School Conflict

Despite being a probable aspect of life, conflict defined as “a state of incompatible behaviours, disagreement and opposition” (Laursen & Collins, 1994, p. 197) is related to a host of adverse outcomes for children and adolescents (Cohen et al., 2015; Timmons & Margolin, 2015). Some examples may include poorer academic functioning and internalizing/externalizing mental health problems (Timmons & Margolin, 2015). The implications that relationships with family, friends and school personnel have on a child’s socio-emotional development have been identified in the literature (Fosco & Lydon-Staley, 2019; Moore et al., 2018; Zwaanswijk et al., 2003). In general, the more negative relationships that a child or adolescent has increases the risk for experiencing emotional distress (Cohen et al., 2015).

For children and adolescents, relationships with parents and caregivers are considered extremely important for socio-emotional development. Parents and caregivers often act as a base from which children and adolescents explore the world around them (Laursen & Collins, 1994). Family environments characterized by negative parenting
behaviours, lower levels of support and parental disengagement put children and adolescents at greater risk for developing maladaptive outcomes such as internalizing and externalizing problems, substance-use, angry moods and less engagement with school (Auerbach et al., 2014; Moore et al., 2018). Conflict within the family is considered a strong predictor of adolescent depression (Auerbach et al., 2014) and has been linked to less purpose in life (Fosco & Lydon-Staley, 2019). These conflictual family relationships have also been connected to suboptimal relationships with peers and school personnel.

Similar outcomes are reported in studies investigating children’s peer relationships and mental health. Children with conflictual relationships at home may depend on peer relationships to compensate for the lack of closeness experienced with parents or caregivers (Auerbach et al., 2014; Sanders et al., 2017). Children and adolescents who experience family conflict tend to build relationships with troubled peers which heightens risk-taking behaviours (Moore et al., 2018; Sanders, et al., 2017). In some cases, stressors from the family environment may extend into relationships with peers and negatively influence the quality of these bonds (Auerbach et al., 2014). Generally, children and adolescents with positive peer relationships tend to report better well-being and mental health (Moore et al., 2018).

The quality of interpersonal relationships extends into the educational setting. Relationships with school personnel influence a child’s socio-emotional well-being as well. Studies have indicated that positive relationships between teachers and students is associated with better mental health and overall well-being (Long et al., 2017; Moore et al., 2018). On the contrary, poor relationships in the school context negatively impact the child’s desire to attend school. Excessive absenteeism has been linked to lower academic performance, social isolation, involvement with the juvenile system, and permanent dropout from school putting students at greater risk for poorer occupational and economic outcomes (Finning et al., 2019; Kearney, 2008). These maladaptive outcomes are often exacerbated for children and adolescents who experience familial relationships characterized by conflict. In a study conducted in 2001 investigating school refusal, researchers found that 43% of the adolescents experienced family conflict, underlining the importance of family relationships (Ingul et al., 2012).

*Legal Guardianship*
In line with the area of research investigating children’s interpersonal relationships and well-being, is the exploration of legal guardianship and its impact on the development of mental health concerns. Family structures have changed over the years, with many more children growing up in single-parent households (Phillips, 2012). Studies comparing the mental health of children and adolescents living in single-parent households compared to those being raised by two parents have resulted in mixed findings. Phillips (2012) found participants who reported living in a single-parent home did not fare worse on indicators of well-being compared to their peers living in two-parent households.

In contrast, other researchers have found that children living in single-mother and single-father families report poorer physical and mental health indicators when compared to other legal guardianship arrangements. Research suggests those from single-mother households appear to have an increased likelihood of service use (Langer et al., 2015). Furthermore, children and adolescents living with other relatives (i.e., grandparents) have been found to report poorer physical and mental health when compared to peers living with both parents (Bramlett & Blumberg, 2007; Smith & Palmieri, 2007). Finally, when comparing children in the guardianship of child protection agencies to those living with both parents, children and adolescents in the former, report poorer outcomes; greater prevalence of mental health disorders and developmental delays (Burge, 2007; Greeson et al., 2011; Long et al., 2017). Similarly, emancipated youth or youth taking care of themselves after being in the guardianship of child protection agencies, have been found to experience mental health concerns such as anxiety and depression at greater rates than their peers (Havlicek et al., 2013; McMillen et al., 2005).

Intellectual Disability and Comorbid Health Condition(s)

When compared to the evidence of relationships between interpersonal, school relationships, legal guardianship and mental health in the literature for typically-developing children and adolescents, research focused on mental health outcomes for those with intellectual disabilities and comorbid health conditions is scarce. Preliminary research surrounding children with intellectual disabilities suggests they use more health care services, as they experience more problematic behaviours and are at increased risk of experiencing a mental health disorder when compared to peers without an intellectual
disability (Stewart, Hassani et al., 2017). In addition, mental health comorbidity co-occurring with an intellectual disability, results in a greater need for services across multiple service sectors (Lapshina & Stewart, 2019). Similarly, children and adolescents with comorbid health problems have been found to be at an increased risk of developing mental health concerns. Specifically, these children and adolescents exhibit symptoms related to internalizing problems, social functioning difficulties and tend to use more mental health services (Billawala, et al., 2018; McDougall et al., 2019; Perrin, 2002; Wilcox et al., 2016). This is partly due to the unique needs that these children and adolescents face that are exacerbated by underlying mental health conditions (Perrin, 2002).

Age Differences

Regardless of the aforementioned variables, children at any age can experience a distressing mental health condition. However, more than 50% of mental health concerns in adulthood have their onset before the individual turns 18 years of age (Das et al., 2016). Certain developmental stages are met with their unique challenges related to internalizing and externalizing issues. Research suggests that the root of common mental health problems can be traced back to young childhood. For this developmental age, the extent to which behaviours are expected and fitting for the given context, versus unusual and interfering with their functioning, is the differentiating factor prompting investigation. For example, younger children often misbehave but when the misbehaviour appears to be problematic and occurs frequently (i.e., daily tantrums), the child may be considered at risk for mental health problems. Lack of appropriate intervention and treatment at this stage, predisposes the young child to an array of mental health problems in adolescence (Wakschlag et al., 2019).

A review of the literature investigating the onset of commonly occurring mental health disorders indicated that 50% of all lifetime mental health disorders started by mid-teens. More specifically, Kessler et al., (2007) found that the median age of onset for attention-deficit/hyperactivity disorder (ADHD) was 7 to 9 years of age, 7 to 15 years of age for opposition-defiant disorder, 9 to 14 years of age for conduct disorder and 7 to 14 years of age for many anxiety disorders (i.e., phobias and separation anxiety disorders). Finally, adolescence has been associated with the onset of nonsuicidal self-injurious
behaviours, higher levels of suicide ideation, personality disorders (i.e., borderline personality disorder), smoking and alcohol use, making this developmental window particularly important for early identification and intervention (Bennett et al., 2015; Hamza et al., 2012; Das et al., 2016; Kessler et al., 2007; Rhodes & Bethell, 2008; Sharp & Fonagy, 2015). The availability of this information is critical in determining age ranges for the implementation of appropriate, preventative services.

Sex Differences in Mental Health State Indicators

A major focus in the child and adolescent mental health literature is the impact of sex on several mental health disorders. It is important to note that the literature uses the terms “sex” and “gender” to describe differences in psychopathology interchangeably. However, the terms are not synonymous. Sex differences refer to the variations in psychopathology influenced by genetics that identify a male versus a female. On the other hand, gender differences refer to the variation in psychopathology that are influenced by environmental or cultural factors that shape personality traits applicable to either or both of the sexes (Lewine et al., 2017). Research focused on sex differences associated with psychopathology and service utilization has indicated that there are differences between males and females related to internalizing, externalizing symptoms, risk of injury to others, risk of suicide and self-harm, distractibility/hyperactivity and social disengagement.

Females are more likely than males to receive services for internalizing symptoms such as mood or anxiety disorders (Gardner et al., 2002; Boak et al., 2016) whereas males are more likely to receive services for externalizing symptoms such as aggression (Boak et al., 2016). In several studies, being a female was considered a protective factor towards violent offending (Tiffin & Nadkami, 2010). In contrast, research focused on suicide and self-harming behaviour has indicated mixed findings. Some research supports a greater prevalence of nonsuicidal self-injurious behaviours in females, while other research has not found sex differences (Hamza et al., 2012). Despite suicidality being more common in males (Rhodes et al., 2013), no sex differences have been found when examining service utilization for those seeking medical attention for suicide attempts (Rhodes & Bethell, 2008). In addition, emerging research has found that the rate of suicide among female children has been increasing (Skinner & McFaul, 2012) and the prevalence of
self-harming behaviours is beginning to show a trend toward younger children (Rhodes & Bethell, 2008).

Males are more likely to exhibit and receive supports for hyperactivity and distractibility and are more likely to be diagnosed with ADHD compared to females (Gardner et al., 2002; Rucklidge, 2008). Finally, studies have shown that compared to their more sociable peers, children exhibiting social disengagement from an early age are more likely to exhibit signs of anxiety and other internalizing problems. They are also more likely to experience issues with school adjustment (Rubin & Coplan, 2004).

Although there are established differences in the types of psychopathology between the sexes, fewer studies have examined how these concerns drive mental health service urgency. Preliminary research has indicated that even in circumstances where males and females present with common symptoms, males are more likely to be in contact with mental health services when compared to their female peers. Studies have reported that males are more likely to receive a diagnosis in a primary care setting and to receive specialized services for this diagnosis when compared to their female peers (Gardner et al., 2002). In addition, studies have found that females exhibit more distressing symptoms before being referred to services for similar disorders exhibited by their male peers (Posserud & Lundervold, 2013).

1.2. Mental Health System in Ontario

It is evident in the child and adolescent mental health literature that there are a variety of mental health concerns that impact prevalence rates (Bor et al., 2014; CMHO, 2020). The reality is that the mental health care system is one whose capacity for service is outweighed by the volume of those requiring treatment (Barwick et al., 2013), incurring costs greater than $59 billion Canadian dollars annually to operate (Duncan et al., 2018). This is due to a host of reasons. However, commonly cited reasons in the literature are the poor access to mental health care and lack of coordination between service sectors (Gandhi et al., 2016; Kinchin et al., 2016).

The need to address a fragmented system has been a consistent theme for the last 20 years (Hirdes et al., 2020; Stewart & Hamza, 2017). Despite this being a reoccurring theme, Canada lacks a uniform policy for child and adolescent mental health services. In fact, Ontario is only one of four provinces and territories to have policies addressing child
and adolescent mental health (Canadian Institutes for Health Research, 2010). The mental health care system in Ontario is composed of several service sectors (e.g., health care, education, mental health, youth justice). In this context, a service sector is composed of trained personnel that deliver child and adolescent mental health services and not products (characteristic of other sectors in the economy) to individuals seeking treatment (World Health Organization [WHO], 2003).

In Ontario, the provision of mental health services for children and adolescents is primarily the responsibilities of the Ministries of Children, Community and Social Services (MCCSS), Health and Long-Term Care (MOHLTC) and Education (MOE) (Reid & Brown, 2008; Duncan et al., 2018). In addition, services are provided by private practitioners, advocacy, charity and self-help groups. Although the MOHLTC has established agencies responsible for planning and delivering mental health services to children and adolescents, the ministries have not outlined standardized processes in collecting information for children, adolescents and their families. As a result, agencies are tasked with individually deciding on the method and process of data collection (Duncan et al., 2018).

The intake process for children and adolescents varies across Ontario. Prior to the most recent changes in government (i.e., the movement of agencies to the MOHLTC from MCCSS) and depending on the specific regions within Ontario: certain agencies conduct their own intake assessments, while others have a centralized intake process. For children and adolescents who require inpatient or residential treatment, a centralized process through Community Services Coordination Network (CSCN) is utilized. The client files are reviewed by a CSCN committee to determine service needs, and if inpatient or residential treatment is warranted, the child or adolescent is placed on wait lists until admission to a treatment bed is available (S.Stewart, personal communication, March 22, 2020).

Hospitals are typically reserved for individuals experiencing an episodic crisis or a psychiatric emergency, characterized by an inability to cope and a need for urgent services (Coates, 2018). However, even in hospital, physicians have reported a lack of time and standardized screening measures to be effective in identifying children at greatest risk (Westers & Plener, 2019). Consequently, there is a varied and inconsistent
assessment, prioritization and triaging approach, that often uses “home grown”, non-standardized assessments, with questionable reliability and validity, thereby preventing appropriate comparisons of service needs across sectors providing mental health care. The inconsistency in practices across the province has detrimentally influenced our understanding of the similarities and differences of children’s mental health needs and contributed to a siloed service delivery system (Duncan et al., 2018; Stewart & Hirdes, 2015).

Unlike interRAI, many assessments have a narrow focus on diagnostic measures to assess and triage children and adolescents to mental health services. The narrowed focus may inhibit the ability for mental health professionals to comprehensively capture the child or adolescent’s mental health status (Hirdes et al., 2020; Langer et al., 2015; Stewart & Hirdes, 2015). The scarcity of data examining the differences in mental health state indicators across service sectors highlights the significant gaps in knowledge related to mental health service needs for children and adolescents.

This gap has been recognized by The Child and Youth Mental Health Lead Agency Consortium in their Lead Agency Provincial Priorities Report (2019) which recommends instruments from the interRAI child and youth suite for standardized use across the province of Ontario. interRAI is “an international not-for-profit collective of researchers and clinicians from over thirty countries committed to improving the care of vulnerable persons through a seamless approach to assessment across a variety of service sectors” (Stewart & Hamza, 2017, p.2). These instruments have been studied and utilized extensively internationally and have strong, widespread, cross-sectoral applicability. These instruments can be used across multiple disciplines to obtain high quality data to enhance clinical decision-making through the use of case-finding methodology and evidence-based care. These instruments also foster improved training and a common language across service sectors and disciplines, improve continuity of care to support, and facilitate evidence-informed treatment over time through the use of care planning protocols. The interRAI assessment-intervention assessment system is also useful in tracking children across sectors as they age, addressing fragmentation, and providing future national and international benchmarking (Hirdes et al., 2020; Stewart & Hirdes, 2015).
1.2.1. Mental Health Service Utilization

At present, differences in mental health state indicators across service sectors is not routinely measured and reported. Research exploring differences across service sectors has suggested there is variability with regard to the need involved (Hazen et al., 2004). Over the years, there has been an increased rate of acute care service visits (Burns, et al., 1995; MHASEF Research Team, 2017). However, this is not in proportion to the urgency of those seeking services in these settings. Edelsohn et al. (2003) conducted a study that found a large percentage of children and adolescents accessing mental health supports via hospitals were doing so for nonurgent reasons. Gandhi et al. (2016) also discovered a rising trend of access to acute care services among children and adolescents when compared to other sectors regardless of the appropriateness.

More recent research has also found similar findings. In a retrospective study of pediatric emergencies, Roberts et al. (2018) found that a third of the cases were not real emergencies. Furthermore, schools have become common settings for mental health screening and interventions as they have become the most frequent providers and are pathways to additional, more specialized mental health services. Adolescents with mild to moderate behaviour disorders are more likely to use services in a school setting resulting in more severe behaviour disorders being treated in child and adolescent mental health agencies or in hospital settings (Green et al., 2013). Considering the school setting is the most common point of entry in the mental health care sector (Farmer et al., 2003; Green et al., 2013; Millar et al., 2013), this service sector will be the focus for this research study.

*Mental Health Services in the Schools*

Currently, 75% of children who are receiving services are doing so via the education system (Millar et al., 2013). Schools have become the setting for many basic mental health treatment services (Marsh, 2016). The implementation of mental health programs relies on psychometrically sound assessment tools and school personnel who are aware of risk factors for mental health concerns. Research has consistently shown that disruptive behaviours are prevalent in school-aged children (Burns & Rapee, 2019; Fazel et al., 2014). Teachers who are often tasked with identifying children requiring a mental health assessment, nominate students exhibiting externalizing behaviours over peers with
internalizing behaviours (Burns & Rapee, 2019; Cunningham & Suldo, 2014; Marsh, 2016). For many school personnel, identification of behaviours that are not problematic for the classroom environment may be challenging (Marsh, 2016).

Identification of behaviours that are indicative of mental health concerns is not the only step necessary in ensuring these students will experience better outcomes. School personnel identifying children or adolescents at risk of a mental health concern, then need to bring these concerns to school staff who can provide assistance (Marsh, 2016). However, the inadequacies of the mental health care system for children and adolescents are only exacerbated in an educational setting. In 2017, 61% of elementary schools and 50% of secondary schools reported that they did not have adequate access to a psychologist to support their students. This is problematic as mental health difficulties have been linked to detrimental effects on academic outcomes including increased absenteeism and lower rates of high school completion, as well as poor socio-emotional development (Kowalewski et al., 2011; Suhrcke & de Paz Nieves, 2011) which has a devastating impact resulting in long-term ramifications into adulthood.

According to the Ontario Psychological Association’s guidelines, one school psychologist should be available for every 1000 students. Despite this recommended ratio, the Association of Chief Psychologists with Ontario school boards reported that on average, the ratio is over one psychologist to 3500 students and in some cases, one psychologist to 8000 students. It is important to note, there are other disciplines that provide mental health support to children and adolescents in a school setting (i.e., guidance counsellors, social workers, child and youth workers). However, a substantial number of elementary and secondary schools in Ontario continue to report no access to these mental health professionals. Furthermore, mental health professionals in the school setting report pressure to complete assessments which impacts their ability to provide other services (People for Education, 2019). This strain on those responsible to address the mental health concerns of children and adolescents in the school system results in students going unrecognized and/or untreated. Alternatively, the children and adolescents who are assessed, are often deferred to waitlists that have been created reflecting lack of resources and time constraints (Barwick et al., 2013).
1.3. Wait List Issue

Long wait times are the most commonly cited barrier for receiving mental health services by clients, their families, health care professionals, and administrators, regardless of the service sector they visit (Anderson et al., 2017; Schraeder & Reid, 2015). In a recent poll, 90% of parents reported wait times for starting or transitioning between services as the biggest gap in their child’s care (CMHO, 2020; The Child and Youth Mental Health Lead Agency Consortium, 2019). Wait lists for mental health services are distressing, especially when children and adolescents are waiting for prolonged periods of time. Research has suggested that the time spent on wait lists for mental health resources may cause the child or adolescent’s problems to worsen, increasing the risk of harm and/or hospitalization (Schraeder & Reid, 2015). In an effort to provide guidelines as they relate to appropriate time frames to receive mental health services, the Canadian Psychiatric Association (CPA) released a policy paper outlining three levels of urgency and appropriate wait times for services.

The CPA discriminated between emergent, urgent and scheduled needs of care. Emergent level for access is associated with danger to life, limb or organ within a few hours or days. For this level of urgency, the CPA suggests specialist care be received within 24 hours. Urgent level for access includes unstable clinical conditions that have the potential to deteriorate quickly. For urgent levels of access, specialist care should be received within one to two weeks. The last urgency level is that of scheduled needs of care which is affiliated with stable symptoms that do not cause disruptions in the individual’s daily activities and will not deteriorate quickly. These individuals have appropriate social supports within their communities. For this level of service urgency, specialist care should be received within two to four weeks.

Preliminary research on wait times in the province of Ontario have indicated that the guidelines are not being met. Kowalewski et al. (2011) conducted a study to examine whether agencies were able to meet the CPA guidelines. According to the results, the average wait times for high, moderate and low clinical priority levels were 29, 75 and 109 days respectively, before individuals were connected to services. The study also discovered variability in wait times among participating agencies across the different
health care sectors. Recent data surrounding wait times for mental health services echo similar findings from Kowalewski and colleagues (2011).

Average wait times from initial date of contact for child and adolescent mental health services ranged from two days for crisis services to 98 days for intensive treatment. The average wait time to be connected to therapy services was approximately 78 days (MHASEF Research Team, 2017). More alarmingly, the most recent investigation on wait times in Ontario has found that there has not been an improvement to these numbers. At present, 28,000 children and adolescents living in Ontario are waiting as long as 2.5 years for mental health treatments and an estimated 200,000 children have no contact to mental health treatments at all (CMHO, 2020). This is problematic as research has indicated that longer wait times between referral to mental health services and initial appointment results in nonattendance for several families.

This nonattendance results in a waste of service sector resources and contributes to longer wait lists (Schraeder & Reid, 2015). The use of standardized screening practices can aid with managing wait lists by identifying the children at greatest risk while helping the service sector plan for a greater proportion of children and adolescents to be serviced given the resources available (Barwick et al., 2004). Provincial governments across the country have agreed that a standardized system for child and adolescent mental health is needed across service sectors to build a stronger and more integrative mental health care system, necessary for system improvement (Duncan et al, 2018; MHASEF Research Team, 2017; The Child and Youth Mental Health Lead Agency Consortium, 2019).
2. Current Study

Despite the increase in knowledge around child and adolescent mental health service use in recent years, there remains a tremendous gap surrounding the profile of children and adolescents at greatest need for urgent mental health services. The literature provides a strong rationale regarding the importance of examining characteristics of children and adolescents to aid in prioritization of those exhibiting the highest need for emergent mental health services (Gevaert et al., 2018). This information is instrumental in understanding the unique needs of particular service sectors, addressing fragmentation (Duncan et al., 2018) and the wait-list crisis. This study is unique in that it is the first study to examine relationships between risk factors and mental health service urgency and differences in mental health state indicators across service sectors using a sample of children and adolescents assessed using the interRAI Child and Youth Mental Health Screener (ChYMH-S; Stewart et al., 2018). In line with the biopsychosocial model, the current study focused on the relationship among interpersonal conflict, school conflict, legal guardianship, intellectual disability, comorbid health condition(s), age, sex and service sector on mental health service urgency. This study further examined differences in mental health state indicators across service sectors.

The specific research questions are as follows: 1) Is service urgency related to sex, age, legal guardianship, intellectual disability, comorbid medical condition(s) interpersonal/school conflict, and service sector? And 2) In terms of mental state indicators (i.e., hyperactivity/distractibility, social disengagement, risk of injury to others, risk of suicide and self-harm, internalizing and externalizing symptoms), how does the school sector compare to (i) child and youth mental health agencies (CYMH agencies) (ii) hospitals and (iii) Local Health Integration Networks (LHINs)?

On the basis of previous research, it was hypothesized that a higher need for urgent mental health services would be associated with female (Posserud & Lundervold, 2013) adolescents (12-18 years of age) (Das et al., 2016), assessed in hospital (Edelsohn et al., 2003) with a child protection agency as guardianship (Long et al., 2017). It was also expected that these variables, in conjunction with interpersonal and school conflict (Moore et al., 2018), intellectual disability (Lapshina & Stewart, 2019), and comorbid health conditions, (Wilcox et al., 2016) would result in the highest level of urgency.
Furthermore, it was expected that there would be a statistically significant difference in mental health state indicators by service sector (Hazen et al., 2004). Using existing research around individual variables and their relation to service urgency as a reference, it was hypothesized that CYMH agencies, hospitals, and LHINs would have higher acuity levels than schools for most mental health state indicators. However, schools would have higher levels of hyperactivity/distractibility and externalizing symptoms, as these mental health states are readily apparent and may be disruptive in the school setting (Cunningham & Suldo, 2014; Green et al., 2013; Millar et al., 2013).
3. Method

3.1. Participants

Archival data from 61,448 children and adolescents between 4 and 18 years of age ($M = 12.36$, $SD = 3.73$) assessed in school boards (0.29%), CYMH agencies (62.33%), hospitals (8.44%) and LHINs (28.94%) across Ontario. Both male (50%) and female (50%) children and adolescents participated. Of those who participated, over half of the sample (62.12%) had both parents holding legal guardianship, 27.36% were of single parent mother-led guardianship, 4.15% were of single parent father-led guardianship, 4.48% had neither parent but had other relatives or nonrelatives holding guardianship, 1.79% of the sample was in legal guardianship of a child protection agency and 0.10% were youth responsible for themselves. In the sample, 5% of the children and adolescents reported an intellectual disability and a comorbid health condition, 36% reported interpersonal conflict and 57% reported conflict in school. The means and standard deviations of the mental state indicators of interest in this study are reported in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Sample Characteristics ($N = 61,448$)</th>
<th>Frequency (%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at assessment</td>
<td>12.36</td>
<td>3.73</td>
<td></td>
</tr>
<tr>
<td>Hyperactive/distraction symptoms</td>
<td>5.89</td>
<td>4.89</td>
<td></td>
</tr>
<tr>
<td>Social disengagement symptoms</td>
<td>2.66</td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td>Risk of injury to others</td>
<td>1.25</td>
<td>1.65</td>
<td></td>
</tr>
<tr>
<td>Risk of suicide and self-harm</td>
<td>1.44</td>
<td>1.64</td>
<td></td>
</tr>
<tr>
<td>Internalizing symptoms</td>
<td>8.70</td>
<td>7.42</td>
<td></td>
</tr>
<tr>
<td>Externalizing symptoms</td>
<td>1.61</td>
<td>1.66</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30,490 (49.62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>30,958 (50.38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal guardianship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both parents</td>
<td>38,172 (62.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother only</td>
<td>16,813 (27.36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father only</td>
<td>2552 (4.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither parent but other relative(s) or nonrelative(s)</td>
<td>2755 (4.48)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youth responsible for self</td>
<td>60 (0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Protection Agency</td>
<td>1098 (1.79)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2. Measures

The *interRAI Child and Youth Mental Health Screener* (ChYMH-S) was used for this research study. The ChYMH-S is among several comprehensive assessment and screening systems designed by interRAI to aid researchers and clinicians in supporting vulnerable populations (Hirdes et al., 2020). Many studies have found the scales and algorithms in the instruments to demonstrate strong psychometric properties (Lau et al., 2018; Lau et al., 2019; Phillips & Hawes, 2015; Stewart & Babcock, 2020; Stewart, Celebre et al., 2020; Stewart & Hamza, 2017; Stewart et al., 2015; Stewart, Morris et al., 2019; Stewart, Poss et al., 2019). An algorithm is a case-finding methodology designed to identify a child, adolescent or family who is at risk. A scale on the other hand, is a set of items developed to assess a particular construct (e.g., depression, anxiety) and are used to evaluate outcomes (e.g., treatment efficacy and pre-post outcomes).

This brief assessment tool is used in assessing, prioritizing and triaging children and youth who are seeking mental health services. It has been designed to be used in inpatient, outpatient and school settings (Stewart, Hirdes et al., 2017; 2018). The semi-structured assessment tool is composed of 99 items and takes approximately 20 minutes to complete depending on case complexity. The tool is completed using multiple sources

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual disability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>58,660 (95.46)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2788 (4.54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comorbid health condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>58,459 (95.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2989 (4.86)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal conflict</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>39,643 (64.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21,805 (35.49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School conflict</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>26,260 (42.74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>35,188 (57.26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CYMH agency</td>
<td>38,302 (62.33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>177 (0.29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LHIN</td>
<td>17,784 (28.94)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>5185 (8.44)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. SD = standard deviation, CYMH agency = Child and Youth Mental Health agency. LHIN = Local Health Integration Network.*
of information: family members, community members, clinical observations and review of relevant documentation. Assessors from a variety of professional backgrounds are required to complete a full-day training session to learn how to administer and score the screener. Upon completion of the training, assessors must complete the interRAI competency evaluation to receive an Assessment and Intelligence Systems (AIS) certificate. All the data collected is entered on the interRAI Canada secure server that is housed at a partner university. For the current study, a variety of scales and risk factors obtained from the ChYMH-S were utilized to investigate service urgency.

3.2.1. Dependent Variables

**Research Question #1:** Is service urgency related to sex, age, legal guardianship, intellectual disability, comorbid medical condition(s) interpersonal and school conflict, and service sector?

The *interRAI Children’s Algorithm for Mental Health and Psychiatric Services* (ChAMhPs) score is an empirically based decision-support tool that can be used to inform the urgency of timing for a comprehensive, face to face mental health assessment (Stewart, Hirdes et al., 2017). There are three algorithms based on research that support predictors of service urgency based on the developmental stage of the child or adolescent. The variables within the algorithm were specifically chosen to ensure they were not “gameable”, thereby reducing the likelihood that certain items could be artificially inflating urgency levels for mental health services (e.g., service-related variables).

For children ages 7 years and under, the levels of urgency for services range from 0 to 5. To create a ChAMhPs score for this age group, determinants from the ChYMH-S include danger to self, violence to others, nightmares and lack of motivation. For children 8 to 11 years of age, the level of urgency ranges from 0 to 5 and determinants include danger to self, danger to others, making negative statements, socially inappropriate behaviours, hyperactivity and family/placement breakdown. For children ages 12 years and older, the levels of urgency for services ranges from 1 to 6. Determinants from the ChYMH-S include danger to self, danger to others, consideration of performing a self-injurious act, family/placement breakdown, intrusive thoughts/flashbacks, expression of intent to quit school, lack of interest in social interactions, expression of guilt or shame,
violence to others, victim of emotional abuse, and concern for self-injury risk. A score equal to three or higher for any of the three age groupings indicates an urgent need for mental health services or a full assessment. Scores on the lower end (i.e., 3 and 4) would call for a full, comprehensive assessment and a need for more urgent care. Scores on the higher end (i.e., 5 and 6) often reflect more emergent care due to suicide risk or violence. While contingent on clinician decisions, scores in this upper range often warrant immediate action on the part of the mental health personnel (Stewart, Hirdes et al., 2017), particularly where there is a lack of social and community supports. For the purposes of this research study, based on cut points highlighted in the manual identified by Stewart, Hirdes et al. (2017) scores between 0 to 2 represent low mental health service urgency and scores of three or greater represent a high urgency.

Research Question #2: In terms of mental state indicators (i.e., hyperactivity/distractibility, social disengagement, risk of injury to others, risk of suicide and self-harm, internalizing and externalizing symptoms), how does the school sector compare to (i) CYMH agencies (ii) hospitals and (iii) LHINs?

For this study, six mental health state indicators were used to describe child and adolescent character profiles across the service sectors obtained from the ChYMH-S. These dependent variables included hyperactivity/distractibility, social disengagement, risk of injury to others, risk of suicide and self-harm, internalizing symptoms (i.e., anxiety, anhedonia, depression) and externalizing symptoms (i.e., proactive aggression, reactive aggression). In addition, information related to interpersonal and school conflict, legal guardianship, presence of intellectual disability, comorbid health condition(s), age, sex and service sector in which the assessment took place were obtained from the ChYMH-S.

Hyperactive/Distraction Scale

The Hyperactive/Distraction scale measures the frequency of hyperactivity and distractibility behaviours using four components of hyperactivity and distractibility (i.e., impulsivity, distractibility, hyperactivity and disorganization). Scores range from 0 to 16 with higher scores indicating a greater frequency and diversity of disruptive behaviours.
The scale demonstrates good measurement properties as assessed through factor analysis and item response theory. It also demonstrates good diagnostic accuracy assessed via receiver operating characteristic curve (0.79; Lau et al., 2018).

**Social Disengagement Scale**

The Social Disengagement Scale measures the frequency of symptoms related to lack of motivation, lack of interest in social interaction and withdrawal from activities of interest. Scores range from 0 to 16 with higher scores indicating higher levels of social disengagement. For further information regarding reliability and validity of the scale see Stewart and Hamza (2017).

**Risk of Injury to Others (RIO) Algorithm**

The RIO algorithm is an empirically based decision support tool to identify children and adolescents at greater risk of engaging in violent or harmful behaviour towards others. Examples of items from the ChYMH-S to develop the RIO algorithm are impulsivity, destructive behaviour and verbal abuse. Scores range from 0 to 6 with scores of three or greater indicating a greater risk of injury to others (Stewart, Celebre, Hirdes & Poss, manuscript submitted for publication).

**Risk of Suicide and Self-Harm (RiSsK) Algorithm**

The RiSsK algorithm is an empirically based decision support tool to identify children and adolescents exhibiting symptoms that increase the likelihood of engaging in self-harm and suicidal behaviour. Examples of items from the ChYMH-S used to develop the RiSsK algorithm include irritability, intent to kill self and hopelessness. Scores range from 0 to 6 with scores of three or greater indicating a greater risk of suicide and self-harm. For the purposes of this research study, scores between 0 to 2 represent low risk and scores above three represent high risk (Stewart et al., 2020).

**Internalizing Scale**

The Internalizing Scale measures the frequency and severity of internalizing symptoms. The scale consists of three factors: anhedonia, anxiety and depression. Examples of items that are included in the scale are unrealistic fears, hypervigilance, and self-deprecation. The scores range from 0 to 44 with higher scores indicating higher levels of internalizing symptoms. The scale demonstrates strong psychometric properties assessed through bifactor analysis and multidimensional item response theory. It also
demonstrates strong criterion validity assessed by comparing the scale to other established subscales from criterion measures. For further information regarding reliability and validity of the internalizing scale see Lau et al. (2019).

*Externalizing Mental Health Problems Scale*

The Externalizing Mental Health Problems Scale measures the frequency of externalizing symptoms. The scale consists of two factors: proactive aggression and reactive aggression. Examples of items that are included in the scale are stealing, bullying peers, impulsivity and violent ideation. The scores range from 0 to 7 with higher scores indicating higher levels of externalizing symptoms (Lau et al., manuscript submitted for publication).

3.2.2. Independent Variables

*Interpersonal conflict*

A variable representing interpersonal conflict was derived by collapsing responses from four individual items from the ChYMH-S. These items obtain information about the child or adolescent’s interactions with family and friends. The items were: (i) conflict with or repeated criticism of family, (ii) family are persistently hostile or critical of child/adolescent, (iii) friends are persistently hostile or critical of child/adolescent and (iv) pervasive conflict with peers (exclude close friends). The composite variable *interpersonal conflict* was coded dichotomously as either no or yes to indicate the absence/presence of interpersonal conflict.

*School conflict*

A composite variable reflective of *school conflict* was derived by collapsing responses from three individual items from the ChYMH-S within the last 90 days. The items were: (i) increase in lateness or absenteeism, (ii) poor productivity or disruptiveness and (iii) conflict with school staff. The derived variable *school conflict* is coded as either no or yes to indicate the absence/presence of school conflict.

*Legal guardianship*

Documentation regarding the child or adolescent’s legal guardianship was collected by each assessor. This variable was given a value between 1 and 6 to represent the legal guardianship category. Options available included (1) *both parents*, (2) *mother*
only, (3) father only, (4) neither parent but other relative(s) or nonrelative(s), (5) child protection agency and (6) youth responsible for self.

Intellectual disability

The assessor documented the presence of an intellectual disability. This variable was coded as either no or yes to indicate the absence/presence of an intellectual disability.

Child/adolescent has serious comorbid medical condition

The assessor documented the presence of any serious medical condition which may include formally diagnosed conditions (i.e., epilepsy, diabetes). This variable was coded as either no or yes to indicate the absence/presence of a serious comorbid medical condition.

Age at assessment

To calculate the child or adolescent’s age at time of assessment, the year corresponding to their date of birth was subtracted from the year corresponding to the date of their initial ChYMH-S assessment. To align with the ChAMhPs algorithm, age was divided into three categories to illustrate various developmental stages (4 to 7 years, 8 to 11 years, and 12 to 18 years of age).

Sex

The assessor indicated if the child or adolescent is male or female.

Service sector

The organization identification codes contained in the dataset were used to determine the specific service sectors. Four groups to indicate which service sector administered the assessment were used: school, CYMH agency, hospital and LHINs.

3.3. Procedure

Informed consent was provided by guardians of the children and adolescents at each agency prior to the assessment being completed. Trained assessors at the participating locations (i.e., agencies, hospitals, etc.) completed the ChYMH-S as part of standard of care (Stewart & Babcock, 2020). All data collected is entered on the interRAI Canada secure server that is housed at a partner university. interRAI Canada provides each child and adolescent a randomly assigned, study-specific participant number. The access to this information for research purposes has been completed through interRAI licensing agreements. The lead investigator, Dr. Stewart receives data that is deidentified...
from the partner university. This information is encrypted and stored on a password protected computer with no internet or Universal Serial Bus (USB) ports in a locked laboratory at The University of Western Ontario. The secondary data analysis of information collected using the interRAI ChYMH-S has been approved by the Research Ethics Board at The University of Western Ontario (REB # 106415).

3.4. Analysis

Firstly, frequency and descriptive statistics were conducted for all variables of interest in this study. Secondly, assumptions testing was completed to assess the suitability for a binary logistic regression model. Collinearity between variables was tested by examining bivariate relationships among the independent variables using Pearson chi-square tests, parameter estimates (i.e., standard errors) and large changes to these parameter estimates using hierarchical logistic regression were conducted. Influential outliers were assessed using Pearson and Deviance residuals, Cook’s D, Leverage and DfFit statistics. Thirdly, a hierarchical binary logistic regression model was conducted to assess the association between mental health service urgency and sex, age, legal guardianship, presence of intellectual disability, comorbid medical condition(s) interpersonal conflict, school conflict, and service sector. The significance level was set to alpha .01, which corresponded to 99% confidence intervals in logistic regression analyses in an effort to be more conservative as the sample size was large. The binary logistic regression model was performed using SAS 9.4 (SAS Institute Inc., Cary, NC., USA). Finally, a Kruskal-Wallis test was conducted to explore the second research question for this study. Non-parametric testing was conducted using SPSS 25 (SPSS, Inc., Chicago, IL., USA).
4. Results

4.1. Preliminary Analyses

For this research study, secondary data analysis was conducted using assessment information from 61,448 children and adolescents. Overall, 27% of the sample exhibited high mental health service urgency. At the univariate level, sex, age, legal guardianship, interpersonal and school conflict, intellectual disability, comorbid health condition and service sector were significant predictors of mental health service urgency ($p < .0001$). As shown in Table 2, there were 16,657 children and adolescents exhibiting high service urgency; of which, 7061 were male and 9596 were female. About 22% of the sample were adolescents (12 to 18 years of age) who exhibited high mental health service urgency. The majority of the high service urgency cases had both parents who held legal guardianship (57%, $\chi^2 = 308$, $df = 5$, $p < .0001$) and were assessed in CYMH agencies (55%, $\chi^2 = 917$, $df = 3$, $p < .0001$). Children and adolescents were most likely to exhibit high mental health service urgency if they: reported an intellectual disability (35% vs. 27%, $\chi^2 = 87$, $df = 1$, $p < .0001$), had comorbid health condition(s) (34% vs. 27%, $\chi^2 = 72$, $df = 1$, $p < .0001$), reported an interpersonal conflict (40% vs. 20%, $\chi^2 = 3034$, $df = 1$, $p < .0001$) and reported school conflict (32% vs. 20%, $\chi^2 = 1084$, $df = 1$, $p < .0001$).
Table 2

Frequencies for Predictor Variables as a Function of Mental Health Service Urgency

<table>
<thead>
<tr>
<th>Variables</th>
<th>Low Mental Health Service Urgency</th>
<th>High Mental Health Service Urgency</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23,429</td>
<td>7061</td>
<td>477</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Female</td>
<td>21,362</td>
<td>9596</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4 to 7 years</td>
<td>7748</td>
<td>659</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 to 11 years</td>
<td>12,972</td>
<td>2723</td>
<td>3681</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>12 to 18 years</td>
<td>24,071</td>
<td>13,275</td>
<td></td>
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</tr>
<tr>
<td>Legal guardianship</td>
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</tr>
<tr>
<td>Both parents</td>
<td>28,716</td>
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</tr>
<tr>
<td>Mother only</td>
<td>11,649</td>
<td>5164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father only</td>
<td>1767</td>
<td>785</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither parent but other relative(s) or nonrelative(s)</td>
<td>1938</td>
<td>815</td>
<td>308</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Youth responsible for self</td>
<td>38</td>
<td>22</td>
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<tr>
<td>Child Protection Agency</td>
<td>683</td>
<td>415</td>
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<tr>
<td>Interpersonal conflict</td>
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<tr>
<td>No</td>
<td>31,801</td>
<td>7842</td>
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</tr>
<tr>
<td>Yes</td>
<td>12,990</td>
<td>8815</td>
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<td>School conflict</td>
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</tr>
<tr>
<td>No</td>
<td>20,936</td>
<td>5324</td>
<td>1084</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Yes</td>
<td>23,855</td>
<td>11,333</td>
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<td>Intellectual disability</td>
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<tr>
<td>No</td>
<td>42,973</td>
<td>15,687</td>
<td>87</td>
<td>&lt; .0001</td>
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<tr>
<td>Yes</td>
<td>1818</td>
<td>970</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comorbid medical condition</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>42,813</td>
<td>15,646</td>
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<td></td>
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<tr>
<td>Yes</td>
<td>1978</td>
<td>1011</td>
<td>72</td>
<td>&lt; .0001</td>
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<tr>
<td>Service sector</td>
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<tr>
<td>CYMH agency</td>
<td>29,067</td>
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<td></td>
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<tr>
<td>School</td>
<td>147</td>
<td>30</td>
<td>917</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>LHIN</td>
<td>11474</td>
<td>6310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>4103</td>
<td>1082</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. CYMH agency = Child and Youth Mental Health agency. LHIN= Local Health Integration Network.

Despite all the independent variables being significant predictors of mental health service urgency at the univariate level, the results did not control for the effect of other predictors. The net effect of each independent variable on service urgency was not established. Therefore, a hierarchical binary logistic regression was used to investigate if the independent variables predicted mental health service urgency for children and
adolescents living in Ontario. This analysis provides information about the overall fit of the statistical model and the association between each independent variable and the likelihood of experiencing a greater need for urgent mental health services.

4.1.1. Assumptions Testing

For a binary logistic regression to be the most appropriate model, the data should meet four main assumptions: (i) the dependent variable should be binary, (ii) outcome categories are mutually exclusive and exhaustive, there should be (ii) an independence of errors of the residuals and (iii) linearity of the logit (Field, 2009). In this research study, the dependent variable was mental health service urgency. This variable is binary such that children and adolescents exhibit either a low or high need for urgent mental health services, satisfying the first and second assumption. The third assumption, an independence of errors and the residuals was violated. Children and adolescents were not randomly visiting schools, hospitals, CYMH agencies or LHINs to be assessed. This sample was actively seeking services within these sectors. The fourth assumption does not apply in this research study as continuous variables were absent from the model.

4.1.2. Collinearity and Influential Outliers

To check for collinearity among predictors, bivariate relationships between independent variables were explored using Pearson chi-square tests. Bivariate relationships greater than .7 and statistically significant were considered to be highly collinear and prompted further investigation (Mukaka, 2012). As some of the independent variables had more than two categories, Cramer’s $V$ statistics were completed. In instances where independent variables have only two categories, phi and Cramer’s $V$ are identical (Field, 2009). In Table 3, values for Cramer’s $V$ illustrating intercorrelations for the independent variables are listed. To further investigate the presence of possible multicollinearity, parameter estimates (i.e., standard errors) and large changes to parameter estimates when conducting a hierarchical logistic regression were examined (Field, 2009).
**Table 3**

*Intercorrelations for Predictor Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sex</td>
<td>--</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Age</td>
<td>.24</td>
<td>--</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
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<td>3. Legal guardianship</td>
<td>.02</td>
<td>.03</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Interpersonal conflict</td>
<td>.03</td>
<td>.07</td>
<td>.09</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. School conflict</td>
<td>-.11</td>
<td>.03</td>
<td>.07</td>
<td>.18</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Intellectual disability</td>
<td>-.07</td>
<td>.04</td>
<td>.05</td>
<td>.04</td>
<td>.03</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Comorbid medical condition</td>
<td>.004</td>
<td>.04</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
<td>.11</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>8. Service sector</td>
<td>.13</td>
<td>.23</td>
<td>.03</td>
<td>.08</td>
<td>.06</td>
<td>.03</td>
<td>.04</td>
<td>--</td>
</tr>
</tbody>
</table>

* * p < .05. ** p < .01. *** p < .001.

Despite statistically significant correlations at the univariate level, no values were greater than or equal to .7. In addition, all standard errors in the model were less than 2. There were no large changes to parameter estimates when the independent variables were systematically placed into the binary logistic regression model. Therefore, no severe multicollinearity was assumed to occur. Influential outliers were assessed using critical thresholds for Cook’s $D$, Leverage and DfFit values. Calculations of the critical threshold values can be found in Appendix A. There was a demonstration of potential outliers as some observations surpassed the critical thresholds calculated. However, no observations were removed or transformed in the final model. A hierarchical binary logistic regression was conducted using eight predictors. Upon investigation of the model parameters and goodness-of-fit statistics at each individual step, the addition of service sector did not
improve the accuracy of the model. Thus, it was removed from the final model. Model fit statistics for the hierarchical binary logistic regressions are summarized in Table 4.

Table 4

<table>
<thead>
<tr>
<th>Step</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$R^2$</th>
<th>% Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4167.80$^a$</td>
<td>&lt; .0001</td>
<td>.0951</td>
<td>65.5</td>
</tr>
<tr>
<td>2</td>
<td>4442.89$^b$</td>
<td>&lt; .0001</td>
<td>.1012</td>
<td>66.4</td>
</tr>
<tr>
<td>3</td>
<td>7672.83$^c$</td>
<td>&lt; .0001</td>
<td>.1703</td>
<td>72.0</td>
</tr>
<tr>
<td>4</td>
<td>7728.70$^d$</td>
<td>&lt; .0001</td>
<td>.1715</td>
<td>72.1</td>
</tr>
<tr>
<td>5</td>
<td>7780.64$^e$</td>
<td>&lt; .0001</td>
<td>.1726</td>
<td>72.2</td>
</tr>
</tbody>
</table>

Note. $^a df = 3. ^b df = 8. ^c df = 10. ^d df = 12. ^e df = 15.$

4.2. Main Analyses

4.2.1. Research Question #1

Binary logistic regression analysis was used to predict mental health service urgency using seven predictors (sex, age, legal guardianship, interpersonal conflict, school conflict, intellectual disability and comorbid health condition(s)). The full model provided a significantly better fit to the data than the constant-only model, Likelihood ratio $X^2(12) = 7728.70, p < .0001$, Max-rescaled $R^2 = .17$. The model was able to discriminate between those who exhibited high mental health service urgency from those with low mental health service urgency with 72% accuracy. In the model with sex, age, legal guardianship, interpersonal conflict, school conflict, intellectual disability and comorbid health conditions, all variables were statistically significant predictors of mental health service urgency, except for youth responsible for themselves. Table 5 presents the results for the model including regression coefficients, standard errors, odds ratios, 99% confident intervals, Wald statistics and significance values.

Holding all other variables constant, males had a 21% decrease in odds of exhibiting high mental health service urgency ($OR = 0.79$, 99% CI [0.75, 0.83]) when compared to females. Age was significantly related to mental health service urgency such that, children (4 to 7 years of age) had a 83% decrease in odds ($OR = 0.17$, 99% CI [0.15,
and children (8 to 11 years of age) had a 60% decrease in odds of exhibiting high mental health service urgency (OR = 0.40, 99% CI [0.38, 0.43]) when compared to adolescent (12 to 18 years of age) peers. All categories of legal guardianship were significantly related to mental health service urgency, except for youth responsible for themselves (p = .1809). Specifically, compared to children and adolescents living with Child Protection Agencies, all other arrangements for guardianship resulted in a decrease in odds of being in a high mental health service urgency group: both parents (38%), mother only (25%), father only (28%), neither parent but other relative(s) or nonrelative(s) (26%). When compared to children and adolescents with interpersonal and school conflict, children without such conflicts resulted in a 59% and 41% decrease in odds of exhibiting high mental health service urgency, respectively. Finally, children and adolescents without an intellectual disability and comorbid health condition(s) when compared to peers with an intellectual disability or comorbid health condition(s) had a 21% and 18% decrease in odds of exhibiting high mental health service urgency, respectively.

Table 5

<p>| Binary Logistic Regression Analysis Predicting Mental Health Service Urgency |
|------------------|---|---|---|---|---|---|</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>99% CI</th>
<th>Wald statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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</tr>
<tr>
<td>Male</td>
<td>-0.24</td>
<td>0.020</td>
<td>0.79</td>
<td>[0.75, 0.83]</td>
<td>142.97</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Female (RC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Age Groups</td>
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<td>---</td>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>4 to 7 years</td>
<td>-1.79</td>
<td>0.043</td>
<td>0.17</td>
<td>[0.15, 0.19]</td>
<td>1740.56</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>8 to 11 years</td>
<td>-0.91</td>
<td>0.025</td>
<td>0.40</td>
<td>[0.38, 0.43]</td>
<td>1338.88</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>12 to 18 years (RC)</td>
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<td></td>
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<tr>
<td>Legal Guardianship</td>
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<td>---</td>
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<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>Both parents</td>
<td>-0.48</td>
<td>0.068</td>
<td>0.62</td>
<td>[0.52, 0.74]</td>
<td>49.85</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Mother only</td>
<td>-0.29</td>
<td>0.070</td>
<td>0.75</td>
<td>[0.63, 0.90]</td>
<td>17.33</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Father only</td>
<td>-0.33</td>
<td>0.081</td>
<td>0.72</td>
<td>[0.58, 0.88]</td>
<td>16.70</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Neither parent but other relative(s) or nonrelative(s)</td>
<td>-0.30</td>
<td>0.081</td>
<td>0.74</td>
<td>[0.60, 0.91]</td>
<td>13.67</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Youth responsible for self</td>
<td>-0.40</td>
<td>0.30</td>
<td>0.67</td>
<td>[0.32, 1.44]</td>
<td>1.79</td>
<td>.1809</td>
</tr>
<tr>
<td>Child Protection Agency (RC)</td>
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<tr>
<td>Interpersonal Conflict</td>
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<td>---</td>
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</tr>
<tr>
<td>No</td>
<td>-0.90</td>
<td>0.020</td>
<td>0.41</td>
<td>[0.39, 0.43]</td>
<td>2095.05</td>
<td>&lt; .0001</td>
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<tr>
<td>Yes (RC)</td>
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</tr>
<tr>
<td>Variable</td>
<td>B</td>
<td>SE</td>
<td>OR</td>
<td>99% CI</td>
<td>Wald statistic</td>
<td>p</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>----------------</td>
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<tr>
<td>School Conflict</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>-0.52</td>
<td>0.021</td>
<td>0.59</td>
<td>[0.56, 0.63]</td>
<td>648.21</td>
<td>&lt; .0001</td>
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<td>Yes (RC)</td>
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<td></td>
</tr>
<tr>
<td>Intellectual Disability</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>-0.24</td>
<td>0.044</td>
<td>0.79</td>
<td>[0.71, 0.88]</td>
<td>28.96</td>
<td>&lt; .0001</td>
</tr>
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<td>Yes (RC)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Comorbid Medical Conditions</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-0.20</td>
<td>0.043</td>
<td>0.82</td>
<td>[0.73, 0.91]</td>
<td>22.02</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Yes (RC)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note. RC = Reference category; CI = confidence interval for odds ratio (OR).

4.2.2. Research Question #2

A Kruskal-Wallis H test was performed to explore differences in mental health state indicators across the various service sectors. There were four different service sectors in this research study: school, CYMH agency, hospital, and LHIN. Of particular interest for this research study was the differences found between the schools and the other service sectors. Non-parametric testing was used for the second research question as the data violated an assumption for use of its parametric equivalent (one-way analysis of variance) (Field, 2009). The mental health state indicators in this study were not normally distributed, thereby warranting the use of Kruskal-Wallis H testing to explore the difference across the service sectors. In addition to Kruskal-Wallis H testing, Mann-Whitney U tests using a Bonferroni-adjusted alpha level of .008 (.05/6) were performed. Post-hoc testing was used to identify where differences in mental health state indicators existed for statistically significant Kruskal-Wallis H tests. The mental health state indicators for this research study were: hyperactive/distraction, social disengagement, risk of injury to others, risk of suicide and self-harm, internalizing and externalizing symptoms.

Hyperactive/Distraction

A Kruskal-Wallis H test provided very strong evidence of a difference in hyperactive/distraction scores across the different service sectors ($\chi^2(3) = 1,777.73, p < .0001$). Mann-Whitney U tests indicated that there was a significant difference between the hyperactive/distraction scores for children and adolescents assessed in schools compared to those assessed in hospital ($U(N_{hospital} = 5185, N_{school} = 177) = 380,513.50, z =$
In addition, a significant difference existed between school and LHINs ($U(N_{LHIN} = 17,784, N_{school} = 177) = 1,196,311.50, z = -5.54, p < .0001$). The mean rank scores for hyperactive/distraction in children and adolescents assessed in school was greater than scores obtained from hospitals and LHINs. However, there was not a significant difference in hyperactive/distraction scores between CYMH agencies and schools ($U(N_{CYMH agency} = 38,302, N_{school} = 177) = 3,298,968.50, z = -.62, p = .537$). Children and adolescents assessed in school presented similarly to their peers assessed in CYMH agencies. Figure 1 illustrates the mean rank hyperactive/distraction scores across the service sectors.

**Figure 1**

*Mean Ranks of Hyperactive/Distraction Scores Across Service Sectors*

![Bar chart showing mean rank scores across service sectors](chart.png)

A Kruskal-Wallis H test provided very strong evidence of a difference in social disengagement scores across the different service sectors ($\chi^2(3) = 1,951.67, p < .0001$). Mann Whitney U tests indicated that there was a significant difference between the social disengagement scores for children and adolescents assessed in school when compared to those assessed in hospitals ($U(N_{hospital} = 5185, N_{school} = 177) = 351,834.50, z = -6.24, p < .0001$) and to those assessed in LHINs ($U(N_{LHIN} = 17,424, N_{school} = 177) = 1,356,151.50, z = -2.84, p = .005$). LHINs exhibited the greatest mean rank scores across the four service sectors, followed closely by those assessed in schools. Differences in
social disengagement scores in schools were not significantly different than those obtained in CYMH agencies \((U(N_{\text{CYMH agency}}=38,287, \ N_{\text{school}}=177) = 3,249,196.50 \ z = -1.0, \ p = .317)\). Demonstrated by comparable mean rank scores, children and adolescents assessed in school presented similarly to children and adolescents assessed in CYMH agencies. Figure 2 illustrates the mean rank scores for social disengagement across the service sectors.

**Figure 2**

*Mean Ranks of Social Disengagement Scores Across Service Sectors*

As it pertains to the risk of injury to others, a Kruskal-Wallis H test showed a statistically significant difference in scores across the various service sectors \((\chi^2(3) = 2145.71, \ p < .0001)\). Mann Whitney U tests indicated that there was a significant difference in scores for risk of injury to other between children and adolescents assessed in school when compared to those assessed in LHINs \((U(N_{\text{LHIN}} = 17,733, \ N_{\text{school}} = 177) = 1,323,038.50, \ z = -4.38, \ p < .0001)\). Children and adolescents assessed in schools exhibited much greater mean rank scores when compared to those assessed in LHINs. However, mean rank scores between schools and hospitals \((U(N_{\text{hospital}} = 5185, \ N_{\text{school}} = 177) = 457,345.50, \ z = -.082, \ p = .934)\) and schools and CYMH agencies \((U(N_{\text{CYMH agency}} = 38,298, \ N_{\text{school}} = 177) = 3,176,793, \ z = -1.54, \ p = .124)\) were not significantly different from each other. Children assessed in schools presented similar mean rank scores in
regards to their risk of injury to others when compared to peers assessed in hospitals and CYMH agencies. Figure 3 illustrates the mean rank scores for risk of injury to others.

Figure 3

*Mean Ranks of Risk of Injury to Others Scores Across Service Sectors*

![Mean Ranks of Risk of Injury to Others Scores Across Service Sectors](chart.png)

*Risk of Suicide and Self-Harm*

A Kruskal-Wallis H test indicated that scores for risk of suicide and self-harm differed across the service sectors ($\chi^2(3) = 3,297.01, p < .0001$). Mann Whitney U tests indicated that there was a significant difference in scores for risk of suicide and self-harm between children and adolescents assessed in school when compared to those assessed in LHINs ($U(N_{LHIN} = 17,578, N_{school} = 177) = 958,474, z = -9.03, p < .0001$). Children and adolescents assessed in schools exhibited much lower mean rank scores when compared to those assessed in LHINs and relative to the other service sectors. Mean rank scores between schools and hospitals ($U(N_{hospital} = 5185, N_{school} = 177) = 457,345.50, z = -.082, p = .934$) and school and CYMH agencies ($U(N_{CYMH agency} =38,298, N_{school} = 177) = 3,176,793, z = -1.54 , p = .124$) were not significantly different from each other. Children assessed in schools presented similar mean rank scores in regards to their risk of suicide and self-harm when compared to those assessed in hospitals and CYMH agencies. Figure 4 illustrates the mean rank scores for risk of suicide and self-harm.
Figure 4

Mean Ranks of Risk of Suicide and Self-Harm Scores Across Service Sectors

*\( p < .0001 \).

Internalizing Symptoms

A Kruskal-Wallis H test indicated that scores for internalizing symptoms differed across the service sectors (\( \chi^2(3) = 839.28, p < .0001 \)). Mann Whitney U tests indicated that there was a significant difference in scores for internalizing symptoms between children and adolescents assessed in school when compared to those assessed in LHINs (\( U(N_{\text{LHIN}} = 17,424, N_{\text{school}} = 177) = 1,340,362, z = -3.00, p = .003 \)). Children and adolescents assessed in schools exhibited lower mean rank scores when compared to those assessed in LHINs. Mean rank scores for internalizing symptoms between schools and hospitals (\( U(N_{\text{hospital}} = 5185, N_{\text{school}} = 177) = 410,374.50, z = -2.40, p = .016 \)) and schools and CYMH agencies (\( U(N_{\text{CYMH agency}} = 38,287, N_{\text{school}} = 177) = 3,112,308.50, z = -1.88, p = .061 \)) were not significantly different from each other. Children and adolescents assessed in schools expressed greater internalizing symptoms than peers assessed in hospitals but fewer internalizing symptoms than peers assessed in CYMH agencies. Figure 5 illustrates the mean rank scores for internalizing symptoms across the service sectors.
Figure 5

Mean Ranks of Internalizing Symptoms Scores Across Service Sectors

*\(p = .003\).

Externalizing Symptoms

A Kruskal-Wallis H test provided very strong evidence of a difference in externalizing symptom scores across the different service sectors (\(\chi^2(3) = 1595.04\), \(p < .0001\)). Mann-Whitney U tests indicated that there was a significant difference between the externalizing symptom scores for children and adolescents assessed in school and those assessed in hospital (\(U(N_{\text{hospital}} = 5185, N_{\text{school}} = 177) = 406,737, z = -2.67, p = .008\)). Children and adolescents assessed in school exhibited greater externalizing symptoms relative to their peers assessed in hospital. In addition, a significant difference existed between school and LHINs (\(U(N_{\text{LHIN}} = 17,784, N_{\text{school}} = 177) = 1,310,151, z = -4.04, p < .0001\)). Again, children and adolescents assessed in school exhibited greater externalizing symptoms relative to their peers assessed in LHINs. However, there was not a significant difference in externalizing symptom scores between schools and CYMH agencies (\(U(N_{\text{CYMH agency}} = 38,302, N_{\text{school}} = 177) = 3,295,416.50, z = -.66, p = .513\)). Children and adolescents assessed in school exhibited similar mean rank externalizing symptom scores when compared to the children and adolescents assessed in CYMH agencies. Figure 6 illustrates the mean rank scores for externalizing symptoms across service sectors.
Figure 6

*Mean Ranks of Externalizing Symptoms Scores Across Service Sectors*

*p* = .008. **p** < .0001.
5. Discussion

This study drew on archival data from a sample of 61,448 children and adolescents living in Ontario, to explore the effects of individual characteristics and service sector on mental health service urgency. In addition, this study compared the presentation of common mental health state indicators across schools, CYMH agencies, hospitals and LHINs. While the current literature highlights the array of characteristics that drive mental health service urgency and suggests there are differences in mental health state indicators across service sectors, no previous work has investigated the (i) impact of individual characteristics and service sector on mental health service urgency and (ii) presentation of mental health state indicators across service sectors using the ChYMH-S.

5.1. Summary of Findings

5.1.1. Research Question #1—Impact of Individual Characteristics on Mental Health Urgency

Based on the extant literature, it was hypothesized that the following factors would increase service urgency: 1) being an adolescent female; 2) receiving an assessment in a hospital; 3) CAS guardianship; and 4) exhibiting interpersonal and school conflict. Additionally, adolescents with an intellectual disability or comorbid health condition(s) were expected to also exhibit higher mental health service urgency. These hypotheses were supported. When conducting a hierarchical binary logistic regression, several fit indices were examined to determine the most parsimonious model. In general, the smaller the chi-square likelihood ratio and the larger the $R^2$ value results in a stronger model (Field, 2009).

As depicted in Table 4, the addition of service sector in the fifth step inflated the likelihood ratio from 7728.70 to 7780.64 without drastically improving the model fit to the data. $R^2$ values remained at 17% and the model continued to discriminate between those who exhibited high mental health service urgency from those with low mental health service urgency with 72% accuracy. The likelihood ratio is considered to be the best removal criterion (Field, 2009). Service sector was removed from the logistic regression model due to its small statistical contribution to the model. As a result, this
eliminated the possibility for comment on its relationship with mental health service urgency.

As hypothesized, sex was a significant predictor of mental health service urgency. Consistent with previous literature, it was found that males exhibited a decrease in odds of being in a high mental health service urgency group (Edelsohn et al., 2003; Posserud & Lundervold, 2013; Zwaanswijk et al., 2003). Males were more likely to be assessed for externalizing disorders earlier in childhood, likely due to the fact that such behaviours are easier to recognize, are disruptive to others, and tend to garner service supports unlike more covert signs and symptoms (e.g., depression, anxiety) that are often exhibited by females. In addition, males have been found to be in contact with mental health services more often than females and receive diagnoses and specialized services sooner than females (Gardner et al., 2002; Posserud & Lundervold, 2013). Several studies have found an unequal access to mental health services between the sexes.

When females engage in mental health seeking behaviours, they are doing so for more distressing concerns compared to their male peers with similar disorders (Paula et al., 2014; Posserud & Lunderbold, 2013). As a result, females have been found to receive a diagnosis later in life and have several unmet mental health needs (Burns et al., 1995; Paula et al., 2014; Posserud & Lundervold, 2013). Consequently, these female adolescents must exhibit more extreme forms of psychopathology to obtain needed resources. This phenomenon may have contributed to the current finding that females exhibit greater odds of being in a high mental health service urgency group.

In addition to sex being a significant predictor of mental health service urgency, it was found that age, more specifically, adolescence (12 to 18 years of age) was associated with a greater likelihood of requiring urgent mental health services. As outlined in the literature, adolescence is a particularly sensitive developmental period for individuals. It is during the first few decades of life that the brain develops, matures, and that specific identities in social settings are created (Malla et al., 2018). More than 50% of mental health concerns that persist in adulthood have their onset before an individual turns 18 years of age (Das et al., 2016; Kessler et al., 2007).

Adolescence may be marked with the onset of internalizing disorders (i.e., anxiety, depression) (Malla et al., 2018), behavioural disorders (i.e., conduct disorders)
(Kessler et al., 2007), psychosis (i.e., schizophrenia) (Kessler et al., 2007; Malla et al., 2018) and risk-taking behaviours (i.e., substance use). Adolescence has also been associated with the onset of nonsuicidal self-injurious behaviours and suicide; making suicide the second leading cause of death in Canada among individuals 15 to 19 years of age (Das et al., 2016). The onset of several mental health concerns paired with the societal pressure of “growing-up”, may be driving the urgency of mental health services in this particular age group. Additionally, compared to adolescents (12 to 18 years of age), children (4 to 7 years of age) and those between 8 and 11 years of age exhibited a decrease in odds of belonging in the high mental health service urgency group by 83% and 60%, respectively.

These findings paired with what is known about adolescence, indicates that lack of appropriate intervention and treatment early could predispose children to several health problems; especially, if at earlier developmental stages the benchmark for referral to mental health services are behaviours deviating from what are expected or age-appropriate. This benchmark for deviancy from expected developmental milestones in childhood may be overlooked by several individuals in a child’s life, resulting in missed opportunities for intervention (Wakschlag et al., 2019) thereby resulting in the deterioration of one’s mental health. This is highlighted by the study findings depicting an increase in age resulting in a greater likelihood of belonging in the high mental health service urgency group, with adolescents (12 to 18 years of age) exhibiting the greatest likelihood that urgent mental health services would be required. Although cross-sectional in nature, the results of this study would suggest that early identification of mental health concerns and subsequent intervention are important for overall development (Bennett et al., 2015; Hamza et al., 2012; Rhodes & Bethell, 2008).

As hypothesized, children and adolescents living under the guardianship of child protection agencies were more likely to be identified in the high mental health service urgency group. Compared to children and adolescents who were under the guardianship of child protection agencies, all other categories of legal guardianship resulted in a decrease in odds of belonging to a high mental health service urgency group. The greatest decrease in odds (38%) was illustrated by the group where both parents held legal guardianship. Consistent with previous literature, family structures that contain both
parents in the household serves as a protective factor for mental health concerns when compared to those with guardianship of child protection agencies (Burge, 2007; Greeson et al., 2011; Long et al., 2017) and compared to those in single parent households (Musick & Meler, 2010; Perales et al., 2017).

Several of the maladaptive outcomes for children that have been linked to single parent households (i.e., higher rates of internalizing and externalizing disorders, lower cognitive, reading, verbal and mathematical abilities; Perales et al., 2017) stem from the lower incomes that are often characteristic of these dwelling types. Mother-only and father-only held guardianship arrangements may be deemed stressful, as the custodial parent is tasked with holding employment while being responsible for child-rearing with no substantial support. In addition, a small percentage (<50%) of single parents receive the child support owed to them from the noncustodial parent and these family types are at higher risk for poverty (Musick & Meler, 2010).

Non-traditional family types (i.e., single-parent, blended family) are also met with fewer resources in general, than two-parent household counterparts (Perales et al., 2017). This added financial challenge could compound the levels of stress felt by single parent households, impacting parent-child relationships (Behere et al., 2017). Children that live in single parent households are often met with parenting styles that are less emotionally supportive, have fewer rules and harsher disciplinary tactics (Musick & Meier, 2010). Recent research has expanded to include several other non-traditional family types beyond the single-parent household. Perales et al. (2017) explored the relationships between family structures and the risk for mental health disorders among 6,310 Australian children and adolescents (aged 4 to 17 years) and found that the prevalence for mental health disorders was not statistically different across the different family set-ups. This similarity across family types was supported in the current study suggesting that the odds of belonging to a high mental health service urgency group was similar among mother-only, father-only and neither parent but other relative(s) or nonrelative(s).

Furthermore, contrary to studies suggesting that children and adolescents living with neither parent but other relative(s) (i.e., grandparent), have significantly poorer mental health outcomes than children and adolescents living in single-parent households (Bramlett & Blumberg, 2007; Smith & Palmieri, 2007), was not illustrated by the current
study’s findings. All three of these categories of legal guardianship (mother-only, father-only and neither parent but other relative(s) or nonrelative(s)) resulted in similar decreases in odds of belonging to a high mental health service urgency group when compared to those in the guardianship of child protection services. Finally, emancipated youth, or youth taking care of themselves after being in the guardianship of child protection agencies, experience mental health concerns at greater rates than their peers (Havlicek et al., 2013; McMillen et al., 2005). However, mental health service urgency for emancipated youth was not statistically different than those under the guardianship of child protection services in this study. The lack of statistical significance could be attributed to the small sample size ($N = 60$) of this group.

Consistent with previous literature, children and adolescents experiencing interpersonal and school conflict had a greater likelihood of belonging in the high mental health service urgency group. Conflictual relationships with family members, peers or school personnel result in poorer mental health and overall well-being (Long et al., 2017; Moore et al., 2018; Sanders et al., 2017). Often, highly conflictual interpersonal relationships are a risk factor for internalizing and externalizing disorders (Fosco & Lydon-Staley, 2019; Timmons & Margolin, 2015), antisocial behaviours, substance use (Fosco & Lydon-Staley, 2019) and victimization (Voith et al., 2016). These negative family environments influence the development of positive relationships outside of the family context.

Children and adolescents from conflict-ridden households are less likely to develop good quality friendships (Moore et al., 2018). Those with conflictual relationships at home, may depend on peer relationships to compensate for the lack of closeness experienced with parents or caregivers (Auerbach et al., 2014; Sanders et al., 2017). They may also build relationships with troubled peers, heightening risk-taking behaviours (Moore et al., 2018; Sanders et al., 2017). Children and adolescents with poor peer relationships are often associated with greater bullying incidents as well. Children and adolescents who are involved in such incidents as bullies or victims themselves, reported poorer quality of attachment with parents and peers in one study, compared to their peers who are not involved (Nikiforou et al., 2013).
The quality of interpersonal relationships impacting mental health outcomes extends into the educational setting as well. Children and adolescents with poorer interpersonal relationships often lack adequate social skills and exhibit disruptive behaviours (Nikiforou et al., 2013), putting them at greater risk for poorer academic functioning (Timmons & Margolin, 2015). Relationships with school personnel have a great influence on a child or adolescent’s socio-emotional well-being. Studies have indicated that positive relationships between teachers and students is associated with better mental health (Long et al., 2017; Moore et al., 2018). On the contrary, poor relationships in the school context negatively impacts the child’s desire to attend school which is problematic. Excessive absenteeism has been linked to lower academic performance, social isolation, involvement with the juvenile system, and permanent dropout from school putting students at greater risk for poorer occupational and economic outcomes (Finning et al., 2019; Kearney, 2008).

Similarly, to children and adolescents with interpersonal and school conflict belonging to a high mental health service urgency group, those with an intellectual disability also had a greater likelihood of being in a high mental health service urgency group compared to their peers without an intellectual disability. As a result of their limitations in intellectual functioning, conceptual and adaptive skills, children and adolescents with an intellectual disability are at risk for any array of maladaptive outcomes (Stewart, Hassani et al., 2017). Children and adolescents with an intellectual disability are more likely to exhibit problematic, attention and aggressive behaviours, lack social skills, be victims of bullying, experience poorer family functioning, and are at higher risk for mental health disorders when compared to their peers without an intellectual disability (Stewart, Hassani et al., 2017). The prevalence of sexual and physical abuse towards children and adolescents with an intellectual disability tends to be much higher when compared to prevalence rates for their peers without disabilities (Reiter et al., 2007; Stewart, Hassani et al., 2017). The mental health comorbidities and adaptive struggles that occur with an intellectual disability, results in a greater need for services across multiple service sectors (Lapshina & Stewart, 2019).

Finally, comorbid health condition(s) was positively related to mental health service urgency. This is consistent with previous research that has indicated that children
and adolescents with comorbid health problems are at an increased risk of developing mental health concerns, exhibit symptoms of internalizing problems and display social functioning difficulties (Billawala et al., 2018; McDougall et al., 2019; Perrin, 2002; Wilcox et al., 2016). Children and adolescents with chronic medical conditions are also at an increased risk for polyvictimization (Stewart, Lapshina et al., 2020). Children and adolescents with comorbid medical conditions may utilize mental health services more frequently because of the unique needs they face that are exacerbated by underlying mental health conditions (Perrin, 2002).

Taken together, female adolescents tend to seek services for more distressing mental health concerns relative to their male peers. Adolescence (12 to 18 years of age) continues to be a particularly sensitive time for child development and is associated with the greatest urgency for mental health services when compared to children between 4 and 11 years of age. In addition, children and adolescents in the guardianship of child protection agencies were at greater odds of belonging to a high mental health service urgency group. Those with an intellectual disability, comorbid health condition(s), experiencing interpersonal and school problems, were more likely to exhibit a high need for urgent mental health services.

5.1.2. Research Question #2—Presentation of Mental Health State Indicators on Mental Health Urgency

Children and adolescents access mental health supports in a variety of service sectors. Based on previous research, it was hypothesized that there would be differences in the presentation of mental health state indicators across them. Specifically, it was expected that CYMH agencies, hospitals, and LHINs would have higher acuity levels than schools for most mental health state indicators. However, schools would have higher levels of hyperactivity/distractibility and externalizing symptoms, as these mental health states often disrupt classroom flow (Cunningham & Suldo, 2014; Green et al., 2013; Millar, et al., 2013). These hypotheses were supported.

School settings have become frequent providers of mental health care services and are often gatekeepers to additional resources in other areas of the mental health care sector (Green et al., 2013). In these settings, the child or adolescent’s teachers are often the ones tasked with identifying students who should receive an assessment or some form
of intervention. Research in this area has highlighted that teachers are more confident and likely to nominate students who exhibit externalizing behaviours over peers with internalizing behaviours for mental health supports (Cunningham & Suldo, 2014; Marsh, 2016). The greater prevalence of overt behaviours for mental health service use in schools was highlighted by Langer et al. (2015), who indicated that approximately 50% of the participants had ADHD or a behavioural disorder compared to less than 10% of those with anxiety or mood disorders. This confidence in identifying externalizing disorders and more disruptive behaviours in a school setting is highlighted by the mean rank scores for hyperactivity/distractibility and externalizing symptoms across the service sectors in the current study; with schools exhibiting higher acuity in these areas.

Based on previous literature, it was expected that hospitals, CYMH agencies, and LHINs would have higher acuity levels (risk of injury to others, risk of suicide and self-harm, social disengagement and internalizing symptoms). Hospitals are typically reserved for individuals experiencing an episodic crisis or a psychiatric emergency, characterized by an inability to cope and a need for urgent services (Coates, 2018). Emergency departments within hospitals are common place for children and adolescents who exhibit suicide and self-harming behaviours (Newton et al., 2016). Social disengagement and anhedonia are core component of depression, other internalizing issues, and are highly associated with suicidal risk (Gutkovich et al., 2011). Recent studies have investigated temporal trends of mental health service use in hospital versus outpatient settings in Ontario and have found that anxiety related disorders were the most common reason for an emergency department visit (Gandhi et al., 2016; MHASEF Research Team, 2017). Thus, it was expected that hospitals may encounter the highest acuity in these areas. However, the current study’s findings discovered that the LHINs experienced greater cases of social disengagement, risk of suicide and self-harm, and internalizing symptoms whereas CYMH agencies resulted in higher mean rank scores for risk of injury to others.

Furthermore, based on the present study’s findings, children and adolescents assessed in schools presented similarly to children and adolescents assessed in a hospital setting for risk of injury to others, risk of injury of suicide and self-harm, and internalizing issues. Collectively, these findings unveil some important attributes of the current mental health care system. Firstly, the acuity levels in schools is much higher than
anticipated. As it relates to risk of suicide and self-harm studies have discovered that more than 55% of children or adolescents who seek supports for suicidal thoughts or behaviours were first seen by school-based services (Westers & Plener, 2019). These findings could also be attributable to the most extreme cases of children and adolescents being selected for assessment in a school setting, resulting in a selection bias and numbers comparable to hospital settings.

Secondly, these findings suggest that children and adolescents may be visiting hospitals for nonurgent problems as a method of obtaining resources, due to the layout of our existing mental health care system and the delayed access to appropriate services (Edelsohn et al., 2003; Sunderji et al., 2015). Given that our emergency department physicians have reported a lack of time and standardized screening measures to be effective in identifying children at greatest risk (Westers & Plener, 2019), a common integrated system is needed to provide the information required to assess acuity. It is important to note however, in the current study, the use of the ChYMH-S was not exclusive to the emergency department. Several outpatient units located within the hospital that are typically working with less acute patients (i.e., children with sleep difficulties, anxiety for non-emergent cases, eating disorders) were also included in this study. Consequently, the acuity levels are not at emergent levels as would be expected in emergency departments. Additionally, emergency departments in Ontario may have been using the interRAI Emergency Screener for Psychiatry with Children and Youth (ESP-CY; Stewart et al., in pilot). This data was not have been included in the current study and minimizes the prevalence of emergency department data. The deidentified data used for the secondary analysis in this study, precludes the ability to determine what types of hospital programs contributed to the hospital data.

Implications for Practice

The findings from this study are important, as this information could scaffold collaborative models across different areas of Ontario’s child and adolescent mental health care system. Integrated mental health care, paired with evidence-based information and practices, would optimize timely access to appropriate services and aid in reducing wait-times at an acceptable cost (Kinchin et al., 2016). The results from this study provide information surrounding risk factors increasing the odds of requiring urgent
Mental health services. This information is useful for clinicians often tasked with creating character profiles used for decisions around prioritization of services and ordering assessments for children and adolescents already on wait-lists (Smith & Hadorn, 2002).

Mental health care practitioners in Ontario are eager to provide quality supports to children and adolescents who are in distress. In doing so, service efficacy needs to be established for the child and adolescent population given the limited resources available (Barwick et al., 2013). This is a complicated feat as services are unlikely to be coordinated and tailored to address the unique needs of presenting children and adolescents since publicly-funded child and adolescent mental health services do not have mechanisms in place mandating coordination or controlled access to services as do medical services (Schraeder & Reid, 2015; Liebenberg & Ungar, 2014). As a result, this exacerbates the wait-list issue that persists in Ontario.

The study’s findings also reinforce the emerging consensus that strong models in the school sector that integrate academic learning with mental health are needed (Pringle, et al., 2010), especially, considering a child’s and adolescent’s academic successes are strong indicators of overall well-being and achievements in adulthood (Atkins et al., 2017). Given the inability for many schools to secure adequate mental health coverage to address their students’ needs (People for Education, 2019), these findings only reinforce the need for strong links between schools and community agencies (Burns et al., 1995; Tegethoff et al., 2013). The focus of service sectors that provide mental health screening and treatment should extend to schools since school personnel are encountering children and adolescents with high acuity levels.

In an attempt to rectify the current state of our service system, adopting a standardized assessment system can foster the increased use of a common language, reduce duplication, foster improved transitions, and begin to facilitate the coordination of efforts across service sectors. Over the years, there has been an urge to adopt empirically-based, clinician informed cut-point measures for assessing children and adolescents to better manage wait-lists based on clinical urgency and priority thereby, introducing objectivity to clinical practice. Triaging decisions would be based on the tool’s psychometric properties in combination with clinician input and discretion, thereby providing a more objective triaging approach to service delivery (Smith & Hadorn, 2002;
It also introduces consistent practices across service sectors since children and adolescents would be prioritized in a similar fashion, providing the standardization required to build an integrated mental health care system (Duncan et al., 2018; Smith & Hadorn, 2002).

The interRAI ChYMH-S was designed to screen and assist with evidence-based triaging and prioritization to support clinical decision making across service sectors. The Child and Youth Mental Health Lead Agency Consortium (2019) recognized the utility of the interRAI tools due to their consistent language in identifying child and adolescent mental health needs, and the ability to be utilized in various service sectors across several professionals (e.g., social work, speech and language, psychologists, resource teachers). The interRAI ChYMH-S provides the ability to utilize standardized, high quality data from clinical profiles to assist with a variety of applications including determining access and distribution of limited resources while supporting decision-making around prioritization (Gardner et al., 2002; Stewart & Hirdes, 2015), as was illustrated by the current research study. A more coordinated effort amongst service sectors would address the fragmented nature of the current mental health care system.

5.2. Limitations

There are some limitations in this study that should be noted. First, the study design was cross-sectional. Although cross-sectional studies having numerous advantages, one of the major drawbacks of this experimental design is the inability to determine causality (Bangdiwala, 2019). As such, the study design does not provide information on the predictive mechanisms that eventually produce mental health service urgency. Second, adverse childhood events have a detrimental impact on overall mental health (Shaffer et al., 2018). Children and adolescents who have experienced any form of trauma are at greater risk of psychiatric and medical service utilization when compared to peers without a history of trauma (De Bellis, 2001). However, this study did not include trauma related variables as predictors of mental health service urgency. The omission of trauma as a risk factor for mental health service urgency was due to the fact that an abuse item (emotional abuse) already existed in the ChAMhPs algorithm. Given that emotional abuse is associated with sexual and physical abuse, much of the variance within the algorithm can be predicted by this construct; specifically, emotional abuse is present
when other forms of abuse occur. Consequently, this specific item accounted for a significant amount of the variance and represents multiple forms of trauma that is contained within the outcome variable.

Third, Kruskal-Wallis testing used to answer the second research question is limited by its simplistic nature and lacks the power that parametric methods have. Information regarding the estimation of effects could not be obtained with nonparametric methods (Nahm, 2016; Whitley & Ball, 2002). Fourth, some of the assessors within the LHINs were nurses providing services for mental health and addiction issues within schools. The deidentified data precluded the ability to obtain that level of detail and precision of study results; consequently, there may have been some school data within the LHINs. Finally, the generalizability of the study results is limited to children and adolescents in Ontario who are actively seeking services for mental health concerns. Therefore, findings of this research study are specific to the clinical child and adolescent mental health landscape in Ontario.

5.3. Future Directions

In an effort to improve the concordance statistic or $c$ value for the resultant model, future research should incorporate other potential risk factors for mental health service urgency. The current study had a resultant value of 72%. Although considered acceptable discrimination for the binary logistic regression model, excellent discrimination between observations of mental health service urgency should be between 80-90% (LaValley, 2008). In the same vein, this study only explored the predictive nature of seven independent variables on mental health service urgency. Many risk factors that would contribute to mental health service urgency were already accounted for within the ChAMhPs algorithm. This limits the ability to maximize the concordance statistic using alternative risk factors. Future researchers may consider investigating other variables such as substance use. Substance use (Leaf et al., 1996) has both been linked to socio-emotional development and subsequently, impacts the need for mental health services. Improving model fit by adding different risk factors to the model could provide a more comprehensive understanding of individual mental health profiles of children and adolescents seeking resources that require a higher need of urgent mental health services.
Lastly, future researchers may want to replicate these findings using community-based samples.

5.4. Conclusions

Research exploring characteristics driving mental health service need in Ontario for child and adolescent populations is complicated and, as a result, gaps in service access and delivery is evident. Using a very large sample, data from the current study has added to the limited, but existing body of literature on clinical profiles related to mental health service urgency and has delineated differences across service sectors on common mental health state indicators. Findings suggested that sex, age, legal guardianship, intellectual disability, comorbid health conditions, interpersonal conflict and school conflict are risk factors for exhibiting a high need for urgent and emergent mental health services as determined by the ChYMH-S. Furthermore, there were differences in mental health state indicators across service sectors; children and adolescents assessed in schools presented with higher acuity levels than anticipated. Findings from the study can inform collaborative efforts among mental health care professionals across various service sectors resulting in a concerted effort in improving the lives of children and adolescents requiring psychological resources and are being placed on burgeoning wait-lists.
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## Appendices

### Appendix A: Influential Outlier Calculations

<table>
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<th>Calculations</th>
<th>Result</th>
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<tr>
<td>Cook’s D</td>
<td>( \frac{4}{n} = \frac{4}{61,448} )</td>
<td>0.0000651</td>
</tr>
<tr>
<td>Leverage</td>
<td>( \frac{2p}{n} = \frac{(2)(8)}{61,448} )</td>
<td>0.0002604</td>
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<tr>
<td>DfFit</td>
<td>( 2 \sqrt{\frac{p}{n}} = 2 \sqrt{\frac{8}{61,448}} = )</td>
<td>0.00228203</td>
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<tr>
<td></td>
<td>( 2\sqrt{0.00013} = 2(0.01141) )</td>
<td></td>
</tr>
</tbody>
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*Note. n = sample size and p = number of model parameters*
Appendix B: Research Ethics Board Approval

Western Research

Date: 1 April 2020
Title: Secondary data analysis of information collected using interRAI instruments
Project ID: 106415
Study Title: Secondary data analysis of information collected using interRAI instruments
Application Type: Continuing Ethics Review (CER) Form
Review Type: Delegated
REB Meeting Date: 07/Apr/2020
Date Approval Issued: 01/Apr/2020
REB Approval Expiry Date: 31/Mar/2021

Dear: [Name]

The Western University Research Ethics Board has reviewed the application. This study, including all currently approved documents, has been re-approved until the expiry date noted above.

REB members involved in the research project do not participate in the review, discussion or decision.

Western University REB operates in compliance with, and is constituted in accordance with, the requirements of the TriCouncil Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The REB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00009040.

Please do not hesitate to contact us if you have any questions.

Sincerely,

[Name]

Research Ethics Coordinator, on behalf of: [Name]

SREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).
# Curriculum Vitae

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