children

MDPI

Article

HEADS-ED Under 6: Accuracy in Informing Pathways to Mental Health and Neurodevelopmental Health Care for Infants and Young Children

Scott Robson [1,*], Nicole Sheridan [1], Paula Cloutier [1,2] and Mario Cappelli [1,3]

[1] CHEO Research Institute, Ottawa, ON K1H 8L1, Canada; nsheridan@cheo.on.ca (N.S.); pcloutier@cheo.on.ca (P.C.); cappelli@cymha.ca (M.C.)
[2] Children's Hospital of Eastern Ontario (CHEO), Ottawa, ON K1H 8L1, Canada
[3] Knowledge Institute on Child and Youth Mental Health and Addictions, Ottawa, ON K1G 0Z1, Canada
* Correspondence: srobson@cheo.on.ca

Highlights

What are the main findings?

- In use at a pathway to mental health and neurodevelopmental health care for children under 6 through a regional coordinated access and service navigation program, The HEADS-ED Under 6 showed high sensitivity (0.95), specificity (0.90), and accuracy (0.91) in guiding referrals to services.
- In total, 93.0% of referrals were accepted by the referred-to agency.

What are the implications of the main findings?

- The HEADS-ED Under 6 can be used effectively by non-specialist healthcare workers to accurately guide referrals to specialized mental health and neurodevelopmental health care for infants and children under 6.
- The HEADS-ED Under 6 can be used in the context of a coordinated access and service navigation program to help match the client's acuity to a service, with a high rate of referral acceptance.

Abstract

Background/Objectives: To examine the effectiveness of the HEADS-ED Under 6 as a tool for determining the appropriate pathways to care for infants, toddlers, and children under 6. **Methods**: We used a retrospective cohort design to analyze client acuity and referrals at a centralized mental health and coordinated access program for infants, children, and youth (1Call1Click.ca). Specifically, we examined client acuity using HEADS-ED Under 6 total scores, accuracy of referrals, and the acceptance rate of referrals for clients at the agencies and hospital resources they were referred to. Clients aged 0–6 years who received referrals ($N = 1637$) between March 2023 and December 2025 were included in the analyses. **Results**: The HEADS-ED Under 6 showed high sensitivity (0.95), specificity (0.90), and accuracy (0.91) in guiding referrals to services. Client referrals were made with a high degree of acceptance, with 93.0% of referrals accepted by the referred-to agencies, community and hospital programs. **Conclusions**: The HEADS-ED Under 6 is a useful tool for assessing need in infants and children under 6 to accurately guide referrals to care resources.

Keywords: mental health; referrals; infant; youth

Check for updates

Academic Editor: Matteo Alessio Chiappedi

Received: 10 October 2026
Revised: 13 November 2026
Accepted: 15 November 2026
Published: 17 November 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

1. Introduction

It is estimated that between 13–27% of children under the age of 6 have mental health (MH) challenges [1,2]. While the measures of the prevalence of neurodevelopmental health (NDH) concerns vary enormously worldwide, estimates in North America suggest a prevalence of 15–20% [3]. The need for efficient pathways to care for infants and young children facing NDH and MH challenges is important for the administration of timely care, the evaluation of early identification methods, and the future outcomes of treatment [4].

Inappropriate or inaccurate referrals delay access to care and increase wasteful administrative burden. However, rates of referral rejection are infrequently reported [5,6]. In the United Kingdom, from 2015–2021, between 10–67% year-to-year of specialist MH referrals for children aged 2 to 4 were rejected by the referred-to care provider, and in Denmark, a referral rejection rate for youth mental health referrals of 25.3% has been reported [5,6]. At CHEO, a Children's Hospital in Ottawa, Canada, over 27% of referrals were denied between 2019–2022 across all specialized care clinics, many of which were duplicate referrals [7]. Mismatched referrals necessarily cause delays in accessing the correct care and wasted time for care providers who must review the referrals before rejecting them.

Screening tools are an important mechanism for determining which children to refer to more specialized care, improving the ability of non-specialist providers to identify concerns and also addressing equity concerns [8]. However, the most used screening tools for children under 6 are quite long and reliant on parent or teacher report [4,9]. A recent scoping review found only 3 brief, general screening tools designed for healthcare providers to use with infants and children aged 0–6, all of which had been developed over 35 years ago [10]. Systematic reviews and meta-analyses have found more variation in parent report measures of MH problems in preschool-aged children, varying from 5.2% to 35%, whereas the percentage identified by primary care or community practitioners was similar (17–18%) to that identified by standardized psychiatric diagnostic criteria (18.4%) [4]. However, the same research notes that there is little current evidence that the infants and children referred to specialist care are being accepted for specialist care, and urges the frequent use of standardized screening tools and monitoring or referral pathways to ensure timely access to appropriate MH care for young children.

Communimetric tools are intended to identify and communicate a client's areas of need and the corresponding level of action appropriate to those needs, focusing on the need to communicate a level of action [11]. The HEADS-ED Under 6 is a recently developed communimetric screening tool to help guide a healthcare provider through a brief psychosocial interview with the caregivers of an infant or child under age 6 [12,13]. It covers a range of domains relevant to the MH and NDH of infants under the age of 6, including Home and caregivers, Eating and sleeping, Activities and peers, Development, speech/motor/language, Safety, Emotions, behaviours, and Discharge or Current resources. The HEADS-ED Under 6 has shown very good to excellent utility validity in previous studies [13].

1Call1Click.ca is a coordinated access and service navigation program serving parts of Eastern Ontario, designed to connect infants, children, youth and families from birth to age 21 to MH, NDH, or substance use healthcare suited to their specific needs. When a child, youth or family has an intake with 1Call1Click.ca, they undergo a robust training protocol including a series of demographic questions, a discussion of client needs and goals, and screening tools. 1Call1Click.ca uses the CASH Bundle for screening, which includes the HEADS-ED Under 6 [14] as a part of its MH and NDH pathway for infants and children under the age of 6. While the screening tools in the CASH Bundle are valid and reliable, the accuracy with which they can be used to refer families to care has not yet been explored.

In this manuscript, we examine the HEADS-ED Under 6 in guiding the referral decisions of 1Call1Click.ca intake workers for infants and children before their sixth birthday. We examine how the clients match the level of acuity served by the referrals provided in the form of Sensitivity, Specificity, Negative Predictive Value, Positive Predictive Value, and overall Accuracy. We also provide analyses of Threshold Probability for the HEADS-ED Under 6 in relation to referrals provided, and the number of referrals rejected by the referred-to community agency of hospital service as a secondary measure of referral accuracy.

2. Materials and Methods

2.1. Participants and Study Inclusion Criteria

1Call1Click.ca serves an area of Eastern Ontario home to over 1.5 million people, including 5 counties and a large metropolitan area (Ottawa). Referral decisions for infants and children under 6 are made using several considerations, including HEADS-ED Under 6 outcomes, the needs and goals of the family, and considerations including geographic location and preferred language of service. To limit the extent to which these other considerations influenced referrals, we limited this study to clients who resided within the city of Ottawa at the time of their intake.

The clients and families ($N = 1637$) included in this study are those who resided in the city of Ottawa and completed an intake at 1Call1Click.ca between March 2023 and December 2025 regarding an infant, toddler, or child prior to their sixth birthday. For all clients under 6, an intake worker completes the HEADS-ED Under 6 during the visit. Clients are then referred to at least one MH or NDH service that best meets their needs. Referrals may include community- or hospital-based programs, an information resource, or a connection to a parent-specific support resource. Clients who were not assigned a Level of Need by the intake worker were excluded from the analyses related to Level of Need.

2.2. Study Design and Data Analysis

This study used a retrospective cohort design to examine how accurately total scores from the HEADS-ED Under 6 screening tool map onto referral outcomes at a regional coordinated access and service navigation program (1Call1Click.ca). Analyses were performed using Excel and JASP (version 0.98.1).

When a client, parent, or caregiver contacts 1Call1Click.ca regarding their infant or child, they complete an intake in which they are asked a variety of demographic questions, screened with the HEADS-ED Under 6, assigned a Level of Need (Figure 1), and connected directly to one or more MH or NDH service providers, parent/caregiver specific resources, or provided information specific to their needs. The information from the intake is shared with the agency, where it is reviewed in relation to the program's acceptance criteria and scope of service.

We examined referral outcomes by sorting the referrals into different categories based on the level of acuity of need the service provides treatment for. Specifically, services were labelled "Low Acuity Services" or "High Acuity Services". Services that offer treatment at both low and high acuity levels were placed in both categories. The determination of service level was made by making a list of all referral codes attached to intakes with a child under 6 or their family. Researchers sorted these referrals using the descriptions of these services on their websites, followed by consultation with the Clinical Manager at 1Call1Click.ca, prior to any analysis of how these related to clinical measures.

1Call1Click.ca may also provide waitlist support or information to callers or provide a referral to parent/caregiver-specific resources. These referrals are often provided in addition to a child-specific referral. For the purposes of our analyses, which were focused on the child-specific referrals, we count parent/caregiver specific referrals or information only/waitlist support calls when those are the only listed outcomes of an intake. As 1Call1Click.ca is a service designed to provide referrals to the service that best matches the needs of the child, analyses related to accuracy of referrals exclude those clients where the only listed outcome is a parent/caregiver specific referral or information only/waitlist support call because these outcomes are directed at the parent/caregiver, and 1Call1Click.ca currently does not complete a parent-specific measure as part of their intake process. The complete list of referred-to services, as well as how they were categorized, can be found in Appendix A.



Figure 1. Levels of Need as utilized at 1Call1Click.ca. Each Level of Need includes a description of the type of care required for clients at that level, along with recommendations for specific types of care.

To describe acuity of need, we split the client outcomes on the HEADS-ED Under 6 based on the HEADS-ED Under 6 total score. Clients with a total score of 5 or lower were classified as "Low Acuity", while clients with a total score of 6 or higher were categorized

as "High Acuity". This cutoff was informed by earlier findings with the HEADS-ED Under 6, in which a total score of 6 was found to support decision-making for moderate or higher needs with an Area Under Curve of 0.807 [13]. The intake workers administer the HEADS-ED Under 6 and know the client's total score, but do not divide clients by acuity in the way we describe for the analyses in this manuscript. Instead, the intake workers assign a Level of Need to clients to guide their service referrals, based on the Ontario Roadmap to Wellness [15]. There are five levels, ranging from General Population (lowest acuity) to Severe or Complex Needs (highest acuity). These Levels are assigned using all information from the intake, including client/family needs, goals, and current connections to care, in addition to the information from the HEADS-ED Under 6 interview. We examine the distribution of clients in the Low Acuity and High Acuity groups across these Level of Need designations. We also analyze whether these differ based on the ages of the clients (0 to 3 years, 4 to 5 years) using a chi-square test of homogeneity.

We examine the Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, and Threshold Probability of the HEADS-ED Under 6 for guiding referrals to Low or High Acuity services. For the purposes of this analysis, a client being matched to a service that matches their level of acuity as designated by the HEADS-ED Under 6 total score is counted as an accurate referral.

We also examined specific domains on the HEADS-ED Under 6, as elevated needs in a particular domain might signify a need for significant intervention even when the total score is below 6 [12,13]. These were analyzed using chi-square tests on each domain, comparing the High Acuity to the Low Acuity group using a Bonferroni-corrected threshold of $p = 0.007$ to account for the 7 comparisons. Standardized Pearson Residuals of $+/-1$ were used as indicators of significance across cells. Because this was not an analysis related to accuracy of referrals, this analysis includes all Under 6 clients who met inclusion criteria.

Additionally, we examined the outcomes of the referrals in relation to the number of referrals that were rejected by the target agency. These include rejections for any reason, including but not limited to the child's level of acuity in relation to the service offered; specific reasons for rejection were not collected. A referral that is accepted by the referred-to agency or hospital service is counted as an accurate referral in these analyses because 1Call1Click.ca is a service that provides referrals, not diagnoses or clinical care. If the referrals are accepted as appropriate by the referred-to agencies, that is more relevant to the service, and the tools used for decision making there, than any outcomes of the treatments provided at the referred-to agencies which occur after the work of 1Call1Click.ca is complete. We additionally use the data from this analysis to examine Threshold Probability, which we examine by looking at the referrals to Low and High Acuity services for only clients who receive a total score of 5 or 6 (on either side of the screener threshold) on the HEADS-ED Under 6. We use whether the referrals to High Acuity services are accepted by the referred-to agency for these threshold cases to examine whether a different threshold might have been a more accurate dividing point.

3. Results

3.1. Demographics

During the study period, 2468 infants, toddlers, and children had an intake at 1Call1Click.ca prior to their sixth birthday. Of these, 1637 (66.3%) were residing in the Ottawa area at the time of their intake and were included in the study. Of the 1637 clients and families that received referrals, 31.7% ($n = 519$) reported female sex at birth. Most clients (58%, $n = 955$) were aged 4 ($n = 485$) and 5 ($n = 470$). Fewer than half of clients self-reported as having a White (43%, $n = 704$) racial background, with the second and third most frequently reported backgrounds being Black (12.7%, $n = 208$) and Multiracial

(multiple racial backgrounds; 10.6%, $n = 174$). See Table 1 for a complete breakdown of the demographics of the clientele.

Table 1. Demographic characteristics of the client population.

Demographic Variable	Client Grouping	Number of Clients	Percentage of Clients
Client Age (Years)	1	50	3.1%
	2	220	13.4%
	3	412	25.2%
	4	485	29.6%
	5	470	28.7%
	Total	1637	
Racial Background	Arab	94	5.7%
	Black	208	12.7%
	Chinese	15	0.9%
	Filipino	15	0.9%
	Indigenous	36	2.2%
	Latin American	22	1.3%
	South Asian	88	5.4%
	Southeast Asian	21	1.3%
	West Asian	37	2.3%
	White	704	43.0%
	Other	48	2.9%
	Multiracial	174	10.6%
	White/Black	*42*	*2.6%*
	White/Indigenous	*24*	*1.5%*
	White/Latin American	*18*	*1.1%*
	White/South Asian	*14*	*0.9%*
	Multiracial grouping with <10 clients	*76*	*4.6%*
	No Data/ Client prefers not to answer	175	10.7%
	Total	1637	
Client Sex at Birth	Female	519	31.7%
	Male	1066	65.1%
	No Data	52	3.2%
	Total	1637	

3.2. HEADS-ED Under 6 Domains

Clients in the High Acuity group (HEADS-ED Under 6 total score of 6 or higher) were significantly more likely to have elevated scores of one or two in every domain relative to the Low Acuity group, except for Development and Discharge, Current Resources (Figure 2). For each of these domains, the High Acuity Clients were significantly more likely to have a rating of 2, and significantly less likely to have a score of 0 or 1.

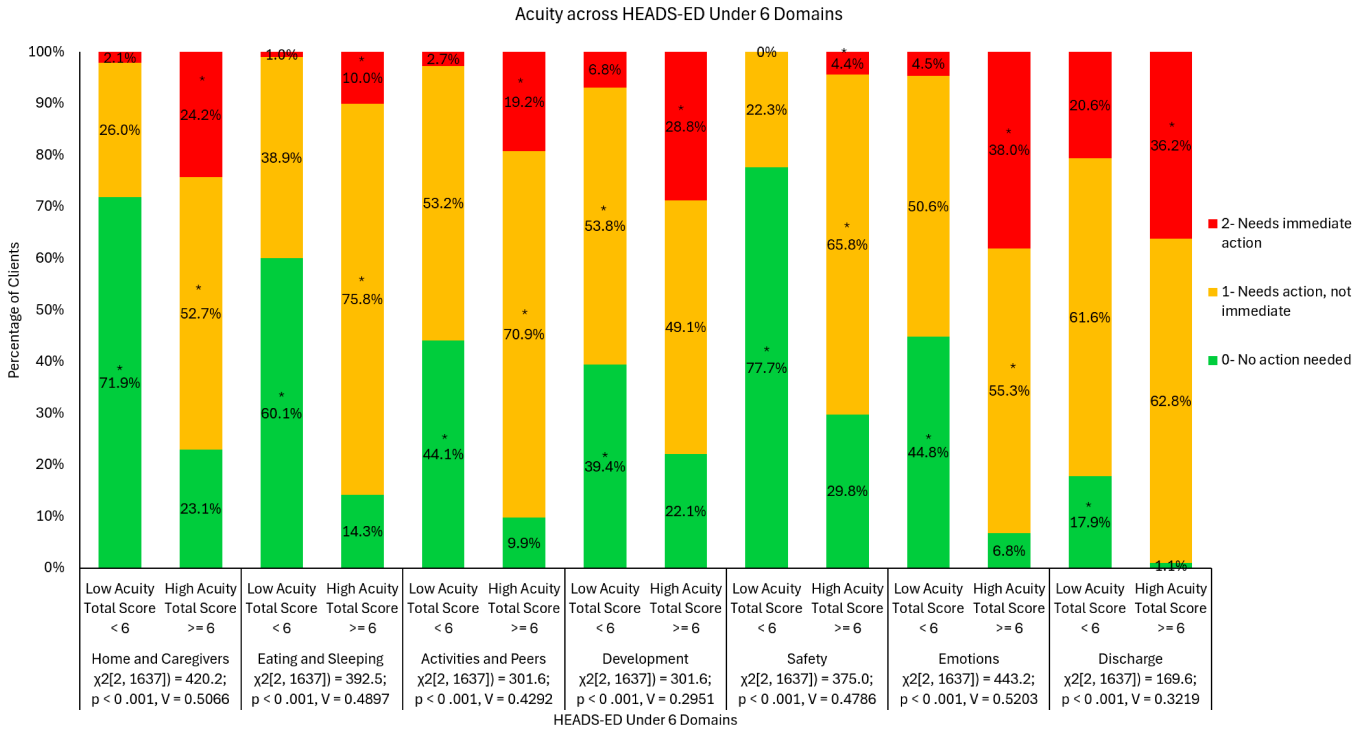


Figure 2. The distribution of scores across domains of the HEADS-ED Under 6, for both the Low Acuity and High Acuity groups. A score that is significantly more frequent in one of the Acuity groups is marked with an *.

3.3. Level of Need & Service Allocation

No clients in the Under 6 dataset were assigned a Level of "Severe or Complex Needs", so the highest in this group is "Moderate to Severe Needs". Thirteen Clients were not assigned a Level of Need by the intake worker (6 Low Acuity, 7 High Acuity) and were not included in this analysis. Chi-square test of independence ($\chi^2[3, 1624]) = 483.2$; $p < 0.001$, Cramer's V = 0.55) indicated that there was a significant relationship with a large effect between the binary split on HEADS-ED Under 6 total and the assigned Level of Need (Figure 3). Using Standardized Pearson Residuals greater than +/−1, clients with total scores below six were significantly more likely to be assigned the lowest levels of need (General Population and Low Need), and significantly more likely to be assigned to the higher levels (Moderate Need, Moderate to Severe Need).

Of the 1637 clients from Ottawa who had an intake during the study period, 40.3% of those ($n = 659$) were referred to a community- or hospital-based MH or NDH resource. The remainder were already connected to an appropriate MH resource and were either connected to an additional parent support resource only (40.7%, $n = 667$) or were provided with information or waitlist support (19.0%, $n = 311$). For clients who received a referral, the average intake call lasted 51 min.

Looking only at those clients referred to MH services, 192/659 (29.1%) had HEADS-ED Under 6 total scores of 5 or lower and were rated as "Low Acuity" for the purpose of our analyses, whereas the remaining 70.9% (467/659) had total scores of 6 or higher and were rated "High Acuity" (See Table 2 for complete breakdown of service allocation and client acuity level).

Examination of the sensitivity and specificity of sorting clients to services on the basis of the HEADS-ED Under 6 total score can be found below in Table 3, demonstrating overall high Specificity, Sensitivity, and overall Accuracy.

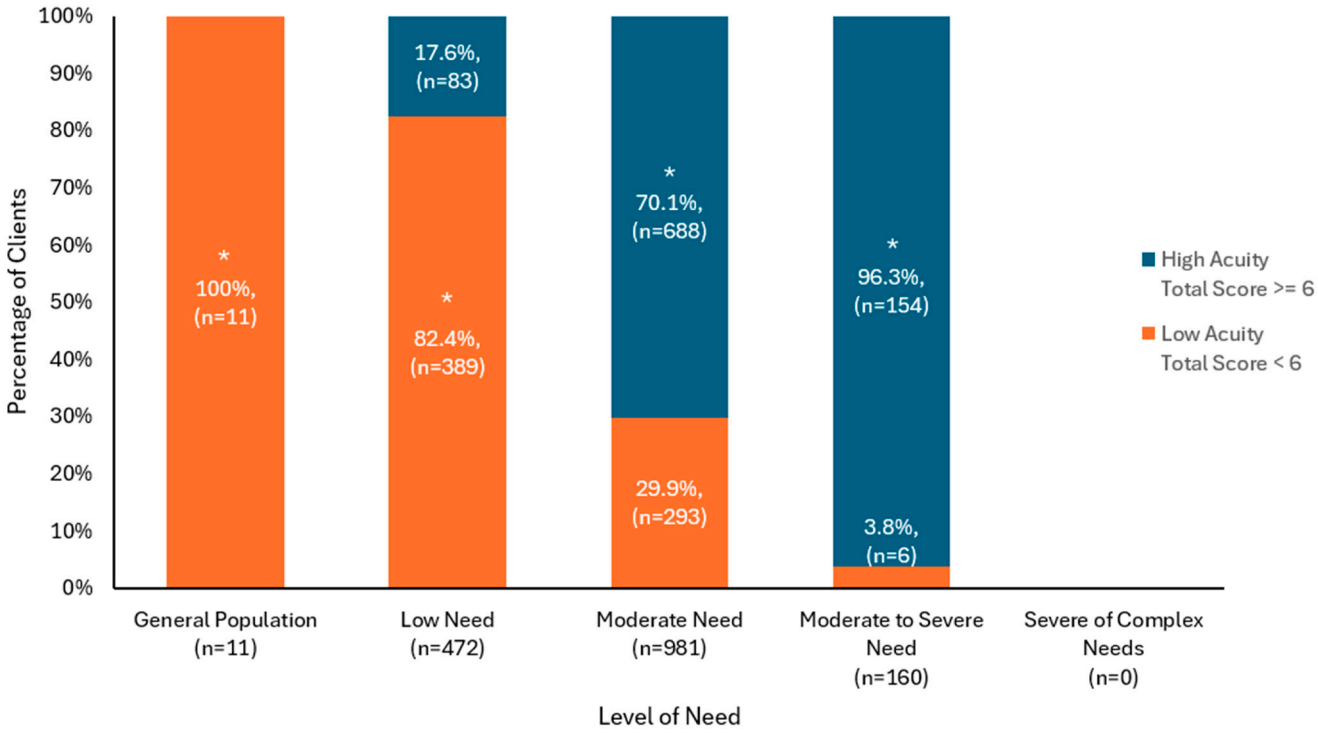


Figure 3. The distribution of clients who were assigned each Level of Need by the Intake Workers, split by whether their HEADS-ED Under 6 Total Score was 5 or fewer or 6 and up. Groups present in significantly higher proportions (Pearson residuals greater than +/−1) are denoted with *.

Table 2. The referral outcomes following intake. Clients are sorted by their Acuity level as determined by their HEADS-ED Under 6 total score, whereas referrals are sorted by the acuity of service they provide, or if they are targeted at parents/caregivers. Info Only/Waitlist Support is for calls where the infant, child, and family either are only requesting information, not a referral, or are already on the waitlist for the appropriate service(s) but are requesting additional information or support during that wait.

HEADS-ED Under 6 Total	Referral Outcome Following Intake				Total
	Low Acuity Service	High Acuity Service	Parent Support Only	Info Only/Waitlist Support	
Low Acuity (Total < 6)	8.7% ($n = 142$)	3.1% ($n = 50$)	19.9% ($n = 326$)	11.4% ($n = 187$)	705
High Acuity (Total ≥ 6)	0.5% ($n = 8$)	28.0% ($n = 459$)	20.8% ($n = 341$)	7.6% ($n = 124$)	932
Total	150	509	667	311	1637

Table 3. Description of the Sensitivity, Specificity, Negative Predictive Value, and Accuracy of the HEADS-ED Total Score in the referral process for clients referred to an infant/child-specific service.

	Formula	Values	Outcome
Sensitivity	(LA to LA Service) / ((LA to LA Service) + (HA to LA Service))	142 / (142 + 8)	0.95 (95% CI: 0.90–0.97)
Specificity	(HA to HA Service) / ((LA to HA Service) + (HA to HA Service))	459 / (50 + 459)	0.90 (95% CI: 0.87–0.92)

Table 3. *Cont.*

	Formula	Values	Outcome
Positive Predictive Value	(LA to LA Service)	142	0.74 (95% CI: 0.67–0.80)
	((LA to LA Service) + (LA to HA Service))	(142 + 50)	
Negative Predictive Value	(HA to HA Service)	459	0.98 (95% CI: 0.97–0.99)
	((HA to LA Service) + (HA to HA Service))	(8 + 459)	
Accuracy	((LA to LA Service) + (HA to HA Service))	(142 + 459)	0.91 (95% CI: 0.89–0.93)
	(All Referred Clients)	(142 + 459 + 8+50)	

3.4. Functional Accuracy of Referrals

Some referrals made by the intake workers were not accepted by the referred-to resources. This can happen for a variety of reasons, including but not limited to a mismatch between client acuity and the scope of service at an MH resource. Overall, 93.0% of referrals (613/659, 95% CI: 0.91–0.95) were accepted by the referred-to agency, with the specific breakdown in Table 4 below. If we assume that all those sent to a service not matching their acuity would have been incorrectly referred, 84.8% of clients would have been referred correctly using only a HEADS-ED Under 6 total score to denote acuity (Low Acuity to Low Acuity Service, High Acuity to High Acuity Service).

Table 4. Number of referrals at each level of acuity and service that were accepted by the referred-to agency for service.

	Low Acuity Services	High Acuity Services
Low Acuity (Total < 6)	89.4% (127/142) 95% CI: 0.83–0.93	98.0% (49/50) 95% CI: 0.90–1.00
High Acuity (Total ≥ 6)	62.5% (5/8) 95% CI: 0.31–0.86	94.1% (432/459) 95% CI: 0.91–0.96

3.5. Threshold Probability

Threshold Probability is the probability that a client at the threshold score on a measure with an ordinal screening tool is assigned the correct outcome [16]. Threshold Probability is a useful measure to consider when discussing screening tools with ordinal scores, where those screened could fall at the threshold or directly below it. In our method, there are two ways we could calculate Threshold Probability: the probability that a client with a threshold score (total score of 6 in this case) is referred to a High Acuity Service, or the probability that a client with a score of 6 is accepted to the High Acuity Service they were referred to. If we examine only clients whose scores on the HEADS-ED Under 6 were at the cutoff point of 6, 99.1% (113/114) were referred to High Acuity Services, and 92.9% (105/113) of referrals to High Acuity Services were accepted (Figure 4). If the threshold for High Acuity had been a total score of 5, the Threshold Accuracy would drop to 30.2% (26/86), as 26 referrals to High Acuity Services were made to clients at a total score of 5 and accepted by the referred-to agency.

If we look at the overall accuracy of referrals considering only clients whose scores were at the threshold (6) or one point below (5), we see referrals accepted in 91.5% (183/200) cases, only 1.5% lower than the overall referral accuracy of 93% when all scores are considered.

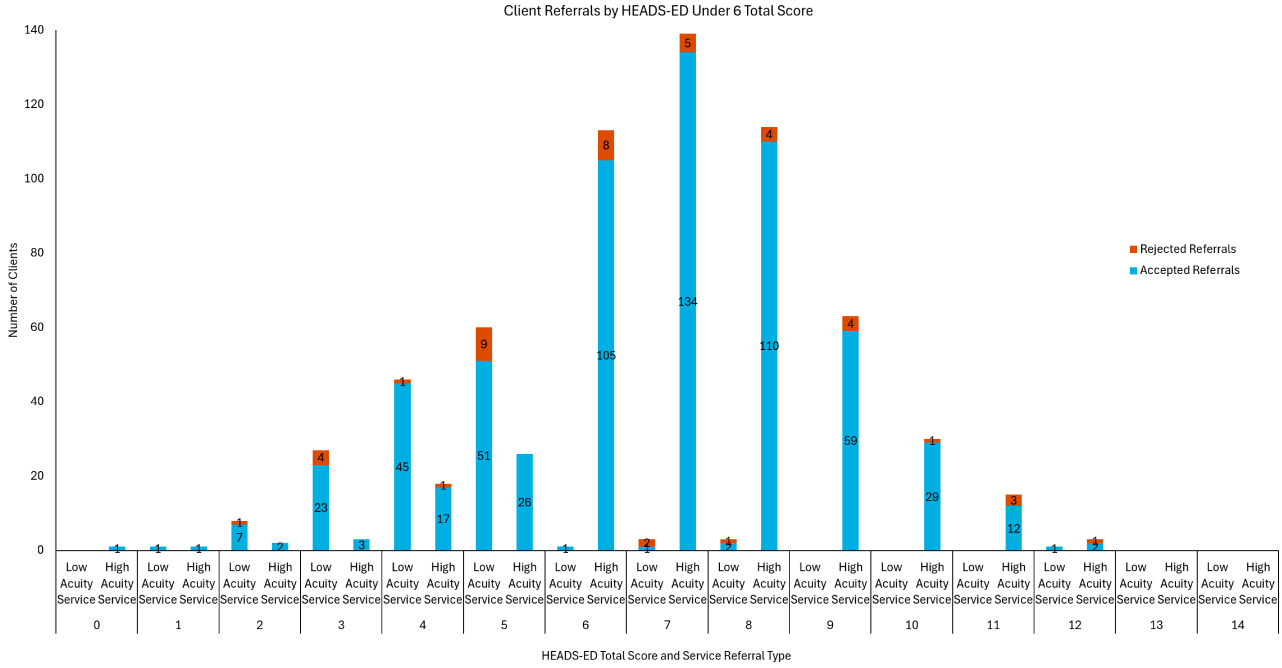


Figure 4. The referrals provided to both Low Acuity Services and High Acuity Services at every HEADS-ED Under 6 total score, along with the number of accepted and rejected referrals to those services for clients at each.

3.6. Age

A chi-square test of homogeneity found no significant difference ($\chi^2[3, 659]) = 1.420$; $p = 0.7$, Cramer's V = 0.05) between the distribution of clients aged 3 or younger ($n = 244$) and clients aged 4 and 5 ($n = 415$) who were referred to child-focused services characterized as Low Acuity or High Acuity Services.

4. Discussion

This work suggests that coordinated access and service navigation programs can support accurate referrals to MH services for infants and children under the age of 6. Additionally, this work indicates that the HEADS-ED Under 6 total score works well as a mechanism for identifying client acuity for the purposes of service allocation. The HEADS-ED Under 6 is the primary tool used to determine acuity of need for clients under 6 at 1Call1Click.ca.

The process used at 1Call1Click.ca indicates very strong sensitivity, specificity, negative predictive value, and accuracy in guiding referrals to services. The positive predictive value of 0.74 indicates that there is a trend towards assigning lower acuity clients to higher acuity services. The high Threshold Probability using the HEADS-ED Under 6 total score of 6 as an indicator of High Acuity is similar to what has been observed in other studies of the tool [13]. The similarity in referral accuracy when only children scoring at or directly below the threshold supports this as well.

The accuracy of referrals to specialized care for infants and children under 6 has been pointed to as an important question, one best examined through the use of pathways to care [4]. Rates of acceptance of referrals are infrequently reported [5,6]. In cases

where referral accuracy has been reported specifically for children under 6, it has been extremely variable, with annual rejection rates fluctuating from 10% to 67% [5]. The comparatively low referral rejection (7%) through this pathway for infants and children under 6 at 1Call1Click.ca indicates that the HEADS-ED Under 6 is working well to guide referrals.

The intake workers at 1Call1Click.ca are healthcare workers but are not physicians or psychologists. That non-specialist healthcare workers can use the HEADS-ED Under 6 as the primary tool to guide referrals to specialized care in under an hour, with an acceptance rate of 93%, points to this pathway to care as both efficient and effective. The existence of a referral pathway such as this has the potential to save both time and resources, though in ways that are not straightforwardly measurable. The time spent waiting by clients and families for the outcome of a rejected referral and the time spent getting a new one. The administrative burden of both making referrals and of receiving and reviewing referrals that cannot be accepted by the referred-to resource.

Limitations

This work is limited in the sense that the categories discussed, Low Acuity Services and High Acuity Services, are not universally defined. We attempted to overcome this by defining services using the way agencies described their own service population, where possible, along with assessment from the clinical director at 1Call1Click.ca. Additionally, by measuring whether the referrals were accepted by the target agencies, we provide a functional, if not clearly definable, measure of acuity agreement between the HEADS-ED Under 6, the Intake Workers at 1Call1Click.ca, and the agency staff.

It is important to note, as well, that when we discuss referral rejection, it includes referral rejection for any reason, as the specific reasons are not recorded; as referrals are made using considerations beyond clinical measures (location, language, needs and goals, current connections to care), there may be reasons for rejection that are not related to acuity. The referred-to agencies were categorized prior to analysis by someone with deep familiarity with the local landscape of MH and NDH resources, though without the use of a rubric, which could lead to classification biases. While our study sample is large, the results reflect a single urban area. Future studies of how the HEADS-ED Under 6 performs in other regions would be informative to the generalizability of the current findings.

A large proportion of clients (59.7% overall) were referred only to parent support resources or only provided with information or waitlist support during their calls. It was disclosed that these call outcomes occur in cases where clients are either already connected to the appropriate service for their needs (or on the wait list for that service), for cases where a child was connected but their parent/caregiver could be offered additional support resources, or where the purpose of the call was information gathering. However, our dataset included no means by which to assess whether this was so in all cases.

The sample is skewed heavily towards male clients (65.1%), which limits the interpretability of the results. At 1Call1Click.ca, there is a relationship between age and gender, wherein clients under 10 years are more frequently male-identifying, whereas clients over 10 are more frequently female-identifying. This is in line with other studies examining the age of onset for mental health challenges related to gender, wherein boys are more likely to have their challenges identified early in life while girls are more likely to present in adolescence [17–19].

Author Contributions: Conceptualization, S.R., N.S., P.C., M.C.; methodology, S.R., N.S., M.C.; validation, S.R.; formal analysis, S.R.; investigation, S.R., N.S.; data curation, SR.; writing—original draft preparation, S.R.; writing—review and editing, S.R., N.S., P.C., M.C.; visualization, S.R.; supervision, M.C.; project administration, S.R.; funding acquisition, M.C. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by an operating grant from the Canadian Institutes of Health Research (UIP-179233).

Institutional Review Board Statement: This study was approved as Quality Improvement by the CHEO Research Ethics Board (#22/27X).

Informed Consent Statement: Individual consent was not collected for this work; this work was classified as Quality Improvement by the CHEO REB, which waives the requirement for individual consent on Quality Improvement work.

Data Availability Statement: The dataset includes potentially identifying personal health data and will not be made available for public access.

Acknowledgments: The authors thank Cindy Dawson for her input on the level of service acuity provided by the referred-to agencies.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

MH Mental Health
NDH Neurodevelopmental Health

Appendix A

Below is a list of the connected agencies to which children under the age of 6 were referred, or to which their parents or caregivers were referred, or the referral codes attached to those meetings indicating that the parents or caregivers were provided with information resources or waitlist support.

Referral	Description	Level of Acuity Served
Mental Health And Additions Nurse (MHAN) South East MHAN Britannia Woods Community Services Family Services Ottawa Jewish Family Services of Ottawa Orleans Cumberland Resource Centre Vanier Community Services Centre Wabano Centre For Aboriginal Health Western Ottawa Community Resource Centre	Community partner agencies with programs serving clients with low acuity needs	Low Acuity
Crossroads Children's Health Centre Le Cap Other Mental Health/NDH/Addiction Services Partner	Community Agencies that serve infants and children with either low or high acuity needs	Low and High Acuity
NDH School Support NDH Social ABCs Cheo Access Team	Referrals to Hospital-based programs serving children with both low and high acuity needs	
1Call1Click.ca Care Coordination	Referral to Care Coordination	High Acuity
Centralized Mental Health and Neurodevelopmental Health Intake (Including 1Call1Click.ca) Centralized Mental Health Intake Cheo NDH Caregiver NVCI Training	Hospital-based programs specifically for infants and children with High Acuity MH and NDH challenges	High Acuity

Referral	Description	Level of Acuity Served
Coordinated Access CTC Infant And Child Development DTC Day Treatment ENS Support Extensive Needs Services NDH CTC Children's Behavior Services NDH Wrap ENS Clinic Wrap Urgent Response Services	Hospital-based programs specifically for infants and children with High Acuity MH and NDH challenges	High Acuity
Autism Program: Post-Diagnostic Service CTC Social Work NDH Supporting Your Journey Call Provided PLEO	Support phone lines for parents and guardians of children & youth going through mental health challenges	Parent Support Resource
No Referral-Provided Support and No Additional Services Required No Referral-Provided Support While On Waitlist No Referral-Provided Support/Information and No Additional Services Required	Referral codes on intakes in which the primary outcome was either support of the provision of informational resources	Info Only/Waitlist Support

References

1. Dougherty, L.R.; Leppert, K.A.; Merwin, S.M.; Smith, V.C.; Bufferd, S.J.; Kushner, M.R. Advances and directions in preschool mental health research. *Child Dev. Perspect.* **2015**, *9*, 14–19. [CrossRef]
2. Skovgaard, A.M.; Houmann, T.; Christiansen, E.; Landorph, S.; Jørgensen, T.; CCC 2000 Study Team; Olsen, E.M.; Heering, K.; Kaas-Nielsen, S.; Samberg, V.; et al. The prevalence of mental health problems in children 1½ years of age—The Copenhagen Child Cohort 2000. *J. Child Psychol. Psychiatry* **2007**, *48*, 62–70. [CrossRef]
3. Francés, L.; Quintero, J.; Fernández, A.; Ruiz, A.; Caules, J.; Fillon, G.; Hervás, A.; Soler, C.V. Current state of knowledge on the prevalence of neurodevelopmental disorders in childhood according to the DSM-5: A systematic review in accordance with the PRISMA criteria. *Child Adolesc. Psychiatry Ment. Health* **2022**, *16*, 27. [CrossRef]
4. Charach, A.; Mohammadzadeh, F.; Belanger, S.A.; Easson, A.; Lipman, E.L.; McLennan, J.D.; Parkin, P.; Szatmari, P. Identification of preschool children with mental health problems in primary care: Systematic review and meta-analysis. *J. Can. Acad. Child Adolesc. Psychiatry* **2020**, *29*, 76.
5. Ball, W.P.; Black, C.; Gordon, S.; Ostrovska, B.; Paranjothy, S.; Rasalam, A.; Ritchie, D.; Rowlands, H.; Rzewuska, M.; Thompson, E.; et al. Inequalities in children's mental health care: Analysis of routinely collected data on prescribing and referrals to secondary care. *BMC Psychiatry* **2023**, *23*, 22. [CrossRef]
6. Hansen, A.S.; Christoffersen, C.H.; Telléus, G.K.; Lauritsen, M.B. Referral patterns to outpatient child and adolescent mental health services and factors associated with referrals being rejected: A cross-sectional observational study. *BMC Health Serv. Res.* **2021**, *21*, 1–12. [CrossRef]
7. O'Dwyer, B.; Macaulay, K.; Murray, J.; Jaana, M. Improving access to specialty pediatric care: Innovative referral and eConsult technology in a specialized acute care hospital. *Telemed. e-Health* **2024**, *30*, 1306–1316. [CrossRef]
8. Reilly, M.; Weitzman, C. Mental health screening and measurement in children and adolescents. *Pediatr. Clin. N. Am.* **2024**, *71*, 1013–1026. [CrossRef]
9. McLean, R.K.; Tully, L.A.; Brinley, S.K.; Carl, T.; Turnell, A.; Northam, J.C.; Dadds, M.R. Multi-informant universal mental health screening for preschool-aged children by parents and educators: A PRISMA systematic review. *Clin. Child Fam. Psychol. Rev.* **2025**, *28*, 1–21. [CrossRef]
10. Radomski, A.D.; Polihronis, C.; Cloutier, P.; Beaudin, K.; Cappelli, M. Brief multidimensional screening tools for young children's mental health and development for administration by primary care providers: A scoping review. *BMC Prim. Care* **2025**, *26*, 199. [CrossRef]
11. Lyons, J.S. *Communimetrics: A Communication Theory of Measurement in Human Service Settings*; Springer Science + Business Media: New York, NY, USA, 2009.
12. Polihronis, C.; Cloutier, P.; Kempe, L.; Schryer, J.; Cappelli, M. The HEADS-ED under 6: Piloting a new communimetric mental health and developmental screening and triage tool for young children. *Infant Ment. Health J.* **2024**, *45*, 557–568. [CrossRef]
13. Polihronis, C.; Cloutier, P.; Robson, S.; Beaudin, K.; Blackburn, J.; Dawson, C.; Cappelli, M. HEADS-ED Under 6: A clinician-administered mental health and developmental screening and triage tool. *Paediatr. Child Health* **2025**, *30*, 312–319. [CrossRef]

14. Robson, S.J.; Cloutier, P.F.; Polihronis, C.; Blackburn, J.; Dawson, C.; Cappelli, M. The CASH Bundle: A standardized screening assessment bundle for child and youth mental health, addictions, and substance use health implemented in a regional coordinated access and service navigation program: L'ensemble CASH: Outil normalisé de dépistage pour la santé mentale, les dépendances et la santé liée à l'utilisation de substances chez les enfants et les jeunes, mis en œuvre dans le cadre d'un programme régional coordonné d'accès et de navigation des services. *Can. J. Psychiatry* **2026**. [CrossRef]
15. Government of Ontario. *Roadmap to Wellness: A Plan to Build Ontario's Mental Health and Addictions System*; Government of Ontario: Toronto, ON, Canada, 2020. Available online: https://www.ontario.ca/page/roadmap-wellness-plan-build-ontarios-mental-health-and-addictions-system (accessed on 9 November 2026).
16. Sheldrick, R.C.; Benneyan, J.C.; Kiss, I.G.; Briggs-Gowan, M.J.; Copeland, W.; Carter, A.S. Thresholds and accuracy in screening tools for early detection of psychopathology. *J. Child Psychol. Psychiatry* **2015**, *56*, 936–948. [CrossRef]
17. Dalsgaard, S.; Thorsteinsson, E.; Trabjerg, B.B.; Schullehner, J.; Plana-Ripoll, O.; Brikell, I.; Wimberley, T.; Thygesen, M.; Madsen, K.B.; Timmerman, A.; et al. Incidence rates and cumulative incidences of the full spectrum of diagnosed mental disorders in childhood and adolescence. *JAMA Psychiatry* **2020**, *77*, 155–164. [CrossRef]
18. Scheiner, C.; Grashoff, J.; Kleindienst, N.; Buerger, A. Mental disorders at the beginning of adolescence: Prevalence estimates in a sample aged 11–14 years. *Public Health Pract.* **2022**, *4*, 100348. [CrossRef]
19. Van Droogenbroeck, F.; Spruyt, B.; Keppens, G. Gender differences in mental health problems among adolescents and the role of social support: Results from the Belgian health interview surveys 2008 and 2013. *BMC Psychiatry* **2018**, *18*, 6. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.