

## **The Early Intervention Program at Children’s Centre Thunder Bay: Evaluating Service Delivery and Treatment Effectiveness via the Child and Adolescent Needs and Strengths (CANS)**

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To date, the Early Intervention Program (EIP) for infants and children (ages 0 – 6 years) receiving mental health services at CCTB has yet to be evaluated. While understanding the impact and effectiveness of counseling services on clients and families is of paramount importance, young children comprise an inherently complex population with unique challenges for assessment, intervention, and associated evaluation of relevant programs. In addition to individual differences and wide variability in self-regulation, affect, and behavior, normative displays of emotion dysregulation and behavioral problems are often transient and diminish over time. The absence of mature language and verbal abilities adds further complexity in distinguishing between age-appropriate and clinically significant socio-emotional and behavior problems, as information is primarily relayed through reports of parents/caregivers.

Reliance on parent-report questionnaires, as is common practice with infant/young child populations, poses a number of challenges, and is of questionable reliability/validity given informant biases and discrepancies, lack of completion and/or timely return, as well as the use of symptom counts to assess problem severity. As assessment has traditionally been used to justify service receipt rather than to foster understanding and communication, there is often a divide between the processes of assessment and treatment, as reported by clinicians and families alike. In light of these challenges, the Child and Adolescent Needs and Strengths (CANS-Preschool version; Lyons, 2004) has been piloted by the Early Intervention Program at CCTB, with the aim of disseminating it to services and clients agency-wide.

### **Child and Adolescent Needs and Strengths (CANS)**

As a clinician administered and completed instrument, the CANS provides structured information about the child and family along a set of dimensions relevant to individual case planning, and the planning and evaluation of service delivery. Designed as an information integration tool, the CANS is a multi-purpose measure that was developed from a communication perspective to facilitate the linkage between the assessment process and the implementation of individualized client-and-family-centered care. As a communimetric tool, CANS items are agnostic as to etiology and therefore descriptive in nature, and were selected based on their direct implications for service and treatment planning, based on the strengths and needs of the child, caregiver(s), and family. While individual items of the CANS are rated by CANS-certified clinicians, the process of deriving this information from available records and client interviews is a collaborative, dyadic process that is integrated into and over the course of treatment. Ideally, a 30-day window is used for ratings to ensure assessments are relevant and an accurate depiction of individual client needs.

Different versions of the CANS are available for youth of all ages, with the option to add relevant modules targeting trauma, substance use, and developmental disabilities, as well as populations involved in child welfare, foster care, residential treatment, and/or juvenile justice systems. Due to its modular design based on communication theory, the CANS can be, and has been, adapted for local applications without jeopardizing psychometric properties. Items are therefore rated within the cultural and developmental context of the child and family after careful consideration

of the range of factors that may be influencing the expression of needs and strengths. Each item uses a 4-level rating system designed to translate directly into action levels, described in more detail below; different action levels exist to describe needs and strengths.

In summary, the CANS is a comprehensive tool with substantial functional utility across a range of domains that assists in the development of client-centered interventions tailored to the needs of the child/family. By using language that is accessible to families with questions targeting both strengths and needs, the CANS supports effective communication between parent/caregivers, clinicians, and service providers. Consistent collaboration with caregivers throughout the assessment and treatment process is integral for young child populations, and helps to foster therapeutic alliance, active participation, and knowledge translation of treatment targets to all parties involved.

Emphasis on identified strengths to address specified needs often facilitates therapeutic alliance and eases the process of treatment planning for caregivers and families. This is further evidenced by the sensitivity of the CANS to change measurement in outcomes and treatment progress without reliance on symptom counts or level of symptom severity.

### **Description of Action Levels for “Need” Items.**

Each item is rated on a four-point rating system from 0 to 3 that translates immediately into action levels based on the need(s) of the client and family. “Actionable items” requiring clinical intervention are defined as ratings of 2 or 3, while ratings of 0 or 1 do not require active intervention and may be reflective of a need for continued monitoring and/or prevention.

#### Action Levels for “Need” Items

- 0 = No reason to believe that a particular need exists based on the current assessment information.
- 1 = Need for monitoring, watchful waiting, or preventive activities.
- 2 = Action is required to address this identified need or risk behavior.**
- 3 = Immediate and/or intensive action is required.**

### **Description of Action Levels of “Strengths” Items.**

As with “need” items, items reflecting individual, caregiver, and familial strengths are rated on a four-point scale from 0 to 3. In this case, scoring is reversed such that ratings of 0 or 1 represent centerpiece and useful strengths respectively, while ratings of 2 reflect identified strengths that may require substantial efforts to develop, and ratings of 3 are reflective of domains in which strengths have yet to be identified.

#### Action Levels of “Strength” Items

- 0 = Centerpiece Strength.** This rating indicates a domain where strengths exist that can be used as a target for a strength-based plan (i.e., the strength-based plan can be organized around a specific strength in this area).
- 1 = Useful Strength.** This rating indicates a domain where strengths exist and can be included in a strength-based plan, but not as a centerpiece or sole focus of the plan.
- 2 = Identified Strength.** This rating indicates a domain where strengths have been identified but require significant strength building efforts before they can be effectively utilized in a strength-based plan.

3 = **No Strength Identified**. This rating indicates a domain in which efforts are needed in order to identify potential strengths for strength building efforts.

### Method and Analyses: CANS Preschool Version

CANS Preschool Version was piloted for use by Early Intervention Program at the CCTB.

- 104 clients/families had an initial CANS completed within the first 30-days of mental health service receipt (i.e., pre-service)
- 48 of these families had a complete, post-Tx CANS prior to termination of services (i.e., post-service) → Clients with pre/post CANS data included in present analyses.

Participants: Clients/families at CCTB with young children (14 female, 34 male) ranging in age from .05 to 6.13 years ( $M = 3.96$ ,  $SD = 1.504$ ).

- Service delivery data was integrated to provide information about client/family demographics (e.g., child gender, age at referral), and details of treatment (e.g., time on waitlist, reasons for treatment non-completion, use of secondary/specialized services).
- An initial objective comprised examination of data related to treatment dosage, length of service (direct/indirect hours); this was not feasible for purposes of present evaluation.

#### Sample with Pre/Post CANS data (N = 48)

SDMS Data	Minimum	Maximum	Mean	SD
Age at Referral (yrs)	.05	6.13	3.96	1.504
Waitlist (Days)	0	1144	263.91	266.93
Sessions Attended	14	636	91.23	117.13
Gender	<b>Males (n = 34) → 70.8%</b>		<b>Females (n = 14) → 29.2</b>	

#### Recoded into Binary Ratings: Clinical Vs. Non-Clinical

“Non-Actionable” or Non-clinical Ratings (0, 1 → 0)

“Actionable” or Clinical Ratings (2, 3 → 1)

CANS Domain	# Items Total	# Items dropped <sup>1</sup>
Life Domain Functioning	13	0
Child Behavioral/Emotional Needs	11	0
Regulatory Functioning	3	0
Risk Factors	9	5
Caregiver Needs	5	2
Caregiver Strengths & Needs	14	0
*Child Strengths (R)	7	0
(Acculturation)	Not included due to truncated range	

Note. \*Child Strengths: Reverse Scored.

<sup>1</sup>John Lyons advises dropping certain items in planned fashion from the domain(s), such as those that represent static risk factors not amenable to change.

→ **Lower CANS scores desirable**

Items Dropped Per Domain (i.e., not included in analyses):

### **Risk Factor Domain**

**Item 28.** Birth Weight

**Item 30.** Prenatal Care

**Item 31.** Labor/Delivery

**Item 33.** Parent/Sibling Problems → Measure of developmental and/or behavioral diagnoses child's parents/siblings may have

Rating of 3 = Child's parent(s) and/or sibling(s) have been diagnosed with a developmental disability, or child has multiple sibling experiencing developmental or behavioral problems

**Item 34.** Maternal Availability → Measure of caretaker emotional and physical availability to child in the weeks immediately following birth (until 12 weeks postpartum).

### **Caregiver Needs Domain**

**Item 37.** Physical → Measure of physical disabilities of child's caretaker

**Item 40:** Developmental → Measure of caretaker developmental disabilities

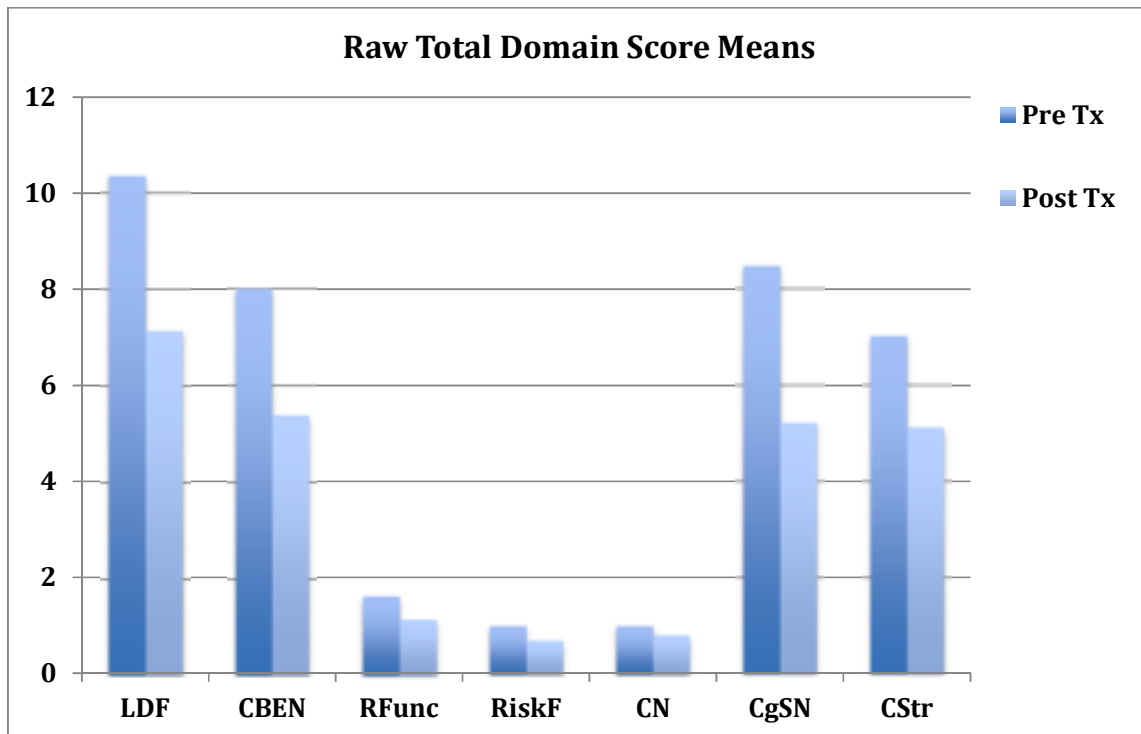
### **Acculturation Domain**

Not included due to truncated range pre and post service

#### **Raw Total Domain Scores - Pre (T1) and Post (T2)**

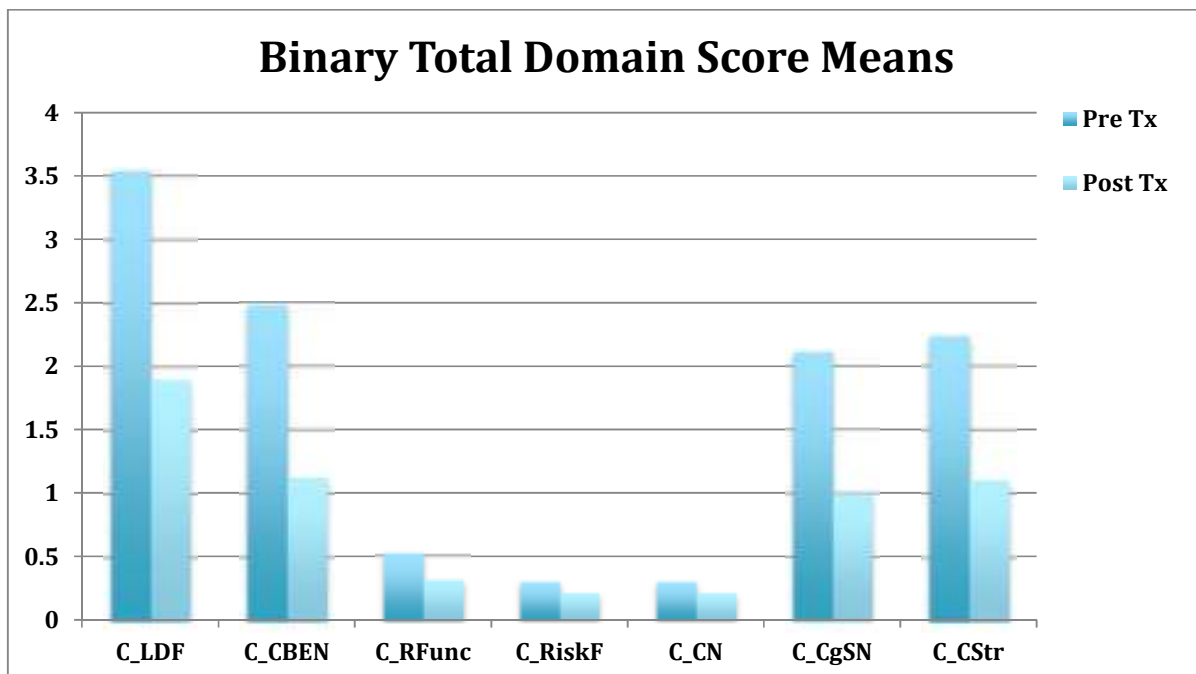
<b>Domain</b>	<b>Range</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
<b>LDFt1</b>	21.00	1.00	22.00	<b>10.362</b>	4.743
<b>LDFt2</b>	16.00	.00	16.00	<b>7.149</b>	3.995
<b>CBENt1</b>	19.00	.00	19.00	<b>8.006</b>	5.160
<b>CBENt2</b>	17.00	.00	17.00	<b>5.396</b>	4.433
<b>R.FuncT1</b>	5.00	.00	5.00	<b>1.596</b>	1.469
<b>R.FuncT2</b>	5.00	.00	5.00	<b>1.125</b>	1.315
<b>Risk.Ft1</b>	4.00	.00	4.00	<b>.979</b>	1.451
<b>Risk.Ft2</b>	5.00	.00	5.00	<b>.688</b>	1.188
<b>CNt1</b>	8.00	.00	8.00	<b>.979</b>	1.451
<b>CNt2</b>	6.00	.00	6.00	<b>.792</b>	1.220
<b>Cg.SNt1</b>	30.00	.00	30.00	<b>8.477</b>	7.009
<b>Cg.SNt2</b>	21.00	.00	21.00	<b>5.215</b>	5.676
<b>C.StrT1</b>	13.00	.00	13.00	<b>7.022</b>	3.461

C.StrT2      11.00      .00      11.00      5.125      3.043



**Binary (Clinical Vs. Non-Clinical) Total Domain Scores Pre (T1) /Post (T2)**

Domain	Range	Minimum	Maximum	Mean	SD
C_LDFt1	10.00	.00	10.00	3.542	2.202
C_LDFt2	6.00	.00	6.00	1.896	1.813
C_CBENt1	8.00	.00	8.00	2.479	2.397
C_CBENt2	8.00	.00	8.00	1.125	1.985
C_R.FuncT1	2.00	.00	2.00	.521	.684
C_R.FuncT2	2.00	.00	2.00	.313	.624
C_Risk.Ft1	2.00	.00	2.00	.292	.582
C_Risk.Ft2	2.00	.00	2.00	.208	.459
C_CNt1	3.00	.00	3.00	.292	.582
C_CNt2	3.00	.00	3.00	.208	.544
C_Cg.SNt1	13.00	.00	13.00	2.111	3.039
C_Cg.SNt2	7.00	.00	7.00	1.000	1.726
C_C.StrT1	6.00	.00	6.00	2.234	1.697
C_C.StrT2	4.00	.00	4.00	1.104	1.357



### Domain-Level Analyses:

#### Paired Samples T-Tests (Binary)

Domain	+Mean (Pre – Post)	SD	df	t
Life Domain Functioning	1.645	1.930	47	5.910**
Child Beh/Emotion Needs	1.354	2.168	47	4.327**
Regulatory Functioning	.208	.544	47	2.653*
Risk Factors	.083	.279	47	2.067*
Caregiver Needs	.083	.710	47	.814
Caregiver Strength & Needs	1.311	2.882	44	3.051*
Child Strengths (R)	1.106	1.478	46	5.132**

Note. \*\* $p < .001$ ; \* $p < .05$ .

+Mean Pre – Mean Post = Positive values → Improvement (right direction)

### Effect Size

Measures degree of change between pre and post-service means that can be used with smaller sample sizes.

**Cohen's  $d$**  = (Pre-Service Mean – Post-Service Mean) / SD Pre-Service Mean

- Small = 0.2
- Medium = 0.5

- Large = 0.8

Domain	Pre Mean	Post Mean	Effect Size
Life Domain Functioning	3.542	1.896	<b>0.75</b>
Child Behavioral/Emotional Needs	2.479	1.125	<b>0.56</b>
Regulatory Functioning	0.521	0.313	<b>0.30</b>
Risk Factors	0.292	0.208	0.14
Caregiver Needs	0.292	0.208	0.14
Caregiver Strengths & Needs	2.111	1.000	<b>0.37</b>
Child Strengths (R)	2.234	1.104	<b>0.67</b>

### Reliable Change Index (RCI):

A method of determining clinically significant and reliable change that is unlikely to be attributable to chance and/or measurement error alone; it is the magnitude of change over time, which can be considered “large enough” to reflect meaningful differences pre and post Tx.

- It is calculated by dividing the pre/post difference score by the standard error of measurement, which is multiplied by 1.96 to control for random or change score change.
- Calculation of the standard error also requires the internal consistency, or in this case, the test-retest reliability of the outcome measure (which for the CANS = .70).

**Pre-Service Mean Total** (collapsed across domains): **Pre Total**  $m = 11.409$ ,  $SD = 7.595$

$$\text{Pre Total Mean} = \sum \text{LDF}_1, \text{CBEN}_1, \text{RFunc}_1, \text{RiskF}_1, \text{CN}_1, \text{CgSN}_1, \text{CStr}_1$$

**Post-Service Mean** (collapsed across domains): **Post Total**  $m = 5.854$ ,  $SD = 6.250$

$$\text{Post Total Mean} = \sum \text{LDF}_2, \text{CBEN}_2, \text{RFunc}_2, \text{RiskF}_2, \text{CN}_2, \text{CgSN}_2, \text{CStr}_2$$

$$[(\text{Pre-Service Mean} - \text{Post-Service Mean}) / \text{St. Error of the Difference}] * 1.96 = \mathbf{1.85}$$

**Standard Error of the Difference:**  $S(\text{diff}) = \sqrt{2(Se)^2}$

$$\text{Where } Se = S_1 \sqrt{1-r_{xx}}$$

$Se$  = Standard Error

$S_1$  = SD pre-service

$r_{xx}$  = Internal consistency, or in this case, Test-Retest Reliability ( $\geq 0.70$ ).

# whose Total Mean decreased by **1.85** pre to post-service = **34**

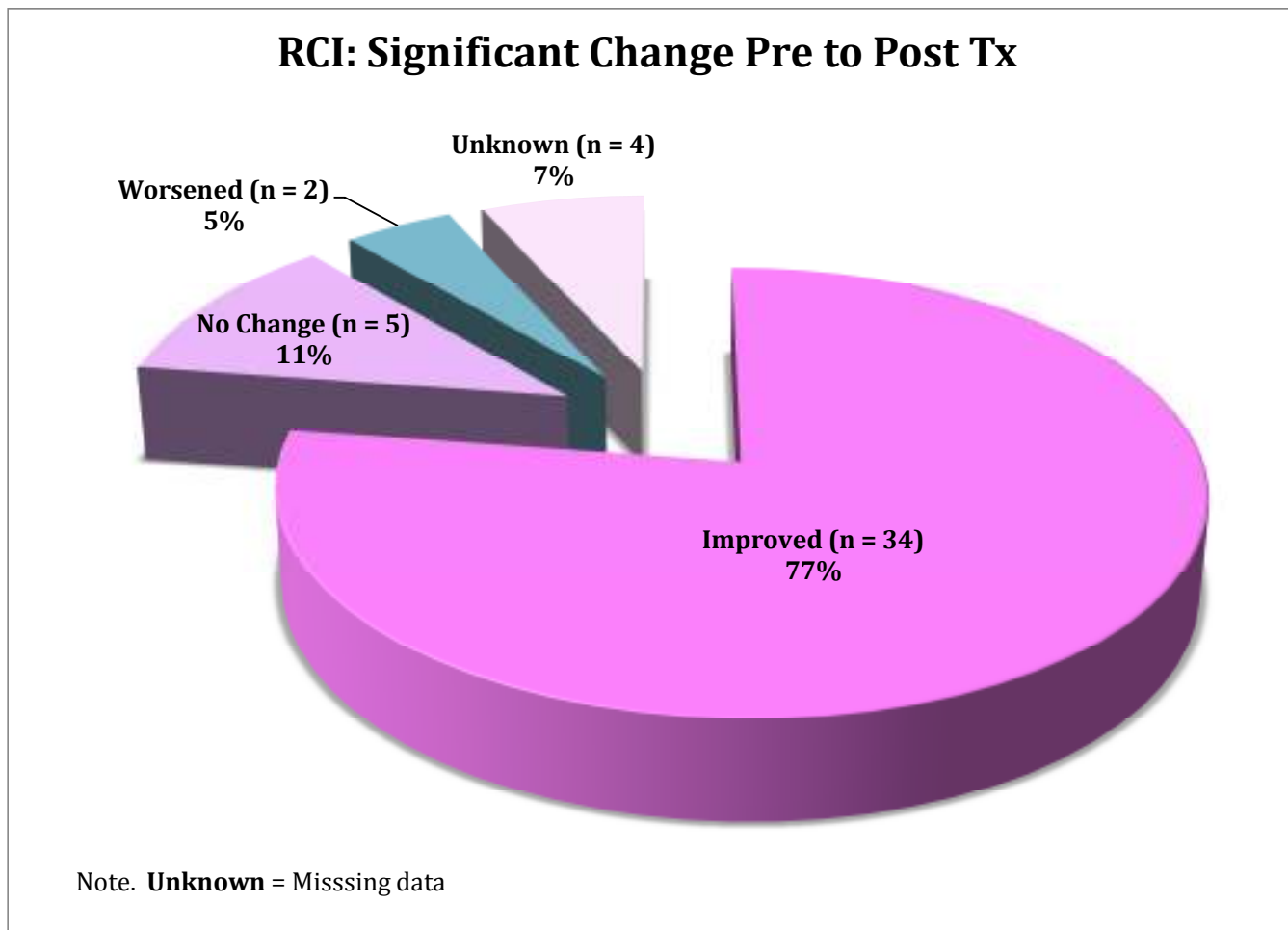
34 / 44 (total n) = 0.773 or **77.3%**

→ 77.3% improved significantly over course of Tx (i.e., showed reliable, positive change due to effects of Tx).

→ **11.4%** (n = 5) showed no change (i.e., difference between means pre to post Tx = 0)

→ **4.5%** (n = 2) worsened over course of Tx (i.e., difference between means pre to post Tx = -1 and -2, respectively)

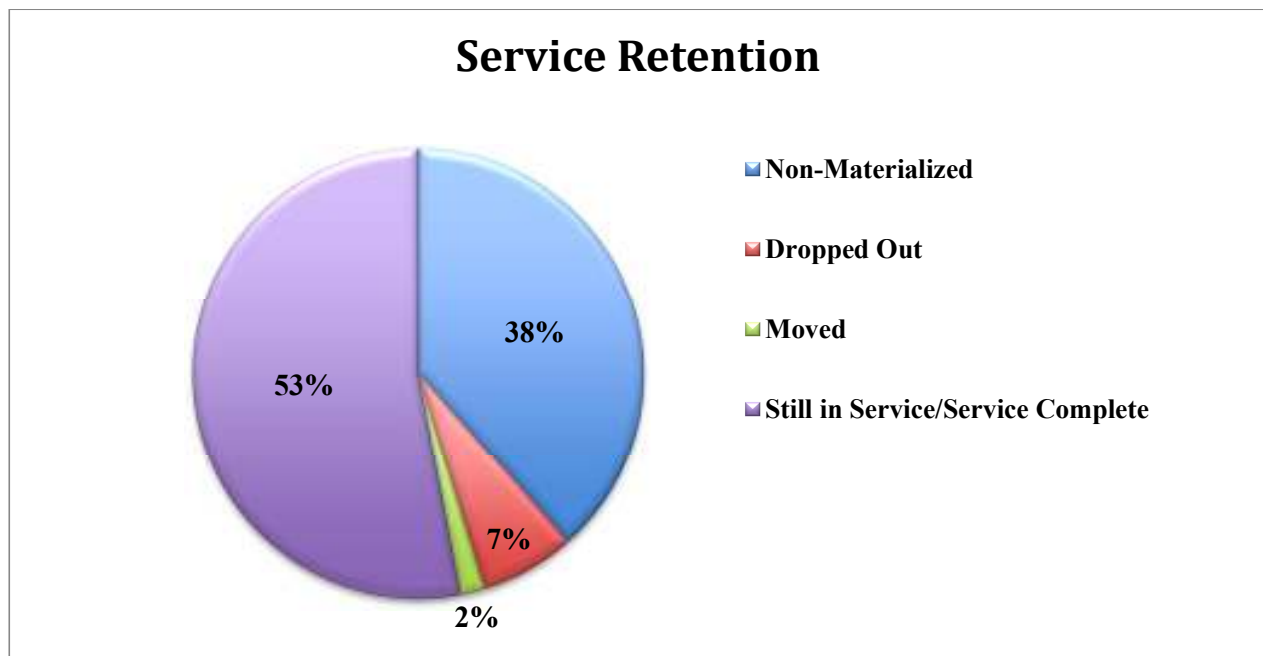
→ **6.8%** missing due to incomplete CANS, use of different CANS versions with differing items



**Graphical depiction of client retention/drop-out (below):**

- 38% of clients non-materialized (did not start service)
- Approximately 53% completed service or are still in service
- Once service began, only 7% dropout rate → Most clients leave before starting services; importantly, once service begins, dropout rate is markedly reduced
- The remaining 2% of clients have moved





### Limitations & Challenges

Missing data or N/A instead of zero (reliability? validity?) → Small *n* pre/post-Tx

Multiple CANS versions used with variable item overlap

Difficulty integrating with SDMS (service delivery data) to assess association with Tx dosage, # sessions attended/missed, reasons for closing, etc.

→ Current electronic CANS now integrated with SDMS

Paper-pencil questionnaires allowed for ratings (check marks) in-between discreet numbers (i.e., 1.5) → In these cases, rounded up to nearest whole number

### Future Directions

Examination of associations between CANS score(s) and SDMS data →

Tx dosage, Direct/Indirect client contacts, Sessions Attended, Sessions Missed, Time in Tx, Time on Waitlist, Reasons for Closing, Additional Services Accessed

Inclusion and examination of optional CANS modules (e.g., Trauma, Developmental, Medical, Cultural Awareness)

Compare trends / trajectories across multiple time points (30-windows)

Decrease non-materialization – Evaluate reasons for drop-out, reduce time on waitlist

Disseminate to partner agencies to facilitate inter-disciplinary communication based on individual child/family needs

Increased recognition of strength-based approaches and importance of fostering child/family strengths as Tx targets, rather than solely focusing on deficits and pathology