Evidence In-Sight:

EVIDENCE-BASED PRACTICES FOR CHILDREN AND YOUTH WITH ADHD

Date: March 2015
This report was researched and written to address the following question(s):

- **What does the literature say are the best evidence-informed practices and approaches for working with children and youth with ADHD and their families?**

We prepared the report given the contextual information provided in our first communications (see Overview of inquiry). We are available at any time to discuss potential next steps.

We appreciate your responding to a brief satisfaction survey that the Centre will e-mail to you within two weeks. We would also like to schedule a brief phone call to assess your satisfaction with the information provided in the report. Please let us know when you would be available to schedule a 15-minute phone conversation.

Thank you for contacting Evidence In-Sight. Please do not hesitate to follow up or contact us at evidenceinsight@cheo.on.ca or by phone at 613-737-2297.
1. Overview of inquiry

The requesting contact is interested in exploring empirical evidence on treatment practices and approaches when working with children and youth with Attention-Deficit/Hyperactivity Disorder (ADHD) and their families with the goal of understanding how best to build capacity at both clinical- and program-levels. This report was written to highlight current evidence-informed practices and approaches for working with children and youth with ADHD and their families.

2. Summary of findings

- Stimulant medication can be very beneficial in the treatment of ADHD, however there may be several limitations related to its use, including a lack of effectiveness in improving social and academic outcomes and a host of potential side-effects. As well, medication may not be effective (or only partially so) in about 20-30% of children. This highlights a need for effective, complementary psychosocial interventions.

- Because of mixed research findings, it is not clear whether cognitively-based interventions (e.g., clinical social skills training, computerized cognitive training, etc.) are recommended for children and youth with ADHD.

- Behavioural interventions appear to be supported by ample research. Likewise, cognitive interventions have shown to be effective when coupled with behaviour modification strategies.

- Behavioural parent training, behavioural classroom interventions, behavioural peer interventions and organization skills training are considered to be well-established treatments of ADHD, based on criteria set by the Society of Clinical Child and Adolescent Psychology (Division 53 of the American Psychological Association). According to these same criteria, neurofeedback is a potentially efficacious treatment; however, there may be concerns with regard to the quality of the current neurofeedback research. Academic interventions also appear promising, especially when coupled with behavioural classroom interventions.

- Combined psychosocial and pharmacological treatment appears to be a valuable option for children and youth with ADHD. Research highlights that when engaged in behavioural treatment, a child can benefit from low doses of medication just as much, if not more, than high doses of medication.

- There is little research on ADHD treatment for adolescents.

- In aiming to engage family members in ADHD treatment, designing ADHD treatment plans that are congruent with child, youth and family preferences is particularly important. Psychosocial treatments are generally better-accepted by parents than medication, although parents tend to adhere to medication use increasingly over time.

3. Answer search strategy

- Databases searched: EBSCO Host (Medline, PsycInfo, CINAHL, Psychology and Behavioral Sciences Collection), Google Scholar & The Cochrane Library.

- Search terms used: Attention Deficit Hyperactivity Disorder, ADHD, evidence-based treatment, program, families, family therapy, group therapy, individual therapy, behavior modification.

4. Findings

ADHD is one of the most commonly diagnosed mental health illnesses in children and youth (Pliszka & AACAP Work Group on Quality Issues, 2007). This neurobehavioural disorder is characterized by difficulties in sustaining attention and effort (i.e., inattention), and exhibiting behavioural inhibition (i.e., hyperactivity, impulsivity) in at least two or more settings (e.g., in the home, school and recreational settings).
ADHD treatment has been, and continues to be, a vastly researched area in child and youth mental health (Pliszka & AACAP Work Group on Quality Issues, 2007). As children and youth with ADHD are faced with difficulties in multiple settings, numerous treatment options have been studied to suit a range of needs. This report provides an overview of treatment approaches found in the literature for children and youth who have been diagnosed with ADHD.

4.1. Pharmacological treatment

There is substantial evidence on the effectiveness of pharmacological treatment of ADHD. In fact, research suggests that the benefits of medication in treating ADHD are greater than those observed for any other mental disorder (Daly, Creed, Xanthopoulos, & Brown, 2007; Greenhill, Pliszka & Dulcan, 2002). Much of this evidence is on stimulant medication, mainly methylphenidate (MPH; Ritalin), which is designed to increase levels of dopamine and/or noradrenaline in the central nervous system (Greenhill, Pliszka & Dulcan, 2002).

Stimulants appear to be effective in reducing core ADHD symptoms (i.e., inattention, impulsivity and hyperactivity) on a rapid, short-term basis (Greenhill, Pliszka & Dulcan, 2002). This seems to be particularly true when their use is well-monitored (American Academy of Pediatrics, 2001). Collaborative medication management (i.e., ensuring appropriate dosing, frequent monitoring, dosages covering after-school hours, regular contact with parents, etc.) with the child’s physician has been shown to significantly enhance the outcomes of pharmacotherapy (MTA Cooperative Group, 1999).

While extensive research highlights the benefits of pharmacological treatment, it should be noted that for certain children and youth with ADHD, medication alone can have some limitations (Daly et al., 2007). For example, some children with ADHD may experience problems with peer relationships (Hoza et al., 2005). Certainly, medication may help to improve social competencies via key behavioural routes (Schachar et al., 2002), however this may not be enough to foster positive social behaviour, much less teach the child particular social skills (Hoza et al., 2005). Medication may also improve a child’s task-focused attention and productivity (Schachar et al., 2002), however it often fails to generate lasting academic or learning improvements (Langberg & Becker, 2012; Purdie, Hattie & Carroll, 2002; Schachar et al., 2002). Pharmacotherapy may also have limited efficacy in terms of improving parent-child relationships, since medication alone cannot address stressors that family members might experience in conjunction with a diagnosis of ADHD (Chronis, Pelham, Gnagy, Roberts & Aronoff, 2003; Hinshaw et al., 2000). The effectiveness of medication may further be limited since ADHD often co-exists with other disorders (Hinshaw & Arnold, 2015), such as learning disabilities, anxiety disorders and conduct disorder (Pliszka & AACAP Work Group on Quality Issues, 2007).

Research shows that about 20-30% of children may not experience clear symptom improvements from medication (Daly et al., 2007), while others may experience negative side-effects from medication such as poor appetite, tics and potential heart problems (Elia & Vetter, 2010; Purdie et al., 2002). Some research also suggests there may be a link between long-term use of medication and reduced height gains in children (MTA Cooperative Group, 2004a,b).

To summarize, the research evidence suggests that pharmacological treatment can be very beneficial in the treatment of ADHD, however there may be limitations to its use on its own. Given these potential limitations, it is important for service providers and families to explore non-pharmacological ADHD treatments to support children and youth experiencing symptoms consistent with this diagnosis (Daly et al., 2007; Watson, Richels, Michalek & Raymer, 2012).

4.2 Psychosocial treatments

“Psychosocial treatment” of ADHD refers to psychotherapy without the use of medication. In the ADHD literature, a distinction can be made between at least two types of psychosocial interventions (Ervin, Bankert & DuPaul, 1996; Fabiano et al, 2009; Purdie et al., 2002; Van der Oord, Prins, Oosterlaan & Emmelkamp, 2008):
ADHD

- Cognitively-based approaches, which incorporate elements of mental coaching. These types of interventions can include social skills training, problem-solving interventions, working memory trainings, and self-monitoring strategies.

- Behavioural approaches, otherwise known as behavioural treatment or behaviour modification, which are grounded in social learning and theories. In essence, behavioural intervention involves introducing a behavioural framework into the child's home, school, and recreational environments.

Over the years, there has been some level of debate and skepticism in the ADHD literature regarding the effectiveness of psychosocial interventions (Fabiano et al., 2009). For instance, some research indicates that when compared to medication, psychosocial treatment leads to less pronounced improvements for children and youth overall (Purdie et al., 2002; Van der Oord, et al., 2008). Additionally, in 1998, the Canadian Coordination Office of Health and Technology Assessment (CCOHTA; Miller, Lee, Raina, Klassen, Zupancic, & Olsen, 1998) released an official report claiming that, based on the evidence available, psychosocial treatment for ADHD is not consistently effective. However, a more recent study by Fabiano and colleagues (2009) brings CCOHTA's claims into question and suggests that the CCOHTA may have overlooked important data in the literature, and may have failed to differentiate between behavioural vs. cognitively-based approaches. This may be problematic because the two treatment approaches have not received the same level of empirical support (Fabiano et al., 2009; Ervin, Bankert & DuPaul, 1996).

Cognitively-based approaches have not shown consistent results in treating ADHD in children and youth (Ervin et al., 1996). For example, clinical social skills training is a short-term intervention which focuses on teaching children how to "read" subtle cues in social interaction (e.g., learning how to wait for their turn, knowing how to shift topics in a conversation). Reviews of the literature on social skills training suggest that it leads to quite small improvements in social competence, if any, for children aged 5-12 years (e.g., Daly et al., 2007; Storebø et al., 2011), and little research has explored such outcomes in adolescents (e.g., Storebø et al., 2011). Other types of cognitive trainings, including working memory training, computerized cognitive training and self-monitoring strategies, have been met with contradictory evidence, with one meta-analysis suggesting they may be beneficial (Purdie et al., 2002), and one other meta-analysis and literature review suggesting the opposite (Hodgson et al., 2012; Evans et al., 2014). Equally conflicting were findings from a meta-analysis by Van der Oord and colleagues (2008), which suggested that contrary to most claims, behavioural and cognitively-based approaches have led to comparable results across a particular subset of studies. Thus, by and large, the literature lacks a clear picture of the extent to which cognitively-based interventions for children and youth with ADHD are effective.

Even before these seeming contradictions surfaced in the literature, Ervin and colleagues (1996) posited that, perhaps, cognitive interventions do not target the right deficits in children and youth with ADHD; namely, it may not be so much that these children and youth lack the cognitive strategies needed to successfully interact with peers or follow through with a task, but rather that they struggle with delaying their cognitive and behavioural responses. This may serve to explain why, in contrast with cognitively-based approaches, behaviour modification approaches are supported by ample efficacy research (Fabiano et al., 2009; Hodgson, Hutchinson & Denson, 2012; Purdie et al., 2002; Van der Oord, et al., 2008). Likewise, this could also help explain why cognitive interventions seem to work better alongside behaviour modification strategies; in this twofold approach, behaviour modification techniques (e.g., reward systems) are used to reinforce the use of cognitive strategies (e.g., impulse inhibition; Ervin et al., 1996). We review these approaches below, along with other psychosocial treatment options that are best supported by the research.

4.2.1 Empirically-supported psychosocial interventions
Pelham and Fabiano (2008), followed by Evans and colleagues (2014), were commissioned to review the ADHD literature by Division 53 of the American Psychological Association (APA). They reported on the available research on ADHD treatments following specific criteria established by the APA. Based on these criteria, a “well-established” treatment is one that is supported by at least two independent studies that showed significant intervention effects over a waitlist or no-intervention group. Accordingly, the treatment approaches reviewed below are deemed well-established by Pelham and Fabiano (2008) and Evans and colleagues (2014). It should be noted, however, that these approaches are supported by research-related criteria only, and may not have incorporated the views and experiences of the practitioners, children and families involved in treatment.

Additionally, researchers and practitioners have developed specific ADHD treatment programs that adopt the intervention approaches reviewed hereunder. These programs have been evaluated by independent research teams and later disseminated as evidence-based programs by regulatory bodies (e.g., The National Registry of Evidence-based Programs and Practices). These evidence-based ADHD treatment programs are highlighted throughout the following sections. For full information on these programs, refer to Appendix A.

1. **Behavioural parent training**

Supportive parenting is a critical factor in ADHD treatment for children. For example, Hinshaw and colleagues (2000) examined how changes in parenting approaches might influence the effects of treatment and found that when parents reported making positive changes in their parenting techniques (e.g., reduced the use of physical punishment, yelling, etc.), children’s behaviour improved greatly, according to teachers’ reports (Hinshaw et al., 2000).

The primary goal of behavioural parent training is to foster positive child behaviours by teaching and supporting parents on how to use positive, proactive discipline and behaviour modification techniques. In essence, parents learn to give a predictable, contingent, and immediate response to child behaviours, which serves to structure the child’s environment and reduce externalizing symptoms. Specifically, behavioural parent training supports the parent to (Daly et al., 2007):

- modify antecedents and consequences their child’s behaviour;
- target and monitor problematic behaviours;
- reward prosocial behaviour through praise, positive attention, and tangible rewards;
- decrease unwanted behaviour through planned ignoring, time out, and other non-physical discipline techniques (e.g., removal of privileges); and
- notice when they may be unconsciously giving positive reinforcement (e.g., parental attention) to the child when he/she misbehaves.

Behavioural parent training is a treatment option that may be quite helpful for families who are facing particular challenges as they relate to diagnoses of ADHD in their children/youth. Though other forms of family interventions have been researched (Corcoran & Dattalo, 2006), behavioural parent has gained the most empirical support in the treatment of ADHD. Indeed, based on criteria established by the APA, behavioural parent training is deemed a well-established treatment of ADHD (Evans, et al., 2014; Pelham & Fabiano, 2008). Studies have found that behavioural parent training can increase parents’ knowledge of ADHD and their sense of competence in managing the condition, and may even reduce parental and family stress (Daly et al., 2007; Corcoran & Dattalo, 2006). Some research also suggests that following a parent training program, parents tend to report significant improvements in their child’s ADHD symptoms (Evans et al., 2014). It should be noted, however, that this finding contrasts other research (Corcoran & Dattalo, 2006;
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Purdie et al., 2002) suggesting that parent training is not consistently effective in reducing core ADHD symptoms, but rather yields improvements in other problems areas associated with ADHD; specifically, children’s internalizing symptoms (e.g. depressed mood), cognitive ability (e.g. memory) and even academic performance appear to respond quite well to parent training, according to some meta-analyses (Corcoran & Dattalo, 2006; Purdie et al., 2002). Triple P (Sanders, Markie-Dadds, Tully, Bor, 2000), The Incredible Years (Webster-Stratton, 1994), and the Parenting Management Training -The Oregon Model (Forgatch & DeGarmo, 1999) are examples of evidence-based behavioural parent training programs. Please refer to Appendix A for further information about these programs.

ii. Behavioural classroom interventions

Classroom interventions, otherwise referred to as classroom behaviour management or classroom contingency management, are another type of behavioural intervention for ADHD that requires a collaborative approach to treatment. Here, clinicians, parents and school teachers are encouraged to work together to identify and evaluate the needs of a child in the classroom setting (Daly et al., 2007). The clinician and teacher then collaboratively develop classroom intervention strategies based on the child’s specific needs. Depending on the classroom setting (e.g., traditional vs. special education), the classroom intervention may be applied to the individual child only, or the entire class. Some classroom intervention strategies involve the use of proactive disciplinary strategies, such as (Daly et al., 2007):

- A token or point system to reinforce positive behaviours, which can be coupled with some type of visible record of achievement.
- Daily report cards, on which the child’s teacher provides feedback to parents on a few (e.g. 3-8) positive behavioural goals. These can target different areas of functioning (e.g. academic work, general behaviour, peer relationships), but must be clearly defined and chosen collaboratively by the teacher, parent, and child (if old enough).
- A reward system, via which the child is rewarded at home and/or at school when desired goals are met. The goal behaviour is modified each time the child is rewarded to foster continuous improvement.

Based on criteria established by the APA, behavioural classroom interventions are deemed a well-established treatment of ADHD (Evans et al., 2014; Pelham & Fabiano, 2008). Studies have found that compared to children who received regular classroom management, behavioural classroom interventions led to better behaviour (e.g., following rules), increased academic productivity, and increased peer acceptance, according to teachers’ reports (Evans et al., 2014). It should be noted, however, that assessments of classroom interventions have not produced consistent outcomes from one study to the next (DuPaul et al., 2012). Research suggests these interventions may work best when coupled with academic interventions (DuPaul et al., 2012), which we review further into this section. Incredible Years (Webster-Stratton, 1994) is an example of an evidence-based program that incorporates classroom management training. Please refer to Appendix A for further information about this program.

iii. Behavioural peer interventions

As mentioned previously, the literature highlights that clinical or traditional peer interventions (also referred to as clinical social skills training), have not shown good results for children with ADHD (Daly et al., 2007; Evans et al., 2014; Storebø et al., 2011). These interventions tend to focus on teaching new prosocial behaviours to the child and discouraging negative social behaviours mainly through discussion and role playing, without the use of contingencies...
such as a point-system (Evans et al., 2014). The goal of traditional peer interventions is to foster social skills that generalize to environments other than the clinical setting in which treatment is provided (Evans et al., 2014).

Unlike traditional peer interventions, behavioural peer interventions are contingency-based, and aim to improve the child’s social behaviour in the same environment in which treatment is provided (Evans et al., 2014). These types of interventions are often implemented in recreational settings. To illustrate, Pelham and colleagues (2014) outline components that may be involved in a behavioural peer intervention implemented in a summer camp setting:

- A point system, with both reward and cost components, in place throughout the day.
- Social skills training sessions led by counsellors, coupled with social skills feedback in all daily activities and reflected in the point system.
- Daily sports skills training led by counselors, coupled with immediate feedback regarding skills, sportsmanship, and sport rule violations during games, for which children can earn or lose points.
- Time-out procedures, in which time is increased for additional inappropriate behaviour, or reduced for appropriate behaviour.
- Daily behavioural report cards, in which counsellors provide an evaluation of the child’s daily behaviour. Counsellors can review these with parents at the end of each day.
- Social honours and reinforcement provided on an on-going basis to children who behaved appropriately. Children earn daily social rewards (e.g., buttons) and weekly privileges (e.g., field trip) based on their earned points.

Based on criteria established by the APA, behavioural peer interventions are deemed a well-established treatment of ADHD (Evans et al., 2014; Pelham & Fabiano, 2008), and have shown notable results in improving children’s social outcomes, such as their interpersonal skills and rule-following behaviours (Carlson et al., 1992; Pelham et al., 2005; 2014). The Summer Treatment Program (Pelham & Hoza, 1996) is an evidence-based program that applies the behavioural peer intervention framework outlined above. Moreover, Evans and colleagues (2014) reviewed The Parent Friendship Coaching program (Mikami, Lerner, Griggs, McGrath, & Calhoun, 2010), which also uses key behavioural peer intervention principles. The Parent Friendship Coaching program has not yet been disseminated as an evidence-based program by a regulatory body, however Evans and colleagues (2014) note that it holds promise based on its evaluation results (Mikami et al., 2010). Refer to Appendix A for further information about these programs.

iv. Academic interventions

Research has shown that regardless of personal or contextual factors, ADHD may hamper certain child behaviours or skills that are conducive to academic achievement (Martin, 2014). Medication can serve as a first step to improving children’s academic outcomes, as it can help to reduce some behavioural difficulties (i.e., inattention, impulsivity and hyperactivity); however, a reduction in externalizing behaviours alone does not always help a child succeed in school. Rather, some children may benefit from interventions that specifically target academic difficulties (e.g., fostering a sense of self-efficacy as it relates to learning, improving cognitive abilities in particular subject areas like math, reading, memory, etc.; Langberg & Becker, 2012; Purdie et al., 2002).

Academic interventions for ADHD differ from behavioural classroom interventions, and focus primarily on altering methods of instruction or learning materials in order to give the child or youth the best chance at succeeding (DuPaul et al., 2012). Academic intervention strategies can include the following (Daly et al., 2007):
ADHD

- Task and instructional modifications, such as reducing task length, dividing tasks into smaller chunks, setting short-term goals for the child, increasing the stimulation/appeal of the task (e.g., color, texture, rate of stimulus presentation), and modifying the delivery of instruction according to learning style.

- Computer-assisted instruction, which usually includes presentation of specific learning objectives, highlighting of essential material, division of content material into subunits, and provision of immediate feedback about response accuracy.

- Training the child in using specific learning strategies (e.g. note-taking, study skills, homework completion, or self-reinforcement procedures) or organization skills (e.g. organization of materials, tracking and monitoring assignments, and planning evening homework completion).

- Peer tutoring, where an older student provides assistance, instruction and feedback to the child around their academic activities and goals.

Although outcomes related to academic interventions appear to vary across studies (DuPaul et al., 2012; Purdie et al., 2002), overall, research findings appear promising. One meta-analysis conducted by Purdie and colleagues (2002) found that academic interventions improved cognitive competencies (e.g., problem solving ability) more than medication did alone. One particular type of academic intervention, called “organization skills training”, has recently met the APA criteria for a well-established ADHD treatment (Evans et al., 2014). Moreover, academic interventions combined with classroom intervention strategies appear to be particularly beneficial in fostering academic adjustment, both in terms of improving classroom behaviour and actual academic performance (DuPaul et al., 2012). One comprehensive, school-based ADHD treatment program called the Challenging Horizons Program (Evans, Serpell, Schultz, & Pastor, 2007) has been shown to improve children and youth’s academic outcomes by integrating elements of academic interventions alongside parent training and behavioural peer intervention components. Please refer to Appendix A for more information about this program.

v. Neurofeedback training

Neurofeedback training is a relatively new non-pharmacological treatment for ADHD. It aims to prompt the child or adolescent to control particular brainwave patterns using electroencephalographic technology, which is thought to enhance attention and concentration (Hodgson et al., 2012). Promising findings have emerged on neurofeedback as a treatment for ADHD in the last few years. For example, one meta-analysis found the treatment to be more effective than any other non-pharmacological treatment, based on a particular subset of studies (Hodgson et al., 2012). However, researchers emphasize that the evidence on neurofeedback is not yet conclusive (Evans et al., 2014). Some concerns may also be raised regarding the quality of the research available, given that research designs comparing intervention outcomes to a wait-list group may not control for the potential placebo effects of the brainwave technology. Since the treatment still needs further research, neurofeedback is only deemed a possibly efficacious treatment based on criteria established by the APA (Evans et al., 2014).

4.3 Combined psychosocial and pharmacological interventions

Combined, or multimodal, treatment of ADHD refers to psychosocial interventions coupled with medication. This approach is widely recommended for children and youth with ADHD (American Academy of Pediatrics, 2001; Purdie et al., 2002; Pliszka & AACAP Work Group on Quality Issues, 2007), and is rooted in the notion that in drawing from both psychosocial and pharmacological treatment benefits, combined treatment leads to better outcomes for children and youth, compared to either treatment used alone.
Despite the fact that combined treatment is widely endorsed, there is still conflicting evidence to support the approach. Specifically, certain data suggest that behavioural intervention does little to enhance ADHD treatment when a child is already on medication (MTA Cooperative Group, 1999; Schachar et al., 2002; Van der Oord, et al., 2008), suggesting that combined treatment does not have additional benefits over exclusively pharmacological treatment. Researchers have highlighted several different factors that could help explain these findings, including potential flaws in study methodology and treatment implementation (Fabiano et al., 2009; Van der Oord et al., 2008). Several studies also demonstrate that the effects of behavioural treatment, over and above the effects of medication, are notable (Carlson et al., 1992; Conners et al., 2001; Fabiano et al., 2007; Pelham et al., 2014; Pelham et al., 2005; Purdie et al., 2002; Swanson et al., 2001). To illustrate, the following section reviews studies that explored the efficacy of combined treatment.

### The MTA study and follow-up analyses

The ADHD literature features a particularly influential study on the efficacy of ADHD treatment modalities called the Multimodal Treatment Study of Children with ADHD (i.e., the MTA study; MTA Cooperative Group, 1999). Results from this study, summarized in the table below, prompted much discussion in the ADHD research community. In particular, results were met with some critiques of the study’s methodological design (e.g. Klein, 2001; Breggin, 2001; Fabiano et al., 2009). Other researchers (Conners et al., 2001; Swanson et al., 2001) ran additional analyses on the MTA data to further explore the impacts of each treatment modality. The following table summarizes the designs and results of the MTA study and two follow-up analyses:

#### The MTA Study

<table>
<thead>
<tr>
<th>First study author</th>
<th>Study methodology</th>
<th>Treatment conditions</th>
<th>Main study results</th>
</tr>
</thead>
</table>
| MTA Cooperative Group (1999) | ● 579 children aged 7 to 9.9 years  
  ● 14-month period  
  ● 6 sites (e.g., summer camps)  
  ● Random assignment to treatment conditions  
  ● Multiple outcomes assessed separately using multiple measures | 1. Medication (MPH)  
  2. Behavioural  
  3. Combined  
  4. Usual community care | ● Medication and combined treatment showed greater effects than behavioural treatment.  
  ● Medication alone is just as effective as combined treatment. |

#### Follow-up analyses

<table>
<thead>
<tr>
<th>First study authors</th>
<th>Study methodology</th>
<th>Treatment conditions</th>
<th>Main study results</th>
</tr>
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</table>
  ● *Exception*: global outcomes were measured using parent and teacher reports | Same as the MTA study (1999). | Combined treatment was superior to all other treatments. |

Extended longitudinal analyses were also conducted 10 and 24 months after the intensive MTA treatments had ended (MTA Cooperative Group, 2004a;b). At this time, ADHD treatments were no longer determined by the study context, and
were instead selected naturally, as needed or preferred for each child, from community resources. These analyses (MTA Cooperative Group, 2004a;b) revealed that eventually, children from all three initial treatment groups showed equal improvements in the main domains of functioning (e.g., social, academic, etc.). These findings are difficult to interpret, however, given that the initial treatment modalities had changed in each group (e.g., some had stopped behavioural treatment, others began to use medication, etc.; Hinshaw & Arnold, 2015).

ii. Dose-ranging studies

Dose-ranging studies compare the effectiveness of different doses or intensities of behavioural and pharmacological treatment. The following table summarizes one dose-ranging study featured in the literature that combined a behavioural peer intervention and medication:

<table>
<thead>
<tr>
<th>First study author</th>
<th>Study methodology</th>
<th>Treatment conditions</th>
<th>Main study results</th>
</tr>
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<tbody>
<tr>
<td>Pelham and colleagues (2005)</td>
<td>- 25 boys and 2 girls between the ages of 6 and 12</td>
<td>1. Medication: 1 of 4 doses (i.e. high, medium, low or placebo) of MPH.</td>
<td>1. Even when used alone, medication and behavioural treatment both had large positive effects.</td>
</tr>
<tr>
<td></td>
<td>- Summer treatment program (STP) context</td>
<td>2. Behavioural treatment: Yes: point system, behavioural report cards, social reinforcement, parent training, etc.</td>
<td>2. Combined treatment showed greater effects than either treatment alone.</td>
</tr>
<tr>
<td></td>
<td>- Children alternated between each combination of treatment conditions every 2 days</td>
<td>- No: children’s behaviour was recorded and monitored, but instructors did not award or take away points. Parents did not receive behavioural training.</td>
<td>3. Benefits of combined treatment were enhanced with low-dose medication, compared to high dose.</td>
</tr>
</tbody>
</table>

Study results by Pelham and colleagues (2005) are consistent with findings from other dose-ranging studies conducted in the same summer camp setting (Carlson et al., 1992; Pelham et al., 2014), as well as the classroom setting (Fabiano et al., 2007). These dose-ranging studies highlight not only the distinctive effectiveness of combined treatment, but also the importance of medication dose in treatment. Specifically, study results suggest that when engaged in behavioural treatment, a child can benefit from low doses of medication just as much, if not more, than high doses of medication (Carlson et al., 1992; Fabiano et al., 2007; Pelham et al., 2005; 2014). This may serve as an interesting option for children who do not fully respond to medication, who experience unpleasant side-effects from high doses of medication, or for parents who worry about the risks associated with medication.

These findings could also serve to explain why some past research has found that supplementing pharmacological treatment with behavioural interventions hardly leads to any added benefits (Pelham et al., 2014; Van der Oord, et al., 2008). Namely, if studies (e.g., the MTA study) did not take into consideration medication dosage in treatment, then they perhaps failed to test the most beneficial combination of treatment modalities (Pelham et al., 2014). Moreover, if children were put on a high dose of medication first and afterwards engaged in regular behavioural treatment,
ADHD researchers were perhaps unable to detect the incremental effects of behavioural intervention (Van der Oord, et al., 2008). Bearing in mind that more research may be needed to verify these results, combined treatment appears to be a highly valuable option for children and youth with ADHD.

4.4 Treatments for adolescents

There appears to be little research with regard to adolescents with ADHD (Hogue et al., 2014). Studies rarely test the efficacy of treatments on adolescents exclusively, nor do they usually include them in their treatment samples (Fabiano et al., 2009). Indeed, the evidence reviewed above is mostly based on elementary and school-aged children populations; therefore, such treatment approaches may not suit adolescents. For example, there is doubt as to how relevant a reward-system would be for a high-school student, because teens are expected to be less closely monitored by adults, and are better motivated by less tangible and more diverse types of reinforcement (Hogue et al., 2014).

Certain cognitively-based interventions (e.g., computerized cognitive training, organization skills training) have been tested on adolescents and show some promising results (Evans et al., 2014). The advantage of these types of interventions for adolescents is that they do not require constant behavioural monitoring by adults in the home and school environments, as would behavioural interventions aimed at younger populations (Hogue et al., 2014). Cognitive-behavioural programs such as the Challenging Horizons Program highlighted above (Evans et al., 2007), as well as another program called HeartMath (Lloyd, Brett, & Wesnes, 2009), have shown to be effective in improving academic functioning and social adjustment in middle/high schools students. Please refer to Appendix A for further information about these programs.

4.5 Family engagement in treatment

The literature highlights the importance of engaging parents in the treatment of ADHD (American Academy of Pediatrics, 2001; Pliszka & AACAP Work Group on Quality Issues, 2007). Meaningful family engagement (e.g., building trust with the child’s parents or caregivers, using a shared decision-making approach) is critical in any mental health treatment, as it can play an important role in enhancing treatment retention and outcomes (Hoagwood, 2005). The following Centre resources explain what family engagement entails and how to do it:

**Family engagement in mental health care (Learning module)** provides an overview of the core definitions, theories and benefits of family engagement in mental health care, and introduces a family engagement training to help service providers start their journey toward family engagement. The module is available at: [http://www.excellenceforchildandyouth.ca/family-engagement-mental-health-care](http://www.excellenceforchildandyouth.ca/family-engagement-mental-health-care)

**Engaging youth and families in mental health care (Evidence In-Sight request summary)** provides an overview of the literature on family engagement as a way to enhance youth and children’s retention and success in treatment. The full report is available on request; please e-mail evidenceinsight@cheo.on.ca for a copy.

For ADHD, family engagement should include a component of psychoeducation on ADHD symptoms and treatment options as a first step, to help parents anticipate and manage the various developmental difficulties that their child may encounter (Pliszka & AACAP Work Group on Quality Issues, 2007). Since parenting a child with ADHD can have its challenges, caregiver engagement in treatment can also be a strategy to enhance family functioning and the parent-child relationship (Corcoran & Dattalo, 2006).
Several factors may be helpful to bear in mind when aiming for meaningful engagement of family members in the
treatment of a child or youth with ADHD. Understanding how parents perceive treatment, and how they believe it may
affect their child, are particularly important considerations.

**Family preferences regarding treatment**

Given the wide variety of treatment options for ADHD, researchers have stressed the importance of designing treatment
plans that are congruent with family preferences and goals (Brinkman & Epstein, 2011). Family engagement is a highly
recommended strategy in ADHD treatment specifically (Pliszka & AACAP Work Group on Quality Issues, 2007).

Brinkman and Epstein (2011) reviewed the available research on family preferences regarding ADHD treatment
modalities. They found that psychosocial treatments are generally better-accepted by parents than medication,
particularly at the beginning of treatment. However, one study found that parents who attribute ADHD to biological
causes are less likely to accept behavioural treatments, making them more likely to prefer and maintain the use of
medication (Reimers, Wacker, Derby, and Cooper, 1995). Brinkman and Epstein (2011) also discuss that a tentative use
of medication, such as contrasting time on and off medication, has shown to be a helpful strategy to inform and guide
parents’ decisions about medication. Parental concerns with medication at the start of treatment may also eventually
dissipate on their own; studies show that many parents eventually become more open to pharmacological treatment
over time as they gain experience and familiarity with the disorder (Brinkman & Epstein, 2011). In fact, family
preferences and goals regarding treatment often change over time; this must be reflected in the treatment plan
(Brinkman & Epstein, 2011).

Brinkman and Epstein’s (2011) review also highlights the importance of preference-sensitive treatment plans. These are
recommended even in the initial stages of treatment, when parents may lack real-life experience with formal ADHD
treatment. In this early stage, the choice of the best initial treatment should be made based on the parents’ (and child’s,
if old enough) informed knowledge of benefits versus potential harms/costs of each treatment modality, as well as their
ability to implement the treatment options available. It is important to bear in mind that initial parent and child
preferences can sometimes be obstructed by misinformation received from a variety of sources, including social
networks and the media (Brinkman & Epstein, 2011; Greenhill, Pliszka & Dulcan, 2002). This further speaks to the need
to provide psychoeducation at the start of treatment to ensure that parents are well-informed of the likely benefits and
risks associated with treatment.

Research also suggests that a treatment plan that is congruent with family preferences does not guarantee
implementation of the treatment, as particular barriers to treatment implementation can get in the way (Brinkman &
Epstein, 2011). Some potential barriers to treatment identified by Brinkman & Epstein (2011) include a lack of service
availability, a lack of feasibility of family attendance, or simply a lack of structure around treatment (e.g., children may
forget to take their medication, or parents may forget to give it to them). This is why it is important that service
providers ensure that a treatment plan is not only preference-sensitive, but also feasible.

5. **Next steps and other resources**

In sum, the literature holds a number of treatment approaches that have shown to be effective in supporting children,
youth and their families with ADHD. In aiming to address the current gaps in the ADHD literature, researchers
underscore the need to further explore treatment of ADHD in adolescents (Hogue et al., 2014) and to further evaluate
emerging treatment options (e.g., neurofeedback; Evans et al., 2014). Moreover, there may be a need for future
ADHD research to address contradictory evidence with respect to certain treatment approaches (e.g., cognitively-based approaches; Van der Oord, et al., 2008).

The following resources may be helpful in informing clinical- and program-level decisions about ADHD treatment:

**Attention deficit hyperactivity disorder: Diagnosis and management of ADHD in children, young people and adults** holds a collection of practice guidelines put together by the National Institute of Clinical Excellence (NICE), a clinical health authority in England. The guidelines are available at:


**Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder** holds a collection of practice guidelines developed by the American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Quality Issues. The practice parameter is available at:


Knowing what works and receiving training on an evidence-informed practice or program is not sufficient to actually achieve the outcomes that previous evaluations indicate are possible. A program that has been shown to improve mental health outcomes for children and youth but that is poorly implemented will not achieve successful outcomes (Fixsen et al, 2005). In order for a program to be evidence-informed, it needs to be applied with fidelity to the design and it needs to be implemented using supportive “drivers” related to staff competency, organizational leadership, and organizational capacity. Choosing a practice is an initial step toward implementation, but the implementation drivers are essential to ensure that the program reaches appropriate clients, that outcomes are successful, and that clinical staff members are successful in their work.

The Ontario Centre of Excellence for Child and Youth Mental Health has a number of resources and services available to support agencies with implementation, evaluation, knowledge mobilization, youth engagement and family engagement. For more information, visit:

http://www.excellenceforchildandyouth.ca/what-we-do or check out the Centre’s resource hub at

For general mental health information, including links to resources for families:

http://www.ementalhealth.ca
References


Appendix A

Evidence-based psychosocial intervention programs for children and youth with ADHD

The following ADHD treatment programs were disseminated by different regulatory bodies as evidence-based programs, based on positive outcome research. External reviewers were also mandated by regulatory bodies to report on the quality of the evidence supporting the programs. The following tables summarize the information disseminated about these programs.

Please note that the Parent Friendship Coaching (PFC) program is an exception as it has not yet been disseminated as an evidence-based program by a regulatory body. We included PFC in the present Appendix based on Evans and colleagues’ (2014) review, which highlights the program’s use of well-established intervention principles borrowed from the behavioural peer intervention approach.

<table>
<thead>
<tr>
<th>Children's Summer Treatment Program (STP)</th>
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<tbody>
<tr>
<td><strong>Program overview</strong></td>
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<tr>
<td>STP is a comprehensive, 8-week intervention for children entering grade 1-6 with ADHD and related disruptive behaviours. The program targets the child's peer relations, academic and/or classroom functioning, and the parents' parenting skills. Children entering grades 1-6 are treated for 6-9 hours daily, 5 days per week, in a summer camp setting. Parents are invited to attend weekly parent training sessions in the evenings.</td>
</tr>
<tr>
<td><strong>Supporting evidence</strong></td>
</tr>
<tr>
<td>External reviewers reported on three experimental studies that evaluated the efficacy of STP. According to these studies, STP improved children’s rule-following and interpersonal behaviours, academic productivity, as well as teachers’ and counsellors’ sense of competency. Reviewers highlight that study designs were strong and the intervention was implemented as planned in the study context, although some methodological factors (i.e., small sample sizes and some missing data) may have affected results slightly. Study findings have been replicated in other studies.</td>
</tr>
<tr>
<td><strong>Cost and training</strong></td>
</tr>
<tr>
<td>Implementation costs vary based on the implementation site (i.e., local cost of living, staff salaries, facility charges, income levels of participating families, and program size and duration). Costs range from $2,500 to $7,000 per participant.</td>
</tr>
<tr>
<td><strong>Source</strong></td>
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</table>
| The National Registry of Evidence-based Programs and Practices (NREPP)  
  ➢ [http://www.nrepp.samhsa.gov/Index.aspx](http://www.nrepp.samhsa.gov/Index.aspx) |
<table>
<thead>
<tr>
<th>The Challenging Horizons Program (CHP)</th>
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<tr>
<td><strong>Program overview</strong></td>
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<tr>
<td>CHP is a school-based intervention for middle/junior high school students with ADHD. It focuses on strengthening skills such as organizational skills, homework management, studying, as well as socialization, goal setting and self-regulation of behaviour. Parents are engaged through group parent training and weekly reports.</td>
</tr>
<tr>
<td><strong>Supporting evidence</strong></td>
</tr>
<tr>
<td>External reviewers reported on three experimental studies that evaluated the efficacy of CHP. According to these studies, CHP improved children’s attention (but not in hyperactivity), social functioning, self-esteem, academic achievement, and functioning at school (e.g., organizational skills). Reviewers raise attention to some methodological issues, however, including the fact that parents and teachers who reported on children’s improvements were not blinded to the treatment, and researchers did not control for confounding factors (e.g., medication).</td>
</tr>
<tr>
<td><strong>Cost and training</strong></td>
</tr>
<tr>
<td>The cost of the 15-hour off-site training is $4,000 per site for up to 12 participants, plus travel expenses. Training manuals and supporting materials are including in this price.</td>
</tr>
<tr>
<td><strong>Source</strong></td>
</tr>
<tr>
<td>The National Registry of Evidence-based Programs and Practices (NREPP)</td>
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</tbody>
</table>
### Program overview

The Triple P-Positive Parenting Program is a multilevel program that offers families parenting support.

- **Level 4 Triple P** helps parents learn strategies to promote children’s healthy adjustment from age 0-12. Parents are encouraged to develop a parenting plan, and then asked to apply their parenting plan with their children. The program is then fine-tuned based on progress made with the help of a practitioner. Triple P aims uses a strengths-based approach and aims to provide a supportive, non-judgmental environment for parents.
- **Level 4 Triple P** is offered in different formats (e.g., individual, group, online).
- **Level 5 (Enhanced Triple P)** is offered for families in which parenting difficulties are complicated by other family stressors (e.g., relationship conflict, parental depression). In addition to sessions that target parenting skills, the program includes sessions that target mood management strategies, stress coping skills, and partner support skills.

### Supporting evidence

External reviewers reported on five experimental studies that evaluated the efficacy of CHP. The studies suggest that the Triple P Program led to clinically significant improvements in child behaviour (about a 30% improvement according to one measure). The program also appeared to enhance parents’ disciplinary strategies and their sense of parenting competence, in addition to other outcomes (e.g., parent conflict, caregiver depression). Reviewers highlight that outcome measures and analyses were adequate. Strategies were also used to ensure the program curriculum was well-implemented. However, some sample sizes were small, and some symptom improvements were noted in both intervention and comparison groups, which may indicate that confounding variables influenced the results.

### Cost and training

The estimated cost of the program is $1,000 per participant, with 10-15 participants per group and 2 group facilitators over 14 sessions. This estimated cost includes all recording equipment, training of facilitators, program and training materials, transportation assistance, etc. The developer (see below) should be contacted for exact prices.

### Sources

- **The National Registry of Evidence-based Programs and Practices (NREPP)**
  - [http://www.nrepp.samhsa.gov/Index.aspx](http://www.nrepp.samhsa.gov/Index.aspx)
- **The California evidence-based Clearinghouse (CEBC)**
  - [http://www.cebc4cw.org/program/triple-p-positive-parenting-program-level-4-level-4-triple-p/](http://www.cebc4cw.org/program/triple-p-positive-parenting-program-level-4-level-4-triple-p/)

### Additional resources


### Contact

Marion S. Forgatch, Ph.D.
Phone: (541) 485-2711
e-mail: marionf@oslc.org
### The Incredible Years

#### Program overview

The Incredible Years program includes three developmentally-based interventions for children with externalizing problems, as well as their parents and teachers.

- The Incredible Years child program (the Dinosaur School child training prevention program) includes 60 classroom lesson plans, which are approximately 45 minutes each, for children in preschool through second grade. Teachers lead the lessons at least twice a week over consecutive years. Separate from these classroom lessons plans, Incredible Years includes a small group treatment program of about 18-22 weekly sessions (2 hours each). These are offered alongside the training programs for parents of preschoolers or school-age children. The child program aims to enhance children’s socio-emotional skills (e.g., communicating feelings, problem-solving strategies, managing anger, positive social behaviour, etc.).

- The Incredible Years parent program is available for parents of babies and toddlers (up to 30 months), preschoolers (3-5 years), and school-age children (6-12 years). The program can run from 12 to 20 weekly group sessions that are 2-3 hours each. It focuses on improving parent-child relationships and teaching parents ways to promote their children's social, emotional, and language development, based on their developmental level.

- The Incredible Years teacher program is available for teachers of young children from 3-8 years. It includes 42 hours (6 days) of monthly workshops delivered by a trained facilitator and focuses on promoting teachers’ classroom management strategies, teacher-parent collaboration, positive child behaviour and academic outcomes.

#### Supporting evidence

External reviewers reported on eight experimental studies that evaluated the efficacy of CHP. Studies suggest that The Incredible Years led to better parenting skills (e.g., more monitoring, less harsh discipline), reductions in core ADHD symptoms, more child prosocial behaviours, better child emotion regulation, more positive teaching styles (e.g., warmer/more affectionate), and better parent-teacher bonding. External reviewers report that this evidence is of high empirical quality; studies used rigorous study designs and outcomes measures, controlled for confounding variables, and ensured excellent intervention fidelity. Few study weaknesses are reported, apart from some small sample sizes and potential biases due to wait-list control groups.

#### Cost and training

The cost of the program, depending on the series selected, is $1,150-$1,895 for program materials, $400-$500 per participant for leader training, $600 per participant for annual leader consultation, and $450 for the certification fee. On-going costs include $476 for each parent in parent groups, $775 for each child in child treatment groups, $15 for each child receiving the Dinosaur curriculum in school, and $30 for each teacher receiving the teacher training. These costs vary by location.

#### Sources

The National Registry of Evidence-based Programs and Practices (NREPP)


The California evidence-based Clearinghouse (CEBC)

[http://www.cebc4cw.org/program/the-incredible-years/](http://www.cebc4cw.org/program/the-incredible-years/)

#### Additional resource

The Incredible Years website:

# Parenting Management Training - The Oregon Model (PMTO)

## Program overview
PMTO is a parenting intervention for recently separated single mothers of children aged 6-12. The program aims to prevent child internalizing and externalizing problems and promote healthy child adjustment. PMTO consists of 14 weekly group sessions that target parenting practices by promoting skill encouragement, limit-setting, problem-solving, monitoring, positive involvement, and contingent positive reinforcements (e.g., praise, incentives).

## Supporting evidence
External reviewers reported on one experimental study that evaluated the efficacy of CHP. Based on various measures, the study suggests that the program led to decreases in child internalizing behaviours at 30 months and 9 years post-intervention, reductions in externalizing behaviours over time, lower rates of delinquency compared to other youth, and better academic functioning. Reviewers highlight the high quality of the study design, analyses, and program implementation. The only weakness reported has to do with a possible participation bias (e.g., perhaps better-adjusted mothers participated in the program).

## Cost and training
The estimated cost of the program is $1,000 per participant, with 2 group facilitators and 10-15 participants per group. This estimated cost includes training expenses and program materials. Contact the developer (see below) for exact prices.

## Source
The National Registry of Evidence-based Programs and Practices (NREPP)
- [http://www.nrepp.samhsa.gov/Index.aspx](http://www.nrepp.samhsa.gov/Index.aspx)

## Contact
Marion S. Forgatch, Ph.D.
Phone: (541) 485-2711
e-mail: marionf@oslc.org
<table>
<thead>
<tr>
<th>HeartMath: Coherence Training in Children With ADHD</th>
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<tr>
<td><strong>Program overview</strong></td>
</tr>
</tbody>
</table>
| **Supporting evidence** | The HeartMath program has been evaluated by one experimental study. Results from the study revealed that the program led to improvements in externalizing and internalizing symptoms, based on children’s self-reports and teacher reports, as well as in their new word recognition ability. External reviewers note that double-blind randomization was used, however daily intervention sessions varied in time, the sample size was small, and some confounding factors (e.g., use of medication) were not controlled.  
*Note*: the program has been implemented internationally in approximately 2,000 school sites. |
| **Cost and training** | The cost of the 15-hour off-site training is $4,000 per site for up to 12 participants, plus travel expenses. Training manuals and supporting materials are including in this price. |
| **Source** | The National Registry of Evidence-based Programs and Practices (NREPP)  
➢ [http://www.nrepp.samhsa.gov/Index.aspx](http://www.nrepp.samhsa.gov/Index.aspx) |
## Parent Friendship Coaching (PFC)

| Program overview | The PFC intervention aims to support parents in being social coaches for their children (aged 6-10) by helping them modify contingencies when their children are in social situations, and arrange a social context in which their children are optimally likely to develop good peer relationships. The treatment spans over eight 90-min weekly group sessions, each of which is led by two clinicians and included five to six parents.  
*Note*: This program has not yet been formally disseminated by a regulatory body as an evidence-based program. The supporting evidence (below) has not been assessed for quality by external reviewers. |
<table>
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<tr>
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<tbody>
<tr>
<td>Supporting evidence</td>
<td>The intervention has benefited from one randomized controlled trial (Mikami et al., 2010). Parents involved in the trial reported significant improvements in children’s social skills and quality of play, following completion of the program. Moreover, teachers who were unaware of the fact that the child was engaged in treatment reported similar improvements.</td>
</tr>
<tr>
<td>Cost and training</td>
<td>For information regarding the program, contact the main author (see below).</td>
</tr>
</tbody>
</table>
| Contact | Dr. Amori Yee Mikami  
e-mail: mikami@virginia.edu |