# Preventing and Treating Childhood Mental Disorders: Effective Interventions

## A Research Report

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***We celebrate the Indigenous Peoples on whose traditional territories we are all privileged to live and work.***

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# Contents

## Executive Summary

Mental health, or social and emotional wellbeing, is a crucial resource for all children — enabling them to flourish, meet their potential and be resilient in the face of adversity. Yet based on high-quality epidemiological studies, an estimated 12.7% of children — or nearly 95,000 children aged four to 18 years in British Columbia — will experience mental disorders causing significant symptoms and impairment at any given time. All children with mental disorders require effective treatments, and many additional children would benefit from effective prevention programs.

To inform policymaking to address these needs, this report summarizes the best available research evidence on effective interventions for preventing and treating 12 of the most common mental disorders (or groups of disorders) affecting children aged 18 years or younger. These disorders include: 1) anxiety disorders; 2) attention-deficit/hyperactivity disorder (ADHD); 3) oppositional defiant and 4) conduct disorders; 5) substance use disorders (SUDs); 6) depression; 7) autism spectrum disorder; 8) obsessive-compulsive disorder (OCD); 9) bipolar disorder; 10) eating disorders; 11) posttraumatic stress disorder (PTSD); and 12) schizophrenia.

Our systematic review identified 113 randomized controlled trials (RCTs) and six systematic reviews that met inclusion criteria. Intervention effectiveness was defined as two or more RCT evaluations showing statistically-significant reductions in disorder diagnoses and/or symptoms for children. Applying these criteria, we identified effective prevention interventions for eight of the most common childhood mental disorders and effective treatments for all 12. However, estimates from high-quality epidemiological studies indicate that an estimated 55.8% of children with mental disorders — or nearly 53,000 children in BC — do not receive services for these disorders in a typical year. These estimates suggest stark service shortfalls, even apart from the question of effective services.

To address these high levels of need, a first step is adopting a comprehensive population health strategy for children's mental health. Such a strategy includes:

1) Addressing social determinants and reducing avoidable childhood adversities that contribute to the development of mental health problems
2) Providing effective prevention programs, such as those reported here, for children at risk
3) Providing effective treatments, such as those reported here, for all children with disorders, and
4) Monitoring needs and outcomes over time to evaluate and improve intervention efforts.

Vigorous central leadership is also required to ensure that such a plan is sustained over time, accompanied by adequate and dedicated children's mental health budgets, and coordinated across all relevant sectors within government. BC's children will benefit, as will everyone, if children's mental health is made a high public policy priority — and if children's mental health needs are better met.

# 1. Background

## 1.1 The Importance of Children's Mental Health

Mental health, or social and emotional wellbeing, is a crucial resource for all children in British Columbia (BC) — enabling them to flourish, meet their potential and be resilient in the face of adversity. For some children, however, development is interrupted by mental disorders. If not prevented or treated early, these disorders can lead to serious ongoing distress, symptoms and impairment for individual children, as well as distress and costs for their families — and substantial associated costs for society, particularly when disorders continue into adulthood.[1] An estimated 12.7% of children aged 18 years or younger (or 94,800 in BC) will meet the criteria for a mental disorder at any given time, including having both symptoms and impairment and therefore needing treatment.[2] Yet an estimated 55.8% of children with mental disorders (or 52,900 in BC) do not receive services for these disorders in a typical year.[2] Ensuring the timely availability of effective prevention and treatment interventions for all children in need is a crucial first step in addressing these service gaps. At the same time, policymakers require high-quality research evidence on such interventions to guide program planning and public investments.

Mental health, or social and emotional wellbeing,
is a crucial resource for all children in British Columbia.

## 1.2 Purpose of This Research Report

To inform policymaking in BC, this report summarizes the best available research evidence on effective interventions for preventing and treating 12 of the most common mental disorders occurring in children aged 18 years or younger. These disorders include: 1) anxiety disorders; 2) attention-deficit/hyperactivity disorder (ADHD); 3) oppositional defiant and 4) conduct disorders; 5) substance use disorders (SUDs); 6) depression; 7) autism spectrum disorder; 8) obsessive-compulsive disorder (OCD); 9) bipolar disorder; 10) eating disorders; 11) posttraumatic stress disorder (PTSD); and 12) schizophrenia.

Prevention interventions are programs that intervene before mental disorders develop. These programs typically aim to address underlying causes such as avoidable adversities that can lead to the development of mental disorders; they may be universal (offered to all children and/or families) or targeted (offered to those at risk). Meanwhile, treatment interventions include both psychosocial programs and medications.

The overarching goal is to assist in ensuring that all children in need in BC can access effective mental health interventions. The policy context is that of the BC Government's ongoing commitment to enhancing children's mental health services and to improving mental health outcomes for all children.

## 2. Methods

To compile the best available research evidence, we used systematic review methods adapted from the *Cochrane Collaboration* and *Evidence-Based Mental Health* to identify relevant randomized controlled trials (RCTs). We searched standard databases including Campbell, Cochrane, CINAHL, ERIC, Medline, PsycINFO and Web of Science for RCTs and/or systematic reviews. We built on work done for our previous peer-reviewed academic publications and our *Children's Mental Health Research Quarterly*. To ensure we included the most recent evidence, we conducted additional updating searches to identify new RCTs and systematic reviews for selected disorders where needed.

To be included, RCTs and systematic reviews had to be published in peer-reviewed journals. The interventions they assessed had to be delivered to children (aged 18 years or younger) and/or their families living in high-income countries (for comparability to BC). Study attrition had to be ≤20% or intention-to-treat analyses had to be performed. For most RCTs, we required two or more informant sources (e.g., child, parent and/or teacher). Nevertheless, to ensure comprehensiveness we made exceptions for RCTs assessing psychosocial interventions aimed at preventing ADHD, preventing or treating SUDs and treating bipolar disorder because few included two or more sources.

For psychosocial intervention studies, we required at least one informant source to be "blinded." In other words, child and/or family allocations to intervention or comparison groups were concealed from the assessors. The exceptions were RCTs on ADHD and PTSD prevention interventions and on psychosocial SUD interventions, because few included blinding. We also required follow-up of at least three months for all psychosocial interventions, with the exception of studies assessing OCD treatments because few tracked outcomes beyond the end of treatment.

For medication studies, we required double-blinding, that is, of both participants and assessors, as well as placebo controls and a comprehensive assessment of adverse events. The one exception was medications for schizophrenia, where we accepted studies directly comparing two medications without using a placebo, provided that one of the medications had already shown benefits in young people in a double-blind, placebo-controlled RCT. We excluded medications where the adverse events were particularly troubling and likely to outweigh potential benefits.

For disorders where research evidence was particularly abundant, we added criteria to ensure that we presented the best available evidence. For example, we required diagnostic outcomes for psychosocial prevention interventions for depression and required one-year follow-up for SUD prevention programs.

For all RCTs, we extracted outcomes for both diagnoses and core symptoms of the disorder, where possible. We classified measures of overall functioning as symptom measures. We reported outcomes at final follow-up, noting that RCTs vary considerably regarding this parameter. For example, most medication studies typically stopped at post-test, after children had been taking medications just several weeks, while many

psychosocial intervention studies followed children longer term, for months or years after the interventions ended.

For this report, for an intervention to be deemed effective, two or more RCTs conducted with children had to show statistically-significant reductions ($p < .05$) in disorder diagnoses and/or symptoms using reliable and valid measures. Throughout our process, all steps were conducted and verified by two or more team members, resolving any differences by consensus. The Appendix provides detailed information on our findings for each disorder.

This report is based on research evidence drawn from rigorous, high-quality studies evaluating intervention effectiveness, namely RCTs. RCTs are regarded as the best evidence for assessing the impact of health-related interventions.[3–4] We nevertheless acknowledge that this methodology has limitations — including under-representing Indigenous Peoples as well as Indigenous Methods and perspectives.[5–6]

We identified effective prevention interventions
for eight of the most common childhood mental disorders
and effective treatments for all twelve.

## 3. Findings

We identified effective treatments for all 12 childhood disorders covered in this review — as well as effective prevention interventions for eight. Regarding treatment, for seven disorders (anxiety disorders, ADHD, oppositional defiant and conduct disorders, depression, OCD and bipolar disorder) both psychosocial interventions and medications met our inclusion criteria. For four disorders (SUDs, autism spectrum disorder, eating disorders and PTSD) only psychosocial interventions met criteria. For the remaining disorder (schizophrenia) only medications met criteria.

We have presented our findings based on prevalence, starting with the most common, namely anxiety disorders.[2] We have also provided estimates of the number of BC children affected by each disorder at any given time, based on applying prevalence data to Statistics Canada population data.[7] ("Children" refer to those age 18 years or younger; "parent" refers to all individuals caring for children, including foster parents.)

We identified both universal and targeted prevention interventions. Universal prevention programs are delivered to entire populations, such as every student in a school, while targeted prevention programs are directed to children and families identified as being at risk, such as those experiencing disorder symptoms but not meeting full diagnostic criteria.

We have presented data on interventions for all anxiety disorders together because similar interventions were used for all. We have presented data on interventions for oppositional defiant and conduct disorders together for the same reason.

All effective interventions had at least two RCTs supporting their use with young people. For most disorders, we have presented data from the original RCTs. We have summarized these data in text, while also providing greater detail on the 113 RCTs that met our inclusion criteria in the Appendix. We have also included RCT data contained in systematic reviews for the treatment of five disorders. We did this because most of these systematic reviews included meta-analyses providing additional information, such as relative efficacy or cost-effectiveness comparisons. Where possible, we have also provided information on the effect sizes of interventions. Effect sizes detail the degree of difference that the intervention made in children's lives and help determine if intervention effects were clinically-meaningful.

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**British Columbia's children will benefit, as will everyone,**

**if children's mental health is made a high public policy priority.**

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## 3.1 Anxiety Disorders

### *Prevention*

Four cognitive-behavioural therapy (CBT) interventions, evaluated in five RCTs, proved effective in preventing anxiety diagnoses and/or symptoms with children.[8–13] One intervention was delivered universally while three were targeted. CBT typically involved educating children and families about anxiety, coaching children to reduce physical symptoms of anxiety using techniques such as deep breathing, teaching children to challenge unrealistic and unhelpful anxious thinking, and encouraging children to practice being in fear-provoking situations while managing their anxiety.[14] (Because very similar CBT techniques are used for preventing and treating each anxiety disorder, we review all anxiety disorders together.)

Notably, CBT prevention programs were effective in a variety of formats including teaching parents to provide CBT to their young children, delivering CBT to groups of children or to individual families, or via self-delivery. CBT was effective at preventing anxiety symptoms across developmental periods with children from four to 17 years. In addition to all reported findings being statistically significant, CBT also showed large effect sizes. For example, one RCT found that the odds of being diagnosed with an anxiety disorder was more than eight times lower when young people received CBT.[11–12]

### *Psychosocial Treatment*

CBT also proved highly effective for treating anxiety disorders — with nine programs, assessed in 12 RCTs, significantly reducing the number of children with anxiety disorders and/or anxiety symptoms.[15–27] As with prevention, CBT was effective in a variety of formats including teaching parents to provide CBT to their young children, delivering CBT to children individually or in groups, or via self-delivery. Also similar to prevention, CBT was effective with children from two to 17 years. Where effect sizes were calculated, most were substantial. When young people received CBT, the odds of no longer meeting diagnostic criteria for any anxiety disorder was 2.5 to 8.5 times higher across three RCTs,[18, 26–27] while the odds of no longer meeting criteria for their primary anxiety disorder was 3.7 to 4.9 times higher across two RCTs.[25, 27]

### *Medications*

Fluoxetine and sertraline effectively reduced anxiety symptoms in two RCTs each.[28–31] In one trial, fluoxetine also significantly reduced the number of children meeting criteria for their primary anxiety disorder.[28] One RCT calculated effects sizes, finding that young people prescribed sertraline had 3.9 times lower odds of continuing to have anxiety symptoms.[31] However, both medications produced adverse events. Nausea and drowsiness were common for fluoxetine while drowsiness and dry mouth were common for sertraline.[29–30]

Table 1 summarizes the anxiety intervention findings as well as the prevalence for anxiety disorders and the estimated number of BC children affected at any given time. The Appendix gives more details on the 21 RCTs evaluating anxiety interventions.

**Table 1. Effective Anxiety Disorder Interventions**

| **Anxiety Disorders** | **5.2% or 38,800 (4–18 years) in BC** |
|---|---|
| **Prevention:** Cognitive-behavioural therapy (5 RCTs)[8–13] | |
| **Treatment (Psychosocial):** Cognitive-behavioural therapy (12 RCTs)[15–27] | |
| **Treatment (Medication):** Fluoxetine (2 RCTs)[28–29] + sertraline (2 RCTs)[30–31] | |

## 3.2 Attention-Deficit/Hyperactivity Disorder

*Prevention*

Three targeted parent training interventions, evaluated in four RCTs, proved effective in reducing symptoms of ADHD with at-risk children.[32–38] (We use the phrase "parent training" because it is the term commonly used in the research literature for programs focusing on teaching parents specific skills to help with children's behavioural challenges.) Programs typically focused on teaching parents to encourage their child's positive behaviour by providing attention and praise and by discouraging challenging behaviours, including ignoring minor misbehaviours.[39] All three programs focused on parents with young children, including one that began during pregnancy. As well, all were delivered in groups. The Incredible Years program stood out by reducing ADHD symptoms across two RCTs.[32–33]

*Psychosocial Treatment*

Three parent training programs also proved successful in reducing ADHD symptoms or diagnoses in three RCTs. These programs were effective in varying formats including delivery in groups, to individual parents and via self-delivery. The programs were also effective for children from three to 18 years.[26, 40–41] The Strongest Families program stood out by reducing ADHD diagnoses. Specifically, the odds of children continuing to have an ADHD diagnosis five months after their parents completed the program was 2.7 times lower.[26]

As well, two multicomponent interventions reduced ADHD symptoms with school age children.[42–43] Both combined parent training with child behaviour therapy and child social skills training. Behaviour therapy involved rewarding children for positive behaviours, while social skills training involved teaching children strategies to improve relationships including taking turns and sharing.[43]

*Medications*

Methylphenidate, dextroamphetamine and atomoxetine were effective in significantly reducing ADHD symptoms based on a meta-analysis of 64 RCTs.[44] A cost-effectiveness analysis favoured methylphenidate and dextroamphetamine given that they were less expensive while being as effective as atomoxetine. However, all medications produced adverse events, including decreased appetite, insomnia and stomach-aches, without significant differences between them. Another meta-analysis of 26 RCTs found that methylphenidate used alone or in combination with psychosocial treatments was significantly more effective than psychosocial treatments alone.[45]

Table 2 summarizes the ADHD findings as well as the prevalence for ADHD and the estimated number of BC children affected at any given time. The Appendix gives more details on the 11 RCTs and the two meta-analyses evaluating the ADHD interventions.

**Table 2. Effective ADHD Interventions**

| **ADHD** | **3.7% or 27,600 (4–18 years) in BC** |
|---|---|
| **Prevention:** Parent training (4 RCTs)[32–38] | |
| **Treatment (Psychosocial):** Parent training (3 RCTs)[26, 40–41] + multicomponent interventions (2 RCTs in total)[42–43] with each including behaviour therapy, parent training + social skills training | |
| **Treatment (Medication):** Methylphenidate, dextroamphetamine + atomoxetine (2 meta-analyses including 78 RCTs)[44–45] | |

## 3.3 Oppositional Defiant and 3.4 Conduct Disorders

*Prevention*

Six parent training programs, evaluated in 10 RCTs, proved effective in preventing symptoms of oppositional defiant and conduct disorders — when delivered universally and to at-risk children.[46–58] Programs typically focused on teaching parents to encourage their child's positive behaviour by providing attention and praise and managing challenging behaviours, including by ignoring minor misbehaviours.[59] These parent training programs were delivered both in groups and individually, including using self-directed formats. While most participating parents had young children, typically preschool age, Nurse-Family Partnership began prenatally while Parent-Management Training included parents of children up to age 10. Among these programs, Triple P and Incredible Years stood out by showing success across multiple RCTs.[46, 48, 51–52, 57–58]

Five other programs, evaluated in five RCTs, also proved successful in reducing diagnosis and/or symptoms — by using either single interventions or multicomponent interventions. These included combinations of parent training, behaviour therapy, social skills training, enriched school curricula, and/or parent-school collaborations.[60–65] Behaviour therapy involved rewarding children for their positive behaviours while social

skills training taught children strategies to improve their relationships.[62] The enriched school curricula focused on building children's skills to promote school success, including self-control and critical thinking, while parent-school collaborations aimed to increase communication between parents and teachers.[62] Notably, all five programs were delivered in educational settings, beginning in grade one or earlier. Two programs — Good Behavior Game and Fast Track — stood out by showing very long-term success, including reducing antisocial personality disorder diagnoses in adulthood up to 14 years after the programs ended.[60,63]

*Psychosocial Treatment*

Two parent training interventions, evaluated in two RCTs, successfully reduced symptoms of behaviour disorders in young children.[66–68] For example, children whose parents who participated in Incredible Years had five times higher odds of *not* meeting diagnostic criteria for oppositional defiant disorder nearly eight years after the study ended, compared with children of parents who did not participate in the program.[66] As well, three youth-oriented interventions showed success in four RCTs.[69–72] One used cognitive-behavioural therapy (CBT) to teach young people strategies for coping and solving problems.[69] The two other programs used parent training and youth social skills training or CBT, delivering parent and youth components separately, as well as in family sessions.[70–73]

*Medications*

Risperidone reduced behaviour symptoms according to three RCTs.[74–76] However, adverse effects, including fatigue and weight gain, were frequent.[74–76]

Table 3 summarizes the intervention findings as well as the prevalence for oppositional defiant and conduct disorders and the estimated number of BC children affected at any given time. The Appendix gives more details on the 23 RCTs evaluating the oppositional defiant and conduct disorder interventions.

**Table 3. Effective Oppositional Defiant and Conduct Disorder Interventions**

| **Oppositional Defiant Disorder** | **3.3% or 24,600 (4–18 years) in BC** |
|---|---|
| **Conduct Disorder** | **1.3% or 9,700 (4–18 years) in BC** |
| **Prevention:** Parent training (10 RCTs)[46–58] + multicomponent interventions (5 RCTs in total with 1 RCT evaluating a single component)[60–65] including combinations of behaviour therapy, enriched school curricula, parent-school collaborations, parent training +/or social skills training. | |
| **Treatment (Psychosocial):** Parent training (2 RCTs)[66–68] + multicomponent interventions (4 RCTs in total with 1 RCT evaluating a single component)[69–73] including combinations of cognitive-behavioural therapy, parent training +/or social skills training | |
| **Treatment (Medication):** Risperidone (3 RCTs)[74–76] | |

## 3.5 Substance Use Disorders

*Prevention*

Six universal programs, evaluated in six RCTs, proved effective in reducing substance use. All were multicomponent interventions including combinations of resistance skills, parent training, child education, child social skills training, and child-and-family communication skills training.[77–86] Resistance skills focused on teaching young people to strategies to withstand peer pressure.[87] Parent training focused on enhancing skills including setting limits, rewarding adaptive behaviours and providing consequences for children's substance use.[84, 88] Child education involved teaching young people about the effects of substance use and correcting misbeliefs.[85] Child social skills training included teaching young people skills for establishing and maintaining positive peer relationships.[88] Communication skills training focused on improving dialogues between children and parents.[84, 89] Five programs were delivered to groups of children in schools, typically between grades six and nine, while one program used self-directed delivery with daughters and mothers.[84] Among the six programs, Unplugged stood out by showing success in two RCTs, with comparison youth having 1.3 times greater odds of drunkenness and 1.8 times greater odds of cannabis use in the past month.[85–86]

Three targeted prevention programs, evaluated in four RCTs, also proved effective in reducing substance use using either a single intervention or a multicomponent intervention.[88, 90–94] These interventions included motivational interviewing, cognitive-behavioural therapy (CBT), social skills training and education. Motivational interviewing included encouraging young people to examine the negative consequences of substance use as well as potential benefits for reducing it.[95] CBT included examining triggers for substance use, challenging beliefs that supported substance use and learning to avoid high risk situations. Of the three programs, two were delivered in groups and one was delivered individually — with young people who ranged from 10 to 18 years. The Preventure program — which was delivered in schools — stood out by showing success in two RCTs.[92, 94] As well, its effect size was moderately high, with one RCT showing that comparison youth had 1.4 times greater odds of showing symptoms of problematic alcohol use.

*Psychosocial Treatment*

Four programs, evaluated in six RCTs, proved effective in reducing substance use with young people who had a substance use disorder by using either a single intervention or a multicomponent intervention. These interventions included parent training, family communication skills, CBT, social skills training and motivational interviewing.[96–101] Family communication skills focused on teaching parents and children effective ways to engage with each other.[100] Three programs were delivered to either young people or their families, while one provided individual family sessions and a group for youth.[98] Of these four programs, Multidimensional Family Therapy stood out by showing positive outcomes in three RCTs, including one where participating teens had more than double of the odds of abstaining from substance use.[101]

Table 4 summarizes the main substance use findings as well as the prevalence for SUDs and the estimated number of BC children affected at any given time. The Appendix gives more details on the 16 RCTs evaluating substance use disorder interventions.

**Table 4. Effective Substance Use Disorder Interventions**

| **Substance Use Disorders** | **2.3% or 8,200 (12–18 years) in BC** |
|---|---|
| **Prevention:** Multicomponent interventions (10 RCTs in total with 1 RCT evaluating a single component)[77–95] including combinations of child education, cognitive-behavioural therapy, communication skills, motivational interviewing, parent training, resistance skills, +/or social skills training | |
| **Treatment (Psychosocial):** Multicomponent interventions (6 RCTs in total with 1 RCT evaluating a single component)[96–101] including combinations of cognitive-behavioural therapy, family communication skills, motivational interviewing, parent training +/or social skills training | |

## 3.6 Depression

### *Prevention*

Four targeted cognitive-behavioural therapy (CBT) interventions, evaluated in six RCTs, proved effective in reducing depression diagnoses and/or symptoms.[102–108] CBT typically involved educating children and families about depression, teaching children to challenge unrealistic and unhelpful thinking, and encouraging children to engage in more pleasurable and productive activities.[109] All CBT programs were delivered in groups, two provided to children and one to families. The remaining CBT intervention was a book that youth read. These interventions were completed by young people ranging in age from nine to 19 years. The program Coping with Stress stood out by showing positive outcomes across four RCTs, including three that reduced depression diagnoses. Effect sizes were also impressive. For example, in one RCT, two years after completing Coping with Stress, youth had 60% reductions in major depressive disorder diagnoses.[106]

### *Psychosocial Treatment*

A meta-analysis of 52 RCTs found that interpersonal therapy (IPT) and CBT effectively reduced depression symptoms in children.[110] IPT focused on helping young people make connections between depressive symptoms and specific problems such as grief and role transitions, and supporting them to develop strategies for addressing these problems.[111] Both IPT and CBT were more effective than treatment-as-usual, waitlist controls and play therapy at the end of treatment. However, at six- to 12-month follow-up, only IPT was more effective than treatment-as-usual. IPT was also more effective than CBT at follow-up.[110]

### *Medications*

Fluoxetine effectively reduced mood symptoms for children and youth across four RCTs.[112–115] However, fluoxetine also produced adverse events including significantly more "suicide-related events" (such as

attempts and suicidal thoughts)[116] and headaches than placebo.[114]

Table 5 summarizes the main depression findings as well as the prevalence for depression and the estimated number of BC children affected at any given time. The Appendix gives more details on the 10 RCTs and the meta-analysis evaluating the depression interventions.

**Table 5. Effective Depression Interventions**

| **Depression** | **1.3% or 9,700 (4–18 years) in BC** |
|---|---|
| **Prevention:** Cognitive-behavioural therapy (6 RCTs)[102–108] | |
| **Treatment (Psychosocial):** Interpersonal therapy + cognitive-behavioural therapy (meta-analysis including 52 RCTs)[110] | |
| **Treatment (Medication):** Fluoxetine (4 RCTs)[112–115] | |

## 3.7 Autism Spectrum Disorder

*Psychosocial Treatment*

Six behavioural and two cognitive-behavioural therapy (CBT) interventions improved core symptoms of autism spectrum disorder according to a systematic review of eight RCTs.[117] The behavioural interventions focused on increasing children's appropriate engagement in social interactions[118–123] while CBT taught children skills including taking others' perspective and adapting their behaviour to different situations.[124–125] Most behavioural interventions involved teaching individual parents skills to use with their children. The exception was a computer program for children.[123] In comparison, both CBT interventions were delivered to groups of children. All interventions focused on younger children, with behavioural interventions typically focused on preschoolers and CBT focused on school-age children.

Table 6 summarizes the main autism findings as well as the prevalence for autism spectrum disorder and the estimated number of BC children affected at any given time. The Appendix gives more details on the systematic review that reported the RCTs.

**Table 6. Effective Autism Spectrum Disorder Interventions**

| **Autism Spectrum Disorder** | **0.4% or 3,000 (4–18 years) in BC** |
|---|---|
| **Treatment (Psychosocial):** Behavioural + cognitive-behavioural therapy (1 systematic review including 8 relevant RCTs)[117] | |

## 3.8 Obsessive-Compulsive Disorder

*Psychosocial Treatment*

Nine cognitive-behavioural therapy (CBT) interventions proved effective in reducing OCD diagnoses and/or symptoms.[126–134] CBT typically began by providing children and parents with information about OCD, then teaching children anxiety management strategies — such as breathing and relaxation techniques — as well as how to challenge unrealistic and unhelpful anxious thinking. Children were also supported to confront their obsessions while resisting the urge to engage in compulsions.[135] CBT was effective whether it was delivered to individual children or individual families, including a version that families completed over the internet with only minimal support from a practitioner. CBT was also effective with children between three and 18 years.

*Medications*

Fluoxetine, sertraline, paroxetine and clomipramine proved effective in reducing OCD symptoms based on a meta-analysis of 13 RCTs.[136] Fluoxetine stood out by showing effectiveness in three RCTs and by having a more favourable adverse event profile. In contrast, clomipramine was associated with particularly concerning adverse events including serious heart rhythm abnormalities.[137] But notably, when compared, CBT produced significantly larger treatment effects than any of the medications.[136]

Table 7 summarizes the main OCD findings as well as the prevalence for OCD and the estimated number of BC children affected at any given time. The Appendix gives more details on the nine RCTs and one meta-analysis evaluating the OCD interventions.

**Table 7. Effective OCD Interventions**

| **OCD** | **0.3% or 2,200 (4–18 years) in BC** |
|---|---|
| **Treatment (Psychosocial):** Cognitive-behavioural therapy (9 RCTs)[126–134] | |
| **Treatment (Medication):** Fluoxetine, sertraline, paroxetine + clomipramine (1 meta-analysis including on 3 RCTs for fluoxetine + 2 RCTs for all other medications)[136] | |

## 3.9 Bipolar Disorder

*Psychosocial Treatment*

Three multicomponent interventions proved effective in reducing symptoms of bipolar disorder across four RCTs.[138–141] These interventions included family education, problem-solving and communication training. Family education included providing information about bipolar disorder while problem-solving focused on identifying problems, brainstorming solutions, then implementing the best of these. Communication training involved teaching skills to families including listening actively and providing effective feedback.[138, 141]

Importantly, most young people were also taking medications for their bipolar disorder. Two interventions were delivered to individual families while the third was delivered to children and parents in separate groups.

*Medications*

Lithium was effective in reducing bipolar disorder symptoms according to two RCTs.[142–143] However, it was associated with adverse events including excessive thirst, nausea, vomiting, headache and tremor, among others.[142–143]

Table 8 summarizes the main bipolar findings as well as the prevalence for bipolar disorder and the estimated number of BC children affected at any given time. The Appendix gives more details on the six RCTs evaluating the bipolar interventions.

**Table 8. Effective Bipolar Disorder Interventions**

| **Bipolar Disorder** | **0.3% or 1,100 (12–18 years) in BC** |
|---|---|
| **Treatment (Psychosocial):** Multicomponent interventions including combinations of communication skills, family education + problem-solving (adjunctive to medications in most cases) (4 RCTs)[138–141]<br>**Treatment (Medication):** Lithium (2 RCTs)[142–143] | |

## 3.10 Eating Disorders

*Prevention*

Four multicomponent interventions, evaluated in five RCTs, proved effective in reducing symptoms of eating disorders, including one universal program and three that were targeted.[144–150] Program components included discouraging unhealthy weight control practices, such as dieting, and encouraging positive body image using strategies such as challenging negative thoughts that young people had about their bodies.[146–147, 150] Additional components included media literacy training — which involved developing skills to address an overemphasis on thinness — and implementing a healthy lifestyle plan, including changes to food intake and activity levels.[144, 149–150] Three programs were delivered to groups of girls, while one was self-directed and included both boys and girls. The universal program stood out by reducing bulimia diagnoses.[144]

*Psychosocial Treatment*

Family therapy resulted in significantly more young people achieving remission from anorexia nervosa at follow-up compared with individual child therapy, based on a meta-analysis of three RCTs.[151] Family therapy focused on helping parents avoid blaming themselves for their child's eating disorder and helping the family develop a plan for restoring the child's weight through eating meals together — until the child was able to take more control over their own eating.[152–153] Family therapy also resulted in significantly more

young people achieving remission from bulimia nervosa at follow-up compared with individual child therapy, based on two RCTs covered in the same meta-analysis.[151] Family therapy for bulimia nervosa emphasized parental management of children's eating behaviours.[154]

Table 9 summarizes the eating disorder findings as well as the prevalence for eating disorders and the estimated number of BC children affected at any given time. The Appendix gives more details on the five RCTs and one meta-analysis evaluating the eating disorder interventions.

**Table 9. Effective Eating Disorder Interventions**

| **Eating Disorders** | **0.2% or 700 (12–18 years) in BC** |
|---|---|
| **Prevention:** Multicomponent interventions (5 RCTs in total)[144–150] including combinations of discouraging unhealthy weight control practices, encouraging positive body image, implementing healthy lifestyle plan +/or media literacy training<br>**Treatment (Psychosocial):** Family therapy (1 meta-analysis including 5 RCTs)[151] | |

## 3.11 Posttraumatic Stress Disorder

*Prevention*

Four targeted cognitive-behavioural therapy (CBT) interventions, evaluated in five RCTs, proved effective in reducing posttraumatic stress symptoms in children who had been maltreated.[155–160] CBT typically involved teaching children specific skills including recognizing emotions, solving problems and managing anger.[155] Importantly, parents were involved in three of the programs, including being taught ways to support their children and improve communications with them.[158–160] Two interventions were delivered in groups and two delivered to individual families. Participating children ranged from six to 17 years.

*Psychosocial Treatment*

Three CBT interventions proved successful in reducing posttraumatic stress disorder (PSTD) symptoms and/or diagnoses.[161–163] One reduced PTSD diagnoses and symptoms in girls who had been sexually abused.[162] The other two reduced symptoms for children exposed to a variety of traumas.[161, 163] These CBT interventions typically included educating children about common reactions to trauma, teaching breathing exercises, and helping children to recount their traumatic experiences while being supported.[161–162] Two interventions were delivered to individual children while one was delivered in groups. Participating children ranged from seven to 18 years.

Table 10 summarizes the main PTSD findings as well as the prevalence for PTSD and the estimated number of BC children affected at any given time. The Appendix gives more details on the eight RCTs evaluating the PTSD interventions.

**Table 10. Effective PTSD Interventions**

| PTSD | 0.1% or 700 (4–18 years) in BC |
|---|---|
| **Prevention:** Cognitive-behavioural therapy (5 RCTs, 2 of which also included parent training)[144–150]<br>**Treatment (Psychosocial):** Cognitive-behavioural therapy (3 RCTs)[161–163] | |

## 3.12 Schizophrenia

*Medications*

Aripiprazole and olanzapine were both effective in reducing schizophrenia symptoms according to two RCTs each.[164–167] However, these medications were associated with adverse events. Sedation and tremors were common with aripiprazole, while elevated prolactin levels and weight gain were common with olanzapine.[165–166]

Table 11 summarizes the schizophrenia findings well as the prevalence for schizophrenia and the estimated number of BC children affected at any given time. The Appendix gives more details on the four RCTs evaluating these medications.

**Table 11. Effective Schizophrenia Interventions**

| Schizophrenia | 0.1% or 400 (12–18 years) in BC |
|---|---|
| **Treatment (Medication):** Aripiprazole (2 RCTs)[164–165] + olanzapine (2 RCTs)[166–167] | |

Psychosocial interventions can be cost-effective,
in addition to being clinically effective.

# 4. Conclusions

## 4.1 Prevention

We found effective prevention interventions for eight of the 12 most common childhood mental disorders including anxiety disorders, ADHD, oppositional defiant and conduct disorders, SUDs, depression, eating disorders and PTSD. These findings show that there are numerous opportunities to protect children from the unnecessary distress and impairment caused by these disorders. Still, despite strong evidence for prevention, these kinds of programs receive limited funding in most jurisdictions. In Canada, public health spending has constituted only 5.4% of health expenditures overall.[168] This suggests there are considerable opportunities for further investments in prevention. BC has shown leadership in this area, including making significant investments in three prevention programs identified in this review. This includes developing CBT resources for teachers, school counsellors and parents to support children with anxiety.[169] BC has also invested in Parent Management Training – Oregon, adapted for local use, called Confident Parents: Thriving Kids.[169] Finally, Nurse Family Partnership is being evaluated through the BC Healthy Connections Project[170–171] and is being provided as an enhanced public health service to young first-time mothers and their children in four regional health authorities.[172]

Prevention investments also confer benefits to society as a whole through averted "downstream" costs in the healthcare, special education, child protection and justice systems — as well as reducing economic losses associated with people's societal contributions when disorders persist unnecessarily into adulthood.[173–174] For example, preventing a single case of conduct disorder has been estimated to yield lifetime savings of $5–8 million per child.[175] (All figures reflect 2020 CAD values.) Regarding the prevention of behaviour disorders more generally, economic returns have been estimated for five successful programs covered in this review. Most calculations involve net benefit estimations, which account for both program delivery costs and long-term saving across multiple public service sectors — both for participants and for society — such as savings resulting from reductions in crime.[174] Using this approach, Incredible Years produced returns of approximately $9 thousand per child.[176] Similarly, the Good Behaviour Game led to net benefits of approximately $14 thousand per child[176] while Nurse-Family Partnership and Parent Management Training led to net benefits of $6 thousand and $8 thousand per child, respectively.[176] The estimated benefits of Perry Preschool were calculated using a different metric, with estimated returns of approximately $10–23 dollars for every dollar invested.[177] In other words, as well as effectively preventing disorders and/or symptoms from arising, these successful programs may pay for themselves by reducing the use of other public services over time.[176]

## 4.2 Psychosocial Treatments

We found effective psychosocial treatments for 11 of the 12 mental disorders covered in this review including anxiety, ADHD, oppositional defiant and conduct disorders, SUDs, depression, autism, OCD, bipolar disorder, eating disorders and PTSD. Notably, many effective treatments resulted in children

experiencing benefits beyond symptom reductions — including disorder remission. As well, gains were often enduring, with 15 interventions — evaluated in 17 RCTs — showing benefits persisting for a year or more post-treatment. Also, many treatments were delivered efficiently, in group and self-directed formats, allowing more children to be reached.

Several psychosocial treatments had particularly strong evidence of effectiveness, including multiple RCTs showing beneficial outcomes and large effect sizes, warranting their use as a first-line treatment. These include: CBT for anxiety, PTSD and OCD; parent training for oppositional defiant and conduct disorders; IPT for depression; behavioural interventions for autism spectrum disorder; and family therapy for eating disorders. Parent training also has evidence of success in helping youth with SUDs as well as helping children with ADHD, particularly when combined with an effective medication. Similarly, problem-solving and communication skills training may be helpful adjunctively to medication for young people with bipolar disorder.

Psychosocial interventions can be cost-effective, in addition to being clinically effective. This has been demonstrated through net benefit calculations which account for both program delivery costs and long-term saving across multiple public service sectors — for participants and for society. According to estimates from such economic evaluations, CBT for childhood anxiety disorders produced a net benefit of approximately $14 thousand per child.[176] (All figures reflect 2020 CAD values.) Similarly, CBT for childhood OCD produced a net benefit of nearly $16 thousand per child.[176] Parent training for ADHD produced a net benefit of slightly more than $12 thousand per child.[176] As well, two programs for oppositional defiant and conduct disorders — Multidimensional Treatment Foster Care and Multisystemic Therapy — showed net benefits of approximately $43 and $24 thousand per child respectively.[176] As well as effectively treating children's symptoms, impairment and distress, these programs may therefore also pay for themselves by reducing the use of other public services over time.

## 4.3 Medications

Medications showed success in treating eight of the 12 disorders covered in this review including anxiety, ADHD, oppositional defiant and conduct disorders, depression, OCD, bipolar disorder and schizophrenia. However, there is strong evidence that psychosocial interventions alone can suffice for effectively treating anxiety, oppositional defiant and conduct disorders, depression and OCD. Psychosocial interventions should therefore be offered first for these disorders — and medications only considered after psychosocial interventions have been maximized, particularly considering medication side effects. For example, while risperidone may reduce symptoms of oppositional defiant and conduct disorders, it can lead to serious cardiovascular and endocrine adverse events.[137] As well, medications for these disorders do not yield the same long-term gains that psychosocial interventions do.

Even for conditions where medications are considered a first-line treatment — such as ADHD, bipolar disorder and schizophrenia — risks and benefits must still be carefully weighed. For example, longer-term use of methylphenidate and dextroamphetamine has been associated with decreases in children's height

and weight.[178] As well, while lithium can address bipolar symptoms, it can also cause renal and endocrine problems, among other difficulties, and consequently requires ongoing monitoring.[179] Similarly, while aripiprazole and olanzapine can address schizophrenia symptoms, both require careful oversight to ensure that cardiovascular and other side effects are managed.

There is also a clear need to evaluate medications that are being prescribed to young people — but where high-quality studies are lacking.[180] For example, young people with opioid use disorders are sometimes prescribed suboxone or methadone, even though these drugs have yet to be rigorously evaluated for use in youth.[181]

## 4.4 Moving Forward

Mental disorders typically start in childhood and cause significant impairment and distress — interfering with development and preventing children from flourishing and reaching their potential.[182] Beyond the hardships that these disorders cause for individual children and families, there are also significant avoidable costs for society as a whole.[176] Adding to the burdens, without effective prevention or treatment interventions early in life, mental disorders often persist into adulthood, causing distress and avoidable costs over the lifespan.[183–184]

Based on 113 randomized controlled trials (RCTs) and six systematic reviews, we identified effective prevention interventions for eight of the most common childhood mental disorders and effective treatments for all 12. However, estimates from high-quality epidemiological studies indicate that an estimated 55.8% of children with mental disorders — or nearly 53,000 children in BC — do not receive services for these disorders in a typical year.[2] These estimates suggest stark service shortfalls, even apart from the question of effective services.

To address these high levels of need, a first step is adopting a comprehensive population health strategy for children's mental health. Such a strategy includes:

1) Addressing social determinants and reducing avoidable childhood adversities that contribute to the development of mental health problems
2) Providing effective prevention programs, such as those reported here, for children at risk
3) Providing effective treatments, such as those reported here, for all children with disorders, and
4) Monitoring needs and outcomes over time to evaluate and improve intervention efforts.

Vigorous central leadership is also required to ensure that such a plan is sustained over time, accompanied by adequate and dedicated children's mental health budgets, and coordinated across all relevant sectors within government. BC's children will benefit, as will everyone, if children's mental health is made a high public policy priority — and if children's mental health needs are better met.

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# Appendix: Study and Intervention Details

| Anxiety Disorder Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age/Grade** | **Duration** | **Follow-up** | **Anxiety outcomes (Effect sizes)** |
| **Prevention – Universal** | | | | | |
| MoodGYM [8] | Self-directed child cognitive-behavioural therapy (CBT) | 12–17 years | 1¼ months | 6 months | ↓ 1 of 1 symptom (*d*=0.25) |
| **Prevention – Targeted** | | | | | |
| Cool Little Kids **G** [9] | Parent CBT training | 4 years | 3 months | 9 months | × Any diagnoses<br>↓ 1 of 1 symptom |
| Coping and Promoting Strength [10] | Family CBT | 7–12 years | 5 months | 9 months | ↓ Any diagnoses<br>↓ 2 of 3 symptoms (*d*=0.82–1.99) |
| Coping and Promoting Strength [11–12] | Family CBT | 6–13 years | 5 months | 9 months | ↓ Any diagnoses (OR=8.54)<br>↓ 3 of 4 symptoms (*d*=0.54–0.74) |
| Friends **G** [13] | Child CBT + parent education | Grade 7 | 5½ months | 3¾ years | × Any diagnoses<br>↓ 1 of 2 symptoms |
| **Psychosocial Treatment** | | | | | |
| Cool Kids **G** [15] | Child CBT + parent CBT training | 7–16 years | 2½ months | 3 months | ↓ Primary diagnoses<br>↓ Any diagnoses<br>↓ 3 of 6 symptoms |
| Cool Little Kids plus Social Skills **G** [16] | Parent CBT training + child social skills training | 2–5 years | 2½ months | 3 months | ↓ Any diagnoses<br>↓ # of diagnoses (*d*=1.76)<br>↓ 3 of 5 symptoms (*d*=0.89–2.11) |
| Coping Cat [17] | Child CBT | 7–14 years | 4 months | 1 year | × Primary diagnoses<br>↓ 1 of 8 symptoms |
| Coping Cat [18] | Child CBT | 9–14 years | Not reported | 1 year | ↓ Any diagnoses (OR=3.29)<br>↓ 1 of 3 symptoms (OR=2.56) |
| Coping Koala **G** [19] | Child CBT + parent CBT training | Grades 3–7 | 2½ months | 2 years | ↓ Any diagnoses<br>↓ 2 of 6 symptoms |
| Friends **G** [20–21] | Child CBT | Grades 2–5 | 5 months | 3 months | × Primary diagnoses<br>× New diagnoses |
| | | | | 2¾ years | ↓ 1 of 5 symptoms |
| One-Session Treatment [22] | Child CBT | 7–16 years | 3 hours | 6 months | ↓ Primary diagnoses<br>↓ 1 of 6 symptoms |
| Parent Education Program **G** [23] | Parent CBT training | 3–4 years | 2½ months | 3 years | ↓ Any diagnoses<br>↓ 2 of 3 symptoms |
| Skills for Academic and Social Success **G** [24] | Child CBT + parent + teacher education | Grades 9–11 | 5 months | 4 months | ↓ Primary diagnoses<br>↓ 2 of 5 symptoms |
| Skills for Academic and Social Success **G** [25] | Child CBT + parent + teacher education | Grades 9–11 | 5 months | 3 months | ↓ Primary diagnoses (OR=4.89)<br>↓ 3 of 5 symptoms (OR=16.21; *d*=0.38–0.93) |
| Strongest Families – Chase Worries Away [26] | Self-directed family CBT with coaching | 6–12 years | 6½ months | 5½ months | ↓ Any diagnoses (OR=2.51) |
| Timid to Tiger **G** [27] | Parent CBT training | 2–9 years | 2½ months | 1 year | ↓ Primary diagnoses (OR=3.68)<br>↓ Any diagnoses (OR=8.50)<br>× 3 of 3 symptoms |
| **Medication** | **Also sold as** | **Age** | **Duration** | **Follow-up** | **Anxiety outcomes (Effect sizes)** |
| Fluoxetine [28] | Prozac | 7–17 years | 3 months | none | ↓ Primary diagnoses<br>↓ 4 of 8 symptoms |
| Fluoxetine [29] | Prozac | 7–17 years | 3 months | none | ↓ 1 of 6 symptoms |
| Sertraline [30] | Zoloft | 5–17 years | 2¼ months | none | ↓ 6 of 7 symptoms |
| Sertraline [31] | Zoloft | 7–17 years | 3 months | none | ↓ 2 of 2 symptoms (OR=3.9; *g*=0.45) |

*Anxiety outcomes included two different sources, including at least one that was blinded; for prevention and psychosocial treatment studies, postintervention follow-up was 3 months or more. ↓ Outcome was statistically significant *d* = Cohen's *d* **G** = Group delivery × Outcome was not statistically significant OR = Odds ratio *g* = Hedges' *g*

| Attention-Deficit/Hyperactivity Disorder (ADHD) Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age/Grade** | **Duration** | **Follow-up** | **ADHD outcomes (Effect sizes)** |
| **Prevention – Targeted** | | | | | |
| Incredible Years **G** [32] | Parent Training (PT) | 3–4 years | 3 months | 3 months | ↓ 1 of 1 symptom |
| Incredible Years + Literacy training **G** [33–34] | PT | 5–6 years | 6½ months | 4 months | ↓ 1 of 1 symptom |
| Legacy for Children **G** [35–36] | PT | Prenatal | 3¼ years | 2 years | ↓ 1 of 1 symptom (OR=0.50) |
| SAFE Children **G** [37–38] | PT + child tutoring | 6 years | 5 months | 4¼ years | ↓ 1 of 6 symptoms |
| **Psychosocial Treatment** | | | | | |
| Behavioural and Social Skills Class **G** [42] | Child behaviour therapy (BT) + social skills training (SST) + PT | 5–12 years | 1¾ months | 3 months | ↓ 1 of 2 symptoms |
| Child Social Skills and Parenting Group **G** [43] | Child BT + SST + PT | 8–10 years | 1¾ months | 3–4 months | ↓ 1 of 2 symptoms (*d*=0.76) |
| New Forest Parenting Programme [40] | PT | 3–7 years | 2¾ months | 8¼ months | ↓ 1 of 3 symptoms (*d*=0.25) |
| Parenting Group **G** [41] | PT | 5–18 years | 3 months | 1 year | ↓ 1 of 5 symptoms |
| Strongest Families – Parenting the Active Child [26] | Self-directed PT | 8–12 years | 3 months | 5 months | ↓ ADHD diagnosis (OR=2.74) |
| **Medication** | **Also sold as** | **Age** | **Duration** | **Follow-up** | **ADHD outcomes (Effect sizes)** |
| Methylphenidate [185] | Concerta | 8–17 years | 1¾ months | none | ↓ 3 of 3 symptoms (*d*=0.23–0.52) |
| Methylphenidate [186] | Concerta | 6–12 years | ¾ month | none | ↓ 3 of 3 symptoms |
| **Systematic Reviews** | | | | | |
| **Medication** | | | | | |
| Methylphenidate, dextroamphetamine and atomoxetine were effective in significantly reducing ADHD symptoms. All produced similar side effects. Cost-effectiveness analysis favoured methylphenidate and dextroamphetamine given that these medications were less expensive while being as effective as atomoxetine based on 64 RCTs.[44] | | | | | |
| **Medication and Psychosocial Treatment** | | | | | |
| Methylphenidate, alone or combined with psychosocial treatments, were significantly more effective than psychosocial treatments alone at end of treatment based on 26 RCTs. The effect sizes were largest for combined treatments (*d*=1.77–1.89) compared to medications alone (*d*=1.53–1.83) and psychosocial alone (*d*=0.75–0.87) based on parent and teacher ratings.[45] | | | | | |
| *ADHD prevention outcomes included one source while psychosocial treatment outcomes included two differences sources, including at least one that was blinded; for prevention and psychosocial treatment studies, postintervention follow-up was 3 months or more.<br>**G** = Group delivery ↓ Outcome was statistically significant OR = Odds ratio *d* = Cohen's *d* | | | | | |

| Conduct and Oppositional Defiant Disorder Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age/Grade** | **Duration** | **Follow-up** | **Behaviour outcomes (Effect sizes)** |
| **Prevention – Universal** | | | | | |
| Good Behavior Game **G** [60] | Child behaviour therapy (BT) | Grade 1 | 2 school years | 14 years | ↓ Antisocial personality diagnoses |
| Triple P **G** [46–47] | Parent training (PT) | 3–6 years | 1 month | 4 years | ↓ 2 of 8 symptoms |
| Triple P **G** [48–49] | PT | Grade 1 | 1 month | 8 years | ↓ 2 of 7 symptoms (*d*=0.11–0.15) |
| **Prevention – Targeted** | | | | | |
| Chicago Parent Program **G** [50] | PT | 2–4 years | 2¾ months | 1 year | ↓ 2 of 4 symptoms |
| Classroom-Centred Intervention **G** [61–62] | Child social skills training (SST), BT + enriched curricula | Grade 1 | 1 school year | 5 years | ↓ Conduct diagnoses (OR=0.42) |
| | | | | 5–11 years | ↓ 1 of 1 symptom |
| Family School Partnership **G** [61–62] | PT + parent-school collaboration | Grade 1 | 1 school year | 5 years | × Conduct diagnoses |
| | | | | 5–11 years | ↓ 1 of 1 symptom |
| Fast Track **G** [63–64] | PT, child SST+ tutoring | Grade 1 | 10 school years | 8 years | ↓ Antisocial personality diagnoses (OR=0.60)<br>↓ 2 of 5 symptoms |
| Incredible Years Basic **G** [51] | PT | 3–4 years | 2¾ months | 3¼ months | ↓ 2 of 4 symptoms (*d*=0.63–0.89) |
| Incredible Years Enhanced **G** [52] | PT | 2–5 years | 9–11 months | 8 months | ↓ 1 of 2 symptoms |
| Nurse Family Partnership [53] | PT | Prenatal | 2¼ years | 13 years | ↓ 3 of 14 symptoms |
| Parent-Management Training – Oregon **G** ♂ [54] | PT | 6–10 years | 3¼ months | 8¾ years | ↓ 3 of 3 symptoms (*d*=0.28) |
| Perry Preschool **G** [65] | Parent school collaboration + enriched curricula | 3–4 years | 1¼ years | 35 years | ↓ 2 of 9 symptoms (OR=0.48–0.54) |
| Strongest Families Smart Website [55–56] | Self-directed PT with coaching | 4 years | 10 months | 1¼ years | ↓ 1 of 2 symptoms (*d*=0.22) |
| Triple P Online [57] | Self-directed PT with coaching | 2–8 years | 4 months | 5 months | ↓ 2 of 3 symptoms (*d*=0.70–1.28) |
| Triple P Online Brief [58] | Self-directed PT | 2–9 years | 2 months | 9 months | ↓ 2 of 4 symptoms (*d*=0.39–0.41) |
| **Psychosocial Treatment** | | | | | |
| Brief Intervention [69] | Child cognitive-behavioural therapy (CBT) | 11–17 years | ½ month | 2 years | ↓ 1 of 1 symptom |
| Incredible Years Basic **G** [66–67] | PT | 3–7 years | 3–3¾ months | 7¾ years | ↓ Oppositional defiant diagnoses (OR=0.20)<br>↓ 1 of 3 symptoms |
| Multidimensional Treatment Foster Care **G** ♂ [70–71] | PT + child SST | 12–17 years | 6¾ months | 1½ years | ↓ 2 of 2 symptoms |
| Multidimensional Treatment Foster Care **G** ♀ [72] | PT+ child SST | 13–17 years | 5¾ months | 1½ years | ↓ 1 of 3 symptoms |
| Multitsystemic Therapy ♂ [73] | PT + child CBT | 11–17 years | 7 months | 1½ years | ↓ 1 of 2 symptoms (OR=0.41) |
| Parent-Child Interaction Therapy [68] | PT | 2–7 years | 5 months | 1 year | ↓ 2 of 5 symptoms (*d*=0.61–0.64) |
| **Medication** | **Also sold as** | **Age** | **Duration** | **Follow-up** | **Behaviour outcomes** |
| Risperidone [74] | Risperdal | 12–18 years | 1½ months | none | ↓ 1 of 3 symptoms |
| Risperidone [75] | Risperdal | 6–14 years | 2½ months | none | ↓ 5 of 6 symptoms |
| Risperidone [76] | Risperdal | 5–12 years | 1½ months | none | ↓ 3 of 3 symptoms |

*Behaviour outcomes included two different sources, including at least one that was blinded; for prevention and psychosocial treatment studies, postintervention follow-up was 3 months or more. **G** = Group delivery ↓ Outcome was statistically significant *d* = Cohen's *d* OR = Odds ratio × Outcome was not statistically significant ♂ = Boys only ♀ = Girls only

| Substance Use Disorder Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age/Grade** | **Duration** | **Follow-up** | **Substance use outcomes (Effect sizes)** |
| **Prevention – Universal** | | | | | |
| Iowa Strengthening Families **G** [77] | Parent training (PT) + child resistance skills | Grade 6 | 1½ months | 9 years | ↓ 2 of 4 symptoms (RRR=19%–21%) |
| Life Skills Training **G** [78–79] | Child social skill training (SST) + resistance skills | Grade 7 | 1¾ school years | 1 year | ↓ 2 of 5 symptoms |
| Preparing for the Drug Free Years **G** [77, 80] | PT + child resistance skills | Grade 6 | 1¼ months | 9–10 years | ↓ 1 of 5 symptoms (RRR=11%) |
| Project PATHS **G** [81–83] | Child communication skills + SST | Grades 7–9 | 3 school years | 2 years | ↓ 6 of 7 symptoms |
| Substance Use Prevention for Girls ♀ [84] | Self-directed child communication skills + resistance skills + PT | 11–13 years | 2¼ months | 1 year | ↓ 3 of 3 symptoms |
| Unplugged **G** [85] | Child education + resistance skills | Junior high schoolers | 2¾ months | 1¼ years | ↓ 2 of 4 symptoms (OR=0.62–0.80) |
| Unplugged **G** [86] | Child education + resistance skills | Grade 6 | 1 school year | 2 years | ↓ 1 of 5 symptoms (OR=0.56) |
| **Prevention – Targeted** | | | | | |
| CHAT [90] | Child motivational interviewing (MI) | 12–18 years | 15 minutes | 1 year | ↓ 2 of 7 symptoms |
| Middle School Success **G** ♀ [88] | Child SST + coaching + caregiver training | 10–12 years | 1 year | 2 years | ↓ 1 of 2 symptoms (*d*=0.57) |
| Preventure **G** [91–92] | Child education, MI + cognitive-behavioural therapy (CBT) | Grades 8–10 | ½ month | 2 years | ↓ 3 of 5 symptoms (*d*=0.18–0.25) |
| Preventure **G** [93–94] | Child education, MI + CBT | Grade 8 | ½ month | 2 years | ↓ 3 of 6 symptoms (OR=0.71) |
| **Psychosocial Treatment** | | | | | |
| Adolescent Cannabis Check-Up [96] | Child MI + CBT | 14–19 years | ½ month | 3 months | ↓ 3 of 3 symptoms (*d*=0.22–0.71) |
| Brief Intervention [97] | Child MI | Grade 9–12 | ½ month | 6 months | ↓ 4 of 5 symptoms |
| | Child MI + PT | Grade 9–12 | ¾ month | 6 months | ↓ 2 of 5 symptoms |
| Integrated Family + Cognitive-Behavioural Therapy **G** [98] | Family communication skills, PT + child CBT | 14–18 years | 3¾ months | 6 months | ↓ 2 of 3 symptoms |
| Multidimensional Family Therapy [99] | Family communication skills, PT + Child SST | 13–18 years | 6 months | 6 months | ↓ 1 of 3 symptoms (*d*=1.66) |
| Multidimensional Family Therapy [100] | Family communication skills, PT + Child SST | 12–17 years | 4–6 months | 1 year | ↓ 3 of 6 symptoms (*d*=0.32–0.59) |
| Multidimensional Family Therapy [101] | Family communication skills, PT + Child SST | 11–15 years | 3–4 months | 8¼ months | ↓ 3 of 5 symptoms (*d*=0.77–1.36; OR=2.20) |

*SUD outcomes included one source; for prevention studies, postintervention follow-up was 1 year or more; for treatment studies, postintervention follow-up was 3 months or more; for universal prevention programs, all interventions were delivered in schools.
**G** = Group delivery ↓ Outcome was statistically significant RRR = Relative risk reduction ♀ = Girls only OR = Odds ratio
*d* = Cohen's *d*

| Depression Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age/Grade** | **Duration** | **Follow-up** | **Mood outcomes (Effect sizes)** |
| **Prevention – Targeted** | | | | | |
| Coping with Stress **G** [102] | Child cognitive-behavioural therapy (CBT) | Grades 9–10 | 1¼ months | 1 year | ↓ depression/dysthymia diagnoses<br>× 4 of 4 symptoms |
| Coping with Stress **G** [103] | Child CBT + parent education | 13–18 years | 3½ months | 2 years | × depression diagnoses<br>↓ 4 of 6 symptoms |
| Coping with Stress **G** [104] | Child CBT | 14–19 years | 1½ months | 4½ months | ↓ depression diagnoses (OR=2.5)<br>↓ 2 of 2 symptoms (*d*=0.39–0.42) |
| Coping with Stress **G** [105–106] | Child CBT | 13–19 years | 1½ months | 2 years | ↓ depression diagnoses (HR=2.48) |
| Family Group CBT **G** [107] | Family CBT | 9–15 years | 2¾ months | 1½ years | ↓ depression diagnoses (OR=2.91)<br>×1 of 1 symptom |
| Feeling Good [104] | CBT book | 14–19 years | 1½ months | 4½ months | ↓ depression diagnoses (OR=4.5)<br>↓ 1 of 2 symptoms (*d*=0.28) |
| Icelandic Prevention **G** [108] | Child CBT | 14–15 years | 2½ months | 1 year | ↓ depression/dysthymia diagnoses (HR=0.18) |
| **Systematic Review** | | | | | |
| **Psychosocial Treatment** | | | | | |
| Interpersonal Therapy (IPT) and CBT were the only psychotherapies among the nine assessed that were significantly more effective than most comparison conditions at the end of treatment and follow-up based on 52 RCTs. IPT produced slightly larger effect sizes than CBT at both end of treatment and at follow-up (IPT Surface under the cumulative ranking curve at post-test=90.5%; at follow-up=90.3%).[110] | | | | | |
| **Randomized Controlled Trials** | | | | | |
| **Medication** | **Also sold as** | **Age** | **Duration** | **Follow-up** | **Mood outcomes (Effect sizes)** |
| Fluoxetine [112] | Prozac | 12–17 years | 2¾ months | none | ↓ 3 of 7 symptoms |
| Fluoxetine [113] | Prozac | 7–17 years | 1¾ months | none | ↓ 2 of 4 symptoms |
| Fluoxetine [114] | Prozac | 8–17 years | 2 months | none | ↓ 4 of 5 symptoms (*d*=0.31–0.54) |
| Fluoxetine [115] | Prozac | 13–19 years | 3¾ months | none | ↓ 1 of 2 symptoms (*g*=0.78) |
| *Mood outcomes included two different sources, including at least one that was blinded; for prevention and psychosocial treatment studies, postintervention follow-up was 3 months or more and included diagnostic outcomes. **G** = Group delivery ↓ Outcome was statistically significant × Outcome was not statistically significant OR = Odds ratio *d* = Cohen's *d* HR = Hazard ratio *g* = Hedges' *g* | | | | | |

| Autism Spectrum Disorder Evidence |
|---|
| **Systematic Review** |
| **Psychosocial Treatment** |
| Behavioural and cognitive-behavioural interventions with preschool and school-age children produced improvements in communication, socialization and adaptive behaviour based on eight RCTs contained in a systematic review (SR). Five behavioural programs taught parents strategies to encourage their children's social interactions. The remaining three programs taught children social skills in groups or using a computer program.[117] |

| Obsessive-Compulsive Disorder (OCD) Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age** | **Duration** | **Follow-up** | **OCD outcomes (Effect size)** |
| **Psychosocial Treatment** | | | | | |
| Cognitive-Behavioural Therapy (CBT) [126] | Child CBT | 9–18 years | 3 months | none | ↓ 1 of 2 symptoms (*d*=1.07) |
| CBT [127] | Child CBT | 10–18 years | 3 months | none | ↓ OCD diagnosis<br>↓ 4 of 4 symptoms (*d*=1.6–2.2) |
| CBT + Positive Family Interaction Therapy † [134] | Child CBT + family education + problem-solving | 8–17 years | 2¾ months | none | ↓ 2 of 3 symptoms (φ=0.28) |
| Family-based CBT [129] | Family CBT | 3–8 years | 1½ months | none | ↓ 5 of 5 symptoms (*d*=1.24–1.69) |
| Family-based CBT [130] | Family CBT | 5–8 years | 3¼ months | none | ↓ 3 of 4 symptoms (*d*=0.31–0.84) |
| Family-based CBT [132] | Family CBT | 8–17 years | 3¼ months | none | ↓ 1 of 4 symptoms |
| Internet-Delivered Family CBT [131] | Family CBT | 7–16 years | 2¾ months | none | ↓ 5 of 5 symptoms ($\eta^2$=0.16–0.44) |
| Internet-Delivered Family CBT [133] | Self-directed family CBT with coaching | 12–17 years | 2¾ months | none | ↓ 6 of 7 symptoms (*d*=0.69) |
| Telephone-Delivered CBT** [128] | Child CBT | 11–18 years | 4 months | 1 year | ↓ 2 of 3 symptoms |
| **Systematic Review** | | | | | |
| **Psychosocial Treatment and Medication** | | | | | |
| CBT produced significantly larger treatment effects (*d* =1.45) than the medications fluoxetine, sertraline, paroxetine and clomipramine (average *d* = 0.48) based on 13 RCTs, of which 5 evaluated CBT. Among the medications, fluoxetine and sertraline had moderate effect sizes (*d* = 0.51 and 0.47) and the most favourable adverse event profiles.[136] | | | | | |
| *OCD outcomes included two different sources, included at least one that was blinded ↓ Outcome was statistically significant *d* = Cohen's *d* † Limited to children from families with 2+ indicators of poor family functioning associated with diminished response to CBT. φ = Phi $\eta^2$ = Eta squared **A non-inferiority trial designed to evaluate if CBT delivered by telephone was as effective as CBT delivered in-person. | | | | | |

| Bipolar Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Control Trials** | | | | | |
| **Program** | **Program elements** | **Age** | **Duration** | **Follow-up** | **Bipolar outcomes (Effect size)** |
| **Psychosocial Treatment**** | | | | | |
| Child- and Family-Focused Cognitive-Behavioural Therapy (CBT) [139] | Family education, problem-solving, communication skills + CBT | 7–13 years | 9 months | none | ↓ 2 of 5 symptoms† (*d*=0.48–0.50) |
| Family-Focused Therapy [140] | Family education, problem-solving, + communication skills | 12–17 years | 9 months | 1¼ years | ↓ 1 of 2 symptoms† |
| Family-Focused Therapy [141] | Family education, problem-solving, + communication skills | 9–17 years | 4 months | 8 months | ↓ 1 of 2 symptoms (*d*=0.49) |
| Multifamily Psychoeducational Psychotherapy **G** [138] | Family education problem-solving, + communication skills | 8–11 years | 1¾ months | 10 months | ↓ 1 of 1 symptom |
| **Medication** | **Also sold as** | **Ages** | **Duration** | **Follow-up** | **Bipolar outcomes (Effect size)** |
| Lithium [142] | Carbolith | 12–18 years | 1½ months | none | ↓ 1 of 2 symptoms† |
| Lithium [143] | Carbolith | 7–17 years | 1¾ months | none | ↓ 2 of 5 symptoms (*d*=0.53) |

*Bipolar outcomes included at least one blinded measure; outcomes included manic or hypomanic symptoms; studies with insufficient statistical power or inappropriate analyses were excluded. ** Psychosocial treatments were adjunctive to medications in most cases
↓ Outcome was statistically significant † None of the significant outcomes included reductions in manic or hypomanic symptoms.
*d* = Cohen's *d* **G** = Group delivery

| Eating Disorders Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Control Trials** | | | | | |
| **Program** | **Program elements** | **Age/Grade** | **Duration** | **Follow-up** | **Eating disorder outcomes (Effect size)** |
| **Prevention – Universal** | | | | | |
| Education Program **G** ♀ [144] | Media literacy training, discouraging unhealthy weight control practices + encouraging positive body image | Grades 11–12 | 1½ months | 10 months | × Anorexia diagnoses<br>↓ Bulimia diagnoses<br>↓ 2 of 5 symptoms |
| **Prevention – Targeted** | | | | | |
| Dissonance **G** ♀ [145–146] | Discouraging unhealthy weight control practices + encouraging positive body image | 14–19 years | 3 weeks | 3 years | ↓ 3 of 6 symptoms (*d*=0.19–0.43; HR=2.50) |
| Dissonance **G** ♀ [147–148] | Discouraging unhealthy weight control practices + encouraging positive body image | 14–19 years | 1 month | 3 years | × Eating disorder diagnoses<br>↓ 1 of 5 symptoms (*d*=0.30) |
| Healthy Weight **G** ♀ [149] | Discouraging unhealthy weight control practices + implementing healthy lifestyle plan | 14–19 years | 3 weeks | 1 year | ↓ 3 of 4 symptoms |
| Healthy Weight **G** ♀ [145–146] | Discouraging unhealthy weight control practices + implementing healthy lifestyle plan | 14–19 years | 3 weeks | 3 years | ↓ 5 of 6 symptoms (*d*=0.08–0.28; HR=2.27–2.75) |
| Student Bodies [150] | Self-directed media literacy training, discouraging unhealthy weight control practices + encouraging positive body image | 14–18 years | 3¾ months | 5 months | ↓ 2 of 4 symptoms |
| **Systematic Review** | | | | | |
| **Psychosocial Treatments** | | | | | |
| Family therapy resulted in significantly more young people achieving remission from anorexia nervosa at follow-up (ranging from 6–12 months) than individual therapy despite no group difference at end of treatment based on 3 RCTs. Family therapy similarly resulted in significantly more young people achieving remission from bulimia nervosa at follow-up (ranging from 6–12 months) than individual therapy despite no group difference at end of treatment based on 2 RCTs.[151] | | | | | |
| *Eating disorder prevention outcomes included two different sources, including at least one that was blinded; For prevention studies, postintervention follow-up was 3 months or more. **G** = Group delivery ♀ = Girls only × Outcome was not statistically significant ↓ Outcome was statistically significant *d* = Cohen's *d* HR = Hazard ratio | | | | | |

| Posttraumatic Stress Disorder (PTSD) Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Controlled Trials** | | | | | |
| **Program** | **Program elements** | **Age** | **Duration** | **Follow-up** | **PTSD outcomes (Effect size)** |
| **Prevention – Targeted** | | | | | |
| Fostering Healthy Futures **G** [155–156] | Child cognitive-behavioural therapy (CBT) + mentoring | 9–11 years | 9 months | 6 months | ↓ 2 of 3 symptoms (*d*=0.39–0.51) |
| Fostering Healthy Futures **G** [157] | CBT + mentoring | 9–11 years | 9 months | 6 months | ↓ 3 of 3 symptoms (*d*=0.20–0.29) |
| It's My Turn Now **G** [158] | Child CBT + Parent Training (PT) | 6–12 years | 2¼ months | 6 months | ↓ 1 of 2 symptoms |
| Multisystemic Therapy [159] | Child CBT + PT | 10–17 years | 8 months | 4 months | ↓ 3 of 6 symptoms (*d*=0.55–0.73) |
| Risk Reduction through Family Therapy [160] | Child CBT + family problem-solving | 13–17 years | 7¾ months | 6 months | ↓ 1 of 2 symptoms |
| **Psychosocial Treatment** | | | | | |
| KIDNET **G** [163] | Child CBT | 7–16 years | 1¾ months | 4¼ months | ↓ 4 of 5 symptoms |
| Prolonged Exposure Therapy [161] | Child CBT | 12–18 years | 3½ months | 6 months | ↓ 2 of 2 symptoms (*d*=0.51–0.55) |
| Prolonged Exposure Therapy ♀ [162] | Child CBT | 13–18 years | 3¼ months | 1 year | ↓ PTSD diagnoses<br>↓ 3 of 3 symptoms (*d*=0.81) |
| *PTSD outcomes included two different sources, included at least one that was blinded for treatment studies; postintervention follow-up was 3 months or more. **G** = Group delivery ↓ Outcome was statistically significant *d* = Cohen's *d* ♀ = Girls only | | | | | |

| Schizophrenia Evidence* | | | | | |
|---|---|---|---|---|---|
| **Randomized Control Trials** | | | | | |
| **Medication** | **Also sold as** | **Age** | **Duration** | **Follow-up** | **Psychosis outcomes (Effect size)** |
| Aripiprazole [164] | Abilify | 13–17 years | 1½ months | none | ↓ 6 of 7 symptoms |
| Aripiprazole (vs quetiapine) [165] | Abilify | 12–17 years | 2¾ months | none | ↓ 1 of 1 symptom** |
| Olanzapine [166] | Zyprexa | 13–17-years | 1½ months | none | ↓ 5 of 6 symptoms |
| Olanzapine (vs clozapine) [167] | Zyprexa | 7–16 years | 1¾ months | none | ↓ 3 of 5 symptoms** (*d*=0.6–1.3) |
| *Schizophrenia outcomes included at least one blinded measure; head-to-head trials were accepted if at least one medication was already established as being effective in a placebo-controlled RCT with young people; studies with insufficient statistical power or inappropriate analyses were excluded. ↓ Outcome was statistically significant ** For head-to-head trials, reported outcomes are time effects. *d* = Cohen's *d* | | | | | |