

# Addressing Mental Health Needs for Children with Neurodevelopmental Conditions

A Research Report

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*At the Children’s Health Policy Centre, we acknowledge our privilege in being located on the ancestral lands of the xwməθkwəy’əm (Musqueam), Skwxwú7mesh (Squamish), Səl̓íl̓wətał (Tseil-Waututh), q’íc’əy’ (Katzie) and kwikwəł̓ əm (Kwkwetlem) Nations. We understand and commit to the ongoing work of reconciliation that is required to honour all Indigenous Peoples.*

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## Executive Summary

Neurodevelopmental conditions, including autism spectrum disorder (ASD), fetal alcohol spectrum disorder (FASD) and intellectual disabilities, begin very early in a child's life and are associated with characteristic challenges in daily living. As well as coping with these challenges, many children and their families also face concurrent mental disorders – and mental health care systems that often struggle to meet their needs.

To better address the mental health needs of children with neurodevelopmental conditions, policy-makers need high-quality data – including accurate prevalence estimates to inform service planning and evidence on effective treatments to ensure that these children receive interventions that work. This research report therefore aimed to identify (1) the prevalence of common mental disorders for children with ASD, FASD and intellectual disabilities; and (2) effective psychosocial treatments for common mental health concerns for these children.

The available prevalence data showed that the five most common childhood mental disorders overall – anxiety, attention-deficit/hyperactivity disorder (ADHD), oppositional defiant and conduct disorders, and depression – are much more prevalent for children with neurodevelopmental conditions. For example, estimated prevalence for any anxiety disorder was nearly eight times higher for children with ASD, estimated prevalence for ADHD was more than 14 times higher for children with FASD, and estimated prevalence of oppositional defiant and conduct disorders was nearly four times higher for children with intellectual disabilities. These findings suggest that for many children with neurodevelopmental conditions, mental disorders create additional needs – making access to effective treatments imperative.

This review found effective treatments for at least one mental health concern for all three neurodevelopmental conditions. Cognitive-behavioural therapy led to clinically meaningful reductions in anxiety disorder diagnoses and symptoms for children with ASD – across multiple studies. As well, parent training successfully reduced behaviour challenges for children with FASD and intellectual disabilities. We also found emerging evidence that social skills training helps children with FASD. These effective treatments need to be made readily available to all children who need them.

Mental health prevalence and intervention data can inform efforts to support the well-being of children with neurodevelopmental conditions. Next steps include ensuring that all children who have both neurodevelopmental and mental health conditions are identified early and receive timely treatment, and providing these children and their families with mental health resources proportionate to their needs. Services also need to be offered in ways that celebrate children's strengths and recognize their preferences, thereby meeting society's collective responsibility to ensure that all children can flourish and meet their potential.

## **I. Background**

### **I.1 When children have neurodevelopmental and mental health conditions**

Neurodevelopmental conditions – including autism spectrum disorder (ASD), fetal alcohol spectrum disorder (FASD) and intellectual disabilities – begin very early in a child’s life and are associated with characteristic challenges in daily living.<sup>1</sup> ASD includes difficulties with social communication and interactions and with repetitive patterns of interests or activities that interfere with a child’s ability to function at home, at school or in the community.<sup>1</sup> An FASD diagnosis is based on prenatal alcohol exposure at levels that result in neurodevelopmental concerns in at least three areas, including cognition, memory and executive functioning.<sup>2</sup> An intellectual disability diagnosis involves a child having significant challenges with both cognitive abilities and activities of daily living.<sup>1</sup>

Epidemiological surveys provide estimates of the proportion of children who have these three neurodevelopmental conditions. Estimated prevalence is 0.4% for ASD,<sup>3</sup> 0.8% for FASD,<sup>4</sup> and 1.2% for an intellectual disability diagnosis.<sup>5</sup> All these children need appropriate supports to ensure their flourishing – and all children with developmental conditions can flourish when appropriate supports are provided.<sup>6</sup>

Beyond coping with the challenges that come with developmental conditions, these children and their families must frequently cope with concurrent mental disorders.<sup>7</sup> The lives of children with both neurodevelopmental and mental health conditions can be considerably enhanced by effective interventions.<sup>7</sup> However, existing systems of care are often designed for “neurotypical” children and therefore fail to meet the mental health needs of children with neurodevelopmental conditions. For example, community mental health systems are often ill-equipped to assist these children and their families, resulting in needed interventions not being provided.<sup>7</sup> In addition, service delivery systems – including in British Columbia (BC) – have been criticized for being fragmented across agencies, programs and contractors, resulting in service gaps.<sup>8</sup> This criticism is made against the backdrop of mental health services that typically reach only about 44% of all children with mental disorders.<sup>3</sup>

To better address the mental health needs of children with neurodevelopmental conditions, policy-makers first need high-quality data. These data include accurate prevalence estimates, which are crucial for informing service planning; and evidence on effective mental health treatments for young people with ASD, FASD and intellectual disabilities, which is crucial to ensure that children receive interventions that work.

### **I.2 Goals of this research report**

This report therefore aimed to (1) to identify the prevalence of common mental disorders for children with ASD, FASD and intellectual disabilities; and (2) to identify effective psychosocial treatments for common mental health concerns for these children. In both cases, we aimed to identify the best available research evidence. The larger context is that of seeking to improve mental health for all children, including honouring children’s rights to receive the services they need when they need them.<sup>9</sup>

## 2. Methods

For this report, we conducted four systematic reviews using methods adapted from the *Cochrane Collaboration*.<sup>10</sup> The first review focused on the prevalence of concurrent mental disorders for children with ASD, FASD and intellectual disabilities. To meet our inclusion criteria, we required that relevant epidemiological data be reported in a systematic review with clearly described methods. As well, we required that most individual studies covered in the systematic reviews focus on children aged 18 years or younger and be conducted in high-income countries (for relevance to Canadian policy-making). Using this process, we identified 434 potentially relevant articles. We then selected the seven most rigorous systematic reviews to derive prevalence estimates.

Our other three systematic reviews addressed psychosocial treatments for concurrent mental health concerns for children with ASD, FASD and intellectual disabilities. We focused on psychosocial interventions, since these are usually first-line treatments for the most common childhood mental disorders.<sup>11</sup> Specifically, for children with these neurodevelopmental conditions, we searched for randomized controlled trials (RCTs) evaluating treatments for anxiety, attention-deficit/hyperactivity (ADHD), oppositional defiant, substance use, conduct and major depressive disorders, given that these are the most prevalent childhood mental disorders. (However, given the purpose of this report, we did not seek RCTs on interventions aiming to treat core symptoms associated with the three neurodevelopmental conditions of interest, such as behavioural interventions for children with ASD.) The Appendices provide more information on our search processes and inclusion criteria for the three treatment reviews.

Our searches identified more than 1,600 potentially relevant treatment articles. After title screening, two authors independently assessed all relevant abstracts. Applicable studies were then retrieved and independently assessed, again by two authors. Following these steps, we identified 20 RCTs that met all inclusion criteria: 12 RCTs evaluating nine interventions for children with ASD; three RCTs evaluating four interventions for children with FASD; and five RCTs evaluating four interventions for children with intellectual disabilities. We extracted and summarized data for all 20 RCTs, again with independent verification by a second author. At every stage, any differences were resolved by consensus among the larger team.

This report is based on research evidence drawn from epidemiological surveys for estimating prevalence and from RCTs for assessing treatments. We required systematic reviews for the prevalence data because this approach combines data from several studies, which can result in more precise estimates than those derived from single studies.<sup>12</sup> We also required RCTs for the treatment data because this approach is recognized as providing particularly rigorous evidence for evaluating the effectiveness of health interventions.<sup>10, 13</sup> We nevertheless acknowledge that these methodologies have limitations, including under-representing Indigenous Peoples, methods and perspectives.<sup>14-15</sup> More studies are needed that are designed for and about Indigenous children and that are led by Indigenous Peoples – informed by Traditional Knowledge as well as Western scientific methods.

## 3. Findings

### 3.1 Mental disorders in children with neurodevelopmental conditions

We identified prevalence data for five of the most common mental disorders – which in aggregate represent a substantial proportion of all children who have these conditions. For children with ASD and for children with intellectual disabilities these disorders included anxiety, ADHD, oppositional defiant disorder, conduct disorder and depression. (For children with ASD, rather than reporting separate prevalence for oppositional defiant and conduct disorders, systematic review authors reported the proportion of children having either condition.)<sup>16</sup> For children with FASD, we identified prevalence data that meet our inclusion criteria for four of the most common mental disorders, lacking only data for anxiety.

For children with neurodevelopmental conditions, estimated prevalence of each of the five mental disorders exceeded that for the general population of children – with many differences being substantial, as shown in Table 1. For example, estimated prevalence for any anxiety disorder was nearly eight times higher for children with ASD compared with the general population of children,<sup>3, 17</sup> while estimated prevalence of ADHD was more than 14 times higher for children with FASD.<sup>3, 18</sup> As well, the estimated prevalence for major depressive disorder was more than eight times higher for children with ASD and nearly 28 times higher for children with FASD, compared with the general population.<sup>3, 19–20</sup> While differences in estimated prevalence for children with intellectual disabilities were less extreme relative to the general population, rates of oppositional defiant and conduct disorders were still nearly four times higher while ADHD was more than double and major depressive disorder nearly double.<sup>3, 21–22</sup>

**Table 1. Estimated prevalence of mental disorders for children with neurodevelopmental conditions**

Disorder	Autism spectrum disorder	Fetal alcohol spectrum disorder	Intellectual disability	General population* <sup>3</sup>
Any anxiety disorder	39.6% <sup>17</sup>	—	5.4%* <sup>22</sup>	5.2%
Attention-deficit/hyperactivity disorder	34.8% <sup>† 16</sup>	52.9%* <sup>18</sup>	9.5%* <sup>† 21</sup>	3.7%
Oppositional defiant disorder	12.6% <sup>‡ 16</sup>	12.9%* <sup>18</sup>	12.4%* <sup>† 21</sup>	3.3%
Conduct disorder		7.0%* <sup>18</sup>	5.1%* <sup>† 21</sup>	1.3%
Major depressive disorder	10.6% <sup>19</sup>	36.0%* <sup>20</sup>	2.5%* <sup>22</sup>	1.3%

— Data not available

\* Most study participants were ≤ 18 years but some adults were included.

† Prevalence calculated based on data provided in the systematic review.

‡ Prevalence included both oppositional defiant and conduct disorders.

## 3.2 Mental health treatments for children with autism spectrum disorder

We accepted 12 RCTs evaluating 9 mental health interventions for children with ASD.<sup>23–35</sup> All focused on treating anxiety. In 11 studies, all children met criteria for an anxiety disorder,<sup>23–32, 34–35</sup> while in the remaining study, most children did.<sup>33</sup> All 12 studies evaluated the effectiveness of cognitive-behavioural therapy (CBT) in young people ranging in age from six to 18 years. Eleven studies used CBT to treat a variety of conditions including separation anxiety, social anxiety and generalized anxiety disorders as well as specific phobias. The remaining study examined CBT's effectiveness with specific phobias only.<sup>30</sup>

CBT typically involved several elements: (1) educating families about anxiety; (2) coaching children to reduce physical symptoms of anxiety using techniques such as deep breathing; (3) teaching children to challenge unrealistic anxious thinking; and (4) supporting children to practise being in fear-provoking situations while managing their anxiety.<sup>31</sup> Most CBT programs were originally designed for typically developing children and then modified, for example, by using more visual materials and more concrete language to better accommodate learning styles of children with ASD.<sup>34</sup> As well, some programs included specific content to better address the needs of children with ASD, such as components on developing social skills.<sup>27, 35</sup>

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**Estimated prevalence for any anxiety disorder was nearly eight times higher  
for children with autism spectrum disorder.**

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CBT proved highly successful for treating anxiety in children with ASD. Of nine RCTs examining diagnostic outcomes, eight showed statistically significant reductions on a least one diagnostic measure by the end of treatment.<sup>24, 26–27, 29, 31–34</sup> All 12 programs also successfully reduced anxiety symptoms according to one or more measures. As well, even though the interventions focused on anxiety, many produced other positive outcomes, including reducing behaviour problems<sup>23, 29, 33</sup> and core ASD symptoms,<sup>27–29</sup> as well as improving daily living skills.<sup>26, 33</sup>

Beyond reporting on statistical significance, many studies also provided data on effect sizes, indicating the degree to which the intervention made a meaningful difference in children's lives. Seven programs produced large effect sizes for anxiety symptom outcomes: Family-based Exposure-focused Treatment, Building Confidence, Behavioural Intervention for Anxiety in Children with Autism (BIACA), Blue Room Virtual Reality Environment, Facing Your Fears, Brave Online and Coping Cat.<sup>23, 26–32, 34</sup> Moreover, for three of these programs – BIACA, Facing Your Fears and Coping Cat – effect sizes for the diagnostic reductions were also large.<sup>27, 31, 34</sup> Table 2, on the next page, summarizes these 12 RCTs and their findings.



**Table 2. Studies of mental health treatments for children with autism spectrum disorder**

Program name	Program components*	Ages (years)	Duration	Follow-up	Outcomes (effect sizes)
<b>Goal: Reduce anxiety</b>					
Family-based Exposure-focused Treatment <sup>†23</sup>	CBT (child + parent)	6–17	12 weeks	None	NR primary anxiety diagnosis (14.3% vs 100%) ↓ 5 of 6 anxiety symptoms ( $d = 0.84$ – $1.22$ ) ↓ 1 of 1 emotional problems ( $d = 0.84$ ) ↓ 1 of 1 behavioural problems ( $d = 0.79$ )
Building Confidence <sup>24</sup>	CBT (child + parent)	7–11	32 weeks	None	↓ primary anxiety diagnoses (28.6% vs 100%) ↓ 1 of 1 anxiety symptoms
Building Confidence <sup>25–26</sup>	CBT (child + parent)	7–11	16 weeks	None	↓ any anxiety diagnoses (47.1% vs 91.3%) ↓ 3 of 4 anxiety symptoms ( $d = 1.23$ – $2.46$ ) ↑ 1 of 1 daily living skills ( $d = 0.45$ )
Behavioural Intervention for Anxiety in Children with Autism (BIACA) <sup>‡27</sup>	CBT (child + parent)	7–11	16 weeks	None	↓ primary anxiety diagnosis (62.5% vs 95.2%; $d = 1.37$ ) ↓ 6 of 10 anxiety symptoms ( $d = 0.63$ – $1.59$ ) ↓ 1 of 1 emotional problems ( $d = 0.56$ ) X 1 of 1 behavioural problems
BIACA <sup>‡28</sup>	CBT (child + parent)	11–15	16 weeks	None	X primary anxiety diagnoses (68.4% vs 78.6%) ↓ 2 of 4 anxiety symptoms ( $g = 0.74$ ; OR = 9.38) X 1 of 1 emotional problems
BIACA <sup>‡29</sup>	CBT (child + parent)	11–16	16 weeks	None	↓ primary anxiety diagnosis (62.5% vs 100%) ↓ 5 of 6 anxiety symptoms ( $d = 0.59$ – $1.30$ ) X 2 of 2 emotional problems ↓ 1 of 1 behavioural problems ( $d = 0.63$ ) ↓ 1 of 5 anxiety symptoms ( $d = 1.03$ )
Blue Room Virtual Reality Environment <sup>30</sup>	CBT (child)	7–14	2 weeks	2 weeks 6 months	↓ 1 of 5 anxiety symptoms ( $d = 1.14$ )
Facing Your Fears <sup>31</sup>	CBT (child + parent group)	7–14	12–16 weeks	None	↓ primary anxiety diagnoses ( $d = 0.71$ ) ↓ 2 of 3 anxiety symptoms ( $d = 0.66$ – $1.03$ )
Brave Online <sup>32</sup>	CBT (child + parent)	8–12	16 weeks	None	X primary anxiety diagnosis (81% vs 100%) X any anxiety diagnosis (90.5% vs 100%) ↓ # of anxiety diagnoses ( $d = 2.72$ ) ↓ 4 of 4 of anxiety symptoms ( $d = 0.71$ – $2.00$ ) ↓ 1 of 1 emotional problems ( $d = 0.91$ )
Secret Agent Society: Operation Regulation <sup>33</sup>	CBT (child)	8–12	10–14 weeks	None	↓ # of anxiety diagnoses ( $d = 0.61$ ) ↓ 2 of 3 anxiety symptoms ( $d = 0.57$ – $0.60$ ) ↓ 1 of 3 emotional problems ( $d = 0.58$ ) ↑ 1 of 2 emotion regulation ( $d = 0.79$ ) ↓ 1 of 3 behavioural problems ( $d = 0.52$ ) ↑ 1 of 4 daily living skills ( $d = 0.71$ )
Coping Cat <sup>34</sup>	CBT (child)	8–14	16 weeks	None	↓ primary anxiety diagnoses (41.7% vs 100%; NNT = 1.72) ↓ # of concurrent diagnoses ( $d = 1.22$ ) ↓ 2 of 3 anxiety symptoms ( $d = 1.17$ – $1.35$ )
Multimodal Anxiety and Social Skill Intervention <sup>†35</sup>	CBT (child group + individual)	12–18	Not reported	None 12 weeks	NR any anxiety diagnoses (71.1% vs 69.1%) <sup>§</sup> ↓ 1 of 2 anxiety symptoms** NR any anxiety diagnoses (82.2% vs 58.2%) <sup>††</sup> X 0 of 2 anxiety symptoms

CBT = cognitive-behavioural therapy; NR = statistical significance not reported; ↓ or ↑ = statistically significant improvements;  $d$  = Cohen's  $d$ ; X = no statistically significant difference;  $g$  = Hedges'  $g$ ; OR = odds ratio; NNT = number needed to treat

\* Individual delivery unless noted; † No significant difference for ASD symptoms; ‡ Significant reductions for ASD symptoms; § No statistically significant group differences for 3 assessed disorders (social or generalized anxiety or specific phobia); comparison children had significantly fewer separation anxiety diagnoses.

Percentages include children having any of the 4 disorders; \*\* 1 symptom outcome tested separately for 4 anxiety disorders; symptom reduction significant for social anxiety disorder only; †† No statistically significant difference for any of 4 assessed disorders.

### 3.3 Mental health treatments for children with fetal alcohol spectrum disorder

We accepted three RCTs evaluating four mental health treatments for children with FASD.<sup>36-39</sup> (One RCT evaluated two different interventions.)<sup>36</sup> Child participants ranged in age from five to 12 years. Three interventions – GoFAR, FACELAND and the Alert Program (for Self-Regulation) – focused on improving self-regulation for children with behaviour challenges. GoFAR and FACELAND both involved parent training, which included teaching parents strategies to calm their children and to address negative behaviours as well as techniques for helping children learn life skills.<sup>36</sup> Both interventions also included cognitive training sessions for children and parents, focused on using planning and reflection in challenging situations. As well, two of the three interventions focused on executive functioning skills, which include problem-solving and self-regulation abilities.<sup>36-37</sup> Specifically, GoFAR taught children to plan and reflect while playing a challenging computer game,<sup>36</sup> while the Alert Program taught children to regulate emotions and activity levels through self-awareness and practice.<sup>37</sup> FACELAND included emotion-recognition training which involved rewarding children for correctly identifying the emotions of computer game characters.<sup>36</sup>

The fourth intervention – Child Friendship Training – focused on improving social skills using a group training program adapted for children with FASD.<sup>38</sup> Children were taught rules for social interactions as well as specific skills, including starting conversations, joining groups and dealing with conflicts.<sup>38</sup> Parents participated in a concurrent group to support their children’s skill development.<sup>38</sup>

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#### Mental disorders are causing a pronounced burden for children with neurodevelopmental conditions, compared with other children.

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Two of three programs aiming to improve self-regulation for children with behaviour challenges showed success. Both GoFAR and FACELAND reduced behaviour problems.<sup>36</sup> In addition to being statistically significant, children’s gains were clinically meaningful as shown by large effect sizes (partial  $\eta^2 = 0.24$ ) compared to controls (for both programs). In contrast, the Alert Program made no meaningful differences for behaviour, emotional or attention problems; social skills; emotion recognition; or understanding social situations.<sup>37</sup> The program did improve executive functioning but only on one measure out of six.

Child Friendship Training also showed some success.<sup>39</sup> Specifically, the program improved children’s social skills, reduced behaviour and emotional problems and reduced perceptions of hostile intentions in ambiguous situations – all with moderate clinical effects. Children’s social skills knowledge also improved with large clinical effects.<sup>39</sup> Table 3, on the next page, summarizes these four RCTs and their findings.

**Table 3. Studies of mental health treatments for children with fetal alcohol spectrum disorder**

Program name	Program elements*	Ages (years)	Duration	Follow-up	Outcomes (effect sizes)
<b>Goal: Improve self-regulation</b>					
GoFAR	Executive functioning skills training† (child) Parent training Cognitive training (child + parent)	5–10	10 weeks	None	↓ 1 of 1 behavioural problems
FACELAND <sup>36</sup>	Emotion recognition training (child) Parent training Cognitive training (child + parent)	5–10	10 weeks	None	↓ 1 of 1 behavioural problems
Alert Program for Self-Regulation <sup>37</sup> ††	Executive functioning skills training‡ (child)	8–12	14 weeks	None	X 1 of 1 behavioural + emotional problems X 2 of 2 attention problems ↑ 1 of 6 executive functioning X 1 of 1 social skills X 1 of 1 emotion recognition X 4 of 4 understanding of social situations
<b>Goal: Improve social skills</b>					
Child Friendship Training <sup>38–39</sup>	Social skills training (child + parent groups)	6–12	12 weeks	None	↑ 1 of 2 social skills ( $d = 0.52$ ) ↓ 1 of 2 behavioural + emotional problems ( $d = 0.40$ ) ↓ 1 of 2 perceiving hostile intentions in ambiguous situations ( $d = 0.42$ ) ↑ 1 of 1 social skills knowledge ( $d = 1.28$ )

↓ or ↑ = statistically significant improvements; X = no statistically significant difference;  $d$  = Cohen's  $d$

\* Individual delivery unless noted; † Included teaching children to plan and reflect; ‡ Including teaching children self-awareness skills

### 3.4 Mental health treatments for children with intellectual disabilities

We accepted five RCTs evaluating four mental health interventions for children with intellectual disabilities.<sup>40–45</sup> Child participants ranged in age from three to 18 years. Three RCTs evaluated two interventions for addressing behavioural challenges: Parent-Child Interaction Therapy (PCIT) (one RCT); and Stepping Stones Triple P (Triple P) (two RCTs, including one comparing basic and enhanced versions of the program).<sup>40–42</sup>

Both PCIT and Triple P used parent training.<sup>40–42</sup> For PCIT this included providing the standard program, developed for neurotypical children without adaptation, which involved teaching parents to establish nurturing relationships with their children while setting consistent limits.<sup>40</sup> In contrast, Triple P was adapted for children with an intellectual disability by adding components to the standard program on families' adjustment to having a child with this diagnosis. This included teaching parents strategies to promote their child's competence and development as well as managing challenging behaviours.<sup>41–42</sup> Enhanced Triple P included a coping skills training program for parents – focused on working collaboratively with professionals, strengthening social supports, and learning effective CBT-based techniques such as relaxation and challenging unhelpful thinking.<sup>41</sup>

The third intervention – Training Attention and Learning Initiative – focused on helping children with attention problems.<sup>43</sup> This computerized program included games designed to improve children’s selective and sustained attention, for example, by locating target objects that differed in size and colour from non-target objects.<sup>43</sup>

The fourth intervention – Cognitive Bias Modification Training for Interpretation (CBMTI) – attempted to reduce children’s social anxiety.<sup>45</sup> In this program, children were presented with very short stories describing social situations – both verbally and in writing – with one word missing in the final sentence. The missing word was then presented separately, resulting in the story having a positive ending, such as other students liking the child’s presentation.<sup>45</sup>

Both parent training programs showed positive results. PCIT reduced child behaviour problems with a moderate clinical impact at the end of treatment.<sup>40</sup> Similarly, the basic and enhanced Triple P evaluation both showed reduced child behaviour problems at the end of treatment.<sup>41</sup> The other Triple P evaluation also showed reductions on a combined measure of behavioural and emotional problems at the end of treatment but not at six-month follow-up.<sup>42</sup>

The Training Attention and Learning Program produced only modest results. Specifically, children showed significant gains on one of seven attention measures, with small clinical effects at the end of treatment and at six-week follow-up.<sup>44</sup> At six-week follow-up, children also showed significant gains on one of nine measures of executive functioning, namely, a planning and organizing task. However, the program made no significant difference for children’s behaviour or anxiety symptoms.<sup>44</sup>

CBMTI successfully reduced children’s anxiety symptoms as well as their perceptions of negative evaluations in ambiguous situations – both with moderate clinical effects.<sup>45</sup> Table 4, on the next page, summarizes all five RCTs and their findings.

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**For children with intellectual disabilities and concurrent behaviour challenges,  
parent training programs showed evidence of success,  
particularly for parents of preschoolers.**

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**Table 4. Studies of mental health treatments for children with intellectual disabilities**

Program name	Program elements*	Ages (years)	Duration	Follow-up	Outcomes (effect sizes)
<b>Goal: Reduce disruptive behaviours</b>					
Parent-Child Interaction Therapy <sup>40</sup>	Parent training	3–6	12 weeks	None	↓ 1 of 1 behavioural problems ( $d = 0.67$ )
Stepping Stones Triple P	Parent training	<6	10–16 weeks	None	↓ 3 of 4 behavioural problems
Stepping Stones Triple P Enhanced <sup>41</sup>	Parent training Coping skills training (parent)	<6	10–16 weeks	None	↓ 3 of 4 behavioural problems
Stepping Stones Triple P <sup>42</sup>	Parent training	5–12	10–12 weeks	None  6 months	X 1 of 1 behavioural problems ↓ 1 of 2 behavioural + emotional problems X 1 of 1 behavioural problems X 2 of 2 behavioural + emotional problems
<b>Goal: Reduce attention problems</b>					
Training Attention and Learning Initiative <sup>43–44</sup>	Attention training (child)	4–11	5 weeks	None  6 weeks	↓ 1 of 7 attention problems ( $d = 0.24$ ) X 4 of 4 behavioural problems X 1 of 1 anxiety symptoms X 9 of 9 executive functioning  ↓ 1 of 7 attention problems ( $d = 0.26$ ) X 4 of 4 behavioural problems X 1 of 1 anxiety symptoms ↑ 1 of 9 executive functioning
<b>Goal: Reduce social anxiety</b>					
Cognitive Bias Modification Training for Interpretation (CBMTI) <sup>45</sup>	Cognitive training (child)	12–18	3 weeks	10 weeks	↓ 1 of 1 of anxiety symptoms ( $\eta^2 = 0.11$ ) ↓ 2 of 2 perceiving negative social evaluation in ambiguous situations ( $\eta^2 = 0.14–0.15$ )

↓ or ↑ = statistically significant improvements; X = no statistically significant difference;  $d$  = Cohen's  $d$

\* Individual delivery unless noted

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All children who have both neurodevelopmental and mental health conditions  
need to be identified early and receive timely treatment.

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## 4. Discussion

### 4.1 Summary

According to this review, among children with neurodevelopmental conditions, the five mental disorders of focus – anxiety, ADHD, oppositional defiant and conduct disorders and depression – are much more common than in the general population of children. For example, estimated prevalence for any anxiety disorder was nearly eight times higher for children with ASD,<sup>3, 17</sup> while estimated prevalence of ADHD for children with FASD was more than 14 times higher.<sup>3, 18</sup> As well, the estimated prevalence for major depressive disorder was more than eight times higher for ASD and nearly 28 times higher for children with FASD, compared with other children.<sup>3, 19-20</sup> Although differences for children with intellectual disabilities were less marked, rates of conduct disorder were still nearly four times higher than in the general population of children.<sup>3, 21</sup> These findings suggest that mental disorders are causing a pronounced burden for children with neurodevelopmental conditions, compared with other children.

The high prevalence of mental disorders for children with neurodevelopmental conditions means that it is crucial that they can access effective mental health treatments when they need them. Regarding such treatments, we found considerable research evidence showing that CBT is highly successful for children with ASD who also have anxiety concerns. Most studies found that CBT reduced anxiety diagnoses and symptoms to a degree that was clinically meaningful.<sup>23, 26-32, 34</sup> As well, CBT was effective for young people with ASD from the early school years to the teens.<sup>23, 29</sup>

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**Children with neurodevelopmental conditions  
should be provided with resources proportionate to their needs.**

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For children with FASD who also have behaviour challenges, multicomponent interventions showed some success. These interventions included parent training coupled with cognitive training for both parents and children.<sup>36</sup> As well, evidence is emerging on the effectiveness of programs to help children with FASD to improve their social skills.<sup>39</sup> For children with intellectual disabilities and concurrent behaviour challenges, parent training programs showed evidence of success, particularly for parents of preschoolers.<sup>40-42</sup> However, there was only modest evidence supporting cognitive training to reduce social anxiety in this population of young people, and only limited evidence supporting attention training. For children with ASD, FASD and intellectual disabilities who also have mental health concerns, more high-quality research is clearly needed – evaluating interventions for a broader range of mental disorders, including major depressive disorder. Yet the available evidence shows that effective treatments do exist. These effective treatments need to be made readily available to all children with developmental conditions, while more research is undertaken.

## **4.2 Policy and practice implications**

### *Recognize and address the high mental health burdens for children with neurodevelopmental conditions*

Our review suggests that children with ASD, FASD and intellectual disabilities face substantially higher rates of mental disorders than children in the general population. Consequently, publicly funded children's mental health services need to provide additional attention and resources to these children and their families at levels that are proportionate to the needs. Children with neurodevelopmental conditions, along with their families, are already coping with many challenges. It is imperative that they be provided with adequate mental health care to meet their needs.

### *Ensure timely access to effective treatments*

There is strong research evidence supporting CBT to treat anxiety disorders for children with ASD. This evidence is particularly compelling given that nearly 40% of children with ASD experience these disorders.<sup>17</sup> As well, emerging evidence suggests that parent training can reduce behaviour problems for children who have FASD or intellectual disabilities. Effective treatments for these concerns are particularly important since behaviour disorders are four and five times higher for children with FASD and intellectual disabilities, respectively, compared with the general population of children.<sup>3, 18, 46</sup>

Recognizing the benefits of CBT and parent training, many jurisdictions have increased their availability – and many practitioners working with typically developing children already deliver these interventions, including in BC.<sup>47-50</sup> These efforts could be enhanced to ensure full inclusion of children with neurodevelopmental conditions within existing mental health care systems. In addition, all children who have both neurodevelopmental and mental health conditions need to be identified early and receive timely treatment. Asking them to wait adds yet another obstacle that is avoidable.

### *Make mental health care systems more responsive to children with neurodevelopmental disorders*

Beyond ensuring that children with neurodevelopmental conditions receive effective and timely treatments for their mental health needs, the mental health care systems serving these children and their families need to be more responsive. For example, practitioners can receive training to enhance their knowledge and skills in delivering mental health treatments to these children and families.<sup>8</sup> As well, it may be beneficial to designate practitioners with specialized training in working with children with neurodevelopmental disorders to provide their mental health treatment – mirroring approaches taken for treating concurrent substance use and other mental health concerns in young people.<sup>8</sup>

### *Increase the mental health care options for children with neurodevelopmental conditions*

While there is considerable high-quality research evidence on effective treatments for childhood mental disorders generally,<sup>11</sup> far fewer interventions have been evaluated for children with neurodevelopmental conditions. The lack of research on treating major depressive disorder for children with ASD, FASD and intellectual disabilities is particularly concerning, given its high prevalence for these populations. Still the available evidence revealed a crucial finding. Effective treatments identified for anxiety and behaviour concerns mirrored those with proven success for typically developing children – and were successfully delivered to children with neurodevelopment conditions without adaptations.<sup>32, 40</sup>

Our findings can inform the development of new mental health interventions for children with neurodevelopmental conditions. Specifically, given evidence from the general population supporting parent training for ADHD, CBT for depression, and multicomponent interventions for substance use disorders, these interventions should be assessed for children with neurodevelopmental disorders.<sup>11</sup> For example, we found less rigorous yet promising studies supporting a multicomponent intervention to reduce alcohol use for teens with FASD who were light-to-moderate drinkers,<sup>51</sup> and supporting CBT to reduce depressive symptoms for teens with ASD.<sup>52</sup> Building on such results is a way to increase the treatment options for children with neurodevelopmental conditions.

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**Services need to be offered in ways that  
celebrate children’s strengths and recognize their preferences.**

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### *Prevent mental health problems and meet children’s basic needs*

Preventing childhood mental disorders can avert unnecessary distress, symptoms and diagnoses while also encouraging healthy development. Many effective prevention interventions have been designed for typically developing children – addressing anxiety, ADHD, oppositional defiant and conduct disorders, substance use disorders, depression, eating disorders and posttraumatic stress.<sup>11</sup> Children with neurodevelopmental conditions also need access to effective prevention programs, so new studies need to be conducted for and with these young people too. Alongside prevention, it is crucial to ensure that all children’s basic needs are met, and to protect all children from avoidable adversities that can contribute to the development of mental disorders, including socio-economic disadvantage, parent mental health problems and child maltreatment.

Children with neurodevelopmental conditions should be provided with resources proportionate to their needs. Providing effective interventions for their mental health concerns is paramount. Services also need to be offered in ways that celebrate children’s strengths and recognize their preferences,<sup>7</sup> thereby meeting society’s collective responsibility to ensure that all children can flourish and meet their potential.<sup>6</sup>



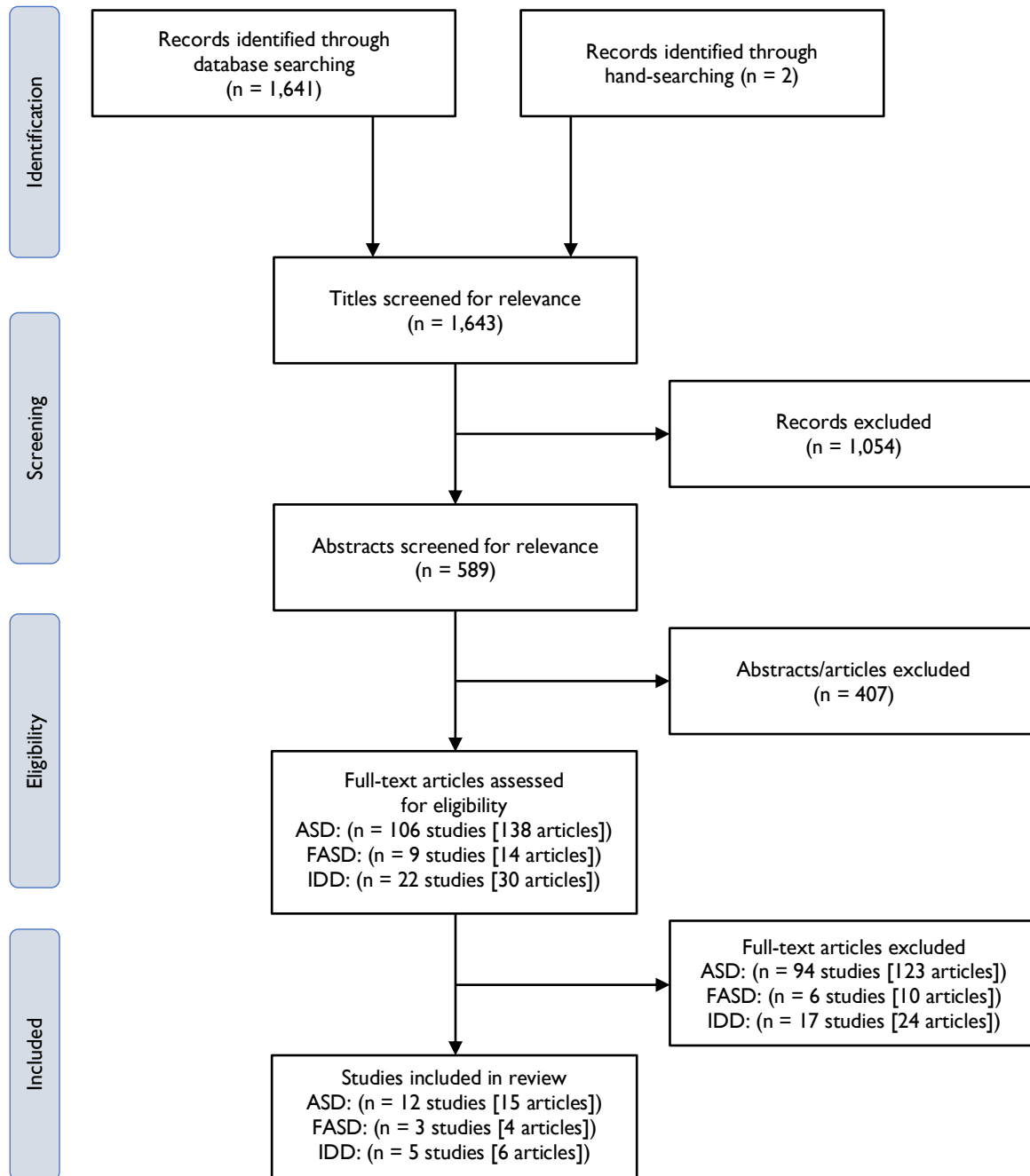
## 5. Appendices

### 5.1 Review methods

**Table A1. Search strategy**

Databases	<ul style="list-style-type: none"><li>• CINAHL, ERIC, Medline and PsycINFO</li></ul>
Search Terms	<ul style="list-style-type: none"><li>• Asperger syndrome, autism, autism spectrum disorders, ASD, fetal alcohol spectrum disorder, FASD, fetal alcohol syndrome, intellectual developmental disorder, IDD, intellectual disability or pervasive developmental disorder; and</li><li>• Anxiety, anxiety disorders, attention deficit disorder, attention deficit disorder with hyperactivity, ADHD, behaviour disorders, conduct disorder, depressive disorder, disruptive behaviour disorders, major depression, mood disorder, oppositional defiant disorder, substance use disorder or substance-related disorder; and</li><li>• Prevention, intervention or treatment</li></ul>
Limits	<ul style="list-style-type: none"><li>• Peer-reviewed articles published in English through until October 2022</li><li>• Child participants aged 18 years or younger</li><li>• Randomized control trial methods used</li></ul>

**Figure A1. Search process for randomized controlled trials\***



\* Adapted from Preferred Reporting Item for Systematic Reviews and Meta-Analyses<sup>53</sup>

**Table A2. Inclusion criteria for mental health treatment studies\***

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▪ Studies focused on evaluating interventions in children ≤18 years
▪ Interventions aimed to treat mental health concerns <sup>†</sup> for children with autism spectrum disorder (ASD), fetal alcohol spectrum disorder (FASD) or intellectual disabilities (ID) <sup>‡</sup>
▪ Interventions were evaluated in high-income countries for applicability to Canadian policy
▪ Interventions fell within scope of delivery for children’s mental health practitioners or for self-delivery
▪ Participants were randomly assigned to intervention or comparison groups (i.e., no intervention, active control or usual care)
▪ Clear descriptions were provided of participant characteristics, settings and interventions
▪ Outcome indicators included mental health diagnostic or symptom measures
▪ Outcome measures <ul style="list-style-type: none"><li>▪ ASD — completed by two or more informants, e.g., child, parent or teacher, at least one of whom was blinded to participant’s group assignment</li><li>▪ FASD and ID — completed by one or more informants who was not required to be blinded<sup>§</sup></li></ul>
▪ Reliability and validity were documented for primary outcome measures or ≥50% of items addressed behavioural and/or emotional problems
▪ Level of statistical significance was reported for primary outcomes measures <sup>**</sup>
▪ Attrition rates were ≤20% at final assessment and/or intention-to-treat analyses were used

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\* Mental health concerns included anxiety, attention-deficit/hyperactivity, oppositional defiant, substance use, conduct and depressive disorder diagnoses or symptoms.

† For children with ASD, we required that participants have mental health diagnoses at the start of the study; however, for children with FASD and ID, we only required that participants have elevated mental health symptoms, not diagnoses, because of the limited number of studies.

‡ All children were diagnosed with ASD or FASD/partial FASD or alcohol-related neurodevelopmental disorder or ID at study outset; most children were also experiencing behavioural or emotional problems (or diagnoses) at study outset.

§ Standards were lower for FASD and ID because so few treatment studies for these children included multiple outcome sources or blinding.

\*\* Studies were excluded where authors indicated insufficient power to detect group (intervention/control) differences.

## 5.2 Research terms explained

Policy-makers need high-quality evidence about whether a given intervention works to help children.

**Randomized controlled trials** (RCTs) are a particularly rigorous method for assessing intervention effectiveness. In RCTs, participants are randomly assigned to intervention or control groups. Randomizing participants – that is, giving everyone an equal likelihood of being assigned to a given group – helps to ensure that the intervention is the only difference between the groups. In turn, this process provides confidence that any benefits are due to the intervention rather than due to chance or other factors.

To determine whether an intervention provides benefits, researchers analyze relevant outcomes. If an outcome is **statistically significant**, it helps provide certainty the intervention was effective rather than appearing that way due to chance. The studies included in this report used the typical convention of having at least 95% confidence that results reflected the intervention’s real impact. As well, some included studies determined whether the intervention was clinically meaningful by assessing the degree of difference the intervention made in the young person’s life. This was achieved by calculating outcome **effect sizes**, which provide a quantitative measure of the strength of the relationship between the intervention and the outcome. The studies we included reported a variety of effect sizes, as described below.

- Cohen’s *d* and Hedges’ *g* have the following standard interpretations: 0.2 = small effect; 0.5 = moderate effect; and 0.8 = large effect.
- Odds ratio indicates the increased or reduced odds of an outcome occurring, for example, having nine times higher odds of reduced anxiety symptoms after participating in cognitive-behavioral therapy.
- Number needed to treat indicates the number of children needed to treat to avoid one additional negative outcome. For example, an NNT of 2 means that you have to treat two children with cognitive-behavioural therapy to have one no longer meet criteria for an anxiety disorder.
- Partial  $\eta^2$  has the following standard interpretations: 0.01 = small effect; 0.06 = medium effect; and 0.14 = large effect.

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