CHILDREN'S MENTAL HEALTH RESEARCH

Quarterly

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Preventing problematic childhood anxiety

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FALL

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Children's Health Policy Centre

About the *Quarterly*

We summarize the best available research evidence on a variety of children's mental health topics, using systematic review and synthesis methods adapted from the *Cochrane Collaboration*. We aim to connect research and policy to improve children's mental health. The BC Ministry of Children and Family Development funds the *Quarterly*.

About the Children's Health Policy Centre

We are an interdisciplinary research group in the Faculty of Health Sciences at Simon Fraser University. We focus on improving social and emotional well-being for all children, and on the public policies needed to reach these goals. To learn more about our work, please see childhealthpolicy.ca.

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THIS ISSUE

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NEXT ISSUE

Preventing problematic anxiety for youth

Continuing the anxiety prevention theme, our next issue focuses on youth, including reviewing interventions to help avert anxiety disorders for teens.

How to Cite the *Quarterly*

We encourage you to share the *Quarterly* with others and we welcome its use as a reference (for example, in preparing educational materials for parents or community groups). Please cite this issue as follows:

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We celebrate the Indigenous Peoples whose traditional lands Quarterly team members live and work on.

We also greatly appreciate the Provincial Advisory Committee for the Child and Youth Mental Health Policy Branch with the BC Ministry of Children and Family Development, who provided helpful feedback on an earlier draft of this issue.

OVERVIEW

Calculating the costs of childhood worries

Anxiety disorders often emerge during childhood.

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Anxiety disorders deserve our attention and our concern. Here's why. In high-income countries, more children are diagnosed with anxiety disorders than any other mental health condition.[1] In BC, this means an estimated 42,000 children aged four to 18 likely meet criteria for an anxiety disorder at any given time.[1–2] To receive such a diagnosis, young people must experience anxiety that is severe enough to cause considerable distress or impair functioning or both.[3] And because many children do not receive treatment for their anxiety disorders, these disorders often persist into adulthood — taking a substantial toll.[1, 4]

The burdens go beyond those experienced by young people. Hardships often extend to family members. For example, parents may end up missing work and incurring costs for treatments that are not publicly funded. Society also pays a price, in the form of lost human potential, when childhood anxiety is not prevented or treated early.[5] Collective fiscal expenses exist as well. For instance, a Dutch study found that annual per capita societal costs were approximately $6,500 (in 2024 CDN$) higher for children with anxiety disorders than for those without them when considering costs such as health care, special education and loss of paid work for parents.[6]

Prevention needs to begin early.

Given the importance of anxiety disorders for children and for society, we are devoting two *Quarterly* issues to their prevention. In this issue, we focus on children aged 12 and younger — because anxiety disorders typically emerge early in the lifespan and because some anxiety disorders are particularly likely to be diagnosed in early childhood. Research includes one study finding that among adults who were diagnosed with separation anxiety disorder and specific phobias, half received the diagnosis by age seven.[4] So prevention needs to begin early.

Assisting anxious children

Early childhood is a time when several risk factors for anxiety disorders emerge and can be addressed. For example, being withdrawn or wary in new situations coupled with shyness — known as behavioural inhibition — has long been recognized as a potent early childhood risk factor.[7–8] One study, which followed nearly 1,000 children from ages four to six, found behavioural inhibition increased the risk for developing an anxiety disorder.[8] Having a parent with high levels of anxiety also increased children's risk.[8]

Supporting parents to help their anxious child

The Canadian Mental Health Association is assisting parents of children aged three to 12 with mild to moderate anxiety through a skill-building program called Confident Parents: Thriving Kids. This program uses cognitive-behavioural therapy techniques proven to be highly effective in addressing childhood anxiety.[9] The intervention, which includes brief online videos supported by weekly phone coaching sessions, is free for parents and other caregivers. Parents can access this program by referral from family doctors, pediatricians, Child and Youth Mental Health clinicians, teachers and school counsellors.

These findings can be applied to help parents and other caregivers support children who are behaviourally inhibited. For example, parents can encourage children to face situations that cause them anxiety. This could include a father creating opportunities for his shy daughter to meet new children at a playground and supporting her to play with others. Similarly, educators can structure activities so that anxious children are paired with socially skilled and supportive peers. Parents and educators can also encourage children to be more confident in new situations by praising them for being so. As well, parents can support their children by addressing their own anxiety, so they are better able to model coping well in situations they find fearful. The adjacent sidebar provides information on a resource for BC parents who require additional assistance in helping their children manage anxiety.

The previously noted study identified other factors that influence the development of childhood anxiety that are particularly relevant for educators. For example, being a victim of bullying behaviour put children at risk while having good social skills protected them.[8] These findings are salient for educators since bullying behaviours often occur in school and many effective antibullying programs can be delivered in schools. (Several such programs were featured in our *Quarterly* issue on that topic.) Educators are also well positioned to effectively teach children social skills.[10–13]

Because anxiety prevention programs are typically delivered to groups of young people, they are often delivered in schools.

Another reason to focus on anxiety prevention separately for children and youth relates to intervention delivery. Because anxiety prevention programs are typically delivered to groups of young people, they are often delivered in schools. As a result, they are usually designed for elementary or secondary school students — allowing program developers to tailor content to specific developmental stages and abilities. In the Review article that follows, we focus on intervention programs for children up to 12 years of age and their families.

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Several modifiable risk factors for anxiety disorders emerge during early childhood.

REVIEW

What's new in anxiety prevention?

Parents can be essential in helping their child overcome anxiety.

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The success of cognitive-behavioural therapy (CBT) in preventing childhood anxiety has long been recognized.[14–16] But are there other interventions that also work? To answer this question, we conducted a new systematic review to identify recent evaluations of anxiety prevention programs. We focused on children aged 12 years and younger, given that different anxiety disorders emerge at different ages and given that programs are typically geared to children at different developmental stages.

For this review, we required studies to use randomized controlled trial (RCT) evaluation methods. We searched for RCTs conducted since our last *Quarterly* issue on the topic. After applying inclusion criteria (detailed in the Methods), we accepted four RCTs, all focused on children with elevated anxiety symptoms.[17–20] All four studies evaluated CBT. In three studies, CBT was compared to a no-intervention control condition.[17–19] In the remaining study, CBT was compared to a neurofeedback video game.[20] While some studies measured outcomes in addition to anxiety, given our focus, we report exclusively on findings related to anxiety.

Here is what each program entailed

Cognitive-behavioural therapy has a very strong record in reducing anxiety symptoms and in preventing the development of anxiety disorders.

The first RCT assessed Cool Little Kids, delivered to parents of four-year-olds displaying high levels of shyness and/or discomfort in new surroundings.[17, 21] Parents learned and applied CBT principles. This process included parents gradually exposing their children to anxiety-provoking situations while managing their own worries and responses, such as being overly protective. Parents also rewarded their children for showing bravery. Psychologists and psychology interns delivered the six group sessions, lasting 90 minutes each, at preschools in the evenings. Parents randomized to the control group received no intervention but could access community support services.[17]

The second RCT evaluated Coping Cat, delivered to students in Grades 3 to 6 with elevated anxiety symptoms.[18] Children learned CBT skills, first practising relaxation techniques and challenging anxious thoughts. Children were then exposed to low-anxiety situations as a group, followed by high-anxiety situations individually. Psychologists delivered the 12 group sessions, lasting one hour each, in schools after regular class hours. Parents received written information about the program and their child's progress in it. Children randomized to the control group received no intervention.[18]

The third RCT evaluated EMOTION, delivered to children between ages eight and 12 with elevated anxiety or depressive symptoms.[19] Children learned CBT techniques, including challenging negative thinking and practising being in anxiety-inducing situations.[22] Psychologists, school nurses and counsellors delivered the 20 group sessions, lasting between 45 and 60 minutes each, in schools either during school

hours or afterwards.[22–24] Parents participated in seven group sessions, which included information on anxiety, depression and parenting techniques.[22, 24] Children attended half of the parent sessions so families could practise together the skills they were learning. Children in the control group received no intervention but could have access to the school nurse if they needed.[19]

Building a therapeutic video game

MindLight incorporated neurofeedback, which involved teaching children to relax their bodies using real-time feedback through an EEG headset. Specifically, as children showed success in calming themselves, light levels in the game increased.[25] MindLight also exposed children to fearful obstacles and rewarded them when they paid attention. As well, the game used attention bias modification training, which included teaching children to focus on happy faces instead of threatening ones.[25]

The fourth RCT set out to determine whether the computer game MindLight was as effective as Coping Cat for students in Grades 3 to 6 with elevated anxiety.[20] (Coping Cat was chosen as the comparison intervention due to previous research highlighting its effectiveness.) MindLight incorporated training in neurofeedback, exposure and attention bias modification. The adjacent sidebar describes how these components were built into the game. Children played MindLight for six sessions, lasting one hour each, at school after classes ended. Two psychologists delivered the eight-session version of Coping Cat, also after regular school hours, with the first two sessions lasting 1½ hours each and the final six sessions lasting one hour each. Parents received written information about the program and their child's progress in it.[20] Table 1 summarizes the four RCTs.

Table 1. Study Descriptions

Program name	**Approach**	**Sample size**	**Child ages** (country)
Programs compared to a control group			
Cool Little Kids[17]	Parents: 6 group cognitive-behavioural therapy (CBT) sessions to learn strategies to use with their children	545	4 years (Australia)
Coping Cat[18]	Children: 12 group CBT sessions Parents: Handout describing program + their child's progress in it	141	7–12 years (The Netherlands)
EMOTION[19]	Children: 20 group CBT sessions Parents: 7 group parenting sessions, half with children present	795	8–12 years (Norway)
Program compared to another program			
MindLight vs.	Children: 6 video game sessions incorporating training in neurofeedback, exposure + attention bias modification	174	7–12 years (The Netherlands)
Coping Cat[20]	Children: 8 group CBT sessions Parents: Handout describing program + their child's progress in it		

How well did the programs work?

Cool Little Kids had mixed results at nine-month and at 1¾-years follow-up.[17] At both of these follow-ups, the program was unsuccessful in preventing the development of anxiety disorders.[17, 26] There were also no significant differences in the number of anxiety diagnoses that each child received, which were 1.3 for Cool Little Kids versus 1.4 for the control group (measured at nine-month follow-up only). Cool Little Kids did result in children experiencing significantly fewer anxiety symptoms at both of these initial follow-ups.[17, 26] However, at all three subsequent follow-ups, which occurred annually over a three-year period, no group differences existed for either anxiety diagnoses or symptoms.[27]

Coping Cat also had mixed results.[18] At three-month follow-up, children who had participated in the program reported significantly fewer anxiety symptoms compared with those in the control group. However, maternal ratings of their children's anxiety symptoms showed no significant differences between the groups.[18]

In contrast, EMOTION produced positive findings on all anxiety measures at one-year follow-up.[23] According to both self-report and parent ratings, children in the program had significantly lower anxiety scores than those in the control group.[23]

MindLight proved to be as effective as Coping Cat in reducing anxiety symptoms at both three- and six-month follow-ups according to child self-report and parent ratings.[20] Beyond finding these statistically significant differences, researchers calculated the degree to which reductions in anxiety symptoms made a meaningful difference in children's lives (i.e., effect sizes). At three-month follow-up, both programs produced large effects based on child report (MindLight: Cohen's *d* = 0.75; Coping Cat: *d* = 0.84) and medium effects based on paternal report (*d* = 0.36 and *d* = 0.61). Based on maternal report, however, effect sizes were medium for MindLight (*d* = 0.47) but large for Coping Cat (*d* = 0.74). At six-month follow-up, effect sizes remained large for both programs based on child self-report (MindLight: *d* = 1.07; Coping Cat: *d* = 0.88). In contrast, effect sizes were medium for MindLight based on maternal and paternal reports (*d* = 0.60 and *d* = 0.62) but large for Coping Cat (*d* = 0.94 and *d* = 0.81).[20] Table 2 summarizes anxiety outcomes for all four studies.

Anxiety disorders can result in lifelong distress and reduced functioning if not detected and prevented early.

Table 2. Anxiety Outcomes

Compared to control group	Follow-up	Anxiety outcomes
Cool Little Kids[17, 26–27]	9 months	NS Any anxiety disorder* (44.2% vs. 50.2%) NS # of anxiety disorder diagnoses ↓ Anxiety symptoms
	1¾ years	NS Any anxiety disorder* (37.6% vs. 42.6%) ↓ Anxiety symptoms
	2¾ years	NS Any anxiety disorder* (42.9% vs. 41.1%) NS Anxiety symptoms (2 of 2 measures)
	3¾ years	NS Anxiety disorder* (39.6% vs. 35.7%) NS Anxiety symptoms (2 of 2 measures)
	4¾ years	NS Anxiety disorder* (27.3% vs. 30.1%) NS Anxiety symptoms (2 of 2 measures)
Coping Cat[18]	3 months	↓ Anxiety symptoms (1 of 2 measures)
EMOTION[23]	1 year	↓ Anxiety symptoms (2 of 2 measures)
Compared to another program	**Follow-up**	**Anxiety outcomes**
MindLight[20]	3 months	As beneficial as Coping Cat in reducing anxiety symptoms (3 of 3 measures)
	6 months	As beneficial as Coping Cat in reducing anxiety symptoms (3 of 3 measures)

NS No significant difference between intervention and control condition.
↓ Statistically significant benefits favouring intervention over control condition.
* Assessed for separation anxiety disorder, specific phobia, social phobia and generalized anxiety disorder.

Building on a strong foundation

The outcomes of these four studies align with previous research on the effectiveness of CBT in reducing anxiety symptoms for at-risk children. The studies also showed that CBT effects can be enduring, lasting at least one year.[23] Notably, evaluations of other CBT programs, featured in previous issues of the *Quarterly*, showed even stronger results. For example, the Coping and Promoting Strength program prevented anxiety *diagnoses* in two separate RCTs.[28–29] Similarly, the CBT-based Dutch prevention program averted anxiety diagnoses almost two years after its completion.[30] For more on these programs, see our Spring 2016 issue.

Perhaps the more surprising finding is the limited success of Cool Little Kids, which did not prevent anxiety diagnoses and had only fading effects in reducing anxiety symptoms. These results may have been due to poor attendance, since only 34% of parents attended 5 or 6 sessions and 18% attended no sessions.[17] Lack of attendance was significantly more likely for parents with very low incomes, suggesting that researchers and practitioners may need to provide better supports so disadvantaged parents can participate in prevention programming.[26]

Many successful prevention programs exist and can be used to avert avoidable suffering.

Embedding fun and games into interventions

This review also identified a successful non-CBT intervention. The video game MindLight was as effective as the CBT-based Coping Cat program in preventing anxiety symptoms, with both interventions producing medium to large effects on all outcomes in this study. Still, caution is warranted given there is to date only one high-quality RCT supporting this intervention. As well, MindLight is associated with costs for the game itself and also requires equipment, including a relatively new computer or tablet as well as a specific headset that can support neurofeedback.[31]

Implications for practice and policy

Our findings suggest five conclusions to help prevent children from experiencing problematic anxiety.

- *Focus on children at risk for anxiety concerns.* The successful anxiety prevention programs all focused on children who were at risk for developing problematic anxiety. This is consistent with findings from a past *Quarterly* issue as well as our report *Preventing and Treating Childhood Mental Disorders: Effective Interventions*, which found no successful universal anxiety prevention programs delivered to children aged 12 and younger.[14, 32] (Universal programs are delivered to entire populations of children, such as all students in a given school grade.) Efforts to prevent anxiety disorders are more likely to succeed when they focus on children with elevated anxiety or children with a parent who has an anxiety disorder.[28–29]
- *Reach children where they are at.* All the programs delivered directly to children took place in schools, typically after classes had ended. This approach has the advantage of engaging with children in locations that do not require travel. As well, after-school programming means children do not have to miss any classroom activities.
- *Start with CBT.* Cognitive-behavioural therapy has a very strong record in reducing anxiety symptoms and in preventing the development of anxiety disorders. Prevention efforts should begin with CBT.
- *Remember parents.* All of the CBT programs featured in this review included parents. Their involvement ranged from participating in multiple group sessions to receiving information on the intervention being delivered to their child and their child's progress. When parents are involved in prevention programming, children benefit.
- *Conduct more research.* While the research supporting CBT is very strong, not every child will benefit from this intervention. So other prevention options are needed. MindLight has some evidence of success, so it may be worth considering for children who have not made gains from CBT. Still, new evaluations of MindLight are needed, especially those that are independent from individuals producing or profiting from the game.

Anxiety disorders, the most prevalent childhood mental health condition, can result in lifelong distress and reduced functioning if not detected and prevented early. Many successful prevention programs exist and can be used to avert avoidable suffering, including in early childhood. Practitioners and policy-makers therefore have an important opportunity to support child well-being — by promoting environments that support children's social-emotional health and ensuring that every child who is at heightened risk of anxiety disorders can access effective prevention programs such as those we have showcased here.

METHODS

We use systematic review methods adapted from the *Cochrane Collaboration*. We build quality assessment into our inclusion criteria to ensure that we report on the best available research evidence, requiring that intervention studies use randomized controlled trial (RCT) evaluation methods and meet additional quality indicators. For this review, we searched for RCTs on programs aimed at preventing anxiety disorders in children 12 years or younger. Table 3 outlines our database search strategy.

Table 3. Search Strategy

Sources	• Campbell Systematic Reviews, CENTRAL, Cochrane Database of Systematic Reviews, CINAHL, ERIC, Medline and PsycINFO
Search Terms	• Anxiety, anxiety disorder, agoraphobia, generalized anxiety disorder, panic disorder, phobic disorder, selective mutism, social phobia, specific phobia, separation anxiety disorder or social anxiety disorder *and* prevention, intervention or therapy
Limits	• Published in English between 2018* and 2024 in a peer-reviewed journal • Reported on children aged 18 years or younger • Used systematic review, meta-analysis or RCT methods

* Searches were conducted building on our prior systematic review,[33] which used search dates from database inception to 2018. We also hand-searched assessed studies published between 2016 and 2018.

To identify additional RCTs, we also hand-searched the reference lists from relevant systematic reviews and previous issues of the *Quarterly*. Using this approach, we identified 120 articles describing 90 studies. Two team members then independently assessed each article, applying the inclusion criteria outlined in Table 4.

Table 4. Inclusion Criteria for RCTs

- Participants or schools were randomly assigned to intervention and comparison groups (i.e., no-intervention or active control) at study outset
- Participants were children 12 years or younger
- Study authors provided clear descriptions of participant characteristics, settings and intervention
- Interventions were evaluated in high-income countries for comparability to Canadian settings
- Interventions aimed to prevent childhood anxiety symptoms or disorders
- At study outset, most participants did not have anxiety disorder diagnoses and/or had not been referred for treatment for anxiety problems
- Follow-up was three months or more (from the end of the intervention)
- Attrition rates were 20% or less at final assessment and/or intention-to-treat analysis was used
- Child outcome indicators included symptoms and/or diagnoses of anxiety disorders
- Anxiety symptoms were assessed at follow-up using two or more informant sources
- Reliability and validity were documented for primary outcome measures
- Statistical significance was reported for primary outcome measures
- Studies were excluded where authors indicated insufficient statistical power or no power analysis was conducted

Four RCTs met all inclusion criteria. Figure 1 depicts our search process, adapted from Preferred Reporting Items for Systematic Reviews and Meta-Analyses.[34] Data from these studies were then extracted, summarized and verified by two or more team members. Throughout our process, any differences among team members were resolved by consensus.

For more information on our research methods, please contact
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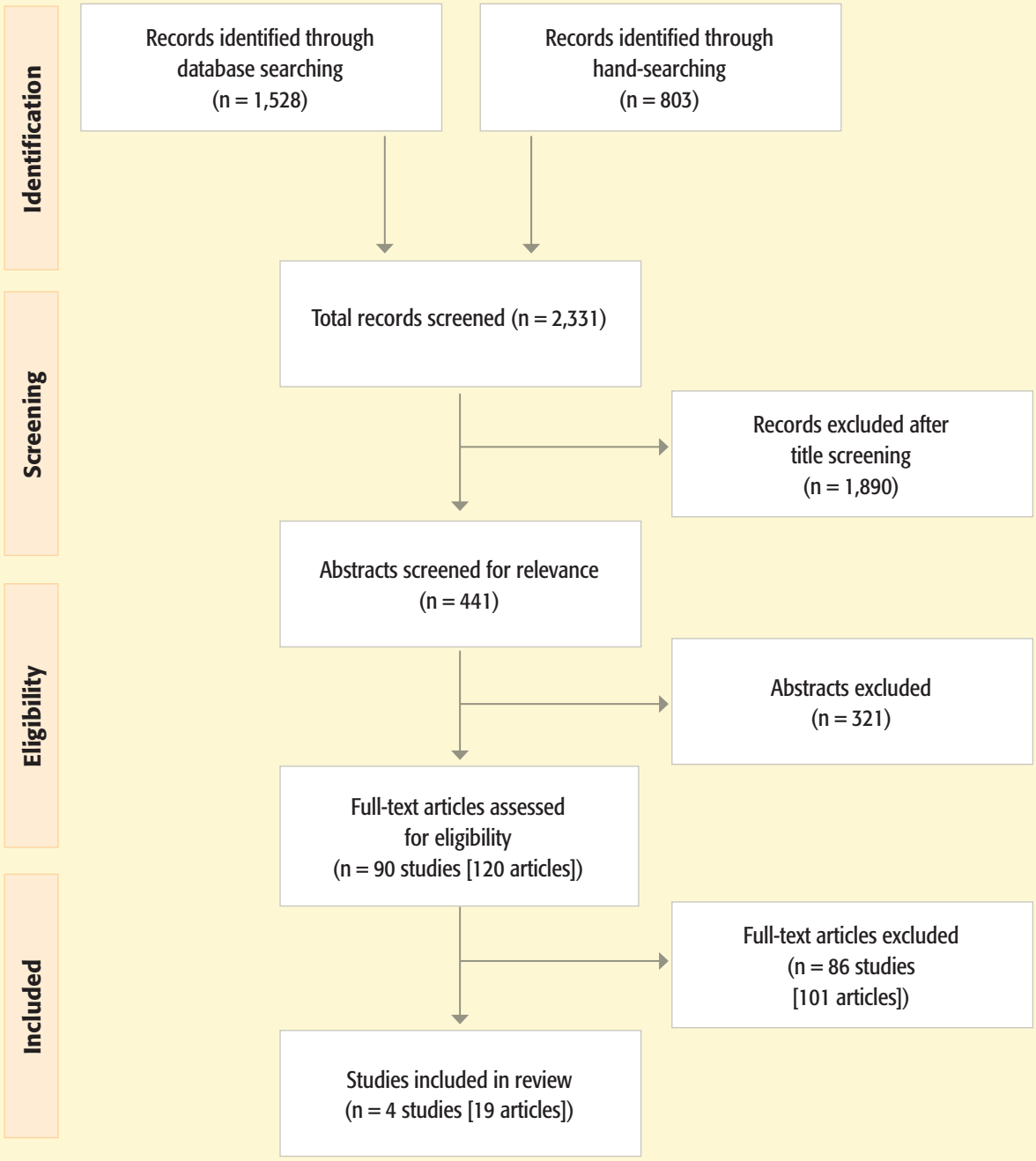
Figure 1. Search Process for RCTs



RESEARCH TERMS EXPLAINED

Identifying the best available research evidence on how well interventions work for children is crucial in guiding public policy and practice decisions and investments. **Randomized controlled trials** (RCTs) are an important standard in the health sciences for assessing intervention effectiveness. RCTs involve randomly assigning participants to a given group (e.g., interventions or no interventions). The randomization process ensures that every young person enrolled in the study has an equal chance of being assigned to any of the groups. The goal is to create conditions that are fully comparable other than the intervention being evaluated.

To determine how well an intervention works, researchers then analyze relevant child outcomes. Analyses include assessing whether group differences are **statistically significant**. This process gives more certainty that any differences favouring a given intervention were not due to chance. In the studies we reviewed, researchers used the typical convention of having at least 95% confidence that observed results reflected the intervention's real impact.

Beyond determining whether outcomes are statistically significant, it is important to evaluate how much meaningful difference an intervention makes to the child's well-being — or the intervention's "real life" magnitude. This outcome, called an **effect size**, is a quantitative description of the strength of the relationship between the intervention and the outcome. Among those we report on in this issue, **Cohen's *d*** effect sizes are quantified as small (0.20), medium (0.50) or large (0.80). 👋

Effect sizes provide information on an intervention's impact on children's daily life.

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BC government staff can access original articles from BC's Health and Human Services Library. Articles marked with * include randomized controlled trial data that was featured in our Review article.

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LINKS TO PAST ISSUES

The *Children's Mental Health Research Quarterly* Subject Index provides a detailed listing of topics covered in past issues, including links to information on specific programs.

2024 / Volume 18
- 3 – Treating opioid use disorder in young people
- 2 – Preventing problematic opioid use for young people
- 1 – Treating childhood eating disorders

2023 / Volume 17
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- 2 – Preventing concurrent mental disorders in children
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