

# Accessibility of childcare services for preschoolers with disabilities:

## A scoping review of promising solutions

Research report  
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# **Accessibility of childcare services for preschoolers with disabilities: A scoping review of promising solutions**

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**Note**

The authors wish to clarify that the present report, published in January 2025, partially incorporates the results and ideas expressed and developed in a manuscript submitted on December 9, 2024, to the journal *Child: Care, Health and Development*.

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## Executive summary

In 2021, the Government of Canada committed to establish, in the coming years, a learning and childcare system designed to provide families across the country with access to high-quality, affordable, and inclusive childcare services. These childcare services will also be tailored to the specific and unique needs of young children with disabilities. Although scientific literature and grey literature document the contribution of certain factors to promote the accessibility of childcare services for these children, there is no overview of the current situation of childcare services in Canada, which fall under the jurisdiction of each province and territory. It is in this context that this research project aims to provide scientific evidence regarding the accessibility of childcare services in Canada for children aged 0 to 5 years with disabilities. More specifically, this project is intended to meet three specific objectives, namely: (1) identify the laws and regulations currently in force in each province and territory of Canada that pertain to the accessibility of childcare services for young children with disabilities; **(2) identify solutions that promote the accessibility of childcare services for young children with disabilities, and identify the outcome variables collected among children as a result of implementing these promising solutions;** and (3) describe experiences in childcare services in Canada from the perspective of workers and parents. **This research report is dedicated to the second specific objective.**

To achieve this objective, a scoping review was conducted. A search strategy was developed in close collaboration with a research librarian, that included the following two concepts: “childcare services” and “children with disabilities.” Seven relevant databases were identified (i.e., Medline, CINAHL, ERIC, Web of Science, PSYCInfo, Academic Search Premier, and Education Source), along with appropriate keywords. Two reviewers independently screened the studies identified through the database search. At the end of the selection process, 65 studies were retained. Data were extracted by a single member of the research team and validated by another team member. Promising solutions and documented outcome variables in the selected studies were categorized according to the *International Classification of Functioning, Disability, and Health for Children and Youth* (ICF-CY; WHO, 2007). Overall, this scoping review reveals that the solutions most often documented in the scientific literature to improve the accessibility of childcare services for young children with disabilities are associated with various forms of support and relationships, mainly concerning the social (e.g., social initiations and interactions with peers) and communication skills (e.g., receptive and expressive language) of children with autism. These promising solutions are generally child-centred. The scientific literature makes little reference to changes in the physical environment. Nevertheless, this scoping review also provides a list of strategies that have demonstrated substantial benefits for children with disabilities attending a childcare service (e.g., training of educational staff and peer-mediated interventions for the social environment, and access to assistive devices and adapted equipment for the physical environment).

The findings of this research project will support the development of the next generation of Canadian standards for childcare accessibility. Indeed, the project will provide a better understanding of the situation in Canada and provide essential evidence for establishing useful and realistic standards.

# **Accessibility of childcare services for preschoolers with disabilities: A scoping review of promising solutions**

## **Background**

Article 23 of the United Nations *Convention on the Rights of the Child* (1989) states that children with disabilities must have access to education and that the necessary resources should be deployed to ensure their social integration and full individual development. In line with this Convention, and because it is also widely acknowledged that childcare services should have an educational mission, the Government of Canada committed in 2021 to creating, over the coming years, a learning and childcare system designed to provide families across the country with access to high-quality, affordable, and inclusive childcare services (Department of Finance Canada, 2021). These services must also be tailored to the specific and unique needs of young children with disabilities (Department of Finance Canada, 2021). This initiative aligns with the goals of *Canada's Disability Inclusion Action Plan*, especially concerning the creation of inclusive spaces for individuals with disabilities (Employment and Social Development Canada, 2022a).

It is in this context that this research project was initiated. It is part of a targeted call for projects under Accessibility Standards Canada's grants and contributions program entitled *Advancing Accessibility Standards Research*. The overall objective of this study is to provide scientific evidence regarding the accessibility of childcare services in Canada for children aged 0 to 5 years with disabilities. The first of the three specific objectives of this research project was to identify the laws and regulations in force in each province and territory of Canada concerning the accessibility of childcare services for young children with disabilities. A research report, available since November 2023, was dedicated to this specific objective (Routhier et al., 2023). It concluded that no document contains legally binding content that requires childcare services to adjust their offerings for children with disabilities, and that the regulations in place and the provision of services for young children with disabilities in childcare services are not uniform across Canada. Please refer to that report for more details regarding the context of this research project.

The current report pertains to the second of the project's three specific objectives, which is to identify solutions, related to the physical or social environment, that enhance the accessibility of childcare services for preschool children (generally aged 0 to 5 years) with disabilities. Additionally, it seeks to identify the outcome variables collected among children as a result of implementing these solutions. As stated in our above-mentioned report, while grey and scientific literature document the contribution of some factors to promote the accessibility of childcare services for these children, a comprehensive description of the social and physical environmental factors contributing to this accessibility remains absent. It also appears essential to explore the promising solutions by providing information on the outcome variables associated with their implementation.

For information purposes, the third specific objective of this project aims to describe the situation in childcare services across different provinces and territories from the perspective of managers and educators working there, as well as of parents of children with disabilities.

## Definitions

### *Disability*

According to the *Canadian Human Rights Act* (Employment and Social Development Canada, 2022b), *disability* means “any impairment, including a physical, mental, intellectual, cognitive, learning, communication or sensory impairment – or a functional limitation – whether permanent, temporary or episodic in nature, or evident or not, that, in interaction with a barrier, hinders a person’s full and equal participation in society.”

### *Accessibility*

*Accessibility* ensures that all individuals, regardless of their type of disability, are able to access, use, and benefit from their environment. According to the United Nations *Convention on the Rights of Persons with Disabilities* (2006), this means that, in order “to enable persons with disabilities to live independently and participate fully in all aspects of life, [...] appropriate measures [must be taken] to ensure to persons with disabilities access, on an equal basis with others, to the physical environment [...] and services open or provided to the public.” In the context of this project, we refer to factors of both the physical environment (e.g., building architecture/design, ramps, door width, wall colours, acoustics, space organization, room lighting, available assistive technology, available educational materials, available toys/games) and the social environment (e.g., inclusion policies, inclusive settings, funding programs, educator training, presence of special care counsellors, support from rehabilitation professionals, attitudes of managers/workers) that can promote accessibility of childcare services for children aged 0 to 5 years with disabilities. This understanding of environmental factors is based on the taxonomy derived from the *International Classification of Functioning, Disability, and Health – Children and Youth Version* (ICF-CY), published by the World Health Organization in 2007.

### *Childcare services*

We refer to *childcare services* as all settings where children aged 0 to 5 years (or of preschool age) receive educational childcare services.

## Methodology

### *Approach and study design*

In order to successfully achieve the objective described above and assess the state of available knowledge, a scoping review was conducted based on the process outlined by Levac et al. (2010), who made recommendations to clarify the methodological framework developed by Arksey and O’Malley (2005). The PRISMA-ScR guidelines (Preferred Reporting Items for Systematic Reviews and Meta-analyses Extension for Scoping Review) were also followed to facilitate the preparation of a rigorous protocol and the presentation of results (Tricco et al., 2018). The protocol for this scoping review was registered on the OSF online platform (<https://doi.org/10.17605/OSF.IO/X4N9W>).

To carry out such a scoping review and support the research team, two advisory committees (one French-speaking and one English-speaking) were formed, made up of researchers (n=6), parent partners (n=6), and representatives from the childcare services community (n=4). These committees

were primarily tasked with validating the steps of the process, monitoring the project's progress, proposing courses of action, and contributing to the synthesis and interpretation of results. In addition, a research librarian was involved in the design and execution of this scoping review. It is now well documented in the scientific literature that close collaboration with a librarian significantly enhances the quality of literature reviews (Meert et al., 2016; Rethlefsen et al., 2015).

### ***Search strategy***

A conceptual plan was developed in close collaboration with the librarian (MG). This plan encompassed two key concepts: “childcare services” and “children with disabilities.” The concept of accessibility was not included in this plan due to its broad scope, which makes it challenging to address all related aspects comprehensively. Seven relevant databases were identified, including Medline (Ovid), CINAHL (EBSCO), ERIC (EBSCO), Web of Science, PSYCInfo (Ovid), Academic Search Premier (EBSCO), and Education Source (EBSCO), and appropriate keywords were defined. These keywords and the writing rules (e.g., truncations, quotation marks, Boolean operators) were adapted for each selected database. The search strategy developed for one of these databases is provided in Appendix 1. The database searches were conducted in May 2023 by the librarian. The references were then exported to the Covidence online platform (<https://www.covidence.org/home>), a collaborative tool that facilitates the literature review process. Duplicate articles were removed.

### ***Selection criteria***

Study selection criteria were established with the librarian and reviewed with the research team at the beginning of the project. These inclusion and exclusion criteria are provided in Table 1, classified according to the following categories: (1) population and setting, (2) promising solutions and outcome variables, (3) study design, (4) source, (5) language, and (6) publication year. Only articles published from 2006 onward were retained, as that was the year in which the United Nations adopted the *Convention on the Rights of Persons with Disabilities* (UN, 2006).



**Table 1.** Inclusion and exclusion criteria

	<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
<b>Population and setting</b>	<ul style="list-style-type: none"> <li>● Preschool children (generally aged 0 to 5 years) with disabilities who attend a childcare service</li> </ul>	
<b>Promising solutions and outcome variables</b>	<ul style="list-style-type: none"> <li>● Promising solutions (i.e., reported to have positive impacts on children) related to environmental factors and implemented to promote accessibility of childcare services for preschool children with disabilities: <ul style="list-style-type: none"> <li>○ Physical environment</li> <li>○ Social environment</li> </ul> </li> <li>● Outcome variables collected among children and resulting from the implementation of the promising solutions</li> </ul>	<ul style="list-style-type: none"> <li>● Healthcare provided to children in a childcare service (e.g., for children with medically complex issues)</li> </ul>
<b>Study design</b>	<ul style="list-style-type: none"> <li>● All types of study designs presenting original data (i.e., quantitative, qualitative, mixed methods)</li> </ul>	<ul style="list-style-type: none"> <li>● Opinion pieces</li> <li>● Literature reviews</li> </ul>
<b>Source</b>	<ul style="list-style-type: none"> <li>● Articles reporting research data, published in peer-reviewed journals</li> </ul>	<ul style="list-style-type: none"> <li>● Conference abstracts</li> <li>● Editorials</li> <li>● Books and book chapters</li> <li>● Dissertations</li> <li>● Reports</li> </ul>
<b>Language</b>	<ul style="list-style-type: none"> <li>● Articles written in English or French</li> </ul>	
<b>Publication year</b>	<ul style="list-style-type: none"> <li>● Articles published from 2006 onward</li> </ul>	

### ***Selection process***

In Covidence, two reviewers first independently examined the titles, abstracts, and publication years of all the studies identified in the database searches. The decision to limit inclusion to articles published from 2006 onward was made while the screening process was under way, which explains why this initial stage also took into account the publication year of the studies. A study was excluded if the information provided in the title and abstract clearly did not meet the predetermined selection criteria. The remaining articles were then read in their entirety. At each stage, the two reviewers compared their decisions, and any discrepancies were discussed. If disagreements could not be resolved through consensus, a third reviewer was consulted. To prevent errors and minimize the risk of discrepancies between reviewers, the screening process began with a calibration exercise. The individuals responsible for screening each independently reviewed the first 20 results (titles and abstracts) in Covidence and then compared their decisions. After discussion, a 100% consensus was achieved.

### ***Data extraction***

All members of the research team and advisory committees contributed to identifying the variables to be extracted from the studies included in this scoping review. These variables fall into five broad categories:

- 1) Study identification: title, author(s), publication year, country where the study was conducted;
- 2) Method: aim of the study, study design, recruitment strategy, setting (e.g., type of childcare service and its main characteristics), assessment tools, data collection process, data analysis;
- 3) Target population and sample: inclusion and exclusion criteria, number of participants, participants' age, sex and diagnosis;
- 4) Promising solutions (i.e., solutions having positive impacts on children): brief description of the intervention, people involved, process (e.g., time needed to implement the intervention, resources required);
- 5) Outcome variables and results: outcome variables collected among children following the implementation of the promising solutions (e.g., duration and quality of social interactions with peers, engagement in play, spontaneous verbalizations), results (e.g., significant decrease in stereotyped behaviors), study limitations.

An extraction grid was created using Excel to record relevant data from all the selected studies. For each study, data were extracted by a single member of the research team and validated by a second member of the team.

### ***Data analysis***

Some data were synthesized descriptively, including those related to study identification and study participants. The promising solutions and documented outcome variables were categorized according to the ICF-CY (WHO, 2007). It is an adaptation of the broader ICF classification and is intended to capture the unique developmental needs and environmental contexts of the children and adolescents (WHO, 2007).

Each promising solution was categorized in one of the five domains within the “Environmental Factors” component of this classification, namely (WHO, 2007):

- 1) Products and technology: “any product, instrument, equipment or technology adapted or specially designed for improving the functioning of a disabled person”;
- 2) Natural environment and human-made changes to environment: “animate and inanimate elements of the natural or physical environment, and components of that environment that have been modified by people [...]”;
- 3) Support and relationships: “people [...] that provide practical physical or emotional support, nurturing, protection, assistance and relationships to other persons, in their home, place of work, school or at play or in other aspects of their daily activities”;
- 4) Attitudes: “attitudes that are the observable consequences of customs, practices, ideologies, values, norms, factual beliefs and religious beliefs. These attitudes influence individual behaviour and social life at all levels [...]”;

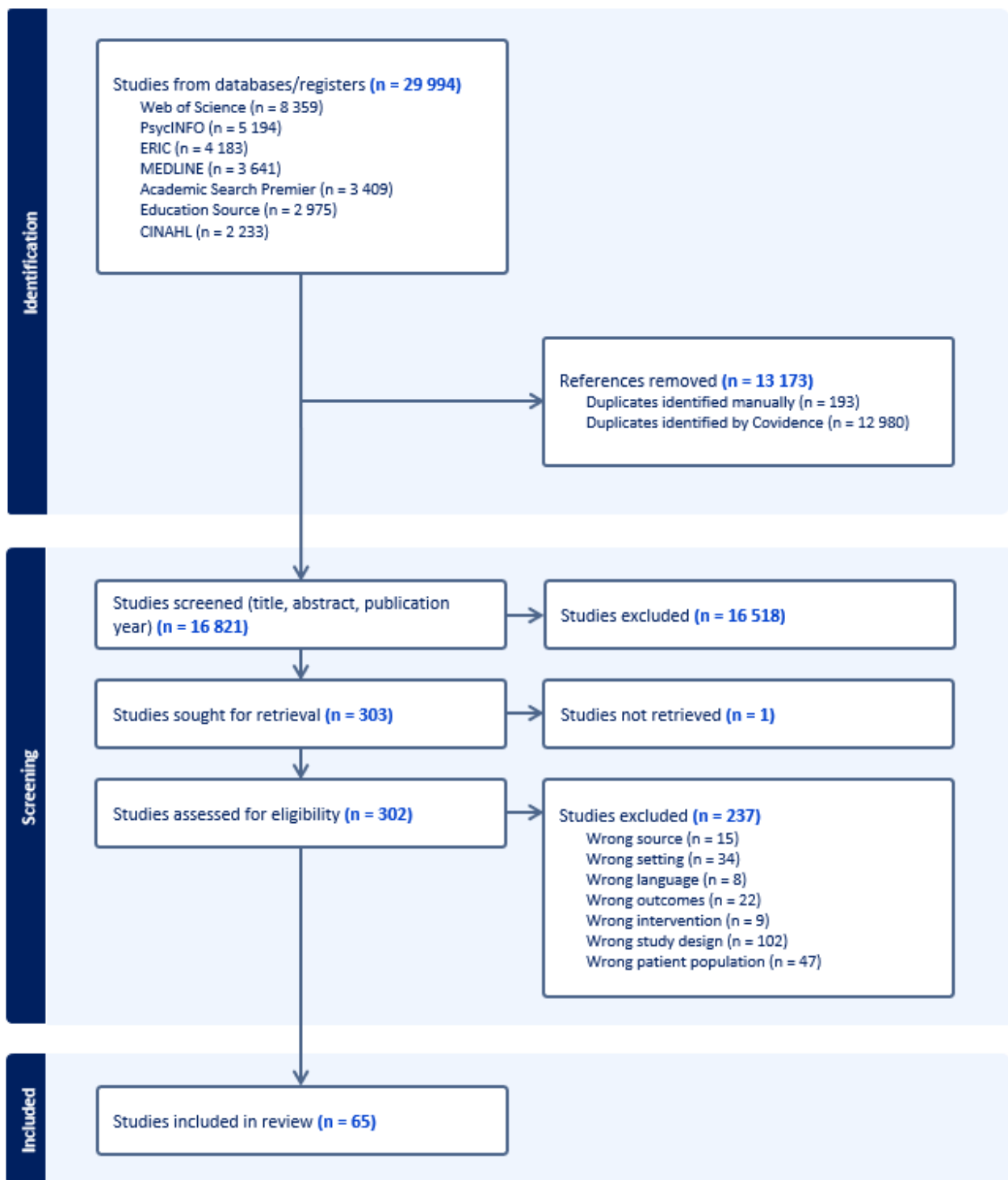
- 5) Services, systems and policies: “*Services* that provide benefits, structured programmes and operations, in various sectors of society, designed to meet the needs of individuals. (Included in services are the people who provide them.) [...]. *Systems* that are administrative control and organizational mechanisms [...]. These systems are designed to organize, control and monitor services that provide benefits, structured programmes and operations in various sectors of society. *Policies* constituted by rules, regulations, conventions and standards [...] govern and regulate the systems that organize, control and monitor services, structured programmes and operations in various sectors of society”.

In addition, where possible and relevant, promising solutions were grouped into categories (e.g., group activities, class-wide intervention and inclusive playgroup experiences were grouped together). Finally, each of the documented outcome variables was categorized according to the most appropriate ICF-CY component, including the domain and first branching level in the classification to which it most accurately referred (e.g., “Activities and participation” component – “Mobility” domain – “Walking and moving” branch).

## **Results**

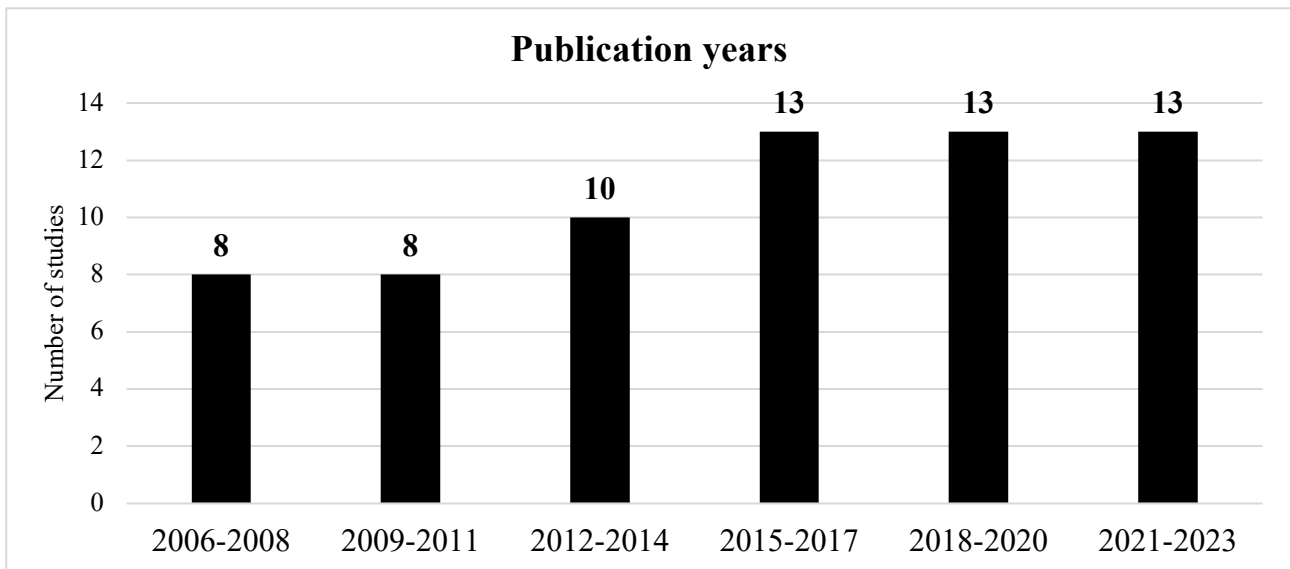
### ***Identification of selected studies***

The database searches generated 29 994 results. The study selection process is shown in Figure 1, using a PRISMA flow diagram (Tricco et al., 2018). Sixty-five articles were included in this scoping review. The references for these 65 studies are provided in Appendix 2.



**Figure 1.** PRISMA flow diagram showing the study selection process

Figure 2 shows the publication years of the selected studies, while Table 2 shows the countries in which they were carried out. It can be seen that the vast majority of studies were carried out in the United States (n=40; 61.5%).



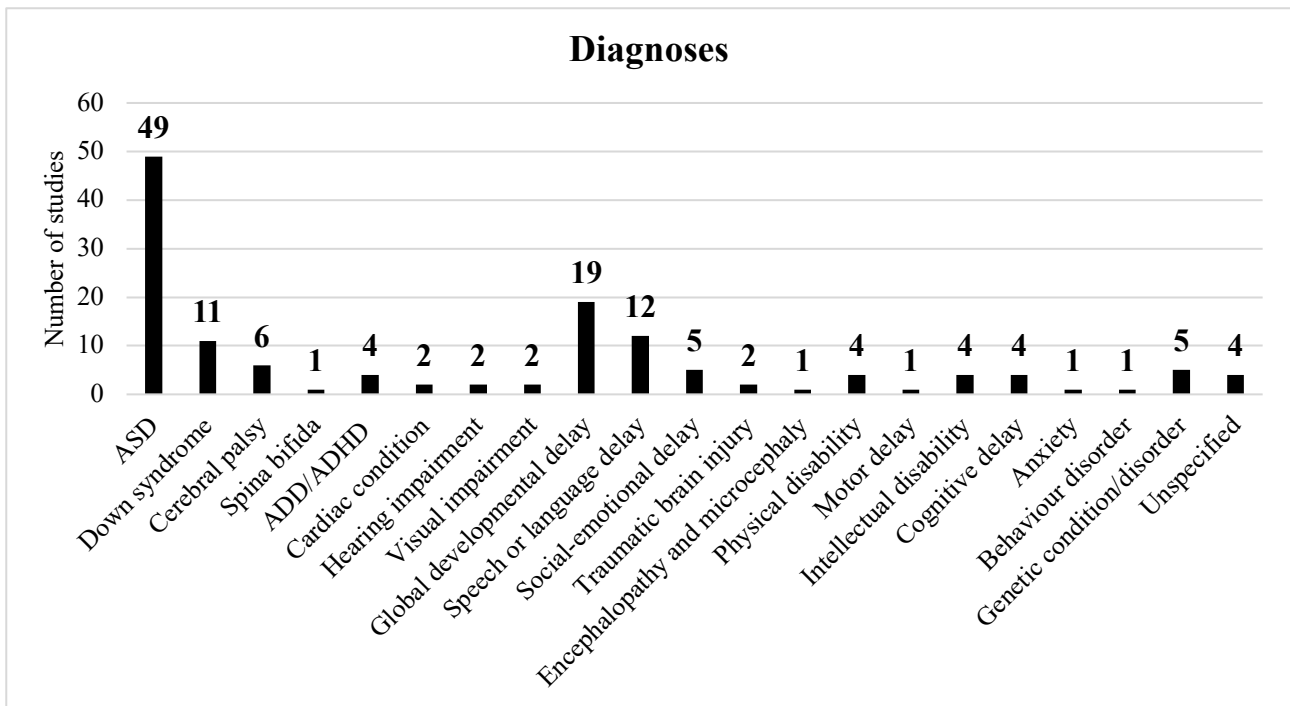
**Figure 2.** Publication years of the selected studies

**Table 2.** Countries in which the selected studies were carried out

Country	n	%
United States	40	61.5
Canada	4	6.2
Turkey	4	6.2
Australia	3	4.6
China	2	3.1
Israel	2	3.1
Sweden	2	3.1
England	1	1.5
Germany	1	1.5
Iceland	1	1.5
Japan	1	1.5
Malaysia	1	1.5
Portugal	1	1.5
Switzerland	1	1.5
United Kingdom	1	1.5

### ***Target population***

The children who participated in the selected studies were aged 18 months to 6 years and 6 months. Although some of the children were older than 5 years, they were all attending a preschool childcare service. These children had a wide variety of diagnoses, as illustrated in Figure 3, but the most common were autism spectrum disorder (ASD; n=49 studies; 75.4%) and global developmental delay (n=19 studies; 29.2%). Among the 65 studies selected for this scoping review, just over half (n=34; 52.3%) were conducted exclusively with children with autism, and 15 (23.1%) included children with autism, but not exclusively.



**Figure 3.** Diagnoses of children who took part in the selected studies. ASD: autism spectrum disorder; ADD: attention deficit disorder; ADHD: attention-deficit/hyperactivity disorder.

***Promising solutions***

Table 3 presents the number of studies that discussed a promising solution related to each of the domains in the “Environmental Factors” component of the ICF-CY. It is noteworthy that no solution was coded under the “Attitudes” domain. Appendix 3 presents the specific solutions (or groups of solutions) belonging to each of these domains, as well as the associated studies.

**Table 3.** Promising solutions documented in the selected studies, categorized according to the ICF-CY

<b>Environmental factors (ICF-CY)</b>	<b>n (%)</b>	<b>Some examples of promising solutions</b>
<b>Social environment</b>		
Support and relationships	61 (93.8%)	Prompting/guidance, modelling, adult participation/involvement, peer-mediated interventions, class-wide interventions
Services, systems and policies	28 (43.1%)	Training/coaching of educators/preschool staff, structured program/curriculum already in place in the childcare service
<b>Physical environment</b>		
Products and technology	41 (63.1%)	Speech-generating devices, visual supports, play material/toy sets, communication boards, mobility aids
Natural environment and human-made changes to environment	11 (16.9%)	Minimize distractions, strategically organize the learning environment, create a separate, quiet space within the classroom

#### *Social environment*

Among the studies selected for this scoping review, 61 (93.8%) evaluated one or more promising solutions belonging to the “Support and relationships” domain, as presented in Table 3 and Appendix 3. The most often documented solutions coded under this domain are as follows:

- 1) Some instructional techniques and supports (n=22; 33.8%), including prompting, guidance, modelling, verbal instructions, feedback, demonstrations, and reinforcement. These methods are used to assist the child, for example, when performing an activity or learning a targeted skill (Bennett et al., 2011; Dionne et al., 2019; Ingvarsson and Le, 2011; McDowell et al., 2015; Raver et al., 2014; Tzanakaki et al., 2014). These approaches, which may be faded out over time (e.g., according to a specific hierarchy), can, among other things, ensure that the child correctly understands the task or activity and completes it appropriately, with the ultimate goal of helping the child progress in their learning (Dionne et al., 2019).
- 2) Peer-mediated interventions, peer support, and cooperative activities (n=21; 32.3%). Through these strategies, neurotypical children are sensitized to the reality of children with disabilities and are trained and encouraged to help them (Zhang et al., 2022). These interventions generally aim to promote social interactions among all children, thereby fostering the acquisition of social skills by children with disabilities and facilitating their inclusion in childcare or school settings (Chang and Locke, 2016; Gladh et al., 2022; Zhang et al., 2022).
- 3) Naturalistic teaching strategies and naturalistic developmental behavioural interventions (n=15; 23.1%), whereby skills are taught in a developmental sequence and with increasing complexity, and in the child’s natural environment (Schreibman et al., 2015). These

interventions are well documented in the scientific literature, primarily among children with autism (Crank et al., 2021; Franz et al., 2022; Frost et al., 2020).

The other promising solutions associated with the “Supports and relationships” domain under the “Environmental factors” component of the ICF-CY were related to Discrete Trial Teaching (a behavioural approach designed to teach children new skills) (Bravo and Schwartz, 2022; Downs et al., 2008a and 2008b) (n=5; 7.7%); group activities/classroom-wide interventions/inclusive playgroup experiences (n=9; 13.8%); group composition or size (n=6; 9.2%); music and/or dance activities (n=4; 6.2%); experience-based learning (n=1; 1.5%); support provided to parents/collaboration with parents (n=5; 7.7%); adult participation/involvement in children’s activities (e.g., involvement in children’s play according to a particular hierarchy, adjusting based on their needs) (n=9; 13.8%); modification/adaptation of the daily routine (n=3; 4.6%); sensory support (n=1; 1.5%); collaboration/liaison between all professionals involved with the child with disabilities (n=2; 3.1%); and support provided by an educational support worker (n=1; 1.5%).

Two types of promising solutions were coded under the “Services, systems, and policies” domain, addressed in 28 studies (43.1%). First, interventions involving the training and/or coaching of educational or preschool staff were identified (n=25; 38.5%). Various formats are offered, including teaching/training, coaching, and personalized support (both in person and remotely). These interventions for childcare service staff generally aim to strengthen their knowledge and capabilities for the optimal support of young children with disabilities, enabling the full realization of these children’s potential. Also under this domain, structured programs/models/curricula implemented within a childcare service were identified (n=7; 10.8%), for example prior to conducting a study (e.g., Project DATA [Developmentally Appropriate Treatment for Autism], LEAP Model [Learning Experiences and Alternative Program for Preschoolers and Their Parents], Intensive Early Intervention Program, or PB-ESDM [Preschool-based Early Start Denver Model]). These programs typically include multiple components, such as training educational staff, collaboration with parents and healthcare professionals, and peer involvement. All of these activities aim to sustainably optimize the accessibility of childcare services for young children with disabilities.

### *Physical environment*

The promising solutions grouped under the “Products and technology” domain refer to assistive devices, equipment, or adapted materials used to facilitate activities and participation for children with disabilities. This type of solution was discussed in 41 of the 65 selected studies (63.1%). These include assistive devices (e.g., Braille materials, mobility aids, weighted items, spoon with a large soft-grip handle) (n=4; 6.2%); visual supports/strategies/schedules (n=10; 15.4%); equipment or tools for augmentative and alternative communication (e.g., picture cards, speech-generating devices, communication boards, mediating tools) (n=11; 16.9%); play materials/toy sets (n=13; 20.0%); social stories/storybooks (n=5; 7.7%); iPads (e.g., iPads with specific apps downloaded) (n=2; 3.1%); and videos (e.g., for video prompting or video modelling) (n=3; 4.6%). It is important to point out that the vast majority of these promising solutions were used in conjunction with an intervention from the “Supports and relationships” domain. Indeed, to optimize the use of an assistive device or specific equipment, it is necessary to provide some support/teaching and involve peers and/or adults in the child’s environment.



Very few studies have documented promising solutions belonging to the “Natural environment and human-made changes to environment” domain (n=11; 16.9%). The solutions coded under this domain have been grouped into three categories: (1) setting up the physical environment to optimize accessibility (e.g., physical delineations, organizing spaces to promote children’s communication, organizing the learning environment, easily accessible toys, use of open spaces) (n=8; 12.3%); (2) modification or adaptation of the sensory aspects of the environment (e.g., minimizing distractions, changing the lighting, reducing visual stimuli in the room, creating a separate quiet space within the classroom) (n=3; 4.6%); and (3) setting up and using the outdoor environment (n=3; 4.6%).

### ***Outcome variables***

Outcome variables were collected among children and resulted from the implementation of each promising solution. Table 4 presents some examples of outcome variables documented in the selected studies, coded according to the ICF-CY, as well as the number of studies that documented these outcome variables. For each identified promising solution (or groups of solutions) in the selected studies, Appendix 3 provides the outcome variables coded according to the ICF-CY. However, caution should be exercised when interpreting the outcome variables presented in Appendix 3. When multiple solutions were implemented within the same study, it was not possible to isolate which specific solution the observed outcome variables were associated with. For example, the impact on mobility of an assistive device *and* of the support provided by an educator was attributed to both types of promising solutions.

Almost all of the outcome variables fall under the “Activities and participation” component of the ICF-CY. They are primarily associated with two domains: “Interpersonal interactions and relationships” (n=42; 64.6%) and “Communication” (n=41; 63.1%). Finally, a few outcome variables relate to the “Body functions” component of the ICF-CY, specifically to the “Mental functions” (n=7; 10.8%) and “Neuromusculoskeletal and movement-related functions” (n=2; 3.1%) domains. For more details, Appendix 3 also provides the first branching level in the classification to which these outcome variables specifically refer (e.g., “Activities and participation” component – “Mobility” domain – **“Walking and moving” branch**).

**Table 4.** Outcome variables documented in the selected studies, categorized according to the ICF-CY

ICF-CY	n (%)	Some examples of outcome variables
<b>Activities and participation</b>		
Interpersonal interactions and relationships	42 (64.6%)	Social interactions with peers (e.g., duration and quality), number and types of social initiations, toy sharing with peers, social skills, prosocial behaviour, social behaviours, social engagement
Communication	41 (63.1%)	Receptive and expressive language, conversation quality, mean length of utterances, spontaneous verbalizations, nonverbal communication/use of gestures, total number of words, use of a communication assistive device
Major life areas	26 (40.0%)	Engagement in play, play complexity, play behaviour (e.g., solitary, parallel, cooperative), preschool education
Learning and applying knowledge	21 (32.3%)	Independent imitation of actions with objects, vocabulary development, shape and colour concepts, letter and word recognition
General tasks and demands	15 (23.1%)	Self-regulation behaviours/managing one's own behaviour, task completion, carrying out daily routine, independence during transitions between activities
Mobility	11 (16.9%)	Fine motor skills (e.g., drawing, cutting, manipulating utensils), engagement in activities that include movements such as jumping, sitting, kneeling
Self-care	7 (10.8%)	Daily living skills, feeding, dressing, toileting
<b>Body functions</b>		
Mental functions	7 (10.8%)	Temperament and personality functions, symptom severity, anxiety, attention functions
Neuromusculoskeletal and movement-related functions	2 (3.1%)	Stereotyped behaviours

## Discussion

This scoping review aimed to identify promising solutions within the social and physical environments that enhance the accessibility of childcare services for young children with disabilities. Additionally, it sought to identify the outcome variables collected among children and resulting from the implementation of these solutions. In total, 65 articles were selected for inclusion and the data related to the promising solutions and outcome variables were categorized according to the ICF-CY.

### ***Social environment***

Generally, this scoping review reveals that the most commonly documented solutions in the scientific literature for improving the accessibility of childcare services for young children with disabilities are associated with various forms of support and relationships, such as prompting, guidance, modelling, adult involvement and peer-mediated interventions. These promising solutions, specific to the social environment, primarily address the social skills (e.g., social initiations and interactions with peers) and communication skills (e.g., receptive and expressive language) of children with autism. Interventions are mainly implemented by preschool/educational staff (e.g., educator, paraprofessional, teaching assistant, special care counsellor) and are based on play strategies, which aligns with the guidelines of the National Institute for Health and Care Excellence (NICE, 2013) and UNICEF's (2018) recommendations. Play-based learning in young children is indeed a core component of pedagogy and education (UNICEF, 2018), and supports several aspects of their development, including motor skills, cognition, social interactions, and communication (Lifter et al., 2011; Taylor and Boyer, 2020). Among the studies selected in this scoping review, nearly 40% emphasize that preschool/educational staff were trained and supported in implementing new forms of interventions. Educator training is clearly a major issue and a key factor in supporting all children by addressing their unique needs and accompanying them in their development (Julien-Gauthier et al., 2015). Similarly, involving all children in activities and promoting interactions between them are key to optimal development (NICE, 2013; Thiemann-Bourque et al., 2012). This review also emphasizes the importance of peer-mediated interventions and cooperative activities.

Very few studies report solutions or strategies to ensure collaboration and continuity between different settings (e.g., childcare service staff, community partners and healthcare professionals) and with parents. Yet, it is well recognized that these elements are essential for ensuring the coherence of interventions (Early Childhood Observatory, 2023). Along the same lines, a recent scoping review describing services provided by specialized professionals in childcare settings (e.g., healthcare professionals) reports that few studies describe services other than those offered by speech-language pathologists for aspects of language development (Pratte et al., 2024). Finally, no study covered the attitudes of managers or educational staff. It may indeed be more complex to document this type of environmental factor. However, workers' attitudes and beliefs are key factors in the provision of inclusive preschool services (Barton and Smith, 2015).

### ***Physical environment***

For children with disabilities to be able to learn through play, it is important to adapt the materials and equipment available to them (UNICEF, 2018). In this regard, this scoping review reports a wide variety of assistive devices and play materials that are provided to children with disabilities to optimize their autonomy and learning and promote their full participation in activities. Appendix 3 also shows that all these devices have positive impacts on many areas of these children's development. The appropriate use of these devices can certainly be facilitated by the involvement of specialized professionals, such as occupational therapists and speech-language pathologists. On another note, very few of the selected studies describe solutions related to changes made to the physical environment, both indoors and outdoors, aimed at optimizing accessibility and safety or meeting the children's sensory needs. The results of this scoping review are in alignment with the

team's initial determination that physical characteristics of the built environment that promote the accessibility of childcare services for young children with disabilities are rarely reported.

Overall, the promising solutions documented in the scientific literature, whether related to the social or physical environment, are generally child-centred – prioritizing children's individual needs, interests, and abilities (UNICEF, 2014). This approach represents excellent practice as a childcare setting where services are tailored to each child plays a crucial role in helping them achieve their maximum potential (Lalumière-Cloutier and Cantin, 2016). Indeed, recognizing individual differences and adapting activities, learning opportunities, and instructions to each child's developmental needs are fundamental principles of early childhood education (Odom and Kaul, 2003). However, questions arise concerning the application of principles related to universal accessibility and universal design, which seem to be absent from the scientific literature analyzed in this scoping review. This involves adopting an inclusive approach and considering the diversity of profiles and needs of the children that the childcare service must support over time (Ring et al., n.d.; St-Louis, 2021). Ideally, environments should be designed sustainably, and they should be flexible and easily adaptable to allow the maximum number of children to participate fully and safely in the proposed activities (Ring et al., n.d.). The goal should be to aim for equitable use of universally accessible environments that are beneficial for everyone (Ring et al., n.d.; St-Louis, 2021). However, as expressed by several members of our advisory committee, access to the resources needed to create such environments remains a significant challenge.

### ***Study limitations***

This scoping review has certain limitations. As previously mentioned, the concept of accessibility was not included in the search strategy because it is complex to target all the related content. However, this allowed us to conduct a less restrictive search and for our team to validate whether the content of the articles was linked to accessibility. Similarly, although generic keywords related to children with disabilities were used (e.g., disab\*, handicap\*, “special need\*,” deficien\*, “Children with Disabilities”), it seemed important to add certain other keywords associated with specific diagnoses. However, such a list could not be exhaustive, and choices were made to include the diagnoses that seemed to be most common. Moreover, as observed during the data synthesis, the vast majority of studies included in this scoping review were conducted with children with autism, which greatly limits the generalizability of the results to children with other types of diagnoses. Therefore, caution should be exercised in interpreting the results. Furthermore, when developing the list of selection criteria, we decided not to include studies presenting only healthcare services provided to children in a childcare service context, including for medically complex children. This decision was made to avoid identifying an overwhelming number of studies in the databases. However, we are aware that childcare services that cannot offer care such as catheterization, gastric tube feeding, symptom monitoring (e.g., for diabetic children), medication administration, and ostomy care are not accessible to some children. This is an important issue that should not be overlooked. Finally, a search was not conducted in the grey literature, although we recognize that such an approach might have provided a more comprehensive view of the situation by accessing, for example, complementary information or promising initiatives not published in the scientific literature.

## **Conclusion**

First, this scoping review reveals gaps in the scientific literature regarding the solutions implemented to improve the accessibility of childcare services for young children with disabilities. The identified promising solutions are generally child-centred, predominantly focus on children with autism and practices aimed at optimizing the social environment, and make very little reference to changes or modifications to the physical environment. This highlights the need for documentation or development of new solutions. Second, this scoping review also provides a list of promising solutions that have shown substantial benefits for children with disabilities attending childcare services. These results should certainly inspire the development of new inclusion policies or strategies.

This research project will continue until the end of March 2025, as it also aims to address another specific objective: to describe the situation in childcare services across different provinces and territories from the perspective of managers and educators working there, as well as of parents of children with disabilities. This objective will be achieved through consultations, including individual interviews and an online survey. The three phases of this research project will lead to recommendations aimed at minimizing as much as possible barriers to accessibility in childcare services for young children with disabilities. Ultimately, the goal is to support the development of the next generation of accessibility standards for childcare services. Indeed, the project will provide a better understanding of the situation in Canada and offer essential evidence for the establishment of useful, realistic standards. Moreover, by bringing together researchers from three Canadian universities, as well as various partners from the childcare sector, this project will contribute to the creation of a national network of experts in accessibility. It will also engage interested parties and parents of children with disabilities, in addition to identifying and sharing research, information, best practices, and tools related to barriers and accessibility standards for childcare services for young children with disabilities.

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**Appendix 1.** Search strategy for the CINAHL (EBSCO) database

1	TI (“daycare” or “day care” or nurser* or creche* or preschool# or childcare* or “child care*”) or AB (“daycare” or “day care” or nurser* or creche* or preschool# or childcare* or “child care*”)
2	(MH “Child Day Care”)
3	S1 OR S2
4	TI ((Child* or infant* or toddler* or preschooler* or baby or babies) N2 (disab* or handicap* or “special need*” or deficien*)) OR AB ((Child* or infant* or toddler* or preschooler* or baby or babies) N2 (disab* or handicap* or “special need*” or deficien*))
5	(MH “Children with Disabilities”)
6	S4 OR S5
7	TI (“attention deficit*”) or AB (“attention deficit*”)
8	(MH “Attention Deficit Hyperactivity Disorder”)
9	TI ( (“Down syndrome” or trisom* ) ) OR AB ( (“Down syndrome” or trisom* ) )
10	(MH “Down Syndrome”)
11	TI ( (Autis* or “Pervasive Developmental Disorder*” or Asperger) ) OR AB ( (Autis* or “Pervasive Developmental Disorder*” or Asperger) )
12	(MH “Child Development Disorders, Pervasive+”)
13	TI “cerebral pals*” OR AB “cerebral pals*”
14	(MH “Cerebral Palsy”)
15	S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14
16	TI ( (child* or infant* or toddler* or preschooler* or baby or babies) ) OR AB ( (child* or infant* or toddler* or preschooler* or baby or babies) )
17	(MH “Child, Preschool”) OR (MH “Infant”)
18	S16 OR S17
19	S15 AND S18
20	S6 OR S19
21	S3 AND S20

## Appendix 2. Studies included in this scoping review (n=65)

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**Appendix 3.** Promising solutions and outcome variables<sup>a</sup> documented in the selected studies<sup>b</sup>, categorized according to the ICF-CY

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
<b>SOCIAL ENVIRONMENT</b>									
<b>Support and relationships</b>									
Naturalistic teaching strategies and naturalistic developmental behavioural interventions (e.g., incidental teaching, progressive time delay, embedded learning opportunities, contingent imitation, play expansions, <i>Enhanced Milieu Teaching</i> , <i>Joint Attention</i> , <i>Symbolic Play</i> , <i>Engagement and Regulation</i> (JASPER)) [4, 8, 10, 14, 20, 22, 23, 36, 37, 42, 44, 45, 57, 58, 64] <sup>c</sup>	Basic learning Applying knowledge Purposeful sensory experiences	Managing one's own behaviour	Communicating – producing Communicating – receiving Conversation and use of communication devices and techniques	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Self-care (no specific category) Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	
Instructional techniques and supports (e.g., prompting, guidance, modelling, priming, verbal instructions, feedback, demonstrations, reinforcement) [2, 6, 7, 9, 13, 15, 16, 21, 25, 26, 29, 30, 32, 33, 35, 38, 41, 46, 50, 51, 59, 61]	Basic learning Applying knowledge	Undertaking a single task Managing one's own behaviour	Communicating – producing Conversation and use of communication devices and techniques	Carrying, moving and handling objects	Eating Dressing	General interpersonal interactions	Engagement in play Education	Specific mental functions	Movement functions
Discrete Trial Teaching [8, 10, 17, 18, 47]	Basic learning Applying knowledge	Undertaking a single task Managing one's own behaviour	Communicating – producing Communicating – receiving Conversation and use of communication	Carrying, moving and handling objects	Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	



PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation							Body functions	
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
		Carrying out daily routine	devices and techniques						
Peer-mediated intervention/ support from peers/ cooperative activities [1, 3, 4, 7, 9, 15, 24, 27, 29, 32, 33, 34, 35, 38, 39, 45, 49, 56, 61, 62, 65]	Basic learning	Undertaking a single task  Managing one's own behaviour	Communicating – producing  Communicating – receiving  Conversation and use of communication devices and techniques	Carrying, moving and handling objects  Walking and moving  Changing and maintaining body position	Self-care (no specific category)	General interpersonal interactions	Engagement in play  Education	Global mental functions  Specific mental functions	
Group activities/class-wide intervention/inclusive playgroup experiences [3, 5, 7, 8, 32, 45, 53, 57, 63]	Basic learning  Applying knowledge  Purposeful sensory experiences	Undertaking a single task  Managing one's own behaviour  Carrying out daily routine	Communicating – producing  Communicating – receiving  Conversation and use of communication devices and techniques	Carrying, moving and handling objects  Walking and moving  Changing and maintaining body position	Self-care (no specific category)  Eating  Toileting	General interpersonal interactions	Engagement in play  Education	Global mental functions  Specific mental functions	
Group composition/size [4, 13, 28, 29, 52, 55]	Basic learning	Managing one's own behaviour	Communicating – producing  Communicating – receiving	Carrying, moving and handling objects  Walking and moving	Self-care (no specific category)	General interpersonal interactions	Engagement in play  Education	Global mental functions	Movement functions

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
				Changing and maintaining body position					
Music and dance activities [7, 21, 35, 46]	Basic learning	Managing one's own behaviour				General interpersonal interactions	Engagement in play		
Experience-based learning [63]	Basic learning	Managing one's own behaviour	Communicating – producing Communicating – receiving	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Eating	General interpersonal interactions		Global mental functions Specific mental functions	
Support to parents/ collaboration with parents [8, 30, 47, 53, 57]	Basic learning Applying knowledge Purposeful sensory experiences	Undertaking a single task Managing one's own behaviour Carrying out daily routine	Communicating – producing Communicating – receiving Conversation and use of communication devices and techniques	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Self-care (no specific category) Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	
Adult participation/ involvement	Basic learning	Managing one's own behaviour	Communicating – producing	Carrying, moving and	Self-care (no	General interpersonal interactions	Engagement in play		Movement functions

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
[13, 28, 31, 42, 43, 52, 54, 55, 60]			Conversation and use of communication devices and techniques	handling objects Walking and moving Changing and maintaining body position	specific category)		Education		
Routine modification/adaptation [37, 39, 48]	Applying knowledge	Managing one's own behaviour	Communicating – producing			General interpersonal interactions	Education		
Sensory support [48]		Managing one's own behaviour					Education		
Collaboration/liaison among all stakeholders (e.g., service coordinator, key intervenor) [8, 53]	Basic learning Applying knowledge	Managing one's own behaviour Carrying out daily routine	Communicating – producing Communicating – receiving Conversation and use of communication devices and techniques	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Self-care (no specific category) Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	
Educational support worker [53]	Basic learning	Managing one's own behaviour Carrying out daily routine	Communicating – producing Communicating – receiving	Carrying, moving and handling objects	Self-care (no specific category)	General interpersonal interactions	Education	Global mental functions	

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
				Walking and moving Changing and maintaining body position					
<b>Services, systems and policies</b>									
Training/coaching of educators/preschool staff [4, 5, 9, 14, 20, 22, 24, 29, 30, 33, 34, 35, 37, 39, 41, 42, 44, 45, 47, 51, 57, 58, 63, 64, 65]	Basic learning Applying knowledge Purposeful sensory experiences	Undertaking a single task Managing one's own behaviour	Communicating – producing Communicating – receiving Conversation and use of communication devices and techniques	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Self-care (no specific category) Eating	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	
Structured program/model/curriculum [4, 8, 28, 30, 53, 57, 63]	Basic learning Applying knowledge Purposeful sensory experiences	Managing one's own behaviour Carrying out daily routine	Communicating – producing Communicating – receiving Conversation and use of communication devices and techniques	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Self-care (no specific category) Eating Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
<b>PHYSICAL ENVIRONMENT</b>									
<b>Products and technology</b>									
Assistive device/adaptive device (e.g., mobility aids, adapted utensils, sensory equipment) [30, 40, 48, 50]	Basic learning	Managing one's own behaviour		Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Eating	General interpersonal interactions	Engagement in play Education	Specific mental functions	
Visual support/visual schedule/visual strategy [2, 3, 4, 6, 8, 26, 36, 39, 45, 48]	Basic learning Applying knowledge	Undertaking a single task Managing one's own behaviour	Communicating – producing Communicating – receiving Conversation and use of communication devices and techniques	Carrying, moving and handling objects Walking and moving Changing and maintaining body position	Self-care (no specific category) Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	Movement functions
Equipment or tools for augmentative and alternative communication (AAC) (e.g., picture cards, speech-generating devices, communication boards, mediating tools) [1, 8, 9, 30, 31, 33, 50, 56, 59, 61, 62]	Basic learning Applying knowledge	Managing one's own behaviour	Communicating – producing Communicating – receiving Conversation and use of communication		Toileting	General interpersonal interactions	Engagement in play Education	Global mental functions Specific mental functions	

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
			devices and techniques						
Play material/toy sets [3, 5, 19, 21, 27, 28, 29, 35, 37, 42, 46, 52, 55]	Basic learning  Applying knowledge	Managing one's own behaviour	Communicating – producing  Conversation and use of communication devices and techniques	Walking and moving  Changing and maintaining body position		General interpersonal interactions	Engagement in play  Education		Movement functions
iPad [12, 34]	Basic learning  Applying knowledge		Communicating – producing			General interpersonal interactions	Engagement in play		
Social story/storybook [16, 20, 33, 49, 51]	Purposeful sensory experiences	Managing one's own behaviour	Communicating – producing  Communicating – receiving	Carrying, moving and handling objects		General interpersonal interactions	Engagement in play		
Video (e.g., video priming, video self-modelling) [11, 25, 49]		Undertaking a single task	Communicating – producing			General interpersonal interactions	Engagement in play		
<b>Natural environment and human-made changes to environment</b>									
Setting up the physical environment (e.g., physical delineations, arranging environments to promote children's communication, organization of the physical structure/learning environment, toys easily accessible, utilizing open spaces) [4, 6, 20, 29, 30, 37, 44, 55]	Basic learning  Applying knowledge  Purposeful sensory experiences	Undertaking a single task  Managing one's own behaviour	Communicating – producing  Communicating – receiving	Carrying, moving and handling objects  Walking and moving  Changing and maintaining	Self-care (no specific category)	General interpersonal interactions	Engagement in play  Education	Global mental functions  Specific mental functions	Movement functions

PROMISING SOLUTIONS	OUTCOME VARIABLES								
	Activities and participation						Body functions		
	Learning and applying knowledge	General tasks and demands	Communication	Mobility	Self-care	Interpersonal interactions and relationships	Major life areas	Mental functions	Neuromusculo-skeletal and movement-related functions
				body position					
Changes to the sensory aspects of the environment (e.g., minimizing distractions, changing the lighting, keeping the visual stimuli in the room to a minimum, creating a separate, quiet space within the classroom) [20, 37, 48]	Applying knowledge Purposeful sensory experiences	Managing one's own behaviour	Communicating – producing Communicating – receiving	Carrying, moving and handling objects		General interpersonal interactions	Education		
Setting up and using the outdoor environment [35, 55, 65]			Communicating – producing	Walking and moving  Changing and maintaining body position		General interpersonal interactions	Engagement in play		Movement functions

<sup>a</sup>When multiple promising solutions were presented within the same study, it was not possible to isolate which specific solution the observed outcome variables were associated with. For example, the impact on mobility of an assistive device and of the support provided by an educator was attributed to both types of promising solutions.

<sup>b</sup>See Appendix 2 for references of studies included in this scoping review.

<sup>c</sup>References in red: studies that included only with children with autism. References in blue: studies that included children with autism, but not exclusively.