



Preschool Screening

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Rapid EVIDENCE *Reports*



Foreword



It was my pleasure to participate in this project as the consulting subject matter expert. This opportunity drew on my clinical experience as a Registered Psychologist, my academic career in interdisciplinary, community-based research in early childhood development, and my work on screening and assessment within cross-cultural contexts. Early childhood screening and assessment is a critical first step in understanding, and ultimately supporting, the healthy development of infants and toddlers. Supporting health development is dependent on partnership and collaboration between parents, community, public health practitioners and primary care providers.

Readers will note the poor state of the body of research-based evidence for preschool screening programs. In part, this results from the general difficulty in carrying out high-quality experimental research at the population level and by the long timelines required to measure the effectiveness of early childhood interventions. Readers will also note that many of the guidelines and recommendations from policy organizations across Canada, the U.S.A., and Europe continue to support general screening or developmental surveillance of children in the preschool years. These two observations highlight the importance of distinguishing between two things: a lack of evidence to indicate effectiveness is not the same thing as evidence indicating ineffectiveness. Certainly, more evidence is required, and much of this evidence could come from formal evaluations of the screening programs that are currently being offered in many Canadian and international jurisdictions. Readers should also keep additional aspects of preschool screening in mind while developing or assessing policy:

- First, universal screening programs are valuable in and of themselves. They provide the main mechanism by which families and the public health system can connect and build the kind of trusting relationships required for effective population health action.
- Second, universal screening programs offer a means of reaching marginalized groups in the community who may otherwise go without supports and resources, and who are often at greater risk for poorer health outcomes.
- Third, preschool screening opens a door for a conversation with parents about healthy child development. Parents know their child best and if they have a concern, they should be able to raise it with a trusted professional (e.g., pediatrician, nurse, public health professional, early learning and care educator, preschool teacher). While plenty of good information is available to parents, it is problematic to rely solely on parents to identify concerns with their child.

I believe this report will help to clarify issues surrounding universal preschool screening programs, particularly with terminology, and will be a welcome resource for health system decision makers, public health practitioners and families alike.

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This Rapid Evidence Report was prepared by the Newfoundland & Labrador Centre for Applied Health Research (NLCAHR), Memorial University. It was developed through the analysis, interpretation and synthesis of scientific research and/or health technology assessments conducted by other parties. It also incorporates selected information provided by expert consultants in the subject area. This document may not fully reflect all the scientific evidence available at the time this report was prepared. Other relevant scientific findings may have been reported since completion of this synthesis report.

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About This Report

About NLCAHR

The Newfoundland and Labrador Centre for Applied Health Research, established in 1999, contributes to the effectiveness of health and community services in Newfoundland and Labrador and to the physical, social, and psychological wellbeing of its population. NLCAHR accomplishes this mandate by building capacity in applied health research, supporting high-quality research, and fostering the effective use of research evidence by decision makers and policy makers in the provincial healthcare system.

About *Rapid Evidence Reports*

NLCAHR designed *Rapid Evidence Reports* to provide support for evidence-based decision making in the Newfoundland and Labrador healthcare system on an expedited basis as compared to the lengthier '*Evidence in Context*' reports issued through the Contextualized Health Research Synthesis Program. These expedited reports provide a succinct review of recent research evidence on a high-priority research topic selected by decision makers in the province.

This *Rapid Evidence Report* includes:

- A clear statement of the issue and the background to the issue/problem;
- A description of the scope and nature of the pertinent English-language scientific literature from the past five years (this particular report looks at literature from the past ten years, to broaden search results);
- A summary of the principal features of the available evidence – points of consensus, points of disagreement, areas of uncertainty or silence on some or all of the following issues: effectiveness of interventions, potential benefits and harms, risks, costs, and cost-effectiveness; and
- A brief analysis of the types of issues that might affect the applicability of the evidence to the local context.

It is important to note that, unlike our lengthier decision-support product, the '*Evidence in Context*' report, this *Rapid Evidence Report* is **not** a comprehensive and systematic synthesis of the literature on the topic.

The evidence included in this report was critically appraised using the AMSTAR tool (A Measuring Tool to Assess Systematic Reviews) to assess the methodological quality of the included systematic reviews. AMSTAR consists of a set of 11 Yes/No questions, each of which assesses a key component of systematic review methodology: comprehensiveness of literature search, whether funding sources were noted, whether conclusions reached were reasonable, etc. All included systematic reviews have a moderate or high-quality AMSTAR score.

This report does not provide a full analysis of the contextual issues involved in applying evidence to the Newfoundland and Labrador healthcare setting; rather, it provides a brief overview of some key contextual considerations arising from the literature – considerations that decision makers may wish to contemplate when reflecting on the evidence.

Researchers and Consultants

For this report, researchers from the Newfoundland and Labrador Centre for Applied Health Research were Aimee Letto, Research Officer, Contextualized Health Research Synthesis Program (CHRSP) and Dr. Stephen Bornstein, Director of NLCAHR. Our team benefited from the advice and expertise of Dr. Rebecca Gokiert, Associate Professor and Associate Director, Early Childhood Measurement and Evaluation Community-University Partnership for the Study of Children, Youth and Families (CUP) at the University of Alberta. Dr. Gokiert leads a team of researchers and students devoted to utilizing a community-based approach to create measurement and evaluation knowledge and build capacity in the early childhood sector. Dr. Gokiert’s credentials are included in Appendix A.

Background

Preschool screening programs are based on the premise that identifying common health and developmental concerns in young children creates opportunities for early intervention that can improve health and development. Screening programs are often undertaken before or at a child’s entry to school, and may be combined with other public health activities such as immunizations. Screening is not the only way to identify concerns: monitoring changes in health and development over time, called surveillance, also plays an important role.

While *screening* and *surveillance* are distinct concepts, the terms are sometimes used interchangeably by decision makers, clinicians and researchers. This report focuses specifically on the evidence for or against the suitability of **screening**.

In a 1968 World Health Organization report, Wilson and Jungner articulated the classic approach to making a decision about whether or not screening is suitable for a particular condition using criteria that emphasized the capacity to detect a condition at an early stage and the availability of an effective treatment (1). Over the past 40 years, additional screening criteria have been proposed that include the scientific evidence of a screening program’s effectiveness and whether or not the overall benefits of screening outweigh the harms (1).

Definitions:

SCREENING involves the use of a brief standardized tool to identify concerns.

SURVEILLANCE involves a longitudinal process of monitoring changes over time, typically performed over a series of health checks or in a primary care setting.

Decision makers across Canada and internationally have weighed the evidence on preschool screening in different ways, leading to differing conclusions about its value and significant variation in preschool screening practices. Adding to this complexity, a variety of screening tools are being used, as evidenced in the diverse array of pediatric vision and hearing screening programs in Europe and the wide range of vision screening approaches now in use globally (2,3).

In Newfoundland and Labrador, the following screening programs are currently in place for preschool children:

- a Child Health Clinic program for children under the age of two: at two, four, six, twelve and eighteen months of age; and
- a Preschool Health Check for children between the ages of three years, nine months and four years, two months.

Under these programs, a community health nurse provides immunizations, measures height and weight, and screens for vision, hearing, and development. There is some variation across the provincial regional health authorities (RHAs) in the implementation of the Preschool Health Check including the age at which screening takes place and the range of screening measures being offered. For example, in 2014, Eastern Health removed developmental screening from the Preschool Health Check in St. John's, Conception Bay South, Portugal Cove-St. Philip's, Torbay, Bell Island, and the Southern Shore as the result of capacity issues (4).

For infants in the province, the Child Health Clinic series is complemented by:

- a provincial newborn screening program that screens for metabolic disorders, congenital hypothyroidism and cystic fibrosis; and
- the Perinatal Program Newfoundland Labrador (PPNL) that offers follow-up clinics for babies deemed to be at high risk for developmental delays.

Given the variation in preschool screening approaches across Canada and globally, our health system partners at the Department of Health and Community Services requested that CHRSP review the scientific literature on preschool screening to support the development of an evidence-informed provincial policy.

The research question guiding this *Rapid Evidence Report* is:

***“Based on the scientific evidence,
for what health and developmental concerns should the
preschool population of Newfoundland and Labrador be
screened?”***

Scope and Nature of the Scientific Literature

For this *Rapid Evidence Report*, we searched for peer-reviewed articles within the health periodical indices PubMed, PsychINFO, and EMBASE and conducted secondary searches using Google Scholar. Our aim was to locate systematic review evidence published since 2008 and any recent primary research that would not yet be included in the systematic review literature. Given the limited amount of systematic review evidence on this topic, we allowed a ten- year time period and broad search terms to capture as much relevant evidence as possible.

Inclusion and Exclusion Criteria

The intervention of focus for this study is population-based, universal preschool screening programs in three areas: vision, hearing, and development. The population includes children aged three to six years who are not at risk for, or suspected of having, any vision, hearing or developmental concerns. We looked at the following settings for screening programs: public health clinics, schools and daycares. Primary care settings were considered but medical specialty settings were excluded. The primary outcome of interest was the effectiveness of screening. Secondary outcomes included: harms of screening, screening tools, and screening guidelines or recommendations. Information identified under these categories is presented in tables throughout the report but should not be considered exhaustive.

The following table summarized the inclusion/exclusion criteria used to review and select articles for this study:

Table 1: Inclusion and exclusion criteria for this report

Parameter	Inclusion Criteria	Exclusion Criteria
Population	<ul style="list-style-type: none"> Children aged three to six years 	<ul style="list-style-type: none"> Children with risk factors for vision, hearing or development concerns Children suspected of having a vision, hearing or development concern
Setting	<ul style="list-style-type: none"> Public health clinics, schools, daycares Primary care settings 	<ul style="list-style-type: none"> Medical Specialist settings
Intervention	<ul style="list-style-type: none"> Population-based, universal screening programs 	<ul style="list-style-type: none"> Screening programs targeted to special populations or sub-populations Cultural adaptation of screening tools
Outcome	<ul style="list-style-type: none"> Primary: effectiveness of screening (i.e., changes in referral rates for early intervention, vision outcomes, hearing outcomes, cognitive function, academic performance) Secondary: harms of screening, screening tools, and guidelines or recommendations 	

Research Evidence Included in this Report

This report includes evidence from 13 systematic reviews that addressed preschool screening in the following areas:

- Vision screening (6 systematic reviews) (5–11)
- Hearing Screening (2 systematic reviews) (12,13)
- Global Development Screening (1 systematic review) (14)
- Language Development Screening (1 systematic review) (15)
- Autism Spectrum Disorder (ASD) (3 systematic reviews) (16–18)

Autism Spectrum Disorder (ASD) was identified as an area of special interest in Newfoundland and Labrador given that this province has the highest ASD prevalence rate in Canada among children and youth: ASD prevalence in Newfoundland and Labrador is 1 in 57 among children and youth aged 5 to 17 years, compared to 1 in 66 nationally (19).

Also included in this report are three recent primary studies: one each on hearing (20), development (21) and Autism Spectrum Disorder (22).

Characterizing the Evidence

Preschool screening programs have not been examined in rigorous, controlled studies; as a result, there is limited robust evidence for their effectiveness. A common challenge for researchers in identifying screening outcomes has been difficulty designing longitudinal studies of sufficient length to track children over the amount of time required to evaluate changes in health and development outcomes. High attrition rates are reported to be a common limitation. Area-specific limitations of the evidence are described below.

- **Screening for Vision:** Any attempt to synthesize the literature is challenged by the lack of a standard definition for amblyopia, also known as “lazy eye”, and its risk factors. Gaps in the evidence also include: optimal methods for screening; ages and intervals at which to screen children; and approaches to treatment. More research is required that will address how preschool vision screening may affect not only vision outcomes but also school performance and child development outcomes.
- **Screening for Hearing:** Difficulties arise when attempting to generalize the literature on hearing screening to the Newfoundland and Labrador context because there is considerable variation among countries in terms of the age at which children enter school and have their hearing screened; moreover, in countries that have adopted universal hearing screening for newborns, the prevalence and type of hearing impairments found in preschool children can be affected by early detection. Other limitations of the literature include small, non-representative study sample sizes and variability in study parameters such

as the setting for screening and the competence and training of the people who conduct the screening tests.

- **Developmental Screening:** We found little high-quality evidence on the long-term impact of screening on development, although shorter-term outcomes such as changes in expressive language or social functioning have been reported. Sampling issues common in the literature on developmental delay and speech/language screening include small sample sizes and unrepresentative samples. Although the body of research on Autism Spectrum Disorder has increased substantially in recent years, systematic reviews indicate that existing studies tend to be at high risk of bias.

Screening for Vision

Overview

Even though preschool screening for vision is a common practice in many jurisdictions across Canada and internationally, there is very little high-quality evidence in this area. One area of common focus for screening is amblyopia (“lazy eye”) and its risk factors, such as strabismus. A variety of approaches, thresholds, and tools are used to screen for vision. A key area of divergence among approaches to vision screening is the age of the child being screened; although screening before school-entry raises issues about coverage, preschool screening creates opportunities for earlier intervention and potentially leads to better health outcomes than conducting screening after children have started school. Another factor of divergence among studies is who conducts the screening tests.

The Evidence

Amblyopia Screening: A recent high-quality systematic review examined the evidence on screening for, and treatment of, amblyopia, its risk factors, and refractive error in children aged six months to five years (8). The reviewers concluded that the number of studies directly evaluating the effectiveness of screening is limited; moreover, the included studies do not establish whether conducting screening is better than not screening at all. No randomized control trials (RCTs) compared screening with no screening, and no studies evaluated school performance, function or quality of life. This finding is similar to findings from earlier systematic reviews that focused on the effectiveness of preschool vision screening in the primary care setting (5) and before— or at— school entry (9).

On the benefits of screening, one RCT compared an intensive screening approach (at 8, 12, 18, 25, 31 and 37 months) against a less-intensive screening approach (only at 37 months) (8). This trial found that the prevalence of amblyopia at seven and a half years of age was only 1% lower among the more intensively screened group and that this difference was only statistically significant for one of the two definitions of amblyopia used by the researchers.

Another cohort study showed no statistically-significant difference between children screened at 37 months and non-screened children for any definition of amblyopia.

Test Accuracy: With respect to test accuracy, the evidence indicates that some screening tests are useful for identifying children at higher risk for vision problems, and that combinations of multiple screening tests may be a useful approach (8). Two systematic reviews focused specifically on the diagnostic accuracy of preschool vision screening tests:

- One high-quality systematic review assessed and compared the accuracy of tests for detecting strabismus in children aged one to six years in a community setting by non-expert screeners against the accuracy of tests performed by primary care professionals (6). The authors found limited evidence on strabismus screening in community settings and noted that most literature focuses on amblyopia screening. Only one study was included in this systematic review; so it remains unclear which test is the most accurate for strabismus screening.
- An earlier high-quality systematic review evaluated the diagnostic accuracy of preschool vision screening tests for detecting amblyopia and its risk factors, which the authors see as the first step in choosing a screening strategy (11). Diagnostic accuracy is described as a complex topic because there are multiple impairments of interest (reduced visual acuity, refractive errors, binocular disorders), and the development of these conditions is not understood. Test accuracy can only be evaluated after age-related values defining amblyopia, refractive errors, and binocular disorders are established.

There is evidence that some treatments are effective at improving visual outcomes, although improvements tended to be small (8).

The table below outlines guidelines and recommendations for vision screening established in the United States (23,24)

Table 2: Guidelines and recommendations for vision screening in preschool-aged children

Organization	Publication	Recommendation
U.S. National Center for Children’s Vision and Eye Health	2015: Vision Screening for Children 36 to <72 Months: Recommended Practices (23)	This national centre recommends that children aged 36 months to younger than 72 months be screened annually (best practice) or at least once (accepted minimum standard) using one of the best practice approaches.
U.S. Preventive Services Task Force	2017: Vision in Children Ages 6 Months to 5 Years: Screening (24)	This task force recommends vision screening at least once in all children aged 3 to 5 years to detect amblyopia or its risk factors.

Screening for Hearing

Overview

Hearing impairment in children is mainly identified through universal newborn screening programs, but preschool screening can be an important backup measure: it can identify children who are missed by newborn screening (i.e., who have mild hearing impairment) or who develop hearing impairment after being screened. The value of preschool screening where there is already a newborn screening program continues to be debated. A key part of the debate is the diagnostic accuracy of preschool screening tests. Despite this uncertainty, school entry hearing screening remains common in many jurisdictions.

The Evidence

Diagnostic Accuracy: We found two systematic reviews that examined the diagnostic accuracy of hearing screening tests for preschool-aged children:

- A high-quality 2016 systematic review found that due to variability in design, methodological quality, and the findings of existing studies, it was not possible to draw strong conclusions about the diagnostic accuracy of specific tests used in school-entry hearing screening (12). This study confirmed the conclusions of an earlier 2007 systematic review (25). The researchers concluded that in the context of the UK National Health Service and similar health systems, school-entry hearing screening is unlikely to increase the number of cases of hearing impairment identified or to lower the average age at which cases of hearing impairment are identified and is, therefore, not likely to be cost-effective when compared to no screening. The authors cautioned against using their findings as a rationale to withdraw a school-entry hearing screening program. If withdrawal of screening is being considered, the authors emphasized the need for an alternative system to identify children with hearing problems and the need for transition planning prior to withdrawing services.
- A moderate-quality systematic review from 2015 looked at the accuracy of pure-tone and otoacoustic emission (OAE) screening for identifying hearing loss in preschool and school-aged children (13). The study determined that both pure-tone and OAE screening can identify hearing loss, but pure-tone was considered the preferred tool because it is a more sensitive test. The authors noted that a key element of diagnostic accuracy is properly-trained screeners: factors like screener competence and training play a role in accuracy. Other factors that can affect accuracy are the child's age and the setting where screening takes place.

Variation in Approaches to Screening: A 2018 primary study from Sweden illustrates the variability in preschool hearing screening across regions within a country with national guidelines (20). The study evaluated preschool hearing screening practices in Sweden and

found great variation in how preschool hearing screening was implemented across the country’s regional authorities. Sixteen of 21 regions performed universal hearing screening of four-year olds, using many different screening protocols (i.e., different sound levels and frequencies, different criteria for referral to an audiology clinic). In the five regions where there was no universal screening, financial reasons were cited for the decisions; following the introduction of updated national guidelines in 2014, one of the five had started screening and two were planning to start screening.

Table 3 below outlines guidelines and recommendations for hearing screening from the United States and in Europe (26, 27).

Table 3:
Guidelines and recommendations for hearing screening in preschool-aged children

Organization	Publication	Recommendation
American Academy of Audiology (AAA)	2011: Childhood Hearing Screening Guidelines (26)	The AAA endorses detection of hearing loss in early childhood and school-aged populations using evidence-based hearing screening methods.
10th Congress of European Federation of Audiology Societies (EFAS)	2011: Screening for preschool and school-age hearing problems: European Consensus Statement (27)	The EFAS encourages the appropriate authorities of the countries involved to initiate hearing screening programs of preschool and school-aged children.

Developmental Screening

Overview

Universal screening programs to identify developmental concerns in preschool children are common, and the value of early identification and intervention is widely acknowledged. Developmental screening programs tend to use broad screens for global development, usually looking at fine and gross motor skills, social emotional development, communication, and cognitive abilities in order to pinpoint areas of concern. There are also narrower, more specific screens for particular areas of development and for developmental disabilities.

Given their popularity, it may be surprising that evidence on the benefits of universal developmental screens is inconclusive. One challenge is the scarcity of high-quality primary research such as RCTs and controlled cohort studies. Relevant observational studies may also have been excluded from systematic reviews as the result of poor quality (for example, in Warren)(14). Included studies tend to focus on immediate, specific outcomes such as

changes in social functioning with little research having been undertaken on long-term outcomes.

We would caution readers not to interpret the lack of evidence on universal developmental screening as a suggestion that health systems should reduce monitoring child development. Developmental surveillance – a broader, flexible, ongoing assessment of child development that involves clinicians and parents, and considers the role of the child’s environment – is an essential part of standard primary care practice for children (28). For children who do not have good access to primary care, universal developmental screening can be an important bridge in helping to identify developmental concerns and in creating opportunities for early intervention.

Evidence on universal screening for global development is described below, followed by evidence on two narrower areas of developmental screening: language development and ASD.

The Evidence

Screening for Developmental Delay: One moderate-quality systematic review synthesized the literature on the effectiveness and harms of screening for developmental delay in asymptomatic children aged one to four years who were not at high risk of developmental delay (14). This review focused on global developmental delay, described by the authors as the failure of a child to meet expected milestones across the domains of language, social and motor development. The review concluded that there is inconclusive and scant evidence to support screening for developmental delay among this population. No evidence was found for the long-term outcomes of screening, for referral to early intervention, or for effective screening intervals.

Nevertheless, the authors acknowledged that since screening for developmental delay is undertaken regularly, further investigation is warranted to determine whether continuing such screening is clinically relevant and appropriate. The review included only two primary studies, both of which looked at screening for children under the age of three; as a result, these findings would not be directly relevant to the population of interest in this report.

Value of Screening for Low SES Populations: A 2016 primary study from Austria evaluated that country’s nationwide developmental screening program for preschool children and reported on the value of developmental screening programs for low socio-economic status (SES) preschoolers (21). The program was physician-based and screened children at 24, 36, and 48 months. The study found strong evidence for the effectiveness of interventions among low SES preschoolers whereas the evidence for long-term cost savings was weak; among high SES preschoolers, there was little evidence for the effectiveness of interventions and no evidence for long-term cost savings.

Screening for Speech and Language Development: The findings from the Austrian study noted above were consistent with 2015 guidelines from the U.S. Preventive Services Task

Force that found insufficient evidence to screen for speech and language delay in children up to the age of five (29). The U.S. guidelines were based on a high-quality systematic review that failed to find any well-conducted studies to support the effectiveness of screening on speech and language development (15).

Accuracy in Speech and Language Tests: It is noteworthy that the same high-quality systematic review noted above did find 23 primary studies that evaluated a different outcome: the accuracy of speech and language screening in primary care settings. The authors reported that two screening instruments completed by parents – the MacArthur Bates Communication Development Inventory (CDI) and the Language Development Survey (LDS) – can accurately identify children for diagnostic evaluations and interventions. Few studies looked at the same instruments in different populations or ages, making it unclear how accurate professionally or para-professionally administered instruments are, or whether there are optimal ages for screening. This review also included 13 studies that examined treatment options for young children identified with speech and language delay, suggesting that there are some potentially effective treatments (15).

Screening for Autism Spectrum Disorder (ASD): Our search also identified several studies on screening for ASD: a developmental disability that has a high prevalence in Newfoundland and Labrador. While ASD screening is an active area of research, findings remain inconclusive. A moderate-quality systematic review focused on the validity of screening tools for ASD in children aged four to 18 years (17). It found that only three screening tools – the Autism-Spectrum Quotient, the Social Communication Questionnaire, and the Social Responsiveness Scale – had been examined in more than two studies. The authors concluded that these tools have some potential for differentiating ASD from other disorders, but it should be noted that the data was not specifically analyzed for preschool-aged children. A recent primary study looked specifically at the validity of the Autism Spectrum Screening Questionnaire (ASSQ) in preschool children and found that the ASSQ, standardized for 7 to 16 years, had reliability and validity as a screening instrument for preschool children in community settings (22).

Another moderate-quality systematic review examined the evidence for early intervention in ASD in children up to six years of age (16). The authors found that there has been a substantial increase in the number of RCTs evaluating early intervention in ASD but that only 12.5% of the identified studies had a low risk of bias. The existing literature is limited by poor study design and a lack of coordination in the research, including wide variation in outcome measures.

The evidence is also unclear for ASD screening among younger children: a high-quality systematic review studying children under the age of three years concluded that more research is needed to determine the benefits and harms of routine screening for ASD in primary care (18). Similarly, the U.S. Preventive Services Task Force issued a recommendation statement in 2016 concluding that the current evidence is insufficient to

assess the benefits and harms of screening for ASD in children 18 to 30 months for whom no concerns of ASD have been raised by either their parents or a clinician (30).

Table 4 below outlines both Canadian and U.S. guidelines and recommendations for developmental and speech/language delay in preschool children (29,31). Again, readers are cautioned that these guidelines relate to *screening* and not to *surveillance*.

Table 4:
Guidelines and recommendations for developmental screening in preschool-aged children
Note: These recommendations do not address developmental surveillance.

CONCERN: Organization	Publication	Recommendation
DEVELOPMENTAL DELAY: Canadian Task Force on Preventive Health Care	2016: Recommendations on screening for developmental delay (31)	This Canadian task force recommends against screening for developmental delay using standardized tools in children aged 1 to 4 years with no apparent signs of developmental delay and whose parents and clinicians have no concerns about development.
SPEECH AND LANGUAGE DELAY: U.S. Preventive Services Task Force	2015: Speech and Language Delay and Disorders in Children Age 5 and Younger: Screening (29)	This American task force found that current evidence is insufficient to assess the balance of benefits and harms of screening for speech and language delay and disorders in children aged 5 years or younger.

Relevant Contextual Issues

- The concepts of *screening* and *surveillance* are often conflated— in the literature, by clinicians, and by policy makers. Moreover, universal screening is not the same as screening within high-risk populations or investigating specific health or developmental concerns; it is also distinct from surveillance. Decision makers are cautioned to distinguish evidence and recommendations on universal screening programs from the evidence for other types of monitoring.

The importance of these definitions was illustrated in the debate around developmental screening in Canada: in 2016, the Canadian Task Force on Preventive Health Care recommended against universal screening for developmental delay in children aged 1 to 4 years (31). This recommendation was met with concern that it would be misinterpreted as calling for reduced monitoring of children’s development. Critics

emphasized that although no universal screening protocol aimed at children aged 1 to 4 years with no sign of developmental delay has been shown either to detect developmental delay or to improve developmental outcomes, the recommendation should not be interpreted to refute the need for ongoing developmental surveillance among children. Ultimately, more high-quality evidence is needed to develop effective and efficient screening and developmental surveillance strategies (28).

- Much health and development screening and surveillance focuses on children under the age of three years and is not covered in this report.
- Approaches to screening and surveillance are complex and variable. Different jurisdictions take different approaches to preschool screening, focusing on different areas of health and development, with screening taking place at different ages and intervals, in different contexts (public health, primary care, school), and using different screening tools. Adding to this complexity, surveillance practices – which complement screening – are also highly variable.
- In the absence of a mandatory screening program, the preschool population can be difficult to reach. This issue is particularly acute in rural and remote areas of the province, among Indigenous communities, and among newcomer and refugee populations for whom access to public health and primary care services can sometimes be challenging. While opportunities for screening may be found where children are attached to formal early learning and care or to preschool programs, or where children regularly visit a family physician or pediatrician, other children may miss out on screening, and would therefore not be identified until they reach school.

Summary of Key Points

- There is a lack of high-quality evidence on the effectiveness of screening for vision, hearing, and development in preschool populations. Nevertheless, most jurisdictions across the country and internationally operate screening programs for the preschool population.
- Short-term health outcomes are more widely studied than long-term health outcomes or educational outcomes.
- Existing guidelines and recommendations for screening may be of interest to decision makers since they represent different ways of weighing the available evidence and determining the value of preschool screening programs.
- A body of research on the diagnostic accuracy of specific tools shows that there are effective, validated tools for screening preschool populations.

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Appendix A: Our Consultant

Dr. Rebecca Gokiert is an Associate Professor in the Faculty of Extension and Associate Director of the Community-University Partnership for the Study of Children, Youth, and Families (CUP) at the University of Alberta. She is a scientist-clinician who has devoted her career to interdisciplinary inquiry in early childhood development, partnership and collaboration, community-based participatory research, and measurement within cross-cultural contexts. Dr. Gokiert collaborates extensively with early childhood stakeholders, immigrant, refugee, and First Nation communities in research. To this end, she has led several large interdisciplinary projects funded by SSHRC and CIHR, including leading the Evaluation Capacity Network (ECN) to build capacity in the early childhood sector (see www.evaluationcapacitynetwork.com). Dr. Gokiert also had a leadership role on the province-wide *Early Childhood Development (ECD) Community Mapping Project* that gathered data on Kindergarten children across Alberta. To complement this project, she worked with First Nation communities to build a supplemental instrument to measure early development. Additionally, Dr. Gokiert is a registered psychologist and specializes in assessment and intervention in school-based settings.