CALL TO ACTION

Developing Skills for Learning: **Foundations of Motor Skill Development of Children in Grey Bruce**

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EXECUTIVE SUMMARY

- Early Development Instrument (EDI) measurements show that children in Grey Bruce are consistently more likely than Ontario children to score as vulnerable in the Physical Health and Well-Being domain. This includes fine and gross motor skill development (GBHU, 2018b).
- There are many factors that contribute to motor skill development during the early years, including the role of play, stimulating social and physical environments, instructional approaches, and societal influences (Kreichauf et al., 2012; Pivik, 2012; Ward et al., 2010; Wick et al., 2017).
- Literature suggests a strong association between motor skill competence and physical activity in young children (Figueroa & An, 2017; Iivonen & Saakslahti, 2014; Timmons et al., 2012).
- Families and the stimulating environments they live in, play a critical role in influencing a child's capacity to learn.
- This paper highlights the importance of partnerships to promote early child development to meet milestones for school readiness, examines trends in developmental patterns, and presents collaborative recommendations for mitigating existing and future developmental disparities.
- Strategies for action are categorized into the following seven themes which are recommended to reduce vulnerabilities in motor skill development.

    1. Involving Caregivers and Families
    2. Facilitating Connection and Collaboration
    3. Training for Service Providers
    4. Supporting Inclusion for all Children
    5. Incorporating Play throughout Daily Activities
    6. Creating Environments for Play
    7. Continued Monitoring and Evaluation

- Strategies to improve fine and gross motor skills require multi-sectoral collaboration and collective action.
- Key stakeholders for early childhood development collaboration include: local government, healthcare, school boards, childcare providers, non-government organizations, social and community services, private sector partners, and residents of Grey Bruce.

PREFACE

The Ontario Public Health Standards (OPHS) are published by the Ministry of Health and Long-Term Care (MOHLTC) (2018) and establish requirements for programs, services, and accountability standards. Within the standards, the goal for healthy growth and development includes a requirement that the board of health shall collect and analyze relevant data to monitor trends over time, emerging trends, priorities, and health inequities related to healthy growth and development. As such, it is the mandate and interest of the Grey Bruce Health Unit (GBHU) to foster collaboration among community partners, children, youth, and parents in the planning, development, implementation and evaluation of programs, services, and policies, which positively impact the health of families and communities. Furthermore, the OPHS *Relationship with Indigenous Communities Guideline* supports collaborative work to reduce health inequities and create meaningful relationships with Indigenous communities and organizations, as well as with First Nation communities (MOHLTC, 2018).

The impetus for this document occurred in stages. Initially, the GBHU reviewed the Early Development Instrument (EDI) data. The EDI is a tool completed by teachers that measures the prevalence of children vulnerable in areas of early development. Children in both Grey County and Bruce County have trended as higher vulnerability compared to the rest of Ontario in the Physical Health and Well-Being domain which includes gross and fine motor development (GBHU, 2018b). As a result, an evidence search of several databases was conducted to identify programs, interventions, and policies that may influence a child's gross and fine motor skills in order to reduce the incidence of vulnerabilities in school readiness. The population of interest included preterm infants, and typically developing preschool, and school-aged children up to six years of age. Studies that included developmental disorders were removed including (but not limited to): Developmental Coordination Disorder, Attention Deficit Hyperactivity Disorder, Autism, Cerebral Palsy, Down Syndrome, Dyslexia, and Epilepsy. The terms fundamental movement skills and fundamental motor skills were frequently used in the literature to describe the foundational skills needed for gross and find motor skill development. This paper has opted to use the term fundamental motor skills, though both terms were used in the search strategy (See Appendix A: Search Strategy Summary). Subsequently, the GBHU engaged with and fostered collaborations with community partners. Collaborating ensured the development and implementation of the document was informed by local stakeholders in the health, childcare, education, non-governmental, social services and other relevant sectors.

PURPOSE

The purpose of this document is to provide evidence-informed recommendations that support a child's school readiness by reducing the incidence of vulnerable children in Grey County and Bruce County as identified by the *Early Development Instrument (EDI)*. Results of EDI data show that children in Grey Bruce across all cycles, overall and by sex, are consistently more likely than Ontario children to score as vulnerable in the Physical Health and Well-Being domain (GBHU, 2018b). This document was a collaborative process involving invested stakeholders in order to strengthen community action to support the healthy growth and development of children at the population level and reduce the incidence of vulnerable children in Grey Bruce.

INTRODUCTION

School readiness is an indicator of early childhood growth and development, and is a predictor of outcomes in later years (Canadian Institute for Health Information, 2014). The factors that influence whether a child is ready for school are multifaceted and complex. The importance of early childhood development and early health promoting experiences cannot be underestimated. The early childhood period, from zero to six years of age determines outcomes throughout the lifecycle (United Nations General Assembly, 2010; World Health Organization, 1986). The World Health Organization (2012) recognizes early childhood as an opportunity for establishing the capacity, skills, and resources needed for all children to meet their developmental potential and begin life-long learning. This may be particularly true for establishing active living behaviours (Timmons et al., 2012). While this paper identifies physical activity as a contributing factor to improve motor skill competence, it is important to recognize that regular physical activity has many benefits. In fact, physical activity can reduce social and academic stress and support overall improvements to the mental health and wellness of children and youth, especially for those with brain-based disabilities (ParticipACTION, 2018). Research supports the role of physical activity in enhancing the structure and function of the brain, leading to positive learning outcomes (ParticipACTION, 2018). The Ontario Healthy Kids Panel (2013) report *No Time to Wait*, has recognized the need for coordinated, strategic action to create healthy communities that promote physical activity and start all kids on a path to good health.

Many fundamental motor skills (FMS) are developed in the preschool period (Figueroa & An, 2017). Motor skills represent the combination of physical development and cognitive processes that result in movement (Cameron, Cottone, Murrah, & Grissmer, 2016). Fine motor skills are closely associated with academic achievement (Cameron et al., 2016) and encompass "tasks where fine motor precision and integration are needed" (Van der Fels et al., 2015). Gross motor skills require balance, strength, and flexibility and are needed to participate in physical activities (Cameron et al., 2016; Van der Fels et al., 2015). Fundamental motor skills are the core skills associated with running, catching, jumping, balance, and other essential movements that can build to more complex skills observed in sports or other physical activities (Figueroa & An, 2017; Van Capelle, Broderick, Van Doorn, Ward, & Parmenter, 2017). Research has established an association between the development of FMS in early childhood and later physical activity levels and self-efficacy (Figueroa & An, 2017; Hesketh et al., 2016; Robinson et al., 2015; Wick et al., 2017). It is important to note that children's perceived motor competence is integral to actual motor competence (Robinson et al., 2015).

Motor skills are just one indicator of school readiness and are correlated with cognition and social skills (Van der Fels, 2015; Veldman, Jones, & Okely, 2016; Wick et al., 2017). Motor skills are closely associated with behaviour and academics, supporting classroom self-regulation, literacy, and numeracy (Cameron et al., 2016). Poor motor performance can lead to compromised psychosocial health including anxiety and lower self-esteem, compromising children's willingness to participate fully in social and academic activities (Cameron et al., 2016; Timmons et al., 2012; Velman et al., 2016). As a result, children with lower gross motor competence may be less active, have higher BMI, lower cardiorespiratory fitness, and poorer bone and skeletal health (Barnett et al., 2016; Robinson et al., 2015; Timmons et al., 2012; Veldman et al., 2016; Wick et al., 2017). The Ages and Stages Questionnaire (ASQ) and Early Developmental Instrument (EDI) are validated tools used to assess school readiness including fine and gross motor skills in children living in Grey Bruce (Blowes & Associates, 2017; County of Bruce, 2017).

This paper aims to mobilize and support Grey Bruce communities to respond to disparities and ensure all Grey Bruce children have fair opportunities to reach their full potential for healthy growth and development, particularly related to fine and gross motor skills. Many of the determinants of FMS development hold potential for positive influence. Age is consistently correlated with motor competence (Barnett et al., 2016; Robinson et al., 2015), though FMS development does not develop automatically and relies on opportunities for these skills to be learnt, practiced, and reinforced (Robinson et al., 2015; Van Capelle et al., 2017). Childhood use of technology may also have significant impacts on motor skill

development (Rowan, 2010). There is growing evidence on the importance of connecting to the natural world in developing motor skills as well as potential negative impacts of technology overuse by very young children (Rowan, 2010). Supportive environments and knowledgeable caregivers can facilitate the development of FMS for children, creating opportunities that are responsive to disparities in socioeconomic status, weight status, and gender (Barnett et al., 2016; Van Capelle et al., 2017; Ward, Vaughn, McWilliams & Hales, 2010; Wick et al., 2017). It is clear that improving school readiness is a shared responsibility that can only be achieved through continued, multi-sectoral collaboration. Stimulating environments at home, school, and in the community have lasting implications for a child's capacity to develop motor competence (Robinson et al., 2015).

FOUNDATIONS OF MOTOR SKILL DEVELOPMENT

In 2012, an environmental scan of school readiness for health was updated for public health practitioners and communities (Pivik, 2012). The literature review ascertains current definitions, determinants, indicators, and interventions associated with school readiness. A *Conceptual Framework for School Readiness and Health* (Figure 1) was developed from the results of the research review to help assess the quality of and summarize effective approaches in the evidence, as well as to identify research gaps, school readiness indicators, and appropriate interventions (Pivik, 2012). The results of the research review, including the *Conceptual Framework for School Readiness and Health* created a foundation for understanding factors, interventions, programs, and policies that influence school readiness.

As outlined in the research, there are many factors that contribute to motor skill development including physical activity, the role of play, stimulating social and physical environments, instructional approaches, and societal influences (Kreichauf et al., 2012; Pivik, 2012; Ward et al., 2010; Wick et al., 2017). The association between motor skill competence and physical activity in preschoolers has been well documented (Figueroa & An, 2017; Iivonen & Saakslahti, 2014; Timmons et al., 2012). Motor skill competence requires children to be engaged in generous amounts of physical activity including both structured and unstructured play (Figueroa & An, 2017; Ward et al., 2010). Providing regular, structured physical activity programs can improve children's motor skills by increasing the amount and intensity of physical activity they receive (Ward et al., 2010). Structured activities also create opportunities for quality instruction in FMS, however training and other supports are needed for effective programming (Lubans et al., 2010). While literature supports the use of structured physical activity programs to improve children's motor skills and physical activity levels (Ward et al, 2010), Kreichauf et al., (2012) recommends that such interventions should augment, not replace, free play. Free play time is vital for a child's overall development

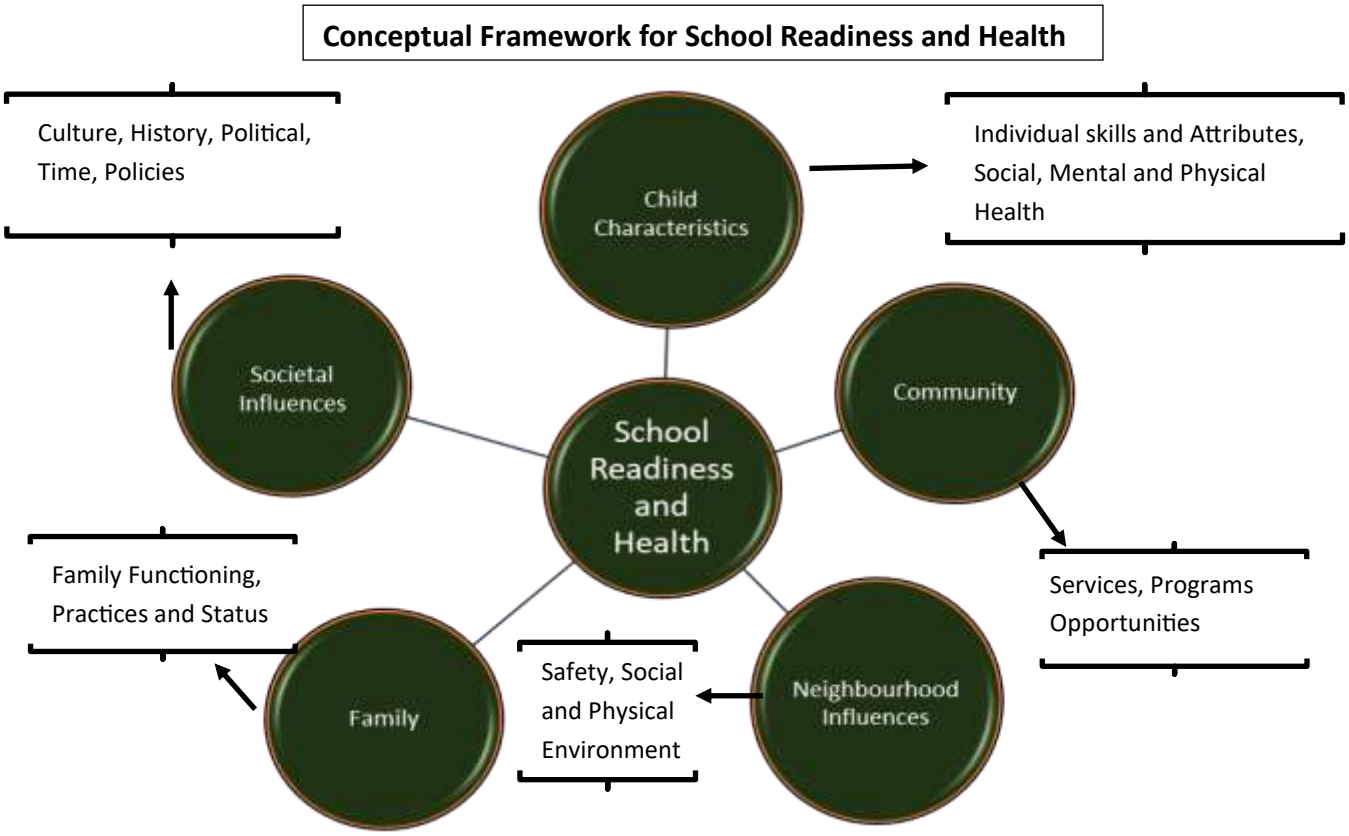

Figure 1 – Adapted from the Human Early Learning Partnership (Pivik, J. (2012). Environmental scan of school readiness for health: Definitions, determinants, indicators and interventions)

and can influence the enjoyment of play, creativity, and friendship (Ward et al., 2010). It is worth noting that the relationship between motor skill competence and physical activity in preschoolers may differ by gender, such that boys have shown a greater affinity for activities involving object control skills and motor coordination than girls (Barnett et al., 2016; Figueroa & An, 2017; Lubans et al., 2010; Wick et al., 2017). Girls and those less interested in structured activities may be encouraged to participate through the development of green and naturalized spaces (Dyment & Bell, 2007).

Physical environments that have sufficient and attractive space encourage children to interact and participate in activities while acquiring FMS (Kreichauf, 2012; Wick et al., 2017). Providing appropriate supports, equipment, and space for structured and/or unstructured play are integral to effective skill development (Kreichauf et al., 2012; Ward et al., 2010; Wick et al., 2017). Portable play equipment or other "loose parts" can facilitate unstructured play and encourage active participation. Figueroa & An (2017), recommend at least 60 minutes of structured and 60 minutes of unstructured activity per day to gain motor skill competence in the preschool years. In order to develop FMS, children need space to run, jump, and play. Decreasing playground density by reducing the number of children playing in the space at one time may be an effective strategy to increase play space where physical environments cannot be adjusted (Iivonen & Saakslahti, 2014; Kreichauf et al., 2012; Ward et al., 2010; Wick et al., 2017). Outdoor

play has been well identified as a strong correlate of physical activity behaviour in young children (Tucker et al., 2017). Kreichauf et al. (2012) and Ward et al., (2010) both cite research claiming that children have short bursts of vigorous activity and are most active in the first 10-15 minutes during time spent outdoors. Most literature supports offering more frequent, shorter, outdoor playtime sessions (Tucker et al., 2017). Shorter sessions may be more effective than additional recess time in promoting physical activity and motor skill development (Ward et al., 2010).

Van Capelle et al. (2017) concluded that physical activity interventions should occur three or more times per week, over at least 30 minutes. Interventions delivered over longer periods of time (over 1 year) (Lai et al., 2014) and with high frequency (>2-3 times per week) (Van Capelle et al., 2017; Veldman et al., 2016) better effected change in physical activity behaviours. This conflicts with Wick et al. (2017), who found that stronger effects were observed in interventions limited to 4 weeks to 5 months when compared to those delivered for more than 6 months. Wick et al. (2017), theorized that this association may have been the result of decreased compliance and motivation among program facilitators or loss of participant interest due to intervention monotony. This suggests that programs must not become complacent in their delivery and continue to incorporate new activities and engage participants.

> The Truth and Reconciliation Commission of Canada (2012) states, "We call upon the federal government to amend the Physical Activity and Sport Act to support reconciliation by ensuring that policies to promote physical activity as a fundamental element of health and well-being, reduce barriers to sport, and build capacity in the Canadian sport system, are inclusive of Aboriginal peoples (p.10).

Adding portable play equipment (e.g., bikes, balls) has also shown positive results in improving physical activity by permitting preschoolers to play with equipment while actively moving. When play equipment is absent, children engage in more sedentary and inactive games (Kreichauf et al., 2012; Vanderloo et al., 2014; Ward et al., 2010). The *Call to Action Working Collectively to Prevent Falls across the Lifespan* report (GBHU, 2017e), recommends active outdoor play principles to promote outdoor environments and playgrounds that create opportunities for self-directed play and a connection to nature. Such play also creates opportunities to build cultural connections to the natural landscapes which has demonstrated benefits for the wellbeing of Indigenous children (Munroe & MacLellan-Mansell, 2013). Outdoor play also presents an opportunity for inter-generational sharing of cultural values and language. While participating in developmentally appropriate, play-based physical activities is vital to promoting children's health, the concern of risky outdoor play can be a barrier. Exciting or thrilling forms of risky play such as great heights, high speed, dangerous tools, and rough and tumble play involve a risk of physical injury that can be real or perceived (Brussoni et al., 2015).

Furthermore, the risk of a child getting lost or disappearing may be a concern for parents or caregivers. Despite concerns of physical injury and child safety, findings from a systematic review suggest the promotion of risky outdoor play is required for healthy child development and action is encouraged to support risky outdoor play opportunities for children (Brussoni et al., 2015).

Successful motor skill and physical activity interventions, programs, and policies frequently involve engagement of three key stakeholders: caregivers (Hughes, Redsell, & Glazebrook, 2016; Van Capelle et al., 2017), childcare (Ansari & Winsler, 2013; Kreichauf et al., 2012; Lubans et al., 2010; McKay & Nigro, 2016; Veldman et al., 2016; Wick et al., 2010) and schools (Lubans et al., 2010; Van Capelle et al., 2017). Educational and familial settings hold strong influence on early childhood development. Childcare also presents a unique opportunity for academic preparation including physical activity initiatives that can be integrated into daily routines and curricula (Kreichauf et al., 2012). Park, Maitra, Achon, Loyola, & Rincon (2014), also recognized a supportive role for a multidisciplinary team including physical therapists, occupational therapists, nurses, and physicians.

Family environments have been identified as the primary influence in promoting children's development and school readiness (Pivik, 2012). Involving caregivers to improve motor skill development could have a positive impact on awareness, role modelling, and skill reinforcement (Hesketh et al., 2016; Hughes et al., 2016; Van Capelle et al., 2017). Parental monitoring is positively associated with change in physical activity in young children (Hesketh et al., 2016). Furthermore, parents who are active themselves and role model in a positive way are important facilitators of child activity. To support the healthy growth and development of young children, parents and caregivers need to support a lifestyle that encompasses nutritious foods, sleep, and quality sedentary behaviours in addition to a daily balance of physical activity. For example, children require interactive non-screen based behaviours such as reading, storytelling, and puzzles (CSEP, n.d.). The Canadian Pediatric Society (CPS) (2017) provides screen time recommendations to support families raising children in a digital world. "'Screen time' refers to time spent with any screen, including smart phones, tablets, television, video games, computers, or wearable technology" (CPS, 2017, p.461). It is the position of the CPS that caregivers minimize and mitigate risks of exposure to screens, be mindful of their use, and model healthy behaviours (CPS, 2017).

Families with limited financial resources routinely face barriers that affect the health and wellbeing of the whole family. Family income has a direct impact on child outcomes including locomotor skill development and school readiness (Barnett et al., 2016; Pivik, 2012; Ribner, Fitzpatrick & Blair, 2017). In fact, Ribner et al. (2017) found a strong negative association between TV viewing and school readiness skills as household income decreased. Children living in disadvantaged homes may also have limited opportunities to develop certain skills as they may have less sports equipment available, less parental

support, and limited finances for organized and recreational sports (Barnett et al., 2016). In addition to income disparities, transportation may act as another barrier limiting opportunities for physical activity and participation in organized sports.

Many childcare providers understand young children should be active and believe they have the potential to influence a child's activity (Hesketh et al., 2015). Evidence suggests that provider training in a childcare environment can positively increase a child's activity particularly moderate to vigorous intensity physical activity. Training may facilitate the adoption and integration of physical activity practices in curricula to support motor skill development (Ansari & Winsler, 2013; Ward et al., 2010). Furthermore, childcare providers should be encouraged to enhance their skills and/or confidence (Hesketh et al., 2016). The literature frequently cited benefits to implementing policies to incorporate consistent and effective provider training (Ansari & Winsler, 2013; Ward, 2010). As such, childcare and early learning centres have been identified as ideal settings for policies to increase physical activity in the early years (Tucker et al., 2013; Ward, 2010). Tucker et al. (2013), also described a positive influence when child care policies for increasing physical activity among preschoolers were implemented.

Ansari & Winsler (2013) concluded that childcare stability can effect a child's readiness for school including fine motor skills. Enrollment in early childcare varies, but most children under five will experience at least one childcare arrangement that is outside of the home (Ansari & Winsler, 2013). Many children over time will also experience changes in the type of childcare. Families living with low-income may experience "childcare instability" as they are challenged with maintaining affordable quality childcare resulting in multiple and changing primary caregivers (Ansari & Winsler, 2013). Families living with low-income are also less likely to enroll children in center-based care and non-relative family childcare compared to families who are financially stable (Ansari & Winsler, 2013). Children who experience childcare or caregiver instability are less prepared for the transition to kindergarten in comparison to children who experience stable care (Ansari & Winsler, 2013). Children cared for in family settings have also shown poorer school readiness compared to children enrolled in other types of childcare.

Although the benefits of physical activity for preschoolers are well known, the majority of preschoolers fail to meet recommended physical activity guidelines (Figueroa, 2016).

The *Canadian 24-Hour Movement Guidelines* recommends 180 min of physical activity per day for children 1-4 years of age (spread throughout the day) with an accumulation of at least 60 min of moderate-to-vigorous physical activity (MVPA) for children ages 5-17 years (Canadian Society for Exercise Physiology (CSEP), n.d.).

Moreover, children at age four who switched from a centre-based care to family childcare scored generally worse in areas of school readiness in comparison to children who experienced a switch from family childcare to centre-based care (Ansari & Winsler, 2013). Children enrolled in a public school pre-kindergarten program at age four showed the most promising results for school readiness. Overall, enrolling children living with low-income in some form of early childhood education program is beneficial to foster school readiness (Ansari & Winsler, 2013).

Within school settings, teacher influence is integral to supporting the development of FMS. In order to view each child as an "active, competent learner" who has individual skills and knowledge, Kreichauf et al., (2012) suggests that learning should be "co-constructive". Co-constructive learning encourages engagement through involving children in planning activities and selecting materials within learning environments (Ontario Ministry of Education, 2016). A teacher's decision on how to best support the learning process and the learning potential of educational situations is based on observing and understanding the needs of the individual child (Kreichauf et al., 2012). In order to achieve this, teachers need to act flexibly when implementing physical activity curriculum with groups of heterogeneous preschool children (Kreichauf et al., 2012). Activity levels of children have also been correlated with teacher behaviour. For example, children are less likely to engage in physical activity when a teacher is sitting down or standing still (Brown et al., 2009; Cardon, Van Cauwenberghe, Labarque, Haerens, & DeBourdeaudhuij, 2008).

The literature clearly suggests greater emphasis on supports for FMS development in the early years; however, more research is needed to fully understand the role of intervention leadership and facilitator training. A study by Van Capelle et al. (2017) found that teacher-led interventions were the subject of the majority of the research and provided moderate quality evidence to suggest a positive impact to FMS. There is a very limited understanding of childcare-led or parent-led interventions in the research (Van Capelle et al., 2017), however, Ward et al. (2010) and Kreichauf et al., (2012) recommend that trained and enthusiastic staff are most effective in leading interventions to improve FMS. Having knowledge about physical activity and motor skill development allows teachers to support the learning and development of children. Thus, research has indicated that motor skill development should be included in curriculum and training for teachers and early childhood educators (Lubans et al., 2010; Ward et al; 2010).

FRAMEWORKS AND MODELS

Developmental models such as the Stodden conceptual model hypothesize the relationships and nature of associations between physical activity and the development of FMS competence (Lai et al., 2014; Stodden et al., 2008). The Stodden model describes a "dynamic relationship" between the development of motor skill competence and physical activity that is mediated by factors such as perceived motor skill competence, physical fitness, and obesity (Stodden et al., 2008). This relationship is hypothesized to strengthen over developmental time (Robinson et al., 2015; Stodden et al., 2008). Motor skill competence is the proficiency in common FMS including object control and locomotor skill development which is foundational to engaging in physical activity (Stodden et al., 2008). Stodden et al., (2008) suggest that increased physical activity in early childhood provides more opportunities to promote neuromotor development, resulting in the development of motor skill competence.

The Stodden model is unique in that it implies variables such as perceived competence interact with actual motor competence and powerfully influences engagement and persistence in physical activity (Stodden et al., 2008). It addresses the role of perceived motor skill competence in children recognizing that they may perceive themselves to be highly skilled but have low levels of actual motor competence. Promoting the attainment of motor skill development is valuable in young children with a higher perceived motor skill competence as children continue to persist and attempt to master activities in which they believe they are skillful. As children transition from early to middle childhood, their perceived motor skill competence equates more closely to their actual motor skill competence. This shift is known as the "period of vulnerability" , during which children who have lower actual motor skill competence and lower perceived motor skill competence become less physically active and are drawn into a negative spiral of disengagement leading to a higher prevalence of an unhealthy weight and obesity. The opposite mechanism occurs in children who have higher perceived and actual motor skill competence. They are more likely to persist with physical activities experiencing a positive spiral of engagement with higher levels of health-related physical fitness and a healthy weight status (Lai et al., 2014; Stodden et al., 2008). Health-related fitness is another defined factor in the relationship between physical activity and motor skill competence. It is the children with intermediate to high levels of motor skill competence that will demonstrate greater health-related fitness and higher performance scores as they move from early to middle childhood (Stodden et al., 2008).

In reviewing the current state of evidence to support the hypothesized Stodden model, a narrative review concluded that motor competence is positively associated with several aspects of health including physical activity, cardiorespiratory fitness, muscular strength, muscular endurance and a healthy weight

status (Barnett et al., 2016). This suggests that physical activity and weight status are important to motor competence, however this relationship depends on the way motor competence is operationalized (Barnett et al., 2016). Wick et al. (2017) agree stating that the association between actual FMS and physical activity, as mediated by perceived FMS and physical fitness, has not been sufficiently studied in young children. The rationale for causal pathways in the model may also be unidirectional across time, therefore understanding the factors that influence health and well-being and how relationships among these factors change across time should be considered in a developmental and systematic manner (Lai et al., 2014; Robinson et al., 2015).

The use of an ecological model can help to examine influencing factors on health behaviour (Barnett et al., 2016; Hesketh et al., 2016). Levels of influence can be classified into five broad categories: individual, interpersonal, organizational, community, and public policy (Hesketh et al., 2016). Influencing factors emphasize the environmental contexts of the behaviour as well as the social and psychological influences (Barnett et al., 2016). Ecological models not only help to better understand the multiple domains of influence on behaviour, but can also help guide targeted interventions to effectively change health behaviours in children (Barnett et al., 2016; Hesketh et al., 2016).

Health Promotion Frameworks such as the Ottawa Charter and the Bangkok Charter, suggest that an ideal long term goal of any intervention or health program is to change behaviour and improve outcomes (Lai et al., 2014; WHO, 1986). Health promotion is described as a comprehensive, multi-strategy approach addressing five key action areas: build healthy public policy, create supportive environments, strengthen community action, develop personal skills, and re-orient health services (McKay & Nigro, 2016; WHO, 1986). Enabling and achieving equity in health is also a primary focus of health promotion (WHO, 1986). Moreover, action in health promotion strives to ensure differences in current health status are reduced and equal opportunities and resources enable all people to achieve their fullest health potential (WHO, 1986). Lai et al. (2014) concluded that interventions longer than one year that utilize a theoretical model or framework are effective in producing a sustainable outcome in physical activity, fitness, or FMS of children.

EARLY DEVELOPMENT INSTRUMENT (EDI)

The Early Development Instrument (EDI) is a validated tool used widely across Canada to measure a child's developmental health and well-being at school entry (EDI, 2016). Kindergarten teachers complete the tool to measure a child's school readiness across five general domains: Physical Health and Well-Being; Social Competence; Emotional Maturity; Language and Cognitive Development; and Communication Skills and General Knowledge (GBHU, 2018a).

Children who score low (below the 10th percentile) on any of the five domains are described as "vulnerable" (EDI, 2016). In Canada, one in four children (25%) entering kindergarten are vulnerable in one or more areas of development (EDI, 2016). Indicators of socio-economic status such as income are positively associated with early child health outcomes. For example, Canadian children in low-income neighbourhoods have a higher rate of vulnerability (34.9%) than those in high-income neighbourhoods (19.5%) (Canadian Institute for Health Information (CIHI), 2014).

Physical Health and Well-Being is the domain children in Grey Bruce are consistently more likely than Ontario children to score as vulnerable across all EDI cycles, overall and by sex (GBHU, 2018a).

EDI measurements in Ontario have taken place over four cycles beginning in the 2003/2004 school year. Cycle 4 was administered in 2014/2015 and Cycle 5 will be collected in 2018. The Physical Health and Well-Being domain covers three subdomains: physical readiness for school, physical independence, and gross and fine motor skills. Examples of these skills include holding a pencil, running on the playground, motor coordination, and adequate energy levels for activities in the classroom. As illustrated in Figure 2, results show that children in Grey Bruce across all cycles, overall and by sex, are consistently more likely than Ontario children to score as vulnerable in the Physical Health and Well-Being domain (GBHU, 2018b).

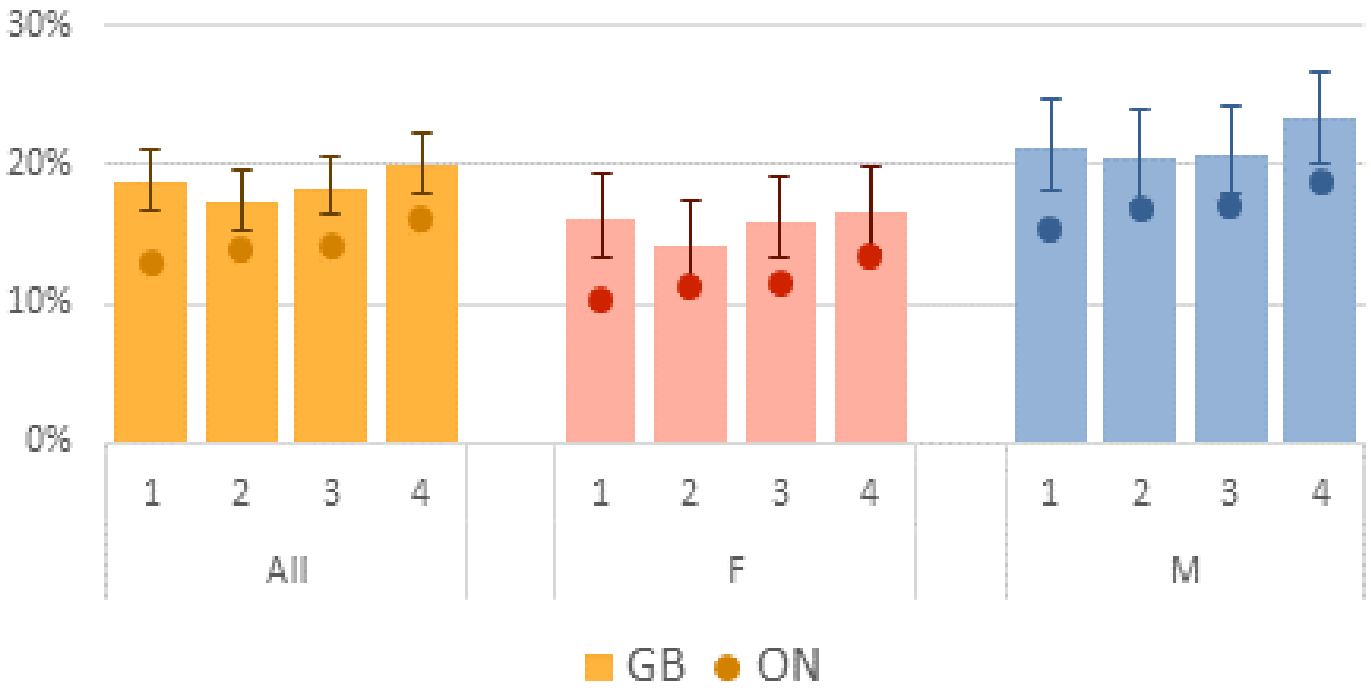

Figure 2. Percentage of Children Scoring in the Vulnerable Range in the Physical Health and Well-being Domain by EDI Cycle and Sex, Grey Bruce and Ontario (GBHU, 2018b).

SOCIO-DEMOGRAPHIC CHARACTERISTICS IN GREY BRUCE

Grey County and Bruce County are two distinct upper-tier municipalities that contain a total of 17 local municipalities (Figure 3). While there is diversity between each of the municipalities, they all share a rural or small population centre context. The total population of the counties is 161,977 spread across 8,603.7 km^2 in 2016 (GBHU, 2017b). Two First Nation Reserves are located in the region; the Chippewas of Nawash Unceded First Nation and the Chippewas of Saugeen First Nation. There are First Nations families also living off reserves as well as small proportions of families who are visible minorities, recent immigrants, and Mennonite or Amish. Such populations may be at risk of social exclusion, discrimination, marginalization, and may have limited access to culturally appropriate resources and services (Mikkonen & Raphael, 2010).

Figure 3 – Map of Grey Bruce Municipalities and First Nation Reserves

Compared to Ontario, children make up a smaller proportion of the population in most Grey Bruce municipalities. In 2016, there were 8,310 children aged 0 to 4 years and 8,305 children aged 5-9 years living in Grey Bruce municipalities (GBHU, 2018b). Each age group accounts for 5.1% of the Grey Bruce population. The municipality with the highest proportion of children 0-4 years is Southgate and Arran-Elderslie for children 5-9 years (GBHU, 2018b). This presents a challenge for service providers to ensure adequate resources are accessible in these areas.

Families are impacted by the health of the communities in which they live. Furthermore, a broad range of factors including the social determinants of health (SDOH) affect the conditions in which individuals and communities live, learn, work, and play (Figure 4). Based on social or economic conditions, these factors may be interconnected and experienced differently by individuals, communities, and populations putting some children, youth, and families at disadvantage and greater susceptibility to poor health outcomes (MOHLTC, 2018). It is important to highlight that the determinants of health for Indigenous peoples have unique aspects related to colonization, racism and social exclusion (National Collaborating Centre for Determinants of Health, 2016). Each Indigenous community is unique given the wide range of cultural, historical, geographic and socioeconomic challenges (MOHLTC, 2016). First Nations, Inuit, and Metis address risk factors such as the social determinants of health using a holistic approach based on Indigenous views of wellness, balancing physical, mental, emotional, and spiritual health (MOHLTC, 2016).

Figure 4: Social Determinants of Health (Mikkonen & Raphael, 2010)

Aboriginal Status
Disability
Early Life
Education
Employment and working conditions
Food insecurity
Health services
Gender
Housing
Income and income distribution
Race
Social exclusion
Social safety net
Unemployment and job security

The Web of Being: Social Determinants and Indigenous People's Health (Figure 5) illustrates the interconnected factors and social determinants that affect the health and well-being of Indigenous people (MOHLTC, 2018; MOHLTC, 2016). An approach that is bottom-up, community-centred and reflects the Web of Being has been recommended in order to provide meaningful, positive change (MOHLTC, 2016).

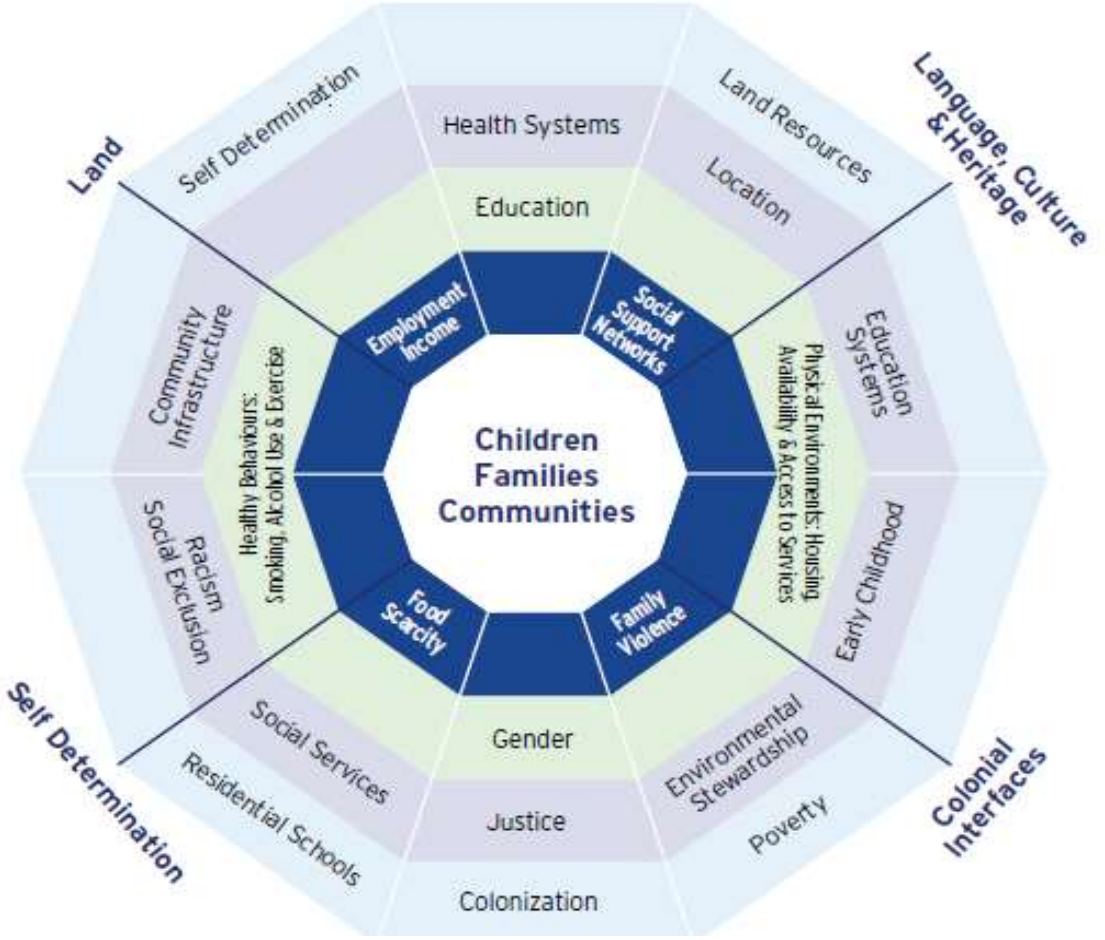

Figure 5: Web of Being: Social Determinants and Indigenous People's Health (Ontario Ministry of Health and Long-Term Care, 2016).

Income and income disparities are often considered to be among the most influential SDOH Canada (Mikkonen & Raphael, 2010). Income determines the quality of other SDOH such as housing, food security, transportation and overall living conditions (Mikkonen & Raphael, 2010). Living in poverty strongly predicts school readiness (Pivik, 2012). Many of the factors contributing to the motor development of children including centre-based childcare, play equipment, and physical activity programs must be paid for by individuals and families. In 2016, 22.2% of Grey Bruce children aged 0 to 5 lived in low income households according to the low income measure, after tax (GBHU, 2018b). A household is defined as low income if its after-tax income is less than half of the median after-tax income of all households in Canada (GBHU, 2018b). The percentage of children aged 0 to 5 living in low-income households in Bruce County is 19.4% which is slighter lower than the Ontario average (19.8%) whereas, Grey County is higher at 24.5% (GBHU, 2018b). In most municipalities, children under 5 are more likely to live in low-income households than children under 17 (GBHU, 2018b). With more than 1 in 5 children growing up in low income households, policies like providing access to affordable licensed childcare can have a significant impact on a child's health and well-being.

Affordable and safe housing is required for living a healthy life (Mikkonen & Raphael, 2010). For many, this can be a challenge due to insufficient social assistance shelter allowance rates, as well as the increasing cost of utilities (Bruce County, 2013). Housing is deemed unaffordable when more than 30% of household income is spent on shelter costs (GBHU, 2017c). The unaffordable housing rate for all households in Grey Bruce is 22.9% (GBHU, 2017c). Renters are affected by the problems of housing affordability more than owners (GBHU, 2017c). In 2016, 16.3% of tenant households in Bruce County lived in subsidized housing, and 17.9% in Grey County (GBHU, 2017c). Subsidized housing includes social housing, public housing, government-assisted housing, non-profit housing, as well as rent-geared-to-income. Housing waitlists continue to exist in both counties.

Research has shown that food insecurity is a highly sensitive indicator of material deprivation (Loopstra & Tarasuk, 2013; Tarasuk, 2017). The 2017 Grey Bruce Nutritious Food Basket for a family of four was $203.61 per week (GBHU, 2017d). For those on social assistance, food purchasing could require 37% of their monthly income (GBHU, 2017d). This leaves little available for other household expenses. Fixed costs like rent and utilities are more likely to be prioritized over food, while household costs are lessened by compromising the quality or quantity of foods purchased. Recent reports have demonstrated increased reliance on emergency food services, with the number of food banks increasing from 14 to 20 and a 47% increase in visits to food banks between 2011 and 2013 (Dobbyn & Gallagher, 2013). However research shows that less than 25% of those experiencing food insecurity access food banks (Kirkpatrick & Tarasuk, 2009).

The economic and social resources available to families influences the quality of early childhood development (Mikkonen & Raphael, 2010). Regardless of wealth or income level, all families should be guaranteed affordable and quality child care (Mikkonen & Raphael, 2010). However, the cost of licensed childcare has become a barrier for many families across Ontario (Government of Ontario, 2017). Licensed child care is available to 1828 children in Bruce County through centre based spaces and home child care programs. In Grey County, there are 1970 licensed centre based spaces and 38 home based centres operating. In the first two quarters of 2018 the fee subsidy program has served an average of 847 children in Grey County and 332 children in Bruce County in the first quarter of 2018 (A. Janssen, personal communication, July 13, 2018; B. Noble, personal communication, July 17, 2018). Children receiving the fee subsidy programs range from infants to school age. Governments can provide a range of supports and benefits to children and families through public policy. Recently, a provincial plan was announced in the Government of Ontario's (2017) *Renewed Early Years and Child Care Policy Framework*, to transform Ontario's early years and child care system. There are seven key areas of action including increasing access to early years and child care programs and services, as well as ensuring a more affordable early years and child care system. Work will be done over the next five years to improve the lives of families and children, including First Nation communities on reserve (Government of Ontario, 2017).

The relationship between caregivers and children plays a pivotal role in healthy growth and development and school readiness. Programs and services must be prepared to work with a variety of family structures. For census purposes, a family is defined as: a married couple and the children, if any, of either and/or both spouses; a couple living common law and the children, if any, of either and/or both partners; or a lone parent of any marital status with at least one child living in the same dwelling and that child or those children. Grandchildren living with their grandparent(s) with no parents present also constitute a census family (GBHU, 2018b). Table 1 displays how many children aged 0 to 14 are living in households defined by census family characteristics.

Table 1. Family Characteristics of Children (0-14), Ontario, Bruce County, and Grey County, 2016 (GBHU, 2018b)

Family Characteristics	Ontario (%)	Grey Bruce (%)	Bruce (%)	Grey (%)
Population 0 to 14 years	2,203,720	24,585	10,750	13,835
Children in census families (as in sons, daughters or grand-children)	2,189,925 (99.4)	24,405 (99.3)	10,665 (99.2)	13,740 (99.3)
Living with two biological or adoptive parents	1,645,880 (74.7)	18,225 (74.1)	8,200 (76.3)	10,025 (72.5)
Living with one biological or adoptive parent and one step-parent	113,675 (5.2)	1,815 (7.4)	735 (6.8)	1,080 (7.8)
Living with one parent in a lone-parent census family	419,375 (19)	4,125 (16.8)	1,650 (15.3)	2,475 (17.9)
With a male lone parent	66,605 (3)	750 (3.1)	320 (3)	430 (3.1)
With a female lone parent	352,770 (16)	3,375 (13.7)	1,330 (12.4)	2,045 (14.8)
Living with grandparents without parents present	10,990 (0.5)	250 (1.0)	85 (0.8)	165 (1.2)
Children not in census families	13,795 (0.6)	175 (0.7)	80 (0.7)	95 (0.7)
Living with other relatives	8,150 (0.4)	95 (0.4)	45 (0.4)	50 (0.4)
Foster children	5,645 (0.3)	75 (0.3)	35 (0.3)	40 (0.3)

Recognizing and responding appropriately to the many challenges that could be faced by populations at risk of marginalization is difficult when planning programs, services, and policies. The MOHLTC (2013) has developed the Health Equity Impact Assessment (HEIA) Tool to support decision makers across all sectors in making equity based improvements. Decision makers can use the tool to identify negative and positive unintended impacts on population groups that result from programs and policies. This can help reduce avoidable health disparities between population groups and maximize positive impacts.

SUPPORTING EARLY CHILDHOOD DEVELOPMENT IN GREY BRUCE

In Grey Bruce, multi-sectoral collaboration has supported strategies that aim to improve the overall health and well-being of children. There are a wide variety of collaborative tables and committees that exist in Grey Bruce to support families and children. Caregiver influence cannot be underestimated and decision makers must work in partnership with caregivers to design and evaluate initiatives. Through role modeling, caregivers also augment the benefits of programs or services. Collaborative partnerships and strategies need to be continually reviewed and evaluated.

The following programs and services support the physical health and well-being of children zero to six years in Grey Bruce, including the fine and gross motor skills needed for school readiness. Additional programs and resources may be available that are not listed below.

Program	Target Population	Primary Activity	Referrals to the Program are made by:
COMMUNITY			
Kindergarten Registration	Universal, Ages 3 to 5	Registration for school-entry Screening & Referral	No referral required
EarlyON Child and Family Centres	Universal, Ages 0-6	Community Programming & Referral	No referral required
M'Wikwedong Native Cultural Resource Centre, Owen Sound	Prenatal care, infants, children, pre-teens and elders	Community Programming & Referral Programs are tailored to meet the needs of the urban Aboriginal population of Owen Sound.	No referral required
PLAY in Bruce Grey	Universal, residents of Grey Bruce	Advocacy and Promotion	No referral required
HEALTH CARE AND EARLY INTERVENTION SERVICES			
Thames Valley Children's Centre	Children and Youth with physical and/or developmental disabilities and/or communication disorders	Intervention & Referral	Caregivers and health care provider
Grey Bruce Health Services (Owen Sound Site)	Newborn to school entry	Intervention & Referral	Health care provider (Required)
Enhanced 18-Month Well Baby Visit	At 18-months	Screening & Referral	Caregivers arrange appointment with health care provider
Infant & Child Development Services, Community Living Owen Sound, Kincardine and Walkerton	Infants and young children with developmental disability or who are at-risk for developmental delay	Screening, Intervention & Referral	Caregivers, health care providers, and community agencies
Special Needs Resource, Community Living Owen Sound & District	Children in childcare, Preschool aged children with two or more developmental delays	Screening, Intervention & Referral	Caregivers, health care providers, early childhood educators, and community agencies
Preschool Resource Programs, Bruce County Human Services	Preschool aged children with two or more developmental delays	Screening, Intervention & Referral	Caregivers, health care providers, early childhood educators, and community agencies

Program	Target Population	Primary Activity	Referrals to the Program are made by:
COMMUNITY HOME VISITATION PROGRAMS			
Healthy Babies, Healthy Children (HBHC), Grey Bruce Health Unit	Families with children aged 0-6 years	Screening, Intervention & Referral	Caregivers, health care providers, early childhood educators, and community agencies
Maternal Child Health program, Mino Bimaadsawin Health Centre	Preconception/prenatal clients and families with children aged 0-6 (members of the Saugeen First Nation)	Screening, Intervention & Referral	Caregivers, health care providers, early childhood educators, and community agencies
Maternal Child Health program, Chippewas of Nawash Health Centre	Preconception/prenatal clients and families with children aged 0-6 (members of the Chippewas of Nawash)	Screening, Intervention & Referral	Caregivers, health care providers, early childhood educators, and community agencies
Southwest Ontario Aboriginal Health Access Centre (SOAHAC)	Preconception to Elder: Health and social services to First Nations, Métis and Inuit communities	Programming, Intervention Screening, & Referral	Caregivers and health care providers

Community

Kindergarten Registration

In 2002, the Let's Learn Kindergarten Registration was implemented community-wide within Grey Bruce. Service providers collaborated with the Bluewater District School Board and the Bruce-Grey Catholic District School Board to offer Let's Learn Kindergarten Registration clinics in all elementary schools. Through these clinics, families are invited to complete a developmental screening process using the Ages & Stages Questionnaire (ASQ), 3rd Edition. Children are then identified for referral to the appropriate resourcing program(s) and/or early intervention services.

Fine and gross motor development are the two areas that three and four year old children are consistently presenting most at-risk through Let's Learn clinics. The number of children ranges from a low of 33 (2012) to a high of 57 (2016) who are at risk for delay in their fine motor skills and a low of 35 (2015) to a high of 57 (2016) who are at risk for delay in their gross motor skills. These numbers represent the children who are in the monitoring zone and are considered to be at risk for delays in this area of development. In 2016, the number of children in the monitoring zone for all 5 areas of development increased over other years. As well, the number of children needing additional support for their gross motor skills is substantially higher than the 5 previous years. Refer to Appendix B: Let's Learn Kindergarten Registration: An Historical Overview for further details.

EarlyON Child and Family Centres

The EarlyON Child and Family Centres, formerly known as the Ontario Early Years Centres, is a Provincial program funded by the Ministry of Education. The EarlyON centres and outreach programs are located throughout Grey Bruce in a variety of accessible communities. The EarlyON centres employ qualified educators that support the well-being of children birth to six years old and their families. EarlyON programs support and strengthen family relationships; support early learning and healthy child development; enhance caregivers' strengths and confidence in their roles; provide access to current information and resources available; and provide referrals to specialized services. EarlyON centres provide a sense of belonging and build community. Children and families are encouraged to learn, grow and connect together in an inclusive learning environment and all programming is free.

PLAY in Bruce Grey

PLAY in Bruce Grey is a strategy designed to help residents of Bruce County and Grey County become more physically active through unstructured play. The strategy was developed in partnership with the 17 municipalities in Grey Bruce and the Grey Bruce Health Unit. Initial funding was provided by the Ministry of Health Promotion. The strategy was officially launched in June 2007. At the launch event, Silken Laumann was the keynote speaker and over 600 children participated in an active *PLAY* day. In addition, all municipalities signed a *PLAY* charter affirming their commitment to support the strategy. Through education, promotion and local events, *PLAY* hopes to encourage residents young and old to stay active with fun activities in their community.

The goals of *PLAY in Bruce Grey* are:

- To educate residents about the health benefits of daily physical activity
- To create opportunities for a collaborative and community specific strategy that will increase physical activity
- To increase the number of residents who are regularly physically active

Health Care and Early Intervention Services

Rehabilitation Services

Across Ontario, the Children's Treatment Centres provide resources and services to children and youth with physical and/or developmental disabilities and/or communication disorders. Young children with speech and language disorders may also be eligible for preschool speech and language services (Ontario Ministry of Children, Community and Social Services, 2016).

Currently Thames Valley Children's Centre provides a number of these services within Grey Bruce, while families within the Owen Sound area are eligible to obtain services through Grey Bruce Health Services. Parents, educators, health professionals, or physicians can refer to a children's treatment centre. Referrals for the GBHS's Occupational Therapy, Physiotherapy or Speech and Language services require a physician's referral.

Enhanced 18-Month Well Baby Visit

Health care providers play an important role in supporting the healthy growth and development of children before they enter school. The Ontario Ministry of Children and Youth Services funds a longer, more in-depth visit to a family physician or health care provider for an enhanced 18-month well-baby visit. Eighteen months is an important milestone and screening provides health care providers with an opportunity to discuss a child's development, and identify any concerns requiring referral to specialized community services.

The Government of Ontario has targeted a 100% coverage rate for 18-month well baby visits (GBHU, 2017a). However, in the last five years, an average of 1 in 3 Grey Bruce children eligible for an 18-month well baby visit received one (5-year coverage rate of 33.6%). While Grey Bruce and Ontario's rates have increased over the past five years of available data, Grey Bruce's progress in coverage rates is lagging behind the province. Currently, Ontario's coverage has risen by 39.3% over five years, with an overall coverage of 56.7%. Meanwhile, Grey Bruce has demonstrated 17.9% gain in coverage rate with only 36.1% of eligible children receiving an 18-month well baby visit (GBHU, 2017a). Community agencies continue to work with primary care to support increased adoption of screening in regular practice.

Infant and Child Development Services

Infant and Child Development Services are designed to serve families with infants and young children with developmental disabilities or who are at risk for developmental delays. A diagnosis is not required for families to access Infant and Child Development Services. Referrals are made by parents, health care providers, and community agencies.

In Grey Bruce, Infant and Child Development Services are offered through 3 agencies: Community Living Kincardine and District, Community Living Owen Sound and District and Community Living Walkerton and District. Services provide an integrated approach to infant and young child development in family-centred intervention that is responsive to parent strengths, competencies and priorities, and is based on up-to-date research data regarding evidence-based practices. Infant and child development consultants provide the expertise needed to assist the family to make informed decisions regarding goals and objectives for their child that will support optimal development and functional outcomes.

Approximately 200 Grey Bruce families are receiving support from Infant and Child Development Services at any given time. Frequency and type of service is established according to family and child needs, and is dependent on the resources available to each program. In many cases, families are served in consultation with the Healthy Babies Healthy Children Program or other community service providers. Through home-based intervention, Infant and Child Development Services are able to reach "hard-to-serve" families who are unable to access more traditional intervention services in the community.

In Ontario, research from two Regional Neonatal Follow-up programs has shown that 70% of children identified in the first year of life with early motor delays demonstrate normal motor patterns by the time they are 2 years of age following intervention through Infant and Child Development Services. This may reflect a benefit of the home-based intervention model which allows the parent to capitalize on learning opportunities for developmentally appropriate activities throughout the child's daily life experiences. Additionally, Infant and Child Development Services identify developmental strengths and weaknesses as children transition into school, creating treatment plans and advocating for appropriate supports within the school system.

Special Needs Resource/Preschool Resource Programs

Special Needs Resource and Preschool Resource Programs are available for preschool aged children presenting with two or more areas of delay in their development. These programs are funded by the Ministry of Education and are delivered by Bruce County Human Services in Bruce County and through a contractual agreement with the County of Grey to purchase the services of Community Living Owen Sound and District to provide the program for children in Grey County. A diagnosis is not required for children to be referred to the programs. Referrals are made by caregivers, health care providers, early childhood educators, speech language pathologists and community agencies. At any given time, approximately 300 preschoolers will be receiving support in Grey Bruce from a Special Needs Resource Consultant or a Preschool Resource Teacher.

Preschool Resource Teachers and Special Needs Resource Consultants facilitate the participation and inclusion of young children who have special needs in child care settings and in their communities. The program assists the adoption of best practices in childcare and peer mentoring for early childhood educators. Employees of both programs work with parents, early childhood educators and other professionals as a team. Each child receiving support will have developmentally appropriate goals and strategies identified on an Individual Support Plan. The plan may also address the family's social and financial needs and facilitate transition into the school system.

Community Home Visitation Programs

Healthy Babies, Healthy Children (HBHC) Program

The HBHC home visiting program is a family-centred voluntary program that supports vulnerable families to help children up to six years of age achieve their full potential. Public Health Nurses and Parent Support Workers provide families the support and information they need to make healthy choices for themselves and their children. The goals of the HBHC program are:

1. To promote optimal physical, cognitive, communicative and psychosocial development in children through a system of effective prevention and early detection services for families.
2. To act as a catalyst for coordinated, effective, integrated system of services and supports for healthy child development and family well-being through partnerships and collaboration with a network of service providers and through participation in community planning.

Maternal Child Health Program

Indigenous Health Centres use a holistic approach to provide culturally competent care and programs that address risk factors such as the social determinants affecting health and wellbeing. The Mino Bimaadsawin Health Centre serves members of the Saugeen First Nation through medical care and community-based health programs and services that combine traditional health and Western medical practices. The Maternal Child Health program offered through the Health Centre, is funded by First Nations and Inuit Health Branch of Health Canada and provides home visiting and case management to improve the outcomes of pregnancies and families of young children within Saugeen. The Chippewas of Nawash Health Centre promotes healthy lifestyles that strive to reflect the spirit of Neyaashiinigmiing. The Health Centre is available to all Chippewas of Nawash residents and band membership. Both Health Centres act as an advocate and a resource to ensure that Jordan's Principles are upheld within the community. This ensures First Nations children living on and off reserve have equitable access to the health, social, and educational services needed.

Southwest Ontario Aboriginal Health Access Centre (SOAHAC)

SOAHAC is dedicated to improving access to high quality health services for Aboriginal peoples in Southwestern Ontario. SOAHAC places culture and tradition at the core of all health and community development practices. Services are offered in Grey Bruce through the Owen Sound office, though many services are also available through outreach clinics at Chippewas of Nawash and Saugeen First Nation. Health care providers offer a variety of services that support the healthy growth and development of children, including the Enhanced 18-Month Well Baby Visit.

Childcare

Bruce County Human Services and Grey County Children's Services, both offer programs, subsidies, and information for parents and families searching for licensed childcare. There are two childcare centres located on Saugeen First Nation; Binoojiinh Gamig Day Care Centre and G'Shaw-da-Gawin Day Care Centre. The childcare centre located on the Chippewas of Nawash Unceded First Nation is the Nshiime Day Care Centre accommodating infants, toddlers, pre-schoolers and school-aged children.

The Ontario Ministry of Education (2018c) regulates child care in Ontario through the *Child Care and Early Years Act, 2014 (CCEYA)*. The CCEYA guides licensed facilities in creating high-quality, inclusive and affordable early years and child care programming. Licensed childcare is available in both centre based and home based formats. There are many programs throughout both Counties. Bruce County and Grey County facilitate caregivers in identifying childcare programming by administrating the One Human Service Network website. The website allows caregivers to find and apply for licensed childcare spaces.

The regulations made under the CCEYA also support the use of *How Does Learning Happen? (HDLH) Ontario's Pedagogy for the Early Years* by licensed child care programs (Ontario Ministry of Education, 2014). *HDLH* is a professional learning resource that builds on the *Ontario Early Years Policy Framework,* supporting the vision for the early years in Ontario. The HDLH describes effective practices and emphasizes positive relationships in building successful early learning programs. It presents four foundational principles that set goals for children and expectations for programs (Figure 6). These principles are: Belonging; Wellbeing; Engagement; and Expression (Ontario Ministry of Education, 2014).

The *Child Care and Early Years Act, 2014 (CCEYA)* applies to:

⇒ Unlicensed child care

⇒ Home child care providers contracted by a licensed agency

⇒ Licensed home child care agencies; and

⇒ Licensed child care centres

(Ontario Ministry of Education, 2018c)

Figure 6: Foundations for Optimal Learning and Development (Ontario Ministry of Education, 2014)

E-Learning modules on *HDLH* are available for educators, leaders, and home childcare providers. The Grey Bruce Health Unit also supports child care providers by offering annual physical literacy workshops. These workshops focus on educating child care staff about the importance of physical literacy while providing tips and tools that staff can incorporate into their daily programming. To support policy and environments that encourage physical literacy, the Grey Bruce Health Unit helped develop the *Physical Literacy Toolkit for Child Care Settings* (Southwest Physical Activity Promoters Network (SPAPN), n.d.). The toolkit supports child care settings in assessing the physical activity environment while providing best practice recommendations and sample policy statements. The goal of the toolkit is to enhance user understanding of physical literacy and to set improvement goals based on identified needs (SPAPN, n.d.).

In a 2017 evaluation survey, managers and supervisors of child care centres in Grey Bruce were asked how they would support physical literacy in their facility .

19 out of 40 survey respondents felt they would include age appropriate, fundamental motor skills into daily programming (GBHU, n.d.).

See Additional Resources for more child care supports.

Schools

The Ontario Ministry of Education (2016) recognizes the importance of early-learning experiences, as influenced by peers, families, educators, and the environment. All school boards in Ontario offer full-day kindergarten as directed by the Ministry of Education. This means children are spending significant time periods within school settings, creating many opportunities to influence motor skill competence. The *Kindergarten Program* is an integrated learning program for four and five year old children that is developmentally appropriate and child-centred (Ontario Ministry of Education, 2016). The role of play-based learning is identified as a foundation of the *Kindergarten Program* as it is an optimal way for children to be engaged in learning (Ontario Ministry of Education, 2016). Furthermore, the *Kindergarten Program* recognizes outdoor spaces as a learning environment that allows children to play, explore and connect to the natural world (Ontario Ministry of Education, 2016).

The *Foundations for a Healthy School Resource* identifies five interconnected areas that contribute to a positive school climate when schools undertake policies, programs and initiatives within these areas (Ontario's Ministry of Education, 2014). Creating a positive school climate through social and physical environments is one of the five interconnected areas that supports the learning and physical development of children. Strategies and activities are also recommended throughout the resource to support physical activity at the school level, in the classroom, and/or among students (Ontario Ministry of Education, 2014).

Recognizing that physical activity is essential for the healthy growth and development of children, the Ontario Ministry of Education issued the Policy/Program Memorandum No. 138 titled *Daily Physical Activity (DPA) in Elementary Schools, Grades 1-8.* The policy ensures all elementary school students in publicly funded schools, including students with special education needs have a daily minimum of twenty minutes of moderate to vigorous physical activity during instructional time. The policy aligns with the *Canadian 24-Hour*

> The purpose of the *Kindergarten Program* "is to establish a strong foundation for learning in the early years, and to do so in a safe and caring, play-based environment that promotes the physical, social, emotional, and cognitive development of all children" (Ontario Ministry of Education, 2016, p.7).

Movement Guidelines recommending an integration of physical activity, sedentary behaviour and sleep for the optimal health benefits of children. School boards, principals, and other education professionals are responsible for the implementation of the policy and necessary training (Ontario Ministry of Education, 2018b).

Children must also have the proper nutrition for healthy growth and development. This includes having the required fuel to participate in physical activity and opportunities for play. *Ontario's School Food and Beverage policy* (PPM 150) seeks to guide schools in the foods sold to children in this setting (Ontario Ministry of Education, 2018a). These guidelines, developed using Canada's Food Guide, can be used to create healthy school food environments that prepare children to learn.

Schools engage in many community initiatives and partnerships to promote school readiness in Grey Bruce. As an integral member of community partnerships, schools can act to promote school readiness before children reach school-ages.

See Additional Resources for more school supports.

STRATEGIES FOR ACTION

The continued fine and gross motor skill vulnerability experienced by children in Grey Bruce demands immediate multi-sectoral action. This paper calls on all stakeholders to create supportive, nurturing environments for all children to grow and learn the fundamental motor skills necessary for school readiness. The following seven themes briefly outline how stakeholders in the community including childcare and early learning centres, schools, service providers, health care providers and caregivers can strengthen action to reduce the incidence of vulnerable children:

- Involving Caregivers and Families
- Facilitating Connection and Collaboration
- Training Service Providers
- Supporting Inclusion for All Children
- Incorporating Play Through Daily Activities
- Environments for Play
- Continued Monitoring and Evaluation

Involving Caregivers and Families

To enhance caregiver and family involvement in community programs that support fundamental motor skill competence.

- Actively involve parents in all stages of programming including design, implementation and evaluation.
- Guide and encourage caregivers to practice fundamental motor skills in the home environment.
- Support caregivers, service providers, and administrators to embrace new knowledge about the role of risky play and healthy child development.
- Identify and reduce barriers that limit access to early learning centres and programs.
- Promote and facilitate involvement in community programs and services.
- Encourage families to access health care for the Enhanced 18-Month Well Baby Visit.

Facilitating Connection and Collaboration

To maximize partnership development and collaborative action with all sectors including families.

- Use standardized screening tools such as *the Poverty Screening Toolkit* to identify at-risk families and children.
- Increase familiarity with programs and services available.
- Connect or refer families to appropriate services.
- Ensure organizational policies and procedures support the completion of the Enhanced 18-Month Well Baby Visit by health care providers.
- Support families to navigate social services and income support programs.
- Create and sustain partnerships.

Training Service Providers

To prepare all service providers with the knowledge and skills required to support the development of FMS for all children.

- Create opportunities to enhance understanding and application of recommendations in the *Physical Literacy Toolkit for Child Care Settings.*
- Identify and implement provider training to incorporate FMS development in curriculum for school, childcare and early learning settings.
- Train and support child care and early learning centres in completing Ages and Stages Questionnaires (ASQs).
- Encourage all staff to complete training to support health equity and cultural sensitivity awareness.

Supporting Inclusion for All Children

To ensure that all children have equitable opportunities for physical activity.

- Conduct universal screening for poverty and intervene as appropriate to reduce inequities.
- Adopt organizational policies and procedures that reduce health disparities including an organizational approach to Jordan's Principle.
- Use equity promoting tools and approaches such as the HEIA tool when planning initiatives.
- Reduce barriers and sources of stress for families accessing supports and resources.
- Promote access to quality early learning for all children.
- Consider literacy levels and other potential barriers when determining communication approaches.

Incorporating Play Through Daily Activities

To ensure children have generous amounts of physical activity daily.

- Promote a variety of activities throughout the day as recommended by the Canadian 24-hour Movement Guidelines (CSEP, 2018).
- Create opportunities for shorter but relatively intense periods of physical activity throughout the day.
- Integrate both structured and free play in daily routines.
- Seek opportunities to increase physical activity through policy and supportive environments.
- Integrate physical activity and play-based learning into childcare and school curriculum.

Environments for Play

To create stimulating social and physical environments for play and physical activity.

- Support family environments that encourage caregivers to role-model active, healthy lifestyle behaviours.
- Promote and support neighbourhoods that engage in creating healthy and safe spaces for outdoor play.
- Promote active transportation by creating travel plans, infrastructure, and policies that encourage safe walking and cycling routes for families and children.

Environments for Play continued:

- Use the *Health in All Policies* approach to support positive health impacts across all sectors (GBHU, 2015).
- Support access to cost-free physical activity opportunities.
- Promote the use of outdoor environments and playgrounds which provide opportunities for self-directed play and a connection to nature.
- Increase access to portable play equipment.
- Arrange indoor equipment to create space for active learning and play.
- Ensure school board policies foster the *Healthy Schools Approach.*
- Support caregivers in minimizing and mitigating risks of screen time or prolonged sedentary activities.

Continued Monitoring and Evaluation

To collect and share data that identifies program or policy gaps and informs strategic planning to support healthy growth and development.

- Continue to use EDI data to plan and deliver services, policies, and programming at the local level.
- Participate in the Bruce Grey Data Information Sharing Collaborative (BGDISC) initiative.
- Continue to share best practices related to FMS competence in children.
- Seek opportunities to partner with academic institutions and conduct research that establishes best practices for improving healthy growth and development in rural settings.
- Utilize a theoretical model or framework when implementing interventions to influence behaviour change.
- Continually review and evaluate programs, services and collaborative committees for optimal impact.

DISCUSSION

Child development research has established that the rate of human learning and development is most rapid in early childhood (WHO, 2012). However, vulnerabilities identified by Grey Bruce EDI results indicate that opportunities are being missed to enhance fundamental motor skills during this period of rapid development (GBHU, 2018). Research has shown that kindergarten vulnerability predicts a child's lifelong health, learning and behaviour (EDI, 2016). The development of fundamental motor skills play a critical role in the health and development of children including achieving school readiness (EDI, 2016; EDI, n.d.; Iivonen & Saakslahti, 2014).

Collectively, the evidence suggests that programs, interventions, and policies can support children in developing or improving gross and fine motor skills (Ansari & Winsler, 2013; Barnett et al., 2016; Hughes, 2017; Kreichauf, 2012; Lai et al., 2013; Lubans, 2010; McKay, 2016; Pivik, 2012; Van Capelle, 2016; Veldman et al., 2016; Ward, 2010; Wick, 2010). Working together with early years coalitions, child care settings, caregivers, and school boards to implement programs or projects can improve areas of weakness found in EDI results (Janus et al., 2007).

This paper has presented evidence of the many factors that influence a child's gross and fine motor skills. Evidence supports the use of programs, interventions, and policies that allow children to play and be physically active in both social and physical environments (Figueroa & An, 2017; Kreichauf et al, 2012; Lubans et al, 2010; Veldman et al., 2016; Ward 2010; Wick, 2017). Physically active children are more likely to be ready for school given benefits to mental health, brain function, and cognition (ParticipACTION, 2018). Furthermore, providing children with opportunities for physical activity supports children in attaining perceived and actual motor skill competence that can influence a child to engage in physical activity (Lai et al., 2014; Stodden et al., 2008). Although the research identifies common themes, factors, and causal relationships, further research is needed to better understand the optimal conditions and interventions necessary for childhood fundamental motor skill development.

The strength of the evidence may be limited as the inclusion criteria was broadened to include multiple sectors. More specific research questions and additional literature searching would be required to fully understand evidence related to the multiple sectors as well as social and physical environments that impact a child's motor skill development. Additionally, only literature on typically developing children was considered for this review. Therefore, the recommendations presented may not reflect the relationship between motor skill competence and school readiness in children with disabilities. Results of the literature scan were restricted to systematic reviews and guidelines, as well as review articles such as scoping reviews and rapid reviews. Therefore, this may not reflect emerging literature.

The Grey Bruce context presented through this paper demonstrates the wealth of skills, resources, and knowledge currently acting to support child motor skill development. Partnership was integral to the creation of this paper and it is clear through this engagement and through the literature that continued collaboration is necessary to pursue the recommendations further. Though only a limited number of stakeholders are represented in this paper, there are opportunities for all sectors to contribute. Recommendations are provided for caregivers, childcare, health care providers, and schools to support their role in motor skill development in order to reduce the incidence of vulnerabilities in children's school readiness. Future efforts should mobilize multi-sectoral action that respond to disparities in motor skill attainment; this paper can be used to support and facilitate these collaborations.

CONCLUSION

All children need opportunities to learn, play, interact and explore in order to reach their developmental potential. Stimulating physical and social environments at home, childcare, school, and in the community can provide opportunities that influence the motor skill development of children required for school readiness. Children also need access to outdoor environments that include green and naturalized spaces to encourage physical activity and build cultural connections.

The continued vulnerability of Grey Bruce children's physical health and well-being requires an immediate, collaborative response. Though positive action is underway, greater efforts can be made to identify and support vulnerable children at an early age, before risks present. Both universal and targeted approaches have a place in these efforts.

Moving forward, this paper can serve as a reference for collaborative committees throughout Grey Bruce to set priorities for collective action. Key areas of action should be considered when planning programs and services that aim to reduce vulnerabilities in motor skill development, support families, reduce health inequities, and create a seamless transition from early childhood programs to kindergarten. Future considerations for community partners and collaborative committees in Grey Bruce may include the development and/or expansion of policies to ensure all children have increased opportunities for daily physical activity in the early years. Through inter-sectoral action, barriers to healthy growth and development, early screening and intervention, social inclusion, and disparities in socioeconomic status can be reduced.

ADDITIONAL RESOURCES

Community

EarlyON Child and Family Centres

Universally accessible centres throughout Grey Bruce where parents with children 0-6 years of age can participate in programs and activities together. The Centre provides interactive early learning, literacy and school readiness activities.

https://www.grey.ca

https://brucecounty.on.ca/human-services/earlyon

Licensed Childcare - OneList

OneList is an online application for parents applying for licensed child care.

Grey County - https://www.grey.ca/childrens-services

Bruce County - https://brucecounty.on.ca/services/human-services/onelist-bruce-county

Ontario 211

A free helpline and website that connects individuals and groups to community and social services in Grey Bruce, 24 hours a day.

https://211ontario.ca/

PLAY in Bruce Grey

A strategy designed to help residents of Bruce and Grey Counties become more physically active through unstructured play.

www.playbrucegrey.com

Southwest Healthline

An online resource that provides health information and links to health services and events.

http://www.southwesthealthline.ca/

YMCA

The YMCA provides a variety of programs and services including recreation and childcare in Grey Bruce. Subsidy may be available for childcare and other programming.

http://www.ymcaowensound.on.ca/

Resources and Education

Bright Bites

BrightBites is a non-profit project that focuses on improving school nutrition. Teachers and school leaders can use free resources to guide teams (individual classes/groups) in a fun, modern way to boost student well-being and earn badges to become part of the BrightBites Hall of Fame.

https://brightbites.ca/

Canadian Society for Exercise Physiology (CSEP)

The Canadian 24-Hour Movement Guidelines encourage children and youth to live active lifestyles with a daily balance of physical activity, sleep and sedentary behaviours to support healthy development.

www.csep.ca/guidelines

Canadian Active After School Partnership

A resource hub to support after school program providers in promoting physical activity.

http://activeafterschool.ca/

Canadian Parks and Recreation Association (CPRA)

A national organization that advocates for parks and recreation to build community health and vibrancy. The CPRA developed the *Everybody Gets to Play: Community Mobilization Toolkit* to help communities reduce the barriers to recreation for low income families and children. This toolkit has a supplement with recommendations for working with First Nations, Inuit, and Métis communities.

www.cpra.ca

Canadian Pediatric Society (CPS)

The CPS is a national association of paediatricians collaborating to advance the health of children and youth. A position paper was released by the CPS in 2017 titled "Screen Time and Young Children: Promoting Health and Development in a Digital World".

www.cps.ca

Infant Mental Health Promotion

Comfort Play & Teach resources are available to educate parents about a child's typical skill development and are translated into easy to understand activities.

http://imhpromotion.ca/

Menu Planning & Supportive Nutrition Environments in Child Care Settings Practical Guide

This guide was created to help child care providers create a supportive nutrition environment and meet the food and drink requirements in the Child Care and Early Years Act, 2014 (Section 42 of Ontario Regulation 137/15) for children one year of age or older.

https://www.odph.ca/upload/membership/document/2018-01/pg-final-en-aoda-jan-19-2018.pdf

Ontario Active School Travel

A program of Green Communities Canada uses an evidence-based approach to create a culture of active school travel.

http://ontarioactiveschooltravel.ca/

Ontario Ministry of Children, Community, and Social Services

Resources to support childcare settings in implementing legislated nutrition standards

http://www.children.gov.on.ca/htdocs/English/professionals/studentnutrition/toc.aspx

Ontario Ministry of Education

PPM 150: The School Food and Beverage Policy

Tools and resources have been developed to support schools in creating healthier learning environments and implement nutrition standards for foods and beverages sold in school settings. http://www.edu.gov.on.ca/eng/healthyschools/policy.html

PPM 138: titled Daily Physical Activity (DPA) in Elementary Schools, Grades 1-8.

The policy ensures all elementary school students in publicly funded schools have a daily minimum of twenty minutes of moderate to vigorous physical activity during instructional time.

http://www.edu.gov.on.ca/extra/eng/ppm/138.html

How Does Learning Happen (HDLH)

A professional learning resource that builds on the *Ontario Early Years Policy Framework,* supporting the vision for the early years in Ontario. The HDLH describes effective practices and emphasizes positive relationships in building successful early learning programs.

http://www.edu.gov.on.ca/childcare/HowLearningHappens.pdf

The Kindergarten Program

An integrated learning program for four and five year old children that is developmentally appropriate and child-centred.

https://files.ontario.ca/books/edu_the_kindergarten_program_english_aoda_web_oct7.pdf

Ontario Physical and Health Education (Ophea): Healthy Schools Healthy Communities

Ophea is a not-for-profit organization that supports healthy, active schools and communities through advocacy, partnerships, and quality programs and services. Ophea also offers the *Early Learning Resource* to assist kindergarten teachers and early-childhood educators with the implementation of *The Kindergarten Program*.

www.ophea.net/

Earlylearning.ophea.net/

Ontario Public Health Association, Nutrition Resource Centre

Eat Right Be Active booklets are available created to assist families, caregivers and professionals with supporting healthy eating and physical activity in toddlers and children.
http://opha.on.ca/Nutrition-Resource-Centre/NRC-Resources/healthy-kids.aspx

Paint Your Plate for Childcare

Many children eat most of their food in a child care setting making it an ideal place to help them learn to love colourful tasty vegetables and fruit. These resources complement the *Menu Planning & Supportive Nutrition Environments in Child Care Settings Practical Guide* and support childcare staff in incorporating vegetable and fruit throughout the child care day.
https://www.odph.ca/paint-your-plate-english

ParticipACTION

A national non-profit organization whose mission is to help Canadians sit less and move more. Provides resources and information to support partners in promoting sport, physical activity, and recreation in everyday life.
www.participACTION.com

The 2018 Report Card contains an expert statement on physical activity and brain health in children and youth. www.participACTION.com/reportcard

The 2015 Position Statement on active outdoor play presents best evidence on outdoor and risky play.
http://stage.participaction.com/sites/default/files/downloads/Participaction-PositionStatement-ActiveOutdoorPlay.pdf

Physical and Health Education Canada (PHE Canada)

PHE Canada provides information, resources, quality programming and best practice on fostering healthy schools and learning environments so that all Canadian children and youth can achieve healthy, active lifestyles.
www.phecanada.ca

Tools

Bruce Grey Data Information Sharing Collaborative (BGDISC)
This online database supports the sharing of local, rural data. Developed through a collaborative of not-for-profit, social service, government, health and education organizations, BGDISC seeks to share the information needed to provide more sustainable and effective regional programming, polices, funding and social services.
https://bgdisc.ca/

Health Equity Impact Assessment Tool (HEIA)
The HEIA tool helps to identify how a program, policy or similar initiative will impact population groups in different ways. The tool identifies unintended potential impacts and can maximize positive impacts and reduce negative impacts that could potentially widen health disparities between population groups.
http://www.health.gov.on.ca/en/pro/programs/heia/

Physical Literacy Toolkit for Child Care Settings
The toolkit assesses the physical activity environment of the childcare setting to help inform future programming and facility needs. By promoting, role modelling and engaging children in daily physical activity, child care staff have the ability to influence healthy child development within their centres or homes by following the best practice guidelines outlined in the toolkit.
www.publichealthgreybruce.on.ca

Play in Bruce Grey Advocacy Toolkit: Physical Activity
The toolkit was developed with a focus on advocacy and public policy development to create supportive environments in which children and youth can be physically active in our community.
www.publichealthgreybruce.on.ca

Poverty: A Clinical Tool for Primary Care Providers
The poverty screening tool suggests a simple approach for licensed health care providers to address poverty with their patients and take action to mitigate the effects of income inequality.
https://thewellhealth.ca/poverty

Take Action towards a Healthy School: Healthy Schools Toolkit
The toolkit guides schools through the steps to creating a healthier school. Resources and sample action plans for physical activity, healthy eating, sun safety and many more are included to support healthy physical and social environments.
www.publichealthgreybruce.on.ca

APPENDIX A: SEARCH STRATEGY SUMMARY

A literature scan was conducted by a public health librarian on evidence based programs, policies and interventions that improve gross and fine motor skills reducing the incidence of vulnerabilities in children's school readiness. Databases searched included: OVID Medline, Ovid MEDLINE(R) Publisher, Ovid MEDLINE (R) In-Process, EMBASE (limited to non-Medline journals), PsycINFO, CINAHL Plus with Full Text, SocINDEX, Academic Search Premier, Child Development & Adolescent Studies, Health Evidence, SPORTDiscus, PubMed-limited to publisher supplied results, Child Development & Adolescent Studies, and desLibris.

Several key words were used including but not limited to policies, programs, interventions, gross motor, fine motor, school readiness, outcomes, and vulnerabilities. A filter was applied to restrict results to systematic reviews and guidelines, as well as articles with titles describing a review. The search was conducted to find articles on motor skills and children. For some of the databases, the search also included articles on prevention and control of movement disorders, but did not specifically search for the name of each movement disorder. In other databases limiting to prevention and control was not possible, so the search was broadened for those databases. Links to grey literature resources were included. The results of articles were published in the English language, from 2010 onwards. The searches were conducted between April 10th -21st 2017. Full search strategies are available upon request.

The original search yielded 974 results before removing duplicates. After removing duplicates, 763 results remained. Two public health nurses (PHNs) and 1 Public Health Dietitian reviewed the titles and abstracts of these articles and as a result, 75 were deemed potentially relevant and were identified for full article retrieval. The team included sources that discussed fundamental movement skills, fundamental motor skills, motor skill competence, motor development, movement competence, physical activity, physical literacy and evidence of outcomes resulting from programs, policies and interventions. Assessment tools, instruments and measurements for gross and fine motor skills were not considered for inclusion since teachers in Grey and Bruce Counties are currently using a validated tool, the *Early Development Instrument (EDI),* upon school entry to identify vulnerabilities in school readiness including physical health and well-being. The population of interest included preterm infants, and typically developing preschool and school-aged children up to six years of age. Studies that included developmental disorders were removed including (but not limited to); Developmental Coordination Disorder, Attention Deficit Hyperactivity Disorder, Autism, Cerebral Palsy, Down Syndrome, Dyslexia, and Epilepsy. Studies set in developing countries were also removed. Internet searches for grey literature was completed, in addition to manual searches for resources identified or referenced in included articles that appeared relevant.

After reading the selected peer-reviewed studies (75), a total of (21) references and grey literature were used to inform the creation of this document. Each of the included articles were critically appraised using a tool appropriate to specific article type (i.e. AMSTAR, CASP). Article quality was considered in forming recommendations.

APPENDIX B: Let's Learn Kindergarten Registration: An Historical Overview

In 1997, the Ministry of Community and Social Services, Integrated Services for Children division, announced an enhancement to the Healthy Babies, Healthy Children (HBHC) program. This enhancement included greater emphasis on screening for healthy growth and development of children, specifically at 18 months of age and prior to school entry. At the same time as this announcement, local school boards and early intervention service providers were examining options to address a growing need to ensure all children had access to resources that support their development and early learning. What has come to be known as *Let's Learn Kindergarten Registration* began as a result of a meeting that was called to examine 2 key challenges related to supporting child development and preparing children for kindergarten

- Identifying children prior to school entry who would benefit from early intervention
- Providing general population developmental screening to a large geographic area with a relatively small population of children dispersed throughout

Service providers and educators agreed that these two challenges were closely linked and thought that a combined approach to addressing these issues was warranted. A history of working together to accomplish joint mandates enabled service providers and educators to look at the new challenges in a collaborative way. Locating preschool children in order to provide general population child development screening is a significant challenge. The only established universal point of convergence for preschool aged children is school registration. School boards reported that historically, 80 % of parents registered their children for school entry. The idea of combining registration for kindergarten and a developmental screening process blossomed and Let's Learn Kindergarten Registration was born.

2000 & 2001: Pilot Years

The first year pilot of the combined kindergarten registration and child development screening process occurred in February 2000. Two schools were chosen in relation to their scores on the *Early Development Instrument (EDI)* testing scores in 1999. The EDI scores indicate the relative "readiness to learn" of children in a geographic area as measured in senior kindergarten. The scores reflect the experiences of children through their preschool years and their emotional, behavioural and developmental skill levels. One community was chosen due to its relatively high score on the EDI (many children in this geographic area entered kindergarten not 'ready to learn") and the other community scored relatively low on the EDI (many children were "ready to learn"). Two very different communities participated in a very similar "Let's Learn" process.

On the day of the Let's Learn Kindergarten Registration, trained early interventionists administered the *Ages and Stages Questionnaires (ASQ)* screening tool. A school psychologist screened children for behavioural challenges using the *Temperament and A-typical Behaviour Tool (TABS)* screening tool. Each school kept tracking logs for the purposes of program planning and evaluation.

The 2nd pilot took place in 2001. Let's Learn Kindergarten registrations combined with child development screenings, were held in October and November, almost a full year prior to school entry. Six schools participated and were selected based on their geographic locations and EDI scores (low, mid and high scoring schools). A number of children were identified with possible delays in their development and were linked with early intervention services. As in the previous year, the *ASQ* screening tool was used and the *TABS* screening tool was used.

2002: Grey-Bruce Wide Implementation

In 2002, the results from the pilot initiatives in 2000 and 2001 were examined and there was consensus from the partnership spearheading Let's Learn Kindergarten registration to move ahead with community wide implementation. Let's Learn Kindergarten Registrations were held in all elementary schools within Grey and Bruce Counties. The *Ages and Stages Questionnaires (ASQ)* was used and the BWDSB utilized a new behaviour-based screening tool administered by each school's Learning Resource Teacher. Over 900 children attended and 90 children were identified with possible delays in key areas of their development including speech, fine and gross motor development and socialization skills. Thirty three (33) referrals were made to Speech and Language services, seventeen (17) referrals were made to Preschool Resource early intervention services and four (4) referrals were made to the HBHC program. The number of children identified with possible delays in their development represented about 10% of the children who participated in the developmental screening.

2003:

During the 2003 Let's Learn Kindergarten Registrations, 870 children attended registrations at schools in Grey and Bruce Counties. Twelve (12%) percent of the children that completed the *Ages and Stages Questionnaires (ASQ)* developmental screening were identified as requiring further consultation and screening. This represented 104 children who were identified as requiring further assistance. Fifty five (55) children were referred to Speech and Language services, twenty (20) children were referred to Preschool Resource early intervention services and fifteen (15) children were referred to Healthy Babies, Healthy Children program. In 2003, the BWDSB incorporated additional screening elements to their kindergarten registrations such as a Behaviour Checklist and a speech articulation screen.

A de-briefing session held in December 2003 for partners in the Let's Learn Kindergarten Registration process identified that Let's Learn presented an opportunity to gather detailed data that could assist service providers and educators in identifying and planning for services as well as supporting children to enter Kindergarten.

Specifically, information regarding the number of children enrolled who may have needs in different areas of development was desired to indicate an overall developmental profile of cohort groups of children and by geographic area. Communities and schools could then mobilize and plan for those children and those communities based on identified strengths and needs. It was recommended that consideration be given to consolidating the various screening tools used to reduce the number and types of screens and focus on one tool that could serve multiple purposes.

The *ASQ* screening tool originally chosen in consultation with the two school boards and local preschool intervention services was discontinued and The *Ages and Stages Questionnaires (ASQ): A Parent -Completed, Child Monitoring System, Second Edition*, was selected. The *ASQ 2* is a comprehensive screening system composed of questionnaires designed to be completed by parents or primary caregivers. The *ASQ* 2 has been the subject of a number of investigations examining the validity reliability and utility of the screen and has been found to be a psychometrically sound and culturally sensitive screening tool for general population screening of pre-schoolers.

At each Let's Learn Kindergarten Registration, a trained screener reviews each child's parent-completed age-appropriate *ASQ 2* screen and the child's scores are calculated in five areas of development (Gross Motor, Fine Motor, Communication, Problem Solving and Personal Social). The Second Edition of the ASQ screening tool was selected for use for the 2004 year and onward.

In 2010, the Ages and Stages Questionnaires, Third Edition was introduced. The 3rd Edition of the ASQ includes a "monitoring zone" to the calculation of a child's scores. With the introduction of the 3rd Edition of the ASQ in 2010, data from 2010 and onward cannot be accurately compared to historical data which was based on the 1st and 2nd editions of the ASQ.

Children Attending Let's Learn Kindergarten Registration

Analysis of data collected annually from 2002 to present reveals an attendance rate ranging from a low of 57 % in 2009 (H1N1 Influenza year) to a high of 73% in 2013. Let's Learn Kindergarten Registration attendance as a percent of school enrolment is calculated based on the number of children registered in Junior Kindergarten as of October 31st in the year following their participation at Let's Learn. On average, 65% of the children eligible for enrolment in JK attend Let's Learn Kindergarten Registration.

Children Participating at Let's Learn Kindergarten Registration

The number of children participating at Let's Learn Kindergarten Registrations ranges from a low of 815 (2009) children to a high of 992 children (2013). Consistently, data collected from analysis of the *Ages and Stages Questionnaires (ASQ Second Edition)* used from 2004 through 2009, at a population level indicates:

- Gross Motor Skills – a greater percentage of children scored below the cut off in 2007 compared to the previous four year average (years 2003 through 2006). In 2007, 8% of three year olds and 19% of three and half year olds were having difficulty with skills such as standing on one foot, jumping, stair climbing, throwing and catching a ball
- Fine Motor Skills – in 2007, 13% of three year old children and 25% of three and half year olds were not able to demonstrate skills such as cutting with child scissors, grasping a crayon or pencil, or manipulating puzzle pieces.
- Fine Motor Skills – in 2008, 13% of three year old children and 25% of three and half year olds presented challenges with their fine motor development. There was no change from the previous year. However, for 4 year olds, fine motor skills presented a significant challenge with 20% of

children scoring below the cut off in this developmental area (compared to 9.8% in 2007)

- With all age groups of children screened in 2008, fine motor skills are those in which most children fall below the cut off. This is consistent with the overall pattern throughout the years for the fine motor domain of development.
- In 2007/2008 the EDI was administered in Senior Kindergarten classrooms in both school boards in Grey and Bruce Counties. The area most closely related to the ASQ screening tool fine motor domain in the EDI is the area of Physical Health and Well-Being. The EDI results in 2007/2008 show that 5 year olds are behind in fine motor development skills. These cohorts of children are those that attended Let's Learn Kindergarten Registration in 2005 and who entered Junior Kindergarten in the 2006/2007 school year. In 2005, the number of children attending Let's Learn who were demonstrating difficulties in the fine motor domain were 17% of three year olds, 18% of three and half year olds and 21% of four year olds. Based on the Let's Learn Kindergarten registration data and the EDI results noted above, it can be concluded that programs for preschool aged children should focus on fine motor and physical health and well being to help prepare children for school. With respect to preschool programming, 2008/2009 saw pilot projects using findings from Let's Learn to implement supports for preschool children at a broader community level. Both the EDI and Let's Learn confirmed that fine motor skills are an area of programming focus for early learning and child care activities in Grey and Bruce Counties.

<u>2010 to 2016</u>

The data analyzed and presented for Let's Learn Kindergarten Registrations from 2010 to 2016 is based on the Ages and Stages Questionnaires – 3rd Edition. The data reported in the Let's Learn Kindergarten Registration Annual Newsletter summary reports reflects the number of children in each of the five developmental areas that are in the "monitoring zone". These children can be considered to be at risk for delays in this area of their development. These children were not involved with early intervention services at the time of screening.

Fine and Gross Motor are the two areas of development that consistently, year over year, three and four year old children are presenting as the developmental areas most at risk. The number of children ranges from a low of 33 (2012) to a high of 57 (2016) who are at risk for delay in their fine motor skills and a low of 35 (2015) to a high of 57 (2016) who are at risk for delay in their gross motor skills. These numbers represent the children who are in the monitoring zone.

In 2016, the number of children in the monitoring zone for all 5 areas of development increased over other years. The number of children needing additional support for their gross motor skills is substantially higher than the 5 previous years.

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