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## Parents as Agents of Change in the Treatment of Childhood Obesity and the Promotion of Children's Health Behaviours

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## Abstract

The overarching purpose of this dissertation was to investigate the role of parents as agents of change in the treatment of childhood obesity and the promotion of children's health behaviours. In order to achieve this purpose, four studies were conducted. The purpose of Study 1 was to explore parents' perceptions of nutritional literacy, as well as their needs for nutritional literacy information, supports, and resources at familial and community levels. Next, Study 2 described the theoretical components and model used in the development and implementation of a parent-focused childhood overweight and obesity intervention (i.e., C.H.A.M.P. Families). The purpose of Study 3 was to investigate the impact of the C.H.A.M.P. Families program on: (a) children's standardized body mass index (BMI-z); and (b) parental self-efficacy for promoting children's health behaviours. Finally, the aim of Study 4 was to explore parents' perspectives of their experiences in and the influence of C.H.A.M.P. Families, as well as their recommendations related to future paediatric overweight and obesity treatment interventions.

The findings presented in Study 1 showed that parents perceived nutritional literacy as having an understanding of nutrition and healthy eating, as well as having the skills to translate such knowledge into practice. All participants agreed that nutritional literacy was important, and the majority believed that it could be improved within their families. With regard to the resources parents identified as needing to enhance nutritional literacy in their families, *professional advice, practical skills, kid-friendly recipes, and environmental information* were identified. *Food regulation, accessible community programming, and school-based policies and curriculum* were the needs identified at the community level. In Study 2, the "C.H.A.M.P. Families" intervention was described in detail. This 13-week

parent-focused program involved eight group-based (parent-only) educations delivered to parents of children aged 6-14 years with overweight or obesity (i.e., body mass index equal to or greater than the 85<sup>th</sup> percentile for age and sex). The program also included eight home-based (family) activities and two group-based (family) follow-up support sessions. In addition to a description of the intervention and feasibility analyses, Study 2 detailed the use of the unique theoretical framework that integrated evidence-based group dynamics principles and motivational interviewing techniques within the broader context of Social Cognitive Theory. Several practical examples related to the application of specific theoretical constructs and evidence-based strategies within a parent-focused paediatric obesity interventions were presented. In Study 3, the results demonstrated that the C.H.A.M.P. Families intervention had a small, positive effect on both parental self-efficacy for promoting child health behaviours and child BMI-z, from baseline to post-intervention. However, the results also showed that these improvements were not maintained at the 6-month follow-up. Finally, findings from Study 4 showed that C.H.A.M.P. Families was well-received by parents. Parents highlighted several positive outcomes for children and families and underscored specifically the importance of the group environment, content and materials, and additional program components (e.g., home visits). Many participants also noted important socioenvironmental and personal barriers related to health behaviour changes for themselves and their child(ren), and recommended that future programs emphasize greater child involvement and additional information and strategies.

Keywords: childhood obesity, overweight, nutritional literacy, parents, intervention, treatment, health behaviours, parental self-efficacy, child health, group dynamics

## Co-Authorship Statement

The contents of this dissertation are my original work, however, I would like to acknowledge the important contributions of eight co-authors. I would first like to offer my thanks and gratitude to my advisor, Dr. Shauna Burke, for her guidance and support related to all four studies presented in this dissertation. Second, I would like to extend my thanks to the C.H.A.M.P. Families research team, including Drs. Patricia Tucker, Jennifer Irwin, Andrew Johnson, Erin Pearson, and Dirk Bock, who contributed conceptual, methodological, and/or editorial expertise related to Studies 2, 3, and 4. Finally, I would like to acknowledge and thank Dr. Dalia Hasan and Daniel Briatico for their methodological and analytical contributions to Studies 1 and 4, respectively.

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## Chapter 1<sup>1</sup>

### Introduction

The issue of childhood overweight and obesity represents a serious international public health crisis (World Health Organization, 2018). The prevalence has increased substantially over the last fifty years, with a recent population-based study estimating that approximately 340 million children are affected worldwide (Abarca-Gómez et al., 2017). Though there is some evidence to suggest that the rates of childhood overweight and obesity have plateaued in high-income countries (Irizarry, Brito, & Freemark, 2014), the prevalence remains elevated (Abarca-Gómez et al., 2017; Bancej et al., 2015; Wabitsch, Moss, & Kromeyer-Hauschild, 2014). And, in some low-income countries, particularly within Asia and Africa, trends of childhood obesity are accelerating (Abarca-Gómez et al., 2017; Ng et al., 2014).

Childhood obesity, defined by the Centers for Disease Control and Prevention (CDC; 2016) as a body mass index (BMI; kg/m<sup>2</sup>) equal to or greater than the 95<sup>th</sup> percentile for children and adolescents of the same age and sex, is associated with a myriad of health sequelae (Bhadoria et al., 2015; Pulgarón, 2013; Velásquez-Rodríguez, Velásquez-Villa, Gómez-Ocampo, & Bermúdez-Cardona, 2014). Children with obesity are more likely to experience physical comorbidities such as high blood pressure (Goran, Ball, & Cruz, 2003; Krzyzaniak, Kaczmarek, Stawinska-Witoszynska, & Krzywinska-Wiewiorowska, 2011; Wake et al., 2010), type 2 diabetes (Goran et al., 2003), metabolic syndrome (Celik, Iyisoy, & Yuksel, 2010; Velásquez-

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Rodríguez et al., 2014), asthma (Pulgarón, 2013), and non-alcoholic fatty liver disease (Mitchel & Lavine, 2014), as well as psychological conditions including eating disorders (Bhadoria et al., 2015), depression (Dockray, Susman, & Dorn, 2009), and reduced quality of life (Morrison, Shin, Tarnopolsky, & Taylor, 2014; Pulgarón, 2013). The health problems that children with obesity may face are not confined to childhood, as excess weight can persist into adulthood and lead to additional complications later in life, such as osteoarthritis (Guh et al., 2009), stroke (J. Reilly & Kelly, 2011), and some cancers (Guh et al., 2009). Childhood obesity also has substantial economic implications (Hamilton, Dee, & Perry, 2018). In fact, a recent literature review ( $n = 13$  studies) estimated that the average lifetime cost of a child with obesity was approximately \$184,660 USD, inclusive of both health care costs (e.g., direct and indirect medical expenses) and productivity losses (e.g., income penalties, workdays lost; Hamilton, Dee, & Perry, 2017).

It is widely understood that paediatric obesity is influenced by complex interactions between an individual and their environment (Anderson & Butcher, 2006; Bhadoria et al., 2015; Ebbelin, Pawlak, & Ludwig, 2002). Childhood obesity has been associated with a broad spectrum of personal (e.g., age, sex, genetics, knowledge, and health behaviours), social (e.g., socioeconomic status, neighbourhood, daily living conditions, culture), environmental (e.g., natural and built environments), and political (e.g., governance, policies, regulations) determinants (Bhadoria et al., 2015; Caprio et al., 2008; Friel, Hattersley, Ford, & O'Rourke, 2015; Hruby et al., 2016; Mills et al., 2017; Thiele, Mensink, & Beitz, 2004; Vargas, Stines, & Granado, 2017). Associations between the family environment (e.g., parenting styles, family dynamics, home food environment) and childhood obesity have also been established (Berge, 2009; Campbell, 2016; Davison, Lawson, & Coatsworth, 2012; Moore, McDonald, Carlon, &

O'Rourke, 2015; Procter, 2007; Weihrauch-Blüher & Wiegand, 2018). With regard to the family context, several explanations have been advanced pertaining to the link between parents, child health behaviours, and childhood obesity (Berge, 2009; Campbell, 2016; Weihrauch-Blüher & Wiegand, 2018). For example, parents make most household decisions about food and beverage purchases, and typically serve as gatekeepers by determining what food is available and when the child can eat it (Baldassarre, Campo, & Falcone, 2016; Mitchell, Farrow, Haycraft, & Meyer, 2013; Yee, Lwin, & Ho, 2017). Further, parents model their own health behaviours to children, which can have either a positive or negative effect on children's attitudes, preferences, and behaviours related to diet (Sutherland et al., 2008; Yee et al., 2017) and physical activity (Dong et al., 2016; Edwardson & Gorely, 2010). With regard to physical activity, parents can also influence the type and intensity of physical activity that children engage in through several factors including active participation, encouragement, and transportation (Edwardson & Gorely, 2010).

In response to the problematic rates of overweight and obesity among children, a number of childhood overweight and obesity treatment interventions have been implemented in a variety of environments including primary care (Vine, Hargreaves, Briefel, & Orfield, 2013), school (Amini, Djazayeri, Majdzadeh, Taghdisi, & Jazayeri, 2015), and family settings (Berge & Everts, 2011; Sung-Chan, Sung, Zhao, & Brownson, 2013). First introduced by Epstein and colleagues in the 1980s, family-based treatment approaches to childhood obesity typically encourage family members—predominantly parents—to take the lead role in facilitating the modification of behaviours among children (Epstein, Paluch, Roemmich, & Beecher, 2007; Epstein, Valoski, Wing, & McCurley, 1994; Epstein, Wing, Koeske, Andrasik, & Ossip, 1981; Epstein & Wing, 1987). In addition to the positive results of primary studies (Epstein, Valoski,

Wing, & McCurley, 1994; Epstein, Wing, Koeske, Andrasik, & Ossip, 1981), additional support for family-based paediatric obesity treatment programs was provided in a meta-analysis conducted by Berge and Everts in 2011. In this study, which included studies that targeted one or more family members to promote or facilitate behaviour change in their children ( $n = 20$ ), Berge and Everts found that family-based interventions were associated with several positive outcomes in children including: improvements in body composition (i.e., BMI, standardized BMI [BMI- $z$ ], BMI percentile, and percentage overweight); improved dietary behaviours (e.g., sugar-sweetened beverage intake); and increased physical activity (Berge & Everts, 2011).

The degree to which parents are involved in childhood obesity treatment programs is directly associated with weight-related outcomes in children (Kitzmann et al., 2010). As Kitzmann and colleagues (2010) demonstrated in their meta-analysis of childhood overweight and obesity intervention studies ( $n = 125$  between-group experimental studies), interventions with “high parental involvement” (i.e., parents participated in all treatment components) produced better weight-related outcomes (i.e., weight loss, reduced BMI, reductions in percentage overweight) than interventions with “low parental involvement” (i.e., parents participated in treatment, but children were primarily responsible for the treatment components).

In light of the abovementioned findings, researchers have begun targeting parents *exclusively* as the principal agents of change in childhood overweight and obesity programs (Ball et al., 2012; Faith et al., 2012; Golan, 2006; Kim, Park, Park, Lee, & Ham, 2016; West, Sanders, Cleghorn, & Davies, 2010). Parent-focused interventions, commonly referred to as “parent-only” (Boutelle et al., 2015; Ewald, Kirby, Rees, & Robertson, 2014; Golan, Kaufman, & Shahar, 2006; Jull & Chen, 2013; Loveman et al., 2015) or “parent agent-of-change” (Ball et al., 2012; Golan, 2006; West et al., 2010) interventions, are childhood overweight and obesity treatments



that are delivered exclusively to parents and do not directly involve children (Golan, 2006; Loveman et al., 2015). Parent-only childhood obesity interventions have taken various forms based on focus (e.g., positive parenting skills [Boutelle et al., 2015; West et al., 2010], health knowledge/education and behaviour change [Esfarjani et al., 2013; Moens & Braet, 2012], environmental modifications [Ek et al., 2015]) and setting (e.g., primary care [Resnicow et al., 2015; Small, Bonds-McClain, Melnyk, Vaughan, & Gannon, 2014], out-patient [Estabrooks et al., 2009; Golley, Magarey, Baur, Steinbeck, & Daniels, 2007; Magarey et al., 2011], university [Moens & Braet, 2012], and community [Janicke et al., 2008; Mazzeo et al., 2014]).

The seminal research on and rationale for parents as the agents of change in childhood obesity was developed by Golan and colleagues (Golan, 2006; Golan & Crow, 2004; Golan et al., 2006). In 2004, Golan and Crow published a longitudinal study comparing child-only and parent-only interventions for childhood obesity, which demonstrated that at a 7-year follow-up, weight reduction was significantly greater in children whose parents participated in the parent-only group than in children who were in the child-only group ( $p < 0.05$ ). In a subsequent study, Golan and colleagues (2006) investigated further by evaluating the effectiveness of obesity interventions targeting parents exclusively vs. parent-child interventions. The results of this study echoed those in the previous study, in that the parent-only intervention was found to be more effective than the parent-child intervention in terms of reducing both child weight ( $p < 0.02$ ) and food stimuli in the home ( $p < 0.05$ ).

Since these landmark studies, there has been a proliferation of research investigating the effectiveness of parent-only interventions for the treatment of childhood obesity (Ewald et al., 2014; Jang, Chao Msn, & Whittemore, 2015; Jull & Chen, 2013; Loveman et al., 2015). The most recent reviews of the literature continue to support the findings that parent-only

interventions are as effective as (Jull & Chen, 2013; Loveman et al., 2015) and potentially more effective than parent-child and child-only approaches (Altman & Wilfley, 2015; Ewald, Kirby, Rees, & Robertson, 2014). Furthermore, there is emerging research to suggest that parent-only interventions are also more cost-effective and less resource-intensive than parent-child interventions (Altman & Wilfley, 2015; Ewald et al., 2014; Janicke et al., 2009).

Findings outlined in qualitative studies provide additional support for the conclusion that greater parental involvement in childhood obesity interventions is warranted (Cowgill et al., 2014; Kipping, Jago, & Lawlor, 2012; Pearson, Irwin, Burke, & Shapiro, 2012; Styles, Meier, Sutherland, & Campbell, 2007). For example, parents who participated in the original *Children's Health and Activity Modification Program* (C.H.A.M.P.; Martin et al., 2009)—a 4-week, family-based (i.e., both child and parental involvement) childhood obesity program developed by Burke and colleagues—noted that future programs should include additional education and opportunities for parents, as well as greater parental accountability (Pearson, Irwin, Burke, et al., 2012). Interestingly, children who participated in C.H.A.M.P. also expressed a desire for increased support and involvement from their parents in order to initiate and maintain health behaviour changes (Pearson, Irwin, & Burke, 2012).

On the basis of the strong empirical evidence and evaluative feedback from participants in support of parent-focused interventions in the treatment of childhood obesity (Ewald et al., 2014; Faith et al., 2012; Pearson, Irwin, & Burke, 2012; Pearson, Irwin, Burke, et al., 2012), our research team designed and implemented an intervention entitled “C.H.A.M.P. Families”; a 13-week group-based, community-oriented educational program targeting parents of children aged 6-14 years with overweight and obesity (K. Reilly, Tucker, et al., 2018). The C.H.A.M.P. Families intervention consisted of three main components: (a) eight group-based (parent-only)

sessions delivered over the course of 13 weeks; (b) eight home-based (family-directed) activities that were ‘assigned’ to parents by the research team following the group-based sessions; and (c) two group-based follow-up support sessions for parents and children following completion of the formal intervention.

While the evidence supporting parent-only interventions such as C.H.A.M.P. Families is compelling (Ewald et al., 2014; Jang et al., 2015; West et al., 2010), there is a paucity in the literature related to the development and implementation of such programs (Alulis & Grabowski, 2017; Jang et al., 2015). Explicit and detailed descriptions of interventions are needed to assess how and why certain intervention components are implemented, and to determine how intervention principles and strategies can be adapted in future studies and/or translated in practice (Ewald et al., 2014; Hoffmann et al., 2014; Jang et al., 2015). The use of theory is another important consideration in the design of behavioural interventions, as theories can provide the foundation for and explanation of the mechanisms through which variables might predict and/or produce behaviour change (Glanz & Rimer, 2005). The need for theoretically-grounded treatment interventions has been frequently cited within reviews of the childhood obesity intervention literature (Alulis & Grabowski, 2017; Berge & Everts, 2011; Faith et al., 2012; Sung-Chan et al., 2013; Thomas, 2006; Wang et al., 2013). In a recent qualitative meta-synthesis of family-based child and adolescent obesity interventions ( $n = 35$  studies), Alulis and Grabowski (2017) found that less than one third (31.4%) of authors explicitly reported the use of theory in the development of the intervention. Further, the authors identified that many of the studies that noted the use of a theoretical foundation lacked transparency and/or important details in reporting how the theory was applied (Alulis & Grabowski, 2017).

Evidently, explicit and consistent applications and reporting of the use of theory in childhood obesity treatment interventions is lacking. However, when researchers in this area have reported the theoretical basis of their interventions, Bandura's Social Cognitive Theory (SCT; Bandura, 1986, 1989, 1998, 2004) has been the most frequently cited (Alulis & Grabowski, 2017). The rationale for applying SCT within childhood obesity interventions targeted at parents exclusively is strong and well-established due to its emphasis on social learning and role modelling (Faith et al., 2012; Golan & Weizman, 2001; Wilfley, Kass, & Kolko, 2011). Given that children learn health behaviours through watching and imitating their parents (Dong et al., 2016; Natale et al., 2014; Sutherland et al., 2008), SCT provides additional support for the development of interventions that include parents as agents of change for and with their children and families.

To effectively engage parents to serve as change-agents, it is imperative that researchers consider relevant factors that might influence their ability to do so. In a conceptual model for a parent-led approach to treating childhood obesity based on SCT (Bandura, 1986, 1989), Golan and Weizman (2001) described three key domains that affect change in child weight status: parental cognitive and behavioural change, environmental change, and parental modelling. Within the parental cognitive and behavioural change domain, Golan and Weizman emphasized increasing parents' knowledge and skills in two areas: nutrition/health and parenting. Many researchers refer to the former as being components of *nutrition(al) literacy* (Carbone & Zoellner, 2012; Silk et al., 2008; Zoellner & Carr, 2010). Since its emergence in the literature, nutritional literacy has been defined and interpreted in a variety of different ways, and there continues to be a lack of consensus among researchers as to the 'optimal' definition (Krause, Sommerhalder, Beer-Borst, & Abel, 2016; Velardo, 2015). Some researchers have defined

nutritional literacy as the fundamental literacy and numeracy skills required to obtain, understand, and apply information to make decisions about nutrition (Blitstein & Evans, 2006; Carbone & Zoellner, 2012; Silk et al., 2008). This definition focuses on the acquisition and application of basic nutrition knowledge and numeracy, but fails to acknowledge other important skills and competencies related to nutrition (Krause et al., 2016; Velardo, 2015). Therefore, other researchers have expanded upon this conceptualization of nutritional literacy through the integration of Nutbeam's (2000) three-tiered model of health literacy which includes functional, interactive, and critical nutritional literacies (Guttersrud, Dalane, & Pettersen, 2014; Velardo, 2015). These researchers suggest that functional nutritional literacy refers to basic literacy and numeracy skills related to nutrition, including the implications of a poor diet as well as the benefits of a nutritious diet (Guttersrud et al., 2014; Velardo, 2015). Interactive nutritional literacy has been defined as a more advanced nutrition knowledge, encompassing the skills and strategies required to transform nutrition knowledge into healthy dietary choices (Guttersrud et al., 2014; Velardo, 2015). Lastly, critical nutritional literacy refers to an awareness of the broader impact of individual and community food and nutrition choices on health and society (Guttersrud et al., 2014; Velardo, 2015). It has also been suggested that critical nutritional literacy includes the skills required to critically appraise nutrition information as well as the motivation to address barriers and inequities related to food and nutrition through personal, social, and global action (Guttersrud et al., 2014; Velardo, 2015).

Within the context of childhood health behaviours and obesity, parental nutritional literacy is an understudied area of research. A recent study, conducted in 2016 by Gibbs and colleagues, demonstrated that increased parental nutritional literacy was correlated with positive outcomes in children, including improved dietary quality and reduced BMI percentile. Another

study that used a health education intervention to enhance nutritional literacy in parents resulted in improvements in parental nutritional literacy (Silk et al., 2008), but did not assess the influence of the intervention on children. Despite the positive effects of parental nutritional literacy on child health outcomes (Gibbs et al., 2016) and the importance of these skills for parent-led treatment of childhood obesity (Golan & Weizman, 2001), there is a paucity of research related to parents' understanding of and perceived needs related to nutritional literacy. This knowledge would undoubtedly provide important insights into the design of effective interventions and resources to improve nutritional literacy, and subsequently, improve dietary habits in families and children.

Given their significant impact on children's lifestyle behaviours, it is crucial that in addition to nutritional literacy, parents also have confidence in their ability to promote and support healthy behaviours for and with their children. This concept, referred to as *parental self-efficacy*, is defined as parents' beliefs about their ability to perform effective parenting practices (De Lepeleere, De Bourdeaudhuij, Cardon, & Verloigne, 2015; Jones & Prinz, 2005). The seminal work establishing self-efficacy and its influence on behaviour change was pioneered by Bandura (Bandura, 1977, 1997, 2004). For example, within SCT, Bandura argues that self-efficacy is the strongest of the four determinants (i.e., self-efficacy, outcome expectations, goals, and socio-structural factors) of health behaviour, insofar as it has a direct impact on health behaviour and mediates health behaviour through its influence on the other three determinants (Bandura, 1977, 1997, 1998). In terms of child health behaviours, studies have shown that greater parental self-efficacy is associated with positive outcomes in children's dietary intake (Gholamalizadeh, Entezari, Paknahad, Hassanzadeh, & Doaei, 2014; Parekh et al., 2018), fast-food consumption (Arsenault, Xu, Taveras, & Hacker, 2014), physical activity (Davies, Terhorst,

Nakonechny, Skukla, & El Saadawi, 2014; Xu, Wen, & Rissel, 2015), and screen time levels (Arsenault et al., 2014; Jago, Wood, Zahra, Thompson, & Sebire, 2015; Jurkowski, Lawson, Green Mills, Wilner, & Davison, 2014). Parental self-efficacy is also an important consideration in parent-focused childhood obesity interventions as studies have shown that: (a) parents of children with overweight/obesity are more likely to have lower parental self-efficacy for managing children's health behaviours than parents of children with healthy body weights (Morawska & West, 2013; Rivera, Msc, Yap, Fracp, & Mager, 2014); and (b) childhood overweight/obesity programs that focus on improving parents' ability to modify children's health behaviours have resulted in improvements in both parental self-efficacy and child BMI-z (West et al., 2010). Furthermore, parents and caregivers have expressed, qualitatively, that they lack confidence in their abilities to address their child(ren)'s health behaviours (Brown, Dolisca, & Cheng, 2015; Styles et al., 2007). Unfortunately, parental self-efficacy has not been assessed or targeted in most parent-only paediatric overweight/obesity interventions (Jang et al., 2015; Loveman et al., 2015). Thus, further research in this area is necessary.

On the foundation of the breadth of evidence in support of targeting parents exclusively in the treatment of childhood obesity (Faith et al., 2012; Gibbs et al., 2016; Jang et al., 2015; West & Sanders, 2009), the present dissertation explores issues related to the development, implementation, and evaluation of a parent-focused childhood overweight and obesity intervention. In Study 1, a cross-sectional, mixed-methods, survey-based study ( $n = 79$  parents of children aged 0-16 years) was conducted to: (a) explore parents' understanding of nutritional literacy and its importance in their families; and (b) identify parents' perceptions of the resources and opportunities required, at both family and community levels, to improve nutritional literacy within their families (K. Reilly, Hasan, & Burke, 2018). On the basis of results from Study 1, as

well as the other literature and supporting evidence described above, Study 2 provides a detailed description and overview of the 13-week, parent-focused C.H.A.M.P. Families (K. Reilly, Tucker, et al., 2018), intervention targeting childhood overweight and obesity. Given the lack of reporting related to the use of theory in childhood overweight and obesity interventions, this study explicitly details the use of evidence-based group dynamics principles and motivational interviewing techniques within the context of a broader Social Cognitive Theory foundation consisting of four determinants (i.e., self-efficacy, outcome expectancies, goals, and socio-structural factors).

Study 3 focused specifically on self-efficacy, the focal determinant of SCT and an important factor influencing parents' ability to manage and support children's weight and health-related behaviours (Bandura, 2004; Golan & Weizman, 2001; West et al., 2010). The purpose of this study was to examine the impact of C.H.A.M.P. Families on child BMI-z and parental self-efficacy for promoting health behaviours in children (K. Reilly, Johnson, et al., 2018).

The fourth and final study of this dissertation is a qualitative investigation that was conducted to explore, via focus groups ( $n = 2$  focus groups, 6 participants per group), the perspectives and experiences of parents who participated in the C.H.A.M.P. Families intervention. Parents were also asked about the program's influence on various aspects of child and parental wellbeing (e.g., health behaviours, parental confidence for supporting health behaviour change, and family communication). A secondary purpose was to explore parents' perceptions of program strengths and weaknesses, and to identify practical issues that could inform the design of future childhood obesity treatment programs.



As a closing note, this dissertation was completed following the integrated-article format, wherein manuscripts are presented as separate chapters. Though each of the four manuscripts included have a distinct research purpose, they are all related to the concept of parents as agents of change in the promotion of health behaviours in children. Therefore, some of the information within this Introduction and each of the following chapters may be repetitive.

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## Chapter 2

### Study 1: Parents' perceptions of nutritional literacy and the resources required to enhance it among children: An exploratory study

#### Introduction

The global prevalence of obesity has increased dramatically over the last half century, affecting millions of children and adults (Abarca-Gómez et al., 2017; Ng et al., 2014) and representing a major international public health priority (World Health Organization, 2018). Evidence suggests that poor dietary practices, such as the consumption of low-nutrient foods that are high in both sugar and fat, contribute to excess weight gain and an increased risk for obesity (Anderson & Butcher, 2006; Hruby et al., 2016; Swinburn, Caterson, Seidell, & James, 2004). Further, the adoption of a healthy diet plays an important role in both the treatment and prevention of obesity (Bhadoria et al., 2015; Hruby et al., 2016). It is also important to note, however, that obesity and the consumption/availability of healthy foods are also influenced by a broad spectrum of complex individual (e.g., age, sex, genetics, knowledge, health behaviours), social (e.g., income, education, occupation, culture), environmental (e.g., food availability, food price, natural and built environments), and political (e.g., food policies and regulations) factors (e.g., Bhadoria et al., 2015; Caprio et al., 2008; Friel, Hattersley, Ford, & O'Rourke, 2015; Hruby et al., 2016; Mills et al., 2017; Thiele, Mensink, & Beitz, 2004; Vargas, Stines, & Granado, 2017).

Another factor that has been shown to impact one's ability to consume a healthy diet is *health literacy* (Aaby, Friis, Christensen, Rowlands, & Maindal, 2017; Cha et al., 2014; Friis, Vind, Simmons, & Maindal, 2016; Guntzviller, King, Jensen, Lashara, & Davis, 2017; Kim, Love, Quistberg, & Shea, 2004; Kuczmarski, 2016; Lim et al., 2017; Park et al., 2017; Sharif &

Blank, 2010; Speirs, Messina, Munger, & Grutzmacher, 2012; Zoellner et al., 2011). Broadly speaking, health literacy refers to the knowledge, confidence, and skills that enable and empower individuals to access, understand, and apply information to promote and maintain health (Nutbeam, 1998, 2008). In both children and adults, health literacy has been found to correlate positively with diet quality and negatively with weight/body mass index (BMI; Aaby et al., 2017; Guntzviller et al., 2017; Kuczmarski, 2016; Michou, Panagiotakos, & Costarelli, 2018; Park et al., 2017; Shih, Liu, Liao, & Osborne, 2016). Among parents and caregivers, health literacy has been found to influence children's BMI percentile (Chari, Warsh, Ketterer, Hossain, & Sharif, 2014; Howe, Alexander, & Stevenson, 2017), and parents with low levels of health literacy have been shown to be more likely to engage in obesogenic feeding practices (e.g., providing sugar sweetened beverages to their children; Yin et al., 2014).

Given the strong associations between health literacy and diet, many researchers have focused on the concept of *nutrition(al) literacy*, a specific domain of health literacy that relates to nutrition, food, and healthy eating (Blitstein & Evans, 2006; Guttersrud, Dalane, & Pettersen, 2014; Mandal, 2010; Rosenbaum et al., 2018; Velardo, 2015). Since its emergence in the literature, nutritional literacy has been defined and interpreted in a variety of ways (Carbone & Zoellner, 2012; Guttersrud et al., 2014; Silk et al., 2008), and there continues to be a lack of consensus among researchers as to the specific knowledge and skills it encompasses (Velardo, 2015). Many researchers have focused on nutritional literacy as the acquisition and application nutrition knowledge and skills, defining it as the basic literacy and numeracy skills required to obtain, understand, and apply information to make decisions about nutrition; Blitstein & Evans, 2006; Carbone & Zoellner, 2012; Silk et al., 2008). Others have focused more broadly on the



practical skills necessary for healthy eating as well as social and environmental contexts and influences (Guttersrud et al., 2014; Velardo, 2015).

In recent years, some researchers (e.g., Guttersrud et al., 2014; Guttersrud & Petterson, 2015; Velardo, 2015) have operationalized nutritional literacy using a comprehensive model of health literacy originally conceptualized by Nutbeam (2000). Using this model, nutritional literacy is defined on three distinct levels: functional, interactive, and critical. *Functional nutritional literacy*, for example, refers to the general literacy skills and knowledge required to obtain and understand basic dietary information, including reading and interpreting food labels or dietary guidelines (Guttersrud & Petterson, 2015; Velardo, 2015). Second, *interactive nutritional literacy* encompasses the skills and strategies required to transform nutrition knowledge into healthy dietary choices (Velardo, 2015). Interactive nutritional literacy also refers to one's level of motivation and/or confidence to seek and apply such nutrition information in their daily lives (Guttersrud et al., 2014). Lastly, *critical nutritional literacy* emphasizes an awareness of the broader impact of individual and community food and nutrition choices (Guttersrud et al., 2014; Velardo, 2015). More specifically, it includes the skills required to critically appraise nutrition information as well as the motivation to address barriers and inequities related to food and nutrition through personal, social, and global action (e.g., advocating for policies that affect the food environment; Guttersrud et al., 2014; Velardo, 2015).

As stated above, nutritional literacy represents a specific form of health literacy that focuses on issues related to nutrition, food, and diet (Krause et al., 2016; Velardo, 2015). Similar to the research conducted on health literacy, adults with high levels of functional nutritional literacy have been found to have better overall weight management behaviours (e.g., Mandal, 2010; Rosenbaum et al., 2018) and diet quality (Cha et al., 2014; Wall, Gearry, Pearson, Parnell,

& Skidmore, 2014) than those with lower levels of functional nutritional literacy. In addition, evidence suggests that adults with low levels of nutritional literacy tend to be more likely to experience overweight or obesity than those with higher levels (Mearns, Chepulis, Britnell, & Skinner, 2017; Rosenbaum et al., 2018). With regard to the impact of parents' nutritional literacy on children, a study conducted by Gibbs and colleagues in 2016 showed that parent nutritional literacy was positively correlated with children's dietary quality, and inversely correlated with children's BMI percentile. Further, educational health-based interventions to improve parental and child nutritional literacy have had a positive effect on dietary behaviours (e.g., fruit and vegetable consumption) in adults (Parekh et al., 2017; Silk et al., 2008) and children (Harley et al., 2018; Rosi et al., 2016).

Researchers have also explored the perspectives of nutrition professionals (Cassar, Denyer, O'Connor, & Gifford, 2018; Gibbs, Harvey, Owens, Boyle, & Sullivan, 2017; Hakami, Gillis, Poureslami, & FitzGerald, 2018), childhood educators (Ballance & Webb, 2015), and other adult populations (Aihara & Minai, 2011; Watson et al., 2013) on various issues pertaining to nutritional literacy. Together, the findings suggest that while nutritional literacy tends to be viewed as important, there is a paucity of literature related to how individuals understand nutritional literacy and/or how it might be improved among children and within families. The lack of published research pertaining to parents' understanding of and perceived needs related to nutritional literacy is problematic given the documented relationship between parent nutritional literacy and child health (Gibbs et al., 2016), and because from a practical perspective, parents often control what, when, and how much food is offered to their children (Mitchell, Farrow, Haycraft, & Meyer, 2013). Further, in addition to being responsible for most household decisions about food purchases and preparation of meals (Yee, Lwin, & Ho, 2017), parents' feeding

practices and parenting styles have been shown to have a strong influence on children's eating behaviours, preferences, and body composition outcomes (Joyce & Zimmer-Gembeck, 2009; Mitchell, Farrow, Haycraft, & Meyer, 2013b; Shloim, Edelson, Martin, & Hetherington, 2015).

Acknowledging the importance of parental influence, a growing number of childhood obesity interventions have targeted parents and caregivers specifically in an attempt to promote healthy eating and other health behaviours among children and families (Annett & Erickson, 2009; Ewald, Kirby, Rees, & Robertson, 2014; Faith et al., 2012; Loveman et al., 2015; Reilly et al., 2018). While most of these parent-focused paediatric obesity interventions have not explicitly targeted or assessed nutritional literacy, these programs have been associated with short-term improvements in child BMI-related outcomes (e.g., BMI, BMI z-scores, BMI percentile) and caloric intake, as well as family eating habits (Ewald et al., 2014; Jang, Chao Msn, & Whittemore, 2015). As such, understanding parents' perceptions of and needs related to nutritional literacy may be helpful in the design of effective interventions and resources that enhance nutritional literacy and subsequently, improve dietary behaviours in families and children. Therefore, the purpose of this mixed-methods, survey-based study was to: (a) explore parents' understanding of nutritional literacy and its importance in their families; and (b) identify parents' perceptions of the resources and opportunities required, at both family and community levels, to improve nutritional literacy within their families.

## **Method**

### **Paradigmatic Perspective**

The present study was guided by *pragmatism*, an outcome-oriented approach that underlines the importance of both quantitative and qualitative methods to create solutions to

health problems (Feilzer, 2010; Polgar & Thomas, 2008; Shannon-Baker, 2016). The goal of this approach is to create knowledge that is both practical and transferable to different settings and contexts (Feilzer, 2010; Shannon-Baker, 2016). With a goal of exploring parents' perceptions of nutritional literacy and identifying the resources that parents feel are required to support nutritional literacy in their families and communities, parents were asked both quantitative and qualitative questions in a mixed-methods, online survey. Given our research aims, pragmatism was deemed to be the most appropriate approach (Feilzer, 2010; Polgar & Thomas, 2008; Shannon-Baker, 2016).

### **Research Design and Procedures**

A cross-sectional survey-based design was used for this study. Parents of children aged 16 years and younger were invited to participate in a larger survey about their perceptions, feelings, and attitudes about nutritional, physical, and civic literacies. For the purpose of the present study, only the results pertaining to nutritional literacy are presented, along with participant demographic information. All study procedures and related documents received approval from the University's Research Ethics Board (Project ID#: 108485, Appendix A). Completion of the entire survey took approximately 25 minutes. Participants who clicked on the survey link were immediately directed to the survey website, which was hosted on Qualtrics (Version 4.02, 2014), an electronic survey software. This tool generated an anonymous link to the survey website, enabling participants to complete the survey at any time. Once on the website, participants were asked to read the letter of information and to provide electronic consent to participate in the study (Appendix B). Participants were not able to proceed to the online survey if they did not provide consent. The survey was not timed; therefore, participants could take as much time as necessary to complete each question, so long as the survey screen

remained open. Once participants provided consent, they were able to skip any subsequent survey question(s) they did not wish to answer.

### **Participant Selection and Recruitment**

Individuals were eligible to participate in the study if they were: (a) English-speaking; (b) a parent or primary adult caregiver of a child (or children) aged 16 years or younger; and (c) currently living in Ontario, Canada. Parents were recruited using social media (i.e., Facebook and Twitter) and word-of-mouth. Social media posts contained a link directing interested parents to the online survey, and those who found out about the study via word-of-mouth were sent a link to the online survey via e-mail.

### **Survey Format and Questions**

This online survey was developed by the authors for the purposes of this study. The items were created on the basis of an extensive review of the literature, which also confirmed that the use of a mixed-methods survey to elicit parents' views on a broad range of topics, and to reach as many parents in Ontario as possible, was the most pragmatic and feasible option. The full survey consisted of 43 questions. As noted above, only the responses from the demographic and nutritional literacy sections of the survey are reported and discussed in this manuscript.

*Demographic variables.* Ten questions pertaining to participant demographics were included in the survey. Specifically, parents were asked to answer questions related to age, sex, marital status, place of birth, ethnicity, level of education, employment, annual household income, and postal code.

**Nutritional literacy.** Seven questions (one yes/no, two Likert-scale, and four open-ended) were designed to explore parents' understanding of nutritional literacy, the perceived importance of this construct within their families, and the resources required to improve children's nutritional literacy at both family and community levels. The questions asked to explore participants' understanding of nutritional literacy were: "*Are you familiar with the term nutritional literacy?*" (response options: yes; no; not sure), and "*What does nutritional literacy mean to you?*" (open-ended). Next, participants were provided with a broad definition and examples of nutritional literacy, based Guttersrud's (2014) definition described above, to ensure that all participants had a similar understanding of the term before proceeding to subsequent questions. After reading the definition, participants were provided with the following statements pertaining to the perceived importance of nutritional literacy, and asked to select a single response option: "*Nutritional literacy is important to me for my family*" (response options: strongly agree; agree; undecided; disagree; strongly disagree), and "*Why or why not?*" (open-ended). Participants were then asked: "*Do you think nutritional literacy could be improved in your family?*" (response options: yes, to a great extent; somewhat; not sure; very little; no, not at all). Researchers purposefully created five response options for the Likert-scale questions, as this number has been shown to produce higher quality data than more answer categories (Revilla, Saris, & Krosnick, 2014).

The last two questions of the survey sought to obtain participants' perceptions of the information, support, and resources they felt were required, at both family and community levels, to improve nutritional literacy within their families. These questions were: "*What types of information, support, and/or resources would you need to improve nutritional literacy in your*

*family?”* (open-ended); and “*What, if anything, do you think needs to happen at the community level to improve nutritional literacy in your family?”* (open-ended).

## **Data Analyses**

**Quantitative data analysis.** All data gathered via demographic and nutritional literacy questions were analyzed using R (R Core Team, 2013) and RStudio (RStudio Team, 2015). Frequencies, proportions, and/or means were calculated for all quantitative data.

**Qualitative data analysis.** Data from open-ended survey questions were analyzed using deductive thematic analysis to interpret and organize participant responses into representative themes (Braun & Clarke, 2006). This method of qualitative analysis is researcher-driven (as opposed to data-driven inductive thematic analysis), wherein the themes that emerge from the data are interpreted in relation to the specific question(s) posed to participants (Braun & Clarke, 2006). In other words, while inductive thematic analysis tends to provide a richer description of the data, deductive thematic analysis can provide a more thorough analysis of the data in order to answer specific research questions (Braun & Clarke, 2006).

Data from the four open-ended survey questions were coded and analyzed in NVivo QSR (Version 11.4, 2016), a data analysis software that facilitates the organization and management of qualitative data. Qualitative data were analyzed in accordance with the six phases of thematic analysis described by Braun and Clarke (2006): (a) *familiarising yourself with the data*; (b) *generating initial codes*; (c) *searching for themes*; (d) *reviewing themes*; (e) *defining and naming themes*; and (f) *producing the report*. In the present study, two independent reviewers (KR & DH) read the data multiple times to immerse themselves in the data, and recorded their initial thoughts and ideas (*Phase 1*). Subsequently, these two researchers independently and

systematically reviewed the data and identified initial codes (short segments of data that can be organized into small, meaningful groups; Braun & Clarke, 2006) with the assistance of NVivo (*Phase 2*). Once all the data were coded, the researchers reviewed the codes independently, looking for relationships, connections, and patterns in order to group them into potential themes (*Phase 3*). Both researchers then created their own thematic maps (i.e., visual representation of codes, sub-themes, and themes) for each theme (*Phase 4*). The two researchers then met with a third investigator (SB) to discuss and corroborate findings. Together, the researchers refined the themes and subthemes, and arrived at a consensus for their respective names and definitions. Final thematic maps (i.e., final themes and sub-themes) for each theme were jointly created and agreed upon (*Phase 5*; Appendix C). Lastly, the researchers selected relevant quotes from the parents' open-ended responses that best illustrated the identified themes and subthemes. These quotes have been integrated throughout this paper to aid in the explanation and description of themes and subthemes (*Phase 6*).

## Results

### Recruitment and Response Rates

In total, 94 individuals clicked on the link to participate in the online survey. Fifteen (16%) of these individuals were removed from the initial dataset for the following reasons: 1) *did not provide consent to participate* (i.e., the respondent did not agree to participate in the study after reading the electronic Letter of Information and Consent Form [ $n = 1$ ]; 2) *ineligibility* (i.e., the respondent did not meet the inclusion criteria because they were not an Ontario resident [ $n = 1$ ] or they were not a parent of a child 16 years of age or younger [ $n = 2$ ]); 3) *insufficient data* (i.e., the individual opened the survey but did not answer any questions [ $n = 6$ ] or did not answer questions beyond the demographic information questions [ $n = 2$ ]; and 4) *duplicate entries* (i.e.,



the same respondent clicked the survey link multiple times as confirmed by IP Addresses [ $n = 3$ ]).

### **Participant Demographics**

The demographic characteristics of the 79 parents who participated in the study are presented in Table 1. The age of participants ranged from 25 to 54 years ( $M_{Age} = 39.4$  years,  $SD = 6.6$ ). The majority of respondents identified as female (91.1%), married (79.7%), White (77.3%), university-educated (65.8%), and employed full time (68.3%). Parents from 21 municipalities (predominantly within Southwestern Ontario) participated in the study, and most participants (72.1%) reported living in large urban population centres.

Table 1

*Demographic information of participants who completed the online nutritional literacy survey (n = 79)*

Demographic variable	<i>n</i> (%)
Age <sup>1</sup> (Mean $\pm$ <i>SD</i> )	39.4 (6.6)
Sex	
Female	72 (91.1)
Male	7 (8.9)
Marital Status	
Married	63 (79.7)
Living with partner (e.g., common-law)	7 (8.9)
Separated	3 (3.8)
Divorced	2 (2.5)
Single, never married	3 (3.8)
Widowed	1 (1.3)
Education	
University or postgraduate degree	52 (65.8)
College diploma	18 (22.8)
Some post-secondary	8 (10.1)
High school graduate	1 (1.3)
Ethnicity	
White, Caucasian, or Euro-Canadian	61 (77.2)
East Asian or Asian-Canadian	5 (6.3)
South Asian or Indian-Canadian	3 (3.8)
Middle Easter or Arab-Canadian	2 (2.5)
Black, Afro-Caribbean, or African-Canadian	1 (1.3)
Latino or Hispanic-Canadian	1 (1.3)
Other	6 (7.6)
Place of Birth	
Born in Canada	71 (89.9)
Born outside of Canada	8 (10.1)
Occupational Status	
Employed, full time	54 (68.3)
Employed, part time	9 (11.4)
Employed and on parental leave	4 (5.1)
Home-based work (e.g., childcare)	3 (3.8)
Not working by choice (e.g., home with child)	6 (7.6)
Not working, but looking for a job	1 (1.3)
Other	2 (2.5)
Household Income	
$\geq$ \$125,000	37 (46.8)
\$90,000–\$124,999	16 (20.3)
\$70,000–\$89,999	12 (15.2)

\$50,000–\$69,999	9 (11.4)
≤ \$49,999	5 (6.3)
<b>Geographic classification</b>	
Large urban population centre ( $\geq 100,000$ )	57 (72.1)
Medium population centre (30,000–99,999)	3 (3.8)
Small population centre (1,000–29,999)	7 (8.9)
Rural area ( $\leq 1,000$ )	0 (0.0)
Not specified	12 (15.2)

<sup>1</sup> Five participants were excluded from calculation for reporting child age rather than parent age.

*Note.* Geographic classification was determined by the Statistics Canada (2016) census profile based on postal code

### **Parents' perceptions and understanding of nutritional literacy**

Approximately half of parents (44.3%,  $n = 35$ ) noted that they were familiar with the term nutritional literacy. Close to one third of parents identified that they were either not familiar with the term (29.1%,  $n = 23$ ) or 'not sure' (26.6%,  $n = 21$ ). When asked to describe what nutritional literacy meant, participant responses resulted in two major themes that were identified by the researchers: *understanding nutrition/healthy eating* and *knowledge to practice*. Both themes and the associated subthemes are displayed in Table 2 and discussed further below.

Table 2

*Selected written responses related to parents' perceptions of the meaning of nutritional literacy.*

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Understanding Nutrition/Healthy Eating

i. Knowledge of Healthy Foods

- “It means having a strong understanding of foods, their nutritional components and how society is currently eating and what people should be eating” (Participant 5, female)
- “Understanding healthy food choices, learning about new foods, knowing where food comes from...” (Participant 31, female)
- “Being aware of what is healthy food for an individual” (Participant 2, female)

ii. Nutritional Information and Guidelines

- “The ability to read, decipher, and comprehend nutritional labels and information” (Participant 74, female)
- “Understanding how to read and identify different things on a nutrition label. Knowing what common nutrition terms mean” (Participant 60, female)
- “Understanding of proper nutrition as well as an understanding of terminology on nutritional labelling” (Participant 21, female)
- “Being able to read labels and make informed decisions about the food we consume” (Participant 36, female)

iii. Health Effects of Nutritional Choices

- “Having knowledge about the impact of nutritional choices on your overall health” (Participant 44, female)
- “Understanding healthy food choices and the consequences to our well-being” (Participant 24, female)
- “Having knowledge and understanding of nutrition and the health benefits/risks of food in order to make informed choices” (Participant 42, female)
- 

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Knowledge to Practice

- “Understanding nutritional value of various foods and how to plan/prepare menus, meals and snacks that are healthy” (Participant 3, female)
  - “Having an understanding of the nutritional value of a variety of foods and being able to use this knowledge to prepare nutritional meals for oneself and family” (Participant 27, female)
  - “Having an understanding and putting into practice the fundamentals of healthy eating” (Participant 75, male)
-

**Understanding nutrition/healthy eating.** This theme pertains to the nutrition-related knowledge and awareness that are required to consume a healthy diet. Within this overarching theme, three subthemes emerged from parents' written responses: (a) *knowledge of healthy foods*; (b) *nutritional information and guidelines*; and (c) *health effects of nutritional choices*. The majority of parents indicated that nutritional literacy was related primarily to one's *knowledge of healthy foods*, with many describing it as an overall understanding of nutrition and knowing what foods are considered to be "healthy". Second, the *nutritional information and guidelines* subtheme reflected parents' responses which emphasized the ability to read, understand, and interpret nutrition-related information including guidelines, terminology, and food labels. Lastly, parents highlighted the *health effects of nutritional choices* as an important component of nutritional literacy; this subtheme encompassed an awareness of the implications of food choices on one's overall health and wellbeing.

**Knowledge to practice.** The second broad theme that emerged from parents' responses pertaining to what nutritional literacy meant to them reflected the application of food-related skills required for healthy eating into their daily lives. Many parents underscored the belief that nutritional literacy extends beyond knowledge and information, and includes important practical skills related to food planning and preparation, and consequently, healthy eating.

### **Importance of nutritional literacy for families**

When asked about perceived importance, all parents (100%,  $n = 79$ ,) either "agreed" (29.1%,  $n = 23$ ), or "strongly agreed" (70.9%,  $n = 56$ ) that nutritional literacy was important for their families. After responding to this quantitative item, participants were asked a simple open-ended question (i.e., "*Why or why not?*") to elicit parents' feelings towards and perceptions of

the importance of nutritional literacy for their families. Two broad themes emerged on the basis of participant responses to this question: (a) *family health and wellbeing*; and (b) *environmental health and preservation*. Again, the two broad themes and their respective subthemes are discussed below, and written responses that illustrate these themes and subthemes are presented in Table 3.

Table 3

*Selected written responses from parents in relation to why nutritional literacy is important for their families*

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Family Health and Wellbeing

i. “Healthy for Life”

- “I want our family to enjoy life to its fullest and eating healthy will help facilitate this” (Participant 16, male)
- “Want to make sure we're getting the proper nutrition for the activities we do. Want to eat healthy and have a great quality of life. Live long and live well” (Participant 10, female)
- “The health of my family is top priority. I want my children to have good nutritional habits that they carry with them into adulthood so they can be healthy for life” (Participant 70, female)

ii. Healthy Parenting and Role Modelling

- “As a Mom of two young girls I want to set a good example of understanding what we eat, why we eat it, and help them develop a good understanding so they will make the right choices themselves in later life. I love the term "strong body" rather than skinny” (Participant 25, female)
- “We are active parents and feel it is important to promote and role model a positive healthy lifestyle for our kids so they can grow up feeling good about themselves and live a healthy life” (Participant 45, female)
- “We try to model healthy behaviour for our children so they can be as healthy as they can be” (Participant 63, female)

iii. Knowledge and Skills for Healthy Eating

- “It's important for me that my family has an understanding of where their food comes from, understands the impact of their diet on their health, have the ability to cook healthy meals from scratch and an appreciation for a time when all foods just didn't come out of a box” (Participant 75, male)
  - “Knowing how to plan meals, from budgeting to preparation, is a skill that is no longer being passed down by parents, who may not have learned these skills themselves” (Participant 36, female)
  - “I believe that what we eat is the basis of our health. Reading labels is very confusing, so the more knowledge that is available, the better for consumers” (Participant 22, female)
- 

Environmental Health and Preservation

- “To ensure sustainability of our local food system” (Participant 20, male)
  - “I want my family to be as healthy as possible while making sure our food choices have minimal impact on the natural environment” (Participant 24, female) “Because it affects most aspects of health and many aspects of the global environment”
  - “I choose local over trucked food to lessen the impact on the environment...” (Participant 9, female)
-



**Family health and wellbeing.** Several parents noted that their family's overall health and wellbeing was the primary reason underlying the importance of nutritional literacy for their families. Within this overarching theme, three subthemes were identified: (a) "*healthy for life*"; (b) *healthy parenting and role modelling*; and (c) *knowledge and skills for healthy eating*. Parents noted that nutritional literacy was important because they wanted their children and family members to be "*healthy for life*"; that is, to make healthy and informed food and nutritional choices that will serve to support and enhance health and wellbeing across the lifespan. Many parents also underscored the importance of *healthy parenting and role modelling*, which included encouraging and modelling healthy eating behaviours, fostering healthy attitudes towards food, and teaching children how to make healthy food choices. Finally, parents emphasized the importance of having *knowledge and skills for healthy eating*, including an awareness and understanding of where food comes from as well as specific skills pertaining to meal planning and preparation, budgeting, and reading food labels.

**Environmental health and preservation.** Several parents expressed that nutritional literacy was also important for environmental reasons. Specifically, parents emphasized the importance of protecting the environment and reducing the human impact on the planet by having knowledge about and making informed, ethical, and environmentally friendly food choices.

### **Information, resources, and supports required to enhance nutritional literacy**

When asked whether they thought that nutritional literacy could be improved within their families, the majority of parents responded with "somewhat" (64.5%,  $n = 51$ ) or "yes, to a great

extent” (19%,  $n = 15$ ). Fewer parents selected the “very little” response option (15.2%,  $n = 12$ ) and only one parent (1.3%) responded with “no, not at all”.

Two subsequent open-ended questions asked parents to identify what kinds of information, support, and/or resources they felt were required at family and community levels to support and enhance nutritional literacy within their families. The four main themes that emerged with regard to the resources required at the family level were: (a) *kid-friendly recipes*; (b) *practical skills for families*; (c) *professional advice*; and (d) *environmental information*. In terms of the resources required at the community level, researchers identified three main themes: (a) *food regulation*; (b) *accessible community programming*; and (c) *school-based policies and curriculum*. These themes, the accompanying subthemes, and illustrative written responses from parents are discussed below and presented in Tables 4 and 5, respectively.

Table 4

*Selected written responses from parents in relation to family-based resources needed to enhance nutritional literacy*

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Kid-Friendly Recipes

i. Quick and Healthy Recipes

- “Healthy, quick kid-friendly recipes” (Participant 65, female)
- “Kid-friendly recipes - that are quick and easy” (Participant 19, female)
- “Healthy recipes that kids actually like and will eat would be great. Go on Epicurious and select the ‘kid-friendly’ category and you’ll see a bunch of stuff that my (pretty flexible) kids wouldn’t agree to even try” (Participant 13, female)

ii. Engaging the Child

- “More healthy and kid friendly recipes that my children can follow, understand and want to eat” (Participant 2, female)
- “Simple cooking recipes, kid friendly recipe so they can learn” (Participant 15, female)
- “I think that my husband and I are so used to making food that is healthy for us to eat that we often get into a routine of recipes which are not always so toddler friendly. We could use more healthy, toddler friendly recipes that engage her mind and imagination and increase her knowledge and attitude towards different foods” (Participant 60, female)

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Practical Skills for Families

i. Meal Planning and Preparation

- “Not so much cooking lessons as meal assembly - ensuring the right portions of macro nutrients and how to prepare the components so that all are ready at the same time” (Participant 36, female)
- “Meal prepping, allowing to take a little bit more time in our busy lives to make sure we always have fresh fruit and veggies washed, cut and ready to go so there is no reason why we can’t have it to eat. And not going straight to the junk that’s ‘easy’” (Participant 49, female)
- “For me I hope to give my kids a better appreciation for healthy foods and home cooked meals. Perhaps if I had more information on how to incorporate my children into meal preparation, they would learn to appreciate a healthy dinner more” (Participant 75, male)

ii. “More Time”

- “More time for me to spend cooking with my kids” (Participant 20, male)
- “More time and organization to shop and cook” (Participant 30, female)
- “How to make quick meals with busy family commitments” (Participant 58, female)

iii. Home Gardening

- “Support and information on how to grow produce in our backyard (urban farming, container gardening)” (Participant 42, female)
- “Gardening support and resources” (Participant 46, female)

iv. Budgeting and Food Costs

- “Education on how to make nutritional meals on a budget” (Participant 70, female)
  - “I think it would be the affordability and accessibility of foods that I am interested in” (Participant 35, female)
  - “Price drops in healthy food. To eat healthy it is expensive and this is why many choose to eat out as it is a lot cheaper” (Participant 45, female)
-

### Professional Advice

- “Dietitian advice on vitamins and supplements for kids and adults” (Participant 67, female)
  - “Advice from a dietitian to provide variety for picky eaters, simple and healthy recipes” (Participant 11, female)
  - “Mandatory dietitian appointment for those who have annual physicals with our physician” (Participant 21, female)
- 

### Environmental Information

- “I would also value more information on environmental food issues that have \*proven\* scientific basis. My Facebook feed is full of nonsense postings claiming sunscreen causes autism or that I need to drink kombucha to ‘boost my immune system’. I’ve become so skeptical ... I feel would I need a really valid and convincing source before I would believe that something presented to me is a true environmental food issue!” (Participant 13, female)
  - “I would love to see less additives and chemicals in everything.” (Participant 9, female)
  - “More info on pesticides, hormones and antibiotics in our food...” (Participant 26, female)
-

Table 5

*Selected written responses from parents in relation to community-based resources needed to enhance nutritional literacy*

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Food Regulation

i. Restricting Junk Food

- “Fewer fast food locations with drive thrus” (Participant 51, male)
- “Remove pop machines and candy machines in public arenas, malls, etc.” (Participant 73, female)
- “Commitment at municipal level to ensure access to fresh, unprocessed food (i.e., eliminate food "deserts"). If all you can access is fast food and convenience stores, knowing that the food is bad is pointless” (Participant 36, female)

ii. Accessible Healthy Foods

- “Cheaper locally produced foods and accessible locations” (Participant 5, female)
  - “More local options to purchase locally grown food” (Participant 20, male)
  - “More affordable organics year round...I like to think more would comply with affordable foods year round” (Participant 59, female)
- 

Accessible Community Programming

i. Grocery Stores

- “I would appreciate more support in local grocery stores (recipes that are displayed, cooking classes for parents and children, neighbour recipe exchange)” (Participant 19, female)
- “Wouldn't it be great if volunteers were available to escort families through grocery stores and aid them in reading labels, making smarter choices?” (Participant 24, female)
- “More community programs on healthy eating put on by health food stores” (Participant 22, female)

ii. Community Gardens

- “Access to community gardens” (Participant 21, female)
- “Community gardens for children at school and in parks” (Participant 42, female)
- “More community gardens” (Participant 54, female)

iii. Cooking Classes

- “Promote cooking classes or meal preparation for teenagers” (Participant 10, female)
- “Cooking classes for kids...more accessible...” (Participant 15, female)
- “Cooking classes for nutritional healthy living” (Participant 34, female)

iv. Workshops and Forums

- “Workshops or community web forums for parents” (Participant 17, female)
  - “Discussions on different ways of making healthy choices for families who have varying incomes and time constraints” (Participant 42, female)
  - “Parent workshops or literature going home as well” (Participant 16, male)
- 

School-Based Policies and Curriculum

i. Hands-On Learning Opportunities

- “Home-ec in school would be good to interest kids in cooking and making healthy delicious food. If we make cooking part of their health mark, then they would have to learn about how to feed themselves well” (Participant 9, female)

- “More classes on how to cook and provide meal planning etc. More like home-ec classes that used to be compulsory” (Participant 56, female)
- “Cooking/meal prep programs during school day for children” (Participant 58 female)

ii. Nutrition Education

- “Nutrition should be an expected class during school in my opinion, it is one way to have a universal approach to health care. It would provide children with the basic understanding of food and nutrition which would give each child a basic starting point to build on. If they do not come from families that promote these positive attitudes and behaviors towards food, they are at a loss against their peers” (Participant 60, female)
- “Health & Nutrition should be a subject at all levels in school” (Participant 12, female)
- “Nutritional literacy education for children at school as it may be more effective than if it comes from the parents. It would also give children the information they need for when they are responsible for their own cooking later in life” (Participant 53, female)

iii. Healthy Snack and Lunch Policies

- “Guidelines for what schools provide to students. E.g., only healthy foods available for sale” (Participant 43, female)
  - “Eliminate unhealthy ‘hot lunches’ (pizza and hot dog days), and set an example by providing healthy lunch alternatives on these days” (Participant 66, female)
  - “Access to true, natural foods through school snack program[s]. Complete elimination of drink and food dispensers in elementary schools” (Participant 21, female)
-

**Family-based resources needed to enhance nutritional literacy within families.**

***Kid-friendly recipes.*** Two subthemes related to kid-friendly recipes emerged from the data, including *quick and healthy recipes* and *engaging the child*. Specifically, parents reported a desire for simple recipes that are time efficient, easy to follow, healthy, and appealing to children. Additionally, parents emphasized the importance of *engaging the child* through the use of child-friendly recipes that could be used as teaching tools and would be suitable and appropriate for children to read, follow, and understand.

***Practical skills for families.*** Four subthemes emerged under this broad theme: (a) *meal planning and preparation*; (b) “*more time*”; (c) *home gardening*; and (d) *budgeting and food costs*. In terms of *meal planning and preparation*, many parents noted that they required information, support, and resources related to organizing and cooking meals together as a family. Additionally, most parents emphasized that with busy family schedules, they needed “*more time*” in the day to plan meals, grocery shop, and prepare food. Some parents indicated that they would like more information and resources related to *home gardening* including how to grow produce and create/sustain a home garden. Finally, parents expressed the need for information and resources pertaining to *budgeting and food costs*, noting issues such as affordability and availability as well as preparing healthy, nutritious family meals on a budget.

***Professional advice.*** This broad theme encompasses the responses from parents who identified a need for consultation and guidance from dietitians on various aspects related to nutrition and healthy eating, including vitamins and supplements, healthy recipes, and strategies for coping with picky eaters.

***Environmental information.*** The fourth overarching theme related to family-based resources needed to support and enhance nutritional literacy—*environmental information*—pertains to parents’ desire for evidence-based information and education on issues concerning food and the environment including organic foods, pesticide use, hormones and antibiotics, and food packaging.

**Community-based resources needed to enhance nutritional literacy within families.**

***Food regulation.*** This broad theme pertaining to the community-based information, supports, and resources needed to enhance nutritional literacy contained two subthemes: (a) *restricting junk food*; and (b) *accessible healthy foods*. With regard to *restricting junk food*, several parents noted the pervasiveness of and desire for fewer readily available unhealthy foods in the community (e.g., at ‘fast-food’ establishments and convenience stores, in sporting venues, etc.). Simultaneously, parents expressed a desire for increased availability and affordability of healthy foods, specifically highlighting the need for better access to locally grown food.

***Accessible community programming.*** Many parents underscored the need for a wide range of food and nutrition-related programming at the community level. These ideas and suggestions were categorized into four subthemes: (a) *grocery stores*; (b) *community gardens*; (c) *cooking classes*; and (d) *workshops and forums*. First, parents noted a desire for new or enhanced food-related programs and resources at community *grocery stores* and health food stores, which were perceived to be convenient venues for healthy eating and nutrition programming for families. Parents also expressed a need for *community gardens* that could be designated for public use and easily accessible to both children and adults. Additionally, parents recommended



additional community-based *cooking classes*, with a particular emphasis on the need for such programming for children and teenagers. Finally, parents highlighted the need for nutrition and food-related *workshops and forums* to gain credible knowledge and engage in group-based discussions and/or activities in person or through online platforms.

***School-based policies and curriculum.*** This overarching theme focused on parents' perceptions of the school-based programming, resources, and opportunities needed to support and enhance nutritional literacy among children and families. Three subthemes emerged from the data: (a) *hands-on learning opportunities*; (b) *nutrition education*; and (c) *healthy snack and lunch policies*. Many parents identified a need for *hands-on learning opportunities* at school wherein children could gain practical skills related to cooking and nutrition (e.g., meal planning and preparation, growing and purchasing food, etc.) through home economics classes or other similar programs. Parents also expressed a desire for a greater emphasis on food and *nutrition education* at schools via specific courses that might be required within the broader health curricula. Finally, parents underscored the need for *healthy snack and lunch policies* to guide and promote healthy food choices for children during the school day while limiting the consumption and availability of unhealthy food options.

## **Discussion**

To date, the literature in this area has focused primarily on how nutritional literacy is defined by researchers (Krause et al., 2016; Velardo, 2015). This study provides key insights into parents' understanding of nutritional literacy and its perceived importance, as well as a broad range of resources and considerations that should be focused on to enhance nutritional literacy

within families. Overall, parents perceived that nutritional literacy refers to an understanding of healthy eating generally, as well as the skills necessary to put this knowledge into practice; though it is important to note that less than half of the parents in our study reported being familiar with the term. One possible explanation for this may be that the term “nutritional literacy” appears to be used less frequently than the closely related and often—albeit incorrectly—interchangeably used term “food literacy” in the literature (Krause et al., 2016; Perry et al., 2017; Truman, Lane, & Elliott, 2017; Vidgen & Gallegos, 2014). Food literacy, which also lacks a unanimously agreed upon definition in the literature (Perry et al., 2017; Truman, Lane, & Elliott, 2017) is considered to be a much broader concept than nutritional literacy, incorporating a wide range of knowledge and practical skills required to make decisions about food and understand the impact of these choices on personal health, society, and the environment (Krause, Sommerhalder, Beer-Borst, & Abel, 2016). Indeed, food literacy and nutritional literacy, and in particular, interactive and critical nutritional literacies, are conceptually similar (Krause et al., 2016; Velardo, 2015). Interestingly, though, these constructs are often studied separately, with many researchers noting that nutritional literacy is only one of many components of the broader concept of food literacy (Krause et al., 2016; Vidgen & Gallegos, 2014; Zoellner & Carr, 2010). However, given that no other studies examining the meaning of or familiarity with the concepts of nutritional and/or food literacy among parents have been identified, it is difficult to frame this set of results within the context of the current literature in this area.

In the context of the three nutritional literacy domains described previously (Guttersrud et al., 2014; Velardo, 2015), parents generally perceived nutritional literacy to be *functional* (i.e., an understanding of and the information related to healthy eating) and/or *interactive* (i.e., the ability to translate nutrition-related knowledge into daily practice via skills and strategies; Velardo,

2015). Parents did not explicitly describe *critical* nutritional literacy in their interpretations of nutritional literacy (i.e., the skills required to critically appraise nutrition information as well as the motivation to address barriers and inequities related to food and nutrition through personal, social, and global action; Guttersrud et al., 2014; Velardo, 2015), however, much of the information, resources and opportunities that parents felt were needed in the community centered around this domain. For example, parents expressed a desire for increased food regulation (i.e., availability and accessibility of healthy versus unhealthy foods), and highlighted the importance of addressing food and nutrition-related policies and curricula within schools.

All parents in the study reported that nutritional literacy was an important consideration for their families. Parents noted the importance of nutritional literacy for the overall health and wellbeing of their families, and highlighted the importance of teaching and modelling healthy eating behaviours and food skills. Notably, many parents reported the perception that time was a significant barrier to healthy food choices and a healthy diet within their homes. This is not entirely surprising, as parents consistently report time constraints as a barrier to healthy eating behaviours (e.g., Cowgill et al., 2014; Dwyer, Needham, Simpson, & Heeney, 2008; Pearson, Irwin, Burke, & Shapiro, 2012; Pelletier & Laska, 2012; Welch, McNaughton, Hunter, Hume, & Crawford, 2009). Among other important considerations, these findings underscore the importance of using S.M.A.R.T. (i.e., specific, measurable, attainable, relevant, and time-related; Bjerke & Renger, 2017; Doran, 1981; Kylo & Landers, 1995; Lawlor & Hornyak, 2012) goal setting activities with parents and families as an effective health behaviour change and time management strategy (e.g., Byrd-Bredbenner et al., 2017; Flattum et al., 2015; Martin et al., 2009)

With regard to the resources and opportunities identified as important for increasing nutritional literacy within families, parents expressed a wide range of needs in the community including cooking classes, community gardens, and grocery/food store services and programs. In the province of Ontario, there are many existing food and nutrition programs for children and/or adults offered by organizations such as municipal governments, private companies, not-for-profit organizations, and grocery stores. Thus, it appears that there is no shortage of such resources available to families across the Province. One issue, however, might be whether these programs are financially and/or geographically accessible for families. While there are organizations that offer free or ‘pay what you can’ cooking classes, for example (e.g., City of Toronto, 2018; Growing Chefs Ontario, 2018), the cost of other similar classes can range between \$10-\$45 CAD per person (e.g., COOKSMART, 2018; Loblaws Inc., 2018; Nutrition Bites, 2018). It might also be possible that there is a general lack of awareness about such programs among parents due to insufficient marketing required to connect parents and families with these services. Additionally, given the time constraints identified by parents, it is likely challenging for many families to commit to a program if they are not offered at flexible times and/or convenient locations.

Parents also expressed a strong desire for greater restriction and regulation of unhealthy foods in the community, advocating for enhanced food-related policies and curriculum within the school environment specifically. Parents are key stakeholders in the educational system and have a strong influence, both as facilitators and inhibitors, on the implementation of school nutrition policies (McIsaac, Spencer, Chiasson, Kontak, & Kirk, 2018) and programs/curricula (Meiklejohn, Ryan, & Palermo, 2016; Peralta, Dudley, & Cotton, 2016). Despite this, several participants in the present study reported feeling that the efforts made by parents to provide children with healthy and nutritious foods were undermined by the readily available processed

and unhealthy foods provided to children regularly in schools (e.g., for birthdays, special events, and hot lunch days). In fact, a growing literature on the food environment (e.g., Shareck, Lewis, Smith, Clary, & Cummins, 2018) and ‘food away from home’ (FAFH; Altman et al., 2015; Mancino, Todd, Guthrie, & Lin, 2014) suggests that indeed, the exposure of children to unhealthy foods is associated with greater caloric consumption and lower diet quality among children. This is clearly a frustration for some parents and, as identified in the current study, a potential area of consideration and focus from both research and policy perspectives. Parents in this study also underscored a perceived need for and value of curricula pertaining to home economics and family studies within the school system, to enhance children’s nutritional literacy, dietary choices, and overall health. Indeed, several national and international experts, including researchers (e.g., Lichtenstein & Ludwig, 2010; Nelson, Corbin, & Nickols-Richardson, 2013), teachers and school board superintendents (e.g., Slater, 2013), and dietitians (e.g., Ontario Dietitians in Public Health, 2018), have also advocated for policy measures to ensure that children and youth have the opportunity to learn these important health behaviours and life skills in the school setting.

This study is not without its limitations. Although social media sites have been found to be useful tools for the recruitment of demographically diverse parents to complete online surveys (Gilligan, Kypri, & Bourke, 2014), the final sample of respondents in the present study was quite homogenous (i.e., female, White, married, university-educated etc.). The lack of diversity related to ethnicity, education, and income is particularly relevant in matters of health literacy (Beauchamp et al., 2015; Berkman et al., 2011). Low levels of health literacy, for example, have been found to be associated with poor health outcomes (Berkman et al., 2011), and minority, vulnerable, and high-risk socio-demographic groups are most affected by these health inequities

(Beauchamp et al., 2015).

In addition, the majority of participants in this study reported living in large urban population centres in Southwestern Ontario (Statistics Canada, 2018). While rural Ontarians make up approximately 14% of the provincial population (Statistics Canada, 2017), none of the survey respondents identified as being from a rural area. This is emblematic of the urban-rural divide that exists in Canada, and is linked with inequities in relation to access to health care services (Sibley & Weiner, 2011) and health outcomes (Pampalon, Hamel, & Gamache, 2010). Future research related to health, nutritional, and/or food literacy should engage and highlight the perspectives of minority, vulnerable, and rural sub-groups in the population as they are more likely to have lower health literacies (Beauchamp et al., 2015; Berkman et al., 2011), less access to health promotion programming (Sibley & Weiner, 2011), and are disproportionately affected by poor health outcomes (Beauchamp et al., 2015; Pampalon et al., 2010).

Finally, though online surveys offer flexibility to participants, we acknowledge that they also have drawbacks related to participant engagement (Neville, Adams, & Cook, 2015). For example, participants can easily ignore or abandon the online survey, which was the case for several individuals in this study who were excluded due to incomplete or missing data. Further, though some participants provided rich and detailed responses to the open-ended questions, many provided short (i.e., one sentence or less) responses lacking in detail and elaboration.

### **Conclusion**

Generally speaking, parents in the present study perceived nutritional literacy to encompass knowledge pertaining to nutrition and healthy eating, as well as the skills necessary to translate such knowledge into practice. Parents highlighted several supports, opportunities,

and resources, both at home and in their communities, that could enhance nutritional literacy within their families. Community organizations, policymakers, and researchers should continue to explore the feasibility of existing and novel family-oriented healthy eating programs in the community (e.g., cooking classes, gardens), goal setting and time management strategies/resources, and expanding and strengthening food and nutrition curricula and policies for children within schools. Additionally, the development of resources and/or interventions for families in relation to the environmental impact and sustainability of food and food choices may be worth considering

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## Chapter 3<sup>2</sup>

Study 2: “C.H.A.M.P. Families”: Description and theoretical foundations of a paediatric overweight and obesity intervention targeting parents – a single-centre non-randomized feasibility study

### Introduction

Childhood obesity is a significant and persistent public health issue, affecting approximately 124 million children worldwide [1]. Numerous types of childhood obesity treatment interventions exist [2,3], and have been implemented with varying success in school [4], primary care [3,5], and family [6,7] settings. Insofar as the latter is concerned, family-centred approaches have typically targeted parental support, familial interactions, and the home environment [8–12]. Epstein et al., who were among the first to design and encourage the use of family-based approaches in the treatment of childhood obesity, have noted that the primary goal is to have family members—primarily parents—take a lead role in the facilitation of behaviour modification among children [10,11]. A meta-analysis of family-based childhood obesity treatment interventions ( $n = 20$  studies targeting at least one family member in the intervention to support or assist health behaviour change in the child) conducted by Berge and Everts (2011) provided support for the use of this approach. Their findings showed that family-based interventions were associated with improvements in children’s body composition (i.e., body mass index [BMI], standardized BMI [BMI- $z$ ],

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<sup>2</sup> A version of this chapter has been published. See Reilly, K., Tucker, P., Irwin, J., Johnson, A., Pearson, E., Bock, D., & Burke, S. (2018). “C.H.A.M.P. Families”: Description and Theoretical Foundations of a Paediatric Overweight and Obesity Intervention Targeting Parents—A Single-Centre Non-Randomised Feasibility Study. *International Journal of Environmental Research and Public Health*, 15(12), 2858. <http://doi.org/10.3390/ijerph15122858>

percentage overweight, and BMI percentile) as well as dietary outcomes (i.e., dietary intake and sugar-sweetened beverage intake) and physical activity. However, the authors did note that the research in this area was limited by a lack of sample diversity, high attrition rates, and inconsistencies with BMI measurements across studies [6]. Berge and Everts (2011) also identified a need for theory-driven research in the field of family-based childhood obesity intervention research.

Ample evidence supports the conclusion that parents are critical in the success of paediatric weight management programs [9,13–17]. Given such evidence, interventions targeting *parents* as the primary agents of change in paediatric obesity treatment programs have garnered increasing attention in the literature [13,17–21]. The work of Golan et al. [8,9,14,15] focusing on the use of parents as the exclusive intervention targets in the treatment of childhood obesity has been particularly influential. In their longitudinal study comparing a parent-only childhood overweight/obesity intervention (14 one-hour support and education group sessions over one year for parents) to a child-only intervention (30 one-hour group education sessions over one year for children), Golan and Crow (2004) found a greater reduction in percent overweight in children from the parent-only intervention than children who participated in the child-only intervention at one, two, and seven-year follow-up assessment points [9]. In a subsequent study, Golan et al. [15] evaluated the effectiveness of a six-month (16 one-hour support and education group sessions and monthly individual sessions) childhood obesity treatment intervention directed exclusively at parents versus one of the same length and structure directed at both parents

and children [15]. Again, the findings demonstrated that the parent-only intervention was more effective than the similar intensity program that included children as active participants [15]. More recently, a 2014 systematic review of randomised controlled trials (RCTs;  $n =$  eight studies) comparing parent-only and parent-child childhood obesity treatment interventions determined that parent-only interventions were equally or more effective than child-only interventions in reducing children's BMI- $z$  and caloric intake, improving family eating habits, and enhancing mental health outcomes among children [16]. There is also evidence demonstrating that parent-focused childhood obesity interventions may be more cost-effective than traditional family-based (i.e., parent and child-focused) interventions, as they are generally less expensive to implement and require fewer resources [16,22].

The evidence supporting parent-only interventions for childhood obesity is compelling. However, there is a lack of reporting in the literature related to the development and implementation of these interventions [23,24]. Without explicit descriptions of the interventions, it is difficult to identify how and why specific intervention components have been implemented, and how intervention principles and strategies can be adapted and translated into practice or future studies [16,18,25]. Theory, for example, is a critical aspect of childhood obesity intervention design, as it provides grounding for and explanation of the mechanisms through which certain variables are expected to produce behaviour change [26]. Researchers have identified a paucity in the application of theory in family-based childhood obesity interventions [23], and recommendations for theoretically

grounded interventions in this area have been well documented in reviews of the literature [6,7,17,23]. A recent qualitative meta-synthesis of child and adolescent obesity family-based interventions conducted by Alulis and Grabowski (2017) showed that the authors of only 31.4% of the reviewed studies reported the use of theory in the development of the intervention [23]. In addition, the authors noted that among the studies that included a theoretical foundation, many lacked transparency in reporting with regard to how the theory was applied within the context of the intervention [23].

Findings outlined in qualitative studies provide additional support for the conclusion that greater parental involvement in childhood obesity interventions is warranted [27–29]. The original Children’s Health and Activity Modification Program (C.H.A.M.P.) was a four-week, family-based program that targeted children with obesity (the day-camp ran Mondays–Fridays from 09:00–16:00) as well as their parents (parent/caregiver sessions ran on Saturdays from 10:00–14:00; see Martin et al. [30] for a full description of the program). C.H.A.M.P. differed from other family-based paediatric obesity programs in that it was developed on the basis of group dynamics theory and utilised evidence-based group dynamics strategies to develop cohesive (i.e., ‘true’) groups with both children and parents [30]. While the results of the pilot program were positive with regard to child BMI-z [31], cardiovascular indices [32], child and parent-reported quality of life [31], and self-efficacy [33], some parents noted that future programs should include more education and opportunities for parents, as well as greater parental accountability [27]. Interestingly, children who participated in C.H.A.M.P. also expressed a desire for increased support and



involvement from their parents in order to initiate and maintain their lifestyle modifications [34]. On the basis of the strong empirical evidence in support of parent-focused interventions in the treatment of childhood obesity, our research team designed and implemented an intervention entitled “C.H.A.M.P. Families”; a 13-week group and community-based educational program targeting parents of children aged six to 14 years with overweight and obesity. Similar to C.H.A.M.P., and given the documented lack of reporting related to the use of theory in family-based childhood obesity interventions [23,24], C.H.A.M.P. Families was designed and implemented on the basis of a unique combined theoretical approach. Thus, the purpose of this paper is to provide a detailed description of this parent-focused childhood overweight and obesity intervention, as well as the theoretical framework that was used in its design and implementation.

## **Materials and Methods**

The following section is divided into two subsections, including: (a) a description of the C.H.A.M.P. Families intervention in accordance with the Template for Intervention Description and Replication (TIDieR) checklist and guide (Appendix D, [35]); and (b) a detailed overview of the theoretical foundation used in the design and implementation of the intervention.

### **Intervention Description**

**Intervention Design.** A single-centre, single-group, non-randomised, prospective feasibility study design [36,37] was used to evaluate the preliminary effectiveness and overall feasibility of C.H.A.M.P. Families, which was a group and community-based

program delivered via eight sessions over a 13-week period to parents of children six to 14 years of age with overweight or obesity in Ontario, Canada. The study was approved by the Health Sciences Research Ethics Board at a large Canadian university (Project ID# 108826, Appendix E) and retrospectively registered with an International Standard Registered Clinical Trial Number on April 24, 2018 (ISRCTN #10752416).

**Participant Recruitment and Eligibility.** Participants were recruited over a four-month period (May–September, 2017). Multiple recruitment strategies targeting parents were utilised, including newspaper and radio advertisements, social media advertisements, posters displayed in various community settings (e.g., libraries, local businesses, family health clinics; Appendix F), and study pamphlets and posters delivered to community paediatricians and family physicians. Parents were eligible to participate if: (a) they had a child between the ages of six and 14 years at baseline; (b) they had a child with a BMI greater than or equal to the 85<sup>th</sup> percentile for their age and sex [38]; and (c) both the child and parent were able to speak, read, and understand English. All parents and caregivers, including those living in separate homes, were invited to attend the program and participate in the study if interested and eligible. Families were excluded from the study if: (a) the child did not have a BMI  $\geq 85^{\text{th}}$  percentile for age and sex; (b) they did not provide written consent or assent; (c) they were unable to read, speak, or understand English; and/or (d) the child had a medical condition or used a medication that impacted physical activity levels and/or other study outcomes. Participants who met the inclusion criteria were invited to participate in the program, and if interested and eligible, four data collection home visits

(with parent(s), child, and a researcher) were scheduled based on the participants' availability. During this first home visit, a researcher provided the letter of information and consent/assent forms to both the parent (Appendix G) and the child (Appendix H & I), who could opt to read it themselves or have the researcher read it to them. Once the letters were read and the participants' questions were answered, the researcher asked the parent(s) and child to provide written consent and assent for study participation, and then proceeded with the collection of baseline measurements (additional description of data collection provided below).

**Intervention Description.** The C.H.A.M.P. Families intervention consisted of three main components: (a) eight group-based (parent-only) education sessions delivered over the course of 13 weeks; (b) eight home-based (family-directed) activities that were 'assigned' by the research team following each of the group-based sessions; and (c) two group-based follow-up support sessions for parents and children following completion of the formal intervention.

***Group-based (parent-only) component.*** Parents were invited to attend a total of eight *parent-only* education sessions on Monday evenings from 18:30–20:00 from September to December 2017, which were held in a boardroom at a local YMCA facility in a large city in Ontario, Canada. The intervention was 13 weeks in total. To date, researchers have been unable to discern a clear dose-response relationship in terms of weight-related outcomes in childhood obesity interventions [39]. Further, given that family-based paediatric obesity interventions have been associated with high rates of attrition [18,24] and

are time and resource-intensive, C.H.A.M.P. Families was created as a low-cost, low-intensity treatment intervention (i.e., 12 hours over 13 weeks) in an effort to increase participant retention and overall feasibility. This intervention was also designed so that the first four sessions were held weekly, and the remaining four sessions were held bi-weekly (an additional week was added to accommodate a statutory holiday). Sessions were offered less frequently as the program progressed to avoid a reliance on the group and encourage participants to utilise their own abilities, as well as the skills discussed in class, with their families in the home environment [40,41].

Each session was group-based and included in-class discussions and presentations pertaining to several lifestyle, environmental, and social factors related to child and family health. Topics included, but were not limited to, healthy eating, physical activity, sleep, screen time, sedentary behaviour, family communication, bullying, effective parenting, and mental health (see Table 1 for a complete overview of session titles, speakers, topics, and materials/information delivered to parents). At the start of each session, parents were asked to sign an attendance sheet and were provided with materials (i.e., handouts and resources) for that session. Attendance was tracked by the Project Coordinator. Program content was delivered verbally to the group by content experts (i.e., a researcher, health professional, and/or other expert in the area[s] of interest) and community organisations, and supplemented with slide presentations and printed resources. Printed materials—existing (e.g., Canada’s Food Guide [42]), adapted (e.g., Socioenvironmental Framework for Promoting Lifestyle Behaviours in Children [43]), or created for the purpose of the

program (e.g., C.H.A.M.P. Families Community Resources Handbook)—were provided to parents during or following each group session. Sessions were educational and interactive in nature, and included activities, evidence-based strategies, and group brainstorming related to how the information discussed in the group setting could be personally applied or used with children and family members in the home environment (intervention materials and resources available upon request). Each 90-minute session followed the same general structure: (a) a 10-minute review and group-based discussion related to the previous week's goal-setting worksheet and/or readings, plus guest speaker introductions and announcements; (b) a 60-minute interactive education session; (c) a 10-minute question, answer, and discussion/reflection period; and (d) a 10-minute overview of the following week's session topic(s), home-based goal setting worksheet, and associated readings and resources. Parents were provided with binders to store and organise all of the program documents and homework activities. The C.H.A.M.P. Families program was offered at no cost to participants. Parking was free, and complimentary YMCA child-minding and drop-in activity-based programming were available for children (including siblings) during each parent session. Healthy snacks and drinks were provided at each session. Outside of the intervention, the Project Coordinator communicated with participants on a regular basis; participants received email reminders of upcoming sessions and were contacted via email and/or telephone to schedule home visits for data collection.

Table 1

*C.H.A.M.P. Families intervention components, providers, and topics/activities*

<b>Timeline (MM/YY)</b>	<b>Intervention Component</b>	<b>Intervention Provider</b>	<b>Topics and/or Activities</b>
08/17	Home Visit 1	– Researcher/Project Coordinator (Master of Public Health [MPH]; Western University)	Letters of information, consent forms, demographic form, data collection
09/18	Education Session 1 “Welcome to C.H.A.M.P. Families”	– Principal Investigator (PhD; Western University) – Certified Professional Co-Active Coach (CPCC) & Motivational Interviewing Facilitator (PhD; Western University) – Hospital-based Paediatrician (MD; London Health Sciences Centre) – Public Engagement Coordinator (PhD; Obesity Canada)	Topics: Childhood growth and development, childhood overweight and obesity, weight bias, stigma, communication, goal setting, program expectations
09/18	Education Session 2 “Setting The Table For Healthy Eating At Home”	– Principal Investigator (PhD, Western University) – Registered Dietitian (RD) (PhD; Brescia University College)	Family goal setting, time management, healthy eating, family meals, parental role modelling
10/18	Education Session 3 “Nutrition by The Numbers”	– Registered Dietitian (RD) (PhD; Public Health Unit)	Diet, nutrition, serving sizes and portion control, meal planning, healthy grocery shopping on a budget, sugar-sweetened beverages, goal setting, reading food labels, grocery store tour (optional)
10/17	Education Session 4 “Get Up and Get Moving”	– Researcher/Project Coordinator (MPH; Western University) – Exercise Instructor/Program Director (PhD; Goodlife Kids Foundation)	Screen time, sedentary behaviours, physical activity, family-friendly exercise (circuit) demonstration and group activity
10/17	Home Visit 2	– Researcher/Project Coordinator (MPH; Western University)	Data collection
10/17	Education Session 5 “Family Communication, Mental Health, and Sleep: Let’s Talk About It”	– Public Health Nurse (Registered Nurse; Public Health Unit)	Family cohesion, sleep and sleep hygiene, bullying communication, resilience and mental health;
11/17	Education Session 6 “Cooking with Kids”	– Professional Chef (Community Food Education Centre – Local Organization)	Food skills, meal preparation, food safety, age-appropriate activities for kids, nutrition, nutritional literacy

11/17	Education Session 7 “Community Connections”	– Area Administrator (Heart and Stroke Foundation) – Membership Representative (YMCA)	Media literacy, marketing of unhealthy foods and beverages to kids, health advocacy, community resources, creating an awareness campaign (group activity)
12/17	Education Session 8 “The Grand Finale: Family Celebration and Certificates”	– Principal Investigator (PhD; Western University) – Researcher/Project Coordinator (MPH; Western University)	Recap/summary of program, family celebration, group discussions, family award presentations, focus groups, farewell
12/17	Home Visit 3	– Researcher/Project Coordinator (MPH; Western University)	Data collection
03/18	Booster Session 1	– Professional Chefs (x3) (Community Food Education Centre – Local Organization) – Principal Investigator (PhD; Western University) – Researcher/Project Coordinator (MPH; Western University)	Food skills, nutritional literacy, healthy eating, food safety, food preparation, family cooking class
06/18	Booster Session 2	– Group Exercise Instructors (x2) (Fitness and Recreational Centre) – Principal Investigator (PhD; Western University) – Researcher/Project Coordinator (MPH; Western University)	Physical activity, active play, family obstacle course
06/18	Home Visit 4	– Researcher/Project Coordinator (MPH; Western University)	Data collection

***Home-based (family) component.*** At the end of each group-based session, parents were assigned a home-based goal setting worksheet to complete with their families (Appendix J). The worksheets were adapted from those used in an evidence-based obesity prevention program for parents in the United States [44], and were intended to support and reinforce the concepts discussed in the group sessions. The worksheets contained several questions (closed and open-ended) regarding their family's health behaviours and habits in the home environment. They prompted parents to consider various health behaviours, their family's current habits and beliefs, as well as facilitators and impediments to change. The worksheets instructed parents and children to work together to set at least one "S.M.A.R.T." (i.e., specific, measurable, attainable, relevant, and time-related [45–48]) goal related to a health behaviour and develop a family action plan, collaboratively, to reach the agreed upon goal. Participants were encouraged to share their family experiences with the group at each subsequent parent session, and submit their worksheets to researchers in order to enhance accountability and track participants' completion of the home-based activities. The first five goal-setting worksheets pertained to the weekly educational topic(s) including: family meals; fruit and vegetable consumption; screen time and eating; physical activity; and sleep. During the last three sessions, parents were asked to revisit, with their families, one of the previously completed family goal-setting worksheets to either revise a previous goal or set a new goal. A sample of the goal setting worksheets were piloted by our team with a small group of parents ( $n = \text{five}$ ) of children aged six to 14 who were not involved in the study.



***Group-based (family) follow-up support.*** Two, two-hour group-based “C.H.A.M.P. Families Booster Sessions” for parents, children, and additional family members were held at 3- and 6- months post-intervention (i.e., March and June 2018). The primary purpose of the booster sessions was to provide parents and children with fun, family-focused, active opportunities to reconnect and socialise in a group environment following the formal intervention. The first session consisted of a family cooking and food/nutritional literacy class hosted by a local not-for-profit organisation, and the second was a physical activity-based obstacle course held at a local business. At each booster session, parents and/or children were provided with helpful resources (e.g., kitchen utensils and pedometers) and information about family-friendly community organisations and activities (e.g., healthy recipes, pamphlets for summer camps). Follow-up support was also offered in the form of post-intervention contacts (i.e., monthly e-mails and telephone calls) from the researchers to outline the details of the booster sessions and schedule each family’s six-month follow-up data collection visit, after which formal contact with participants ceased.

**Intervention Providers.** The C.H.A.M.P. Families Research team consisted of five professors with several years of experience in childhood obesity research, one paediatrician who specialised in childhood obesity treatment, and one PhD-level graduate student who served as the Project Coordinator. One member was a Certified Professional Co-Active Coach who delivered a seven-hour motivational interviewing (MI) training session to the Principal Investigator and Project Coordinator. These team members consistently used an MI spirit (e.g., expressing empathy, drawing upon parents’ own expertise to apply content learnings in their families

[49,50]) with parents, as well as specific techniques (e.g., asking open-ended questions, affirming/acknowledging participants' experiences, reflective listening, and summarising what parents shared) throughout all aspects of the intervention. Guest speakers who were invited to deliver content to participants had appropriate experience and credentials (e.g., registered dietitian, registered nurse), and in some cases, were involved in the original C.H.A.M.P. program. Individuals from community organisations (i.e., Heart and Stroke Foundation, YMCA) had been employed by these organisations for many years and had experience delivering group presentations. All guest speakers sent slide presentations to the Project Coordinator to review content in advance.

**Feasibility Assessment.** The feasibility of the intervention is currently being assessed using RE-AIM [51–53], a framework applied in both the design and evaluation of health behaviour interventions [51,52,54]. RE-AIM consists of five dimensions: *reach* (i.e., the proportion and representativeness of individuals participating in the intervention [51,52,54]); *effectiveness* (i.e., the impact of the intervention on study outcomes [52,54]); *adoption* (i.e., the proportion and representativeness of intervention agents and settings that are willing to initiate the intervention [52,54]); *implementation* (i.e., fidelity of intervention delivery to the intervention protocol, including time and cost of intervention [52,54]); and *maintenance* (i.e., the degree to which intervention participants maintain behaviour change over time and, at the setting level, the extent to which the intervention is sustained over time [51,52,54]). Specific objectives within the 'effectiveness' domain of RE-AIM are to assess the impact of the intervention in relation to several child and family outcomes including: (a) children's standardized body mass index (BMI-

z; primary outcome); (b) parents' BMI; (c) children's health-related quality of life (HRQoL); (d) children's general health and well-being; (e) children's physical activity levels and sedentary time; (f) family cohesion, communication, and satisfaction; (g) parental self-efficacy related to engaging children in healthy eating and physical activity; and (h) children's and parents' overall perceptions of the program and its impact on family health and well-being. Data pertaining to the RE-AIM dimensions were collected at various time points and on an ongoing basis prior to, during, and following the formal intervention; a publication outlining the feasibility analysis is currently in preparation. Table 2 provides an overview of the data collection for each RE-AIM dimension.

Demographic information about parent(s) and children, as well as data pertaining to the primary and secondary outcomes noted above, were collected during scheduled home visits with participants to protect their privacy and ensure the comfort of parents and children. Home visits occurred at four time points: baseline ( $\leq$  four weeks pre-intervention); mid-intervention (i.e., week six); post-intervention (i.e.,  $\leq$  two weeks post-intervention), and six-months post-intervention (i.e., June 2018). Each visit was 45 to 90 minutes in duration. Lastly, qualitative data pertaining to participants' perceptions of and experiences in the program were collected via focus groups with both parents and children (separately) and held at the YMCA during the last group-based session of the formal intervention. The general purpose of the focus groups was to explore parents' and children's perspectives of the impact of C.H.A.M.P. Families, as well as their recommendations for future interventions. All of the focus groups were approximately 75 minutes in duration, audio-recorded, and moderated by researchers involved in the study.

Table 2

*Description and timeline of data collection prior to, during, and following the 13-week*

*C.H.A.M.P. Families intervention.*

Outcome(s)	Measure(s)	Data Collection Time Points				
		Baseline (≤Four Weeks Pre- Intervention)	Mid- Intervention (Week Six)	Final Session of Intervention (Week 13)	Post- Intervention (≤Two Weeks after Final Session)	Follow-up (Six Months Post- Intervention)
Demographic Variables	<i>Parent:</i> Age, sex, ethnicity, marital status, education level, household income, relationship to child	X				
	<i>Child:</i> Age, sex, estimated age that weight became an issue, years child has been overweight	X				
Feasibility Outcomes, RE-AIM Dimensions [51]:						
Reach	Family (parent and child) demographics compared to census demographics in London and Ontario, Canada; records of participant and/or non- participant inquiries to determine participate rate, reasons for participating, reasons for declining to participate, and the most effective recruitment methods	X				
Effectiveness	Short-term (i.e., baseline to mid and/or post- intervention) measurements of primary (i.e., child BMI-z) and secondary outcomes (i.e., parent BMI, health- related quality of life; general health and well- being; family communication, cohesion, and satisfaction; parental self- efficacy; and child physical activity) short- term attrition, reasons for drop out, qualitative data pertaining to program impact (focus groups)	X	X	X	X	
Adoption (Setting and Staff)	Roles, credentials, demographic, and/or representativeness information of delivery settings and intervention agents/staff, where applicable	X	X	X	X	X

Implementation	Fidelity and adaptations to study protocol, intervention adaptations, completion of participant worksheets, and associated costs (including in-kind) of program	X	X	X	X	X
Maintenance (Individual and Setting)	<p><i>Individual:</i> Six-month follow-up on primary (i.e., child BMI-z) and secondary outcomes (i.e., parent BMI, health-related quality of life; general health and well-being; family communication, cohesion, and satisfaction; parental self-efficacy; and child physical activity), long term (i.e., six-month) attrition</p> <p><i>Setting:</i> Mixed-methods questionnaire delivered to staff and organisations (&gt;six months post-intervention) to assess perceptions of program and interest in future involvement</p>					X

*Note.* BMI: body mass index, BMI-z: standardized BMI, RE-AIM: Reach, Effectiveness, Adoption, Implementation, Maintenance. 'X' indicates the timepoint(s) that each outcome was measured.

### **C.H.A.M.P. Families Integrative Theoretical Foundation**

Social cognitive theory (SCT; [55–59]) was selected as the primary underlying theoretical model for C.H.A.M.P. Families. Broadly speaking, SCT aligns with health promotion principles, as it promotes the concept of enabling individuals to exercise control over their own health [55,56,59], and has been applied in interventions targeting a number of lifestyle behaviours including, but not limited to, diet and physical activity [60], smoking cessation [61], and alcohol consumption [62]. In relation to paediatric obesity interventions, SCT was identified by Alulis and Grabowski as the most common theoretical foundation in paediatric obesity interventions [23]. Given its emphasis on social learning [55,56,58,63] and that children learn health behaviours through observing and imitating (i.e., learning from) their parents [64–66], SCT is particularly suitable for interventions in which parents are targeted as family role models [8,17,43].

Within the SCT model of health behaviour, there are four determinants that can function both independently and in concert to regulate and predict behaviour: self-efficacy, outcome expectations, goals, and socio-structural factors [55,56,63,67,68]. Self-efficacy (i.e., a person's belief and confidence in his or her ability to exercise control over their behaviours [55,56,63,67]) impacts health behaviour directly and through its influence on the other determinants [55], in that individuals with higher self-efficacy have greater expectancies of positive outcomes, set higher goals, and perceive fewer impediments to the desired behaviour [55,63,67]. Outcome expectations and goals also operate to impact behaviour directly; however, goals are influenced by perceptions of socio-structural factors and outcome expectations [55].

Self-efficacy is the focal determinant of the SCT model and an important consideration in the development of paediatric obesity interventions. Previous research has demonstrated that many parents lack confidence in their ability to manage children's weight-related behaviours [69,70], and increasing parental self-efficacy is associated with reductions in children's BMI [21,71]. According to Bandura [63], there are four primary sources of efficacy beliefs, all of which were targeted in the C.H.A.M.P. Families intervention: mastery experiences (i.e., "performance accomplishments" [63,68,72]); vicarious experience [63,67]; verbal persuasion [63,67]; and physical and emotional states (i.e., "emotional arousal" [63,68]).

The second determinant of SCT, outcome expectations, corresponds to the results that people anticipate their actions will produce if they do or do not perform a specific behaviour [55,56]; the assumption is that individuals will adopt behaviours that result in advantageous or positive outcomes, and avoid those that lead to negative outcomes [55]. Bandura asserted that outcome expectations may be physical, social, and/or self-evaluative [55,68]. The third SCT determinant is goals [55], which are the results people attempt to obtain through their actions [73]. In SCT, long-term goals provide a general guide towards the desired behaviour in the future, whereas short-term goals provide greater control over current behaviours and actions [55]. Finally, socio-structural factors represent the fourth determinant, and include those factors an individual perceives to promote (i.e., facilitators) or deter (i.e., impediments) their goals, and ultimately, the desired behaviour [55]. In order to assist in the facilitation of sustained behaviour change in their children and families, it is

important that parents are able to identify the barriers obstructing certain behaviours and develop a plan to overcome them [55,74,75].

Within the general framework of and in addition to the four core SCT constructs described above, evidence-based group dynamics principles [30,76,77] and MI techniques [49,50] were also used in the design and implementation of the C.H.A.M.P. Families intervention. In general, group dynamics refer to the interactions and processes that occur within and among members of a group, as well as how individuals behave in group settings [77,78]. With regard to obesity, group dynamics strategies such as social support, collective problem solving, and group goal setting have been shown to be associated with improvements in body composition outcomes [79–82]. Furthermore, RCTs have shown that group-based interventions are more successful in decreasing children’s BMI-z than individual treatments [83,84].

As noted above, group dynamics theory was used as the foundation for the original C.H.A.M.P. intervention developed by members of our research team [27,30–34]. More recently, researchers have suggested that group-based treatments for childhood obesity targeting parents as agents of change are more effective than individualised treatments [83–85]. As such, the use of evidence-based group dynamics strategies in the development of an intervention targeting parents was deemed on both theoretical and empirical grounds to be an important change to the original child-focused C.H.A.M.P. study.

Given its emphasis on self-efficacy, goal setting, and behaviour change, MI has also been utilised in SCT-based interventions [86–88]. MI is defined as “a person-centred counselling style for addressing the common problem of ambivalence about change” (p. 29, Miller and



Rollnick, 2013). Thus, the primary aims of MI are to facilitate behaviour change by enabling individuals to identify their goals, examine and resolve their ambivalence to change, activate motivation for change, and ultimately make plans to change their behaviour [49,50]. Evidence from literature reviews suggests that MI is an effective strategy in addressing paediatric obesity [17,89–91]. Specifically, implementing MI with parents of children with overweight and obesity has been found to be effective in terms of reducing BMI in both feasibility [92] and RCT [93,94] studies. While MI was created and intended for in-person, individual counselling, there is also evidence to suggest that MI strategies and techniques can be delivered effectively via text-based materials and resources [44,95,96], as well as in group-based settings [97,98]. Given this rationale, MI techniques were strategically utilised within C.H.A.M.P. Families group sessions and in the home-based worksheets, as outlined below.

### **Applications of Specific Theoretical Constructs and Strategies within the C.H.A.M.P. Families Intervention**

The following section contains an overview of the application of the four SCT constructs described above, as well as a description of the adaptation of specific group dynamics strategies and MI techniques (emphasised using italics) that were used in the development and implementation of the three C.H.A.M.P. Families components. Table 3 provides definitions of each theoretical component that was applied in the design and implementation of C.H.A.M.P. Families.

Table 3

*The theoretical constructs and strategies used in the design and implementation of the C.H.A.M.P. Families intervention*

<b>Theoretical Component</b>	<b>Description</b>
<b>Social Cognitive Theory</b>	
Self-efficacy	An individual's confidence that change or attainment of a goal is achievable [79, 80]
Outcome expectancy	The outcome(s) an individual anticipates their actions will produce [79, 80]
Goal setting	Identification of a future outcome that is desired and establishing a plan to achieve that result [79, 80]
Sociostructural factors	Factors that an individual perceives to promote or obstruct the desired behavior [79, 80]
<b>Group Dynamics Strategies</b>	
Information sharing	Providing information through group discussions and activities [47]
Observational learning	Developing skills through observation and imitation of others [98]
Interpersonal learning	Developing skills by interacting with other group members [98]
Guidance	Offering and accepting direction to and from the group [98]
Group cohesion	Belonging to a group and building strong relationships with group members [98]
Self-disclosure	Revealing personal information to the group [98]
Collective problem solving	Identifying problems then developing solutions and strategies to overcome them as a group [47]
Proximity	Being within close physical proximity to the group [47]
Distinctiveness	Perceiving that the group is unique from other groups [47, 97]
Ongoing communication, feedback, and social support	Sustained contact and supportive relationships with group members [47, 97]
Ongoing group-based activities and interaction	Sustained participation and completion of group tasks and actions [47, 97]
<b>Motivational Interviewing Strategies</b>	
MI spirit	Creating a participant-centered partnership, with the attitude of acceptance, compassion, and evocation [62]
Accountability	Acknowledging an individual's intentions and promise of action [120]
Asking open-ended questions	Inviting an individual to reflect and elaborate in effort to gather information, evoke motivation, and plan a course toward change [62]
Reflective listening	Restating what an individual has said to demonstrate and/or clarify understanding its meaning and to allow the individual to hear his/her thoughts or feelings again [62]
Affirming	Acknowledging the difficulty that an individual has experienced and recognizing personal strengths and capacity for growth and change [62]
Summarizing	Collection of reflective statements that drawn together and suggest links between what an individual has said during a session and/or discussed prior [62]
Change talk	Promoting behaviour change by having individual verbalize arguments in favor of change [62]

**SCT Determinant #1: Self-Efficacy.**

*Group-based (parent-only) sessions.* Enhancing parents' confidence in their ability to support and assist in their family's health behaviour modifications is crucial to create action towards change [55,56], and was applied in C.H.A.M.P. Families by targeting the four main sources of efficacy [63,67,68]. Specifically, the research team members used an MI spirit [50] to enhance participants' self-efficacy through verbal persuasion [63] by offering suggestions when requested, verbal encouragement, and/or reinforcement that the parents had the personal resources, tools, and knowledge necessary to help their child(ren) achieve the desired health behaviours [55]. Similarly, guest speakers and many of the participants themselves were also sources of verbal persuasion to other participants. Another method of enhancing parental self-efficacy in C.H.A.M.P. Families was the deliberate creation of potential mastery experiences [63], whereby participants were provided with opportunities to practice, apply, and experience success related to new information and health behaviours. For example, after participating in the nutrition-related sessions, parents were invited to attend an optional, guided, hands-on grocery store tour led by a registered dietitian. During the tour, parents were encouraged to practice reading nutrition labels and ingredient lists, identify healthy and 'budget-conscious' foods, compare and identify different and potentially novel/unique healthy food items, and ask questions and engage in discussions with the dietitian and other participants. All of these exercises allowed participants to apply the knowledge gained during group sessions in a "real life" setting. From a group dynamics perspective, this activity is also reflective of how strategies such as *guidance*, *observational learning*, and *interpersonal learning* were applied and utilised between parents as well as between researchers/expert and parents [30,77].

Finally, during the first group session, in which an MI outcomes-based activity took place (described in more detail below), many parents acknowledged that modifying family health behaviours and having weight-related discussions with children were intimidating and anxiety-provoking (i.e., they had the potential for eliciting negative emotions [63,72]); arguably, these and other concerns identified by parents were likely to hinder parents' efficacy to serve as agents of change for their families. Thus, the C.H.A.M.P. Families researchers worked to ensure that the issues and needs identified by parents were addressed throughout the program in an effort to enhance parental self-efficacy. For example, several tips, strategies, and resources for positive communication with children about health, nutrition, body image, body size, and weight were provided to parents in an effort to address parents' concerns and support positive family cohesion and dynamics [100–102]. From an MI perspective, this is also an example of how the researchers applied *affirmation* (i.e., acknowledgement and validation [49]).

***Home-based (family) activities.*** The home-based worksheets were specifically designed and adapted [44] to support participants' self-efficacy using MI techniques including open-ended questions [49], which were designed to guide parents through identifying their views on the importance of and personal values associated with a specific health behaviour. For example, the worksheets related to children's sleep contained the following questions: "*Think about your child's bedtime...On a scale of 1 to 10, how important is it to you that your child gets enough sleep each night?*"; "*What is important to you about your child getting enough sleep each night?*"; and "*What does your child's bedtime routine look like (please include approximate durations)?*" [44]. Additional questions encouraged parents to identify current behaviours and factors that both prevented and promoted the behaviours that they deemed to be important.

***Group-based (family) follow-up support.*** A primary goal of the booster sessions was to provide additional opportunities to enhance parents' *and* children's self-efficacy for engaging in health behaviours after completion of the formal intervention. The sources of self-efficacy that were targeted included vicarious experiences (e.g., participants observed the obstacle course leader and one another to learn how to complete each obstacle), mastery experiences (e.g., professional chefs demonstrated each cooking skill and then gave parents and children the remainder of the session to engage in the skills and then prepare and cook an entire meal for the group), physiological feedback (e.g., families were provided with pedometers to take home and wear during the obstacle course activity so they could track and receive instant feedback about their step counts), and verbal persuasion (e.g., participants, researchers, and instructors encouraged each other regularly and throughout both booster sessions). Booster sessions served as further opportunities to promote group dynamics strategies including *ongoing communication and interaction, guidance, observational learning, and interpersonal learning* [77].

### **SCT Determinant #2: Outcome Expectations.**

***Group-based (parent-only) sessions.*** As noted above, in the first group session, a member of the research team who was a Certified Professional Co-Active Coach (CPCC) and experienced MI facilitator encouraged parents to consider and share the different types of outcomes (i.e., physical, social, and self-evaluative [55]) that they expected for themselves and their children during and upon completion of the program. One of the benefits of the co-active coaching approach is that it sets MI tenets into action [103], which was important for this activity, given that identifying outcome expectations can increase the likelihood of sustained behaviour change [55,104,105]. Specifically, the CPCC used foundational MI techniques, including *asking open-ended questions, affirmations, and reflective listening* to prompt

participants to share their thoughts and expectations with the group [50,103]. The CPCC also *summarised* the information provided by participants and created a list of parent-identified outcome expectancies, which were shared in real time via a screen and projector. The participants then reviewed, discussed, and refined the list of desired outcomes. This activity was done collectively to enhance *cohesion* and promote *self-disclosure* to the group [30,77]. Once the list of expected outcomes was complete, it was circulated to parents as well as all program staff and speakers, and was revisited by the C.H.A.M.P. Families research team frequently to ensure that all of the program sessions were tailored to and addressed parents' expectations.

### **SCT Construct #3: Family Goal Setting**

*Group-based (parent-only) sessions.* In addition to the exercise outlined above in which program expectations/goals were identified, parents participated in a structured group-based goal-setting workshop that provided background information and evidence pertaining to the importance of setting group goals, as well as instruction on how to set S.M.A.R.T. family goals and action plans [45–47]. This session, led by the Principal Investigator, included an interactive presentation that emphasised the importance of involving the entire family in the goal-setting process to increase accountability and provide motivation for behaviour change [55]. Participants were encouraged to find a “buddy” with whom they could share their contact information to promote accountability (i.e., staying true to a promise of action [99]), which is a co-active coaching and MI tool, for family goals. From a group dynamics perspective, this also created additional opportunities for fostering *cohesion* and *social support* among parents [77]. Other group dynamics techniques that were utilised in relation to group goal setting were *information sharing* and *self-disclosure*; at the start of each session, participants discussed their

experiences—including successes, challenges, and revisions to goals—with the previous week’s family goal-setting exercise [77].

***Home-based (family) activities.*** In addition to setting a “S.M.A.R.T.” goal each week (described above), families were asked to create an action plan to achieve their goals (i.e., three specific steps that they would take to reach their goals, by when, how they would track their progress, resources or supports they would need for success, and the main reasons that the goal was important for their family).

***Group-based (family) follow-up support.*** Informal group discussions were held with parents and children regarding progress towards the family goals set during the program, as well as post-program goals and action plans. However, some parents noted that it was challenging to maintain the behaviour changes following the structured group-based sessions. To address this, researchers used affirmation [50] to validate parents’ feelings. Additional group dynamics and SCT-related strategies were also applied (i.e., support, guidance, information sharing, verbal persuasion [30,63,77]) to bolster self-efficacy and encourage parents to persist.

#### **SCT Construct #4: Socio-Structural Factors (Facilitators and Impediments).**

***Group-based (parent-only) sessions.*** At numerous times throughout the intervention, parents were encouraged by the expert speakers and researchers to identify and discuss barriers for health behaviour changes among their children, as well as plans to overcome such obstacles. This resulted in opportunities for *collective problem solving* [30,40] and *self-disclosure* (i.e., the revealing of personal information to a group), which are evidence-based group dynamics strategies that are used to foster *social support* and *cohesion* [77]. Additional group dynamics constructs used—particularly in cases wherein parents had experienced similar impediments and

identified strategies to overcome them—were *information sharing, guidance, and interpersonal learning* [77]. For example, one parent described numerous situations in which her child refused to eat vegetables. To help overcome this impediment, other parents offered several potential solutions that had been effective in their families, including using a spiraliser device to make vegetable noodles, incorporating the child into food and meal preparation, growing vegetables in a garden, and grating vegetables into sauces. In a session related to mental health, another parent shared personal information about her child who was being bullied at school, as well as insights, experiences, and resource information related to the process of reporting bullying and advocating for children within the local school system. In addition to discussing challenges, participants who had identified factors that led to a positive impact on their family's health behaviours (i.e., facilitators) were asked to share their experiences in the same way.

When facilitating group discussions, researchers regularly employed MI techniques to empower and motivate participants. For example, when discussing the barriers to behaviour change, the researchers used *open-ended questions* such as, “*What is hard about that?*” and “*What would be the first step?*”, to help guide the conversation towards a solution. The discussions about impediments also created an opportunity for participants to receive *affirmation* from both the researchers and other parents [49].

***Home-based (family) activities.*** The home-based worksheets included questions that encouraged parents to reflect upon the facilitators and impediments to the lifestyle behaviours discussed in the group sessions. For example, in terms of facilitators for family meals, parents were asked open-ended questions such as: “*Think back to the last time you had a family meal that went really well. What was good about it? What needs to happen to have meals that go well more regularly?*” [44]. Examples of MI *open-ended questions* about impediments to adequate



sleep for children and to encourage ‘change talk’ [50] were, “*What types of things typically prevent your child from getting enough sleep each night? What ideas do you have for overcoming these barriers?*” [44]. These questions and others were intended to empower and prepare participants for change by having them explore their own ideas and experiences [49,50].

### **Additional Group Dynamics and Motivational Interviewing Strategies**

#### **Applied within the C.H.A.M.P. Families Intervention.**

***Group-based (parent-only) sessions.*** In addition to, and overlapping with some of the theoretical constructs discussed above, additional group dynamics strategies were targeted regularly throughout the program that warrant additional emphasis. These include: (a) *distinctiveness*; (b) *proximity*; (c) *ongoing interactions and group-based activities*; and (d) *ongoing communication, feedback, and social support* [30,76]. Group dynamics research suggests that groups with a greater sense of *distinctiveness* tend to be more cohesive than groups that do not perceive themselves to be distinct from or unique in comparison to other groups [30,76]. C.H.A.M.P. Families was a new program with a unique philosophy (Appendix K) that focused on creating an empathetic, safe, and judgement-free environment [50] wherein parents were supported in sharing information about their personal experiences and challenges. Given its specific focus and unique group-based environment, the C.H.A.M.P. Families group was likely different from any other group(s) to which parents belonged (e.g., family, work, social), making it inherently *distinct*. Furthermore, the group environment and classroom layout (i.e., desks arranged in a U-shape to encourage face-to-face communication, with participants often sitting in the same seats throughout the program) ensured that participants were in close and consistent physical *proximity* to one another other, which is a group dynamics factor related to *group cohesion* and *social support* [30,106]. Attending educational sessions enabled participants to

meet and interact with people who shared similar circumstances, which is something that parents in previous paediatric obesity interventions have deemed important and valuable [34]. Beyond several group-based interactions and activities, these sessions were the main mechanism through which participants could provide and receive encouragement, guidance, and support from their peers [30,76].

While parents were the primary intervention targets of C.H.A.M.P. Families, children were invited to attend free, group-based programming offered at the YMCA (e.g., swimming, sports, board games, etc.) during the parent-only sessions. While the theoretical constructs described herein were not used explicitly with children, many parents reported that their children had very positive experiences in the group-based programming, including developing new friendships and engaging in new activities with other similar peers. Several children from C.H.A.M.P. Families attended the optional programming regularly, thus creating the same opportunities for: (a) *ongoing interactions and group-based activities*; (b) *ongoing communication, feedback, and social support*; and (c) *cohesion* [30,76]. This is an important programmatic feature that warrants mention, given the positive impact on the children, and also on the parents who were leaving their children to participate in the weekly group-based parent sessions.

***Home-based (family) activities.*** In addition to the home-based activities (i.e., discussions, goal setting, etc.) led by parents, another aspect of C.H.A.M.P. Families that took place at home was the four data collection visits with the Project Coordinator. From a group dynamics perspective, these visits were important opportunities to continue the *ongoing communication, feedback, and social support* for families throughout and following the intervention [30,76].

Further, given that the Project Coordinator was one of the research team members trained in MI,

she approached each visit and conversation as a partnership with an MI spirit (i.e., creating a participant-centred partnership, with the attitude of acceptance, compassion, and evocation; Miller and Rollnick, 2013) and actively applied MI techniques (i.e., OARS: *open-ended questions, affirming, reflective listening, and summarising*; Miller and Rollnick, 1991, 2013). Participants were also provided with the contact information of the Program Coordinator, Principal Investigator, and guest speakers, and were informed that they could contact these individuals at any time if they had questions and/or required additional support.

***Group-based (family) follow-up support.*** The activities selected for the booster sessions (i.e., cooking class and obstacle course) were purposefully interactive and group-based, often requiring participants to not only work together within their family unit, but also with other families and members of the research team. In addition to serving as opportunities for *interpersonal and observational learning* [77], these experiences provided parents and children with time to reconnect, facilitating *cohesion and ongoing communication, feedback, and social support* [30,76]. Again, given the MI training of the research team, an MI spirit formed the foundation for all of the conversations and group discussions with participants [50].

## **Discussion**

The treatment of childhood overweight and obesity requires complex behavioural and theory-based interventions [13,17,43]. This article provides a rationale for and detailed description of the C.H.A.M.P. Families intervention, as well as practical applications of its foundational theoretical framework. Previous research supports the utilisation of SCT [17,71], MI [89,90,92,107], and group dynamics theory [30,85,108] in childhood obesity interventions, and this paper addresses an important gap in the literature by providing a detailed description of the process by which theoretical constructs are adapted, used, and integrated in a unique

intervention targeting parents as the primary agents of change [3,7,23,24]. The transparent reporting of interventions and their theoretical underpinnings is critical not only for study replication purposes, but also to highlight the factors that might have an influence on the intervention's success or failure [25,26].

Despite our extensive recruitment efforts, which spanned four months, we were only able to recruit 11 families to participate in C.H.A.M.P. Families (six dyads and five triads;  $n = 11$  children and 16 parents/caregiver). Some examples of 'lessons learned' from a recruitment and retention perspective include extending the recruitment period, directing additional efforts towards the messaging and 'marketing' of the Program, and including and highlighting greater child involvement and additional family-based hands-on activities. As noted above, the next step is to evaluate the feasibility (including the effectiveness) of the intervention using RE-AIM [51–54]. Numerous guidelines, templates, and checklists have been developed to improve reporting, and subsequently, replicate interventions [35,109–111]. TIDieR [35] and RE-AIM [51–54] represent tools that can serve to improve the speed, quality, and impact of public health interventions with the goal of translating research into practice [35,112]. Providing a thorough description of a theory-guided intervention such as C.H.A.M.P. Families via TIDieR, and using RE-AIM to evaluate its feasibility, may contribute to improvements in intervention content, delivery, intensity, and dose, as well as participant recruitment, retention, and adherence [53]. Through the dissemination of our feasibility analysis using RE-AIM, specific issues and limitations—as well as suggestions and potential improvements for future researchers and practitioners—regarding Program implementation and participant recruitment will also be addressed. If sufficient evidence of intervention feasibility is found, future steps may also include using a framework such as the PRACTical planning for Implementation and Scale-up

guide (PRACTIS guide [113]) to continue our discussions with community stakeholders regarding the potential to scale up C.H.A.M.P. Families (or an adapted version including components from the original C.H.A.M.P. intervention [27,30,31,34] that takes into account the needs/vision of the stakeholders involved) in the community and beyond.

### **Conclusions**

This article provides researchers and health professionals with practical information and guidance related to the process of developing a theory and evidence-based childhood overweight and obesity treatment intervention targeting parents as the primary agents of change. Reporting detailed intervention descriptions, as well as information related to the adaptation and use of theoretical constructs, is not only useful from an implementation science perspective [113], but also addresses important gaps in the literature.

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## Chapter 4

### Study 3: The impact of a parent-focused paediatric overweight/obesity intervention on parental self-efficacy and children's body composition outcomes

#### Introduction

The global prevalence of childhood obesity has increased dramatically over the past half century, affecting approximately 124 million children as of 2016 (Abarca-Gómez et al., 2017). It is widely accepted that health behaviours such as diet, physical activity, sleep, and sedentary time are closely associated with paediatric obesity (P. M. Anderson & Butcher, 2006; Bhadoria et al., 2015; Procter, 2007; Weihrauch-Blüher & Wiegand, 2018; Zhang, Wu, Zhou, Lu, & Mao, 2016). Childhood obesity and many of these health behaviours are also influenced by socio-ecological determinants such as daily living conditions, socioeconomic status, culture, neighborhood, school environment, media, government (Bhadoria et al., 2015; Caprio et al., 2008; Moore, McDonald, Carlon, & O'Rourke, 2015; Procter, 2007). In addition, research has shown that the family environment (e.g., family dynamics, parenting styles, home food environment, etc.) is associated with childhood obesity (Berge, 2009; Campbell, 2016). A number of explanations pertaining to the link between parents, children's health behaviours, and childhood obesity have also been advanced (Berge, 2009; Bhadoria et al., 2015; Campbell, 2016; Procter, 2007; Weihrauch-Blüher & Wiegand, 2018). For example, while children have gained influence on their parents' food and beverage purchases (Baldassarre, Campo, & Falcone, 2016; Haselhoff, Faupel, & Holzmüller, 2014), parents typically serve as the primary decision-makers about household food, and therefore influence both the availability and accessibility of certain foods (Baldassarre et al., 2016; Mitchell, Farrow, Haycraft, & Meyer, 2013; Yee, Lwin, & Ho, 2017). Further, children often learn and emulate the physical activity (Dong et al., 2016;

Edwardson & Gorely, 2010) and dietary (Sutherland et al., 2008; Yee et al., 2017) behaviours and attitudes of their parents; thus, parental role modelling can have either beneficial or detrimental impacts on children's health (Natale et al., 2014; Yee et al., 2017).

Recognizing the strong influence of parents on children's health behaviours, family-based childhood obesity interventions that emphasize the role of children as well as family members (with a focus on parents/primary caregivers in particular) have been recommended as an effective treatment approach for many years (Epstein, Paluch, Roemmich, & Beecher, 2007; Epstein, Valoski, Wing, & McCurley, 1994; Epstein, Wing, Koeske, Andrasik, & Ossip, 1981; Epstein & Wing, 1987). Though family-based treatments for paediatric obesity have been associated with reductions in child standardized body mass index (BMI-z) and improvements in child health behaviours (Berge & Everts, 2011), the implementation of these interventions is time- and resource-intensive (Coppock, Ridolfi, Hayes, St. Paul, & Wilfley, 2014; Janicke et al., 2009; Upton, Bold, & Peters, 2012). Interestingly, there is a growing body of literature that has focused on the treatment of childhood obesity via the inclusion of parents as the *primary and/or exclusive agents of change*, with limited-to-no child involvement in such programs (Altman & Wilfley, 2015; Ball et al., 2012; Boutelle et al., 2015; Faith et al., 2012; Jang, Chao Msn, & Whittemore, 2015; West, Sanders, Cleghorn, & Davies, 2010). Some of these "parent-only" interventions (Boutelle et al., 2015; Golan, Kaufman, & Shahar, 2006), also referred to as "parents as agent-of-change" (PAC) interventions (Ball et al., 2012; Golan, 2006; Magarey et al., 2011; West et al., 2010), have been shown to be as effective as parent-child interventions in improving child weight-related outcomes (e.g., Ewald, Kirby, Rees, & Robertson, 2014; Jull & Chen, 2013). Parent-only childhood obesity interventions are also typically implemented at a

lower cost and with fewer resources than traditional family-based treatment programs (Ewald et al., 2014; Janicke et al., 2009).

Serving as an agent of change for children's health behaviours requires that parents and caregivers possess knowledge about and confidence in their abilities to promote and modify such behaviours (Bandura, 2004; Golan & Weizman, 2001). *Parental self-efficacy*, defined broadly as parents' beliefs about their ability to utilize effective parenting practices (De Lepeleere, De Bourdeaudhuij, Cardon, & Verloigne, 2015; Jones & Prinz, 2005), has been found to influence child development both directly and indirectly through the use of "promotive parenting strategies" (i.e., activities to cultivate children's skills, talents, and interests; Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999, p. 71). Within the context of child health behaviours specifically, parental self-efficacy has been operationally defined as the level of confidence parents possess in relation to promoting, supporting, enacting, and/or managing certain health behaviours in the family environment (Decker, 2012; West & Sanders, 2009; Wright, Adams, Laforge, Berry, & Friedman, 2014). Research in this area has shown that greater parental self-efficacy for supporting health behaviours is associated with improvements in children's physical activity (Davies, Terhorst, Nakonechny, Skukla, & El Saadawi, 2014; Xu, Wen, & Rissel, 2015), screen time levels (Arsenault, Xu, Taveras, & Hacker, 2014; Jago, Wood, Zahra, Thompson, & Sebire, 2015; Jurkowski, Lawson, Green Mills, Wilner, & Davison, 2014), dietary intake (Gholamalizadeh, Entezari, Paknahad, Hassanzadeh, & Doaei, 2014; Parekh et al., 2018) and fast-food consumption (Arsenault et al., 2014). Some studies have also found that parents of children with obesity are more likely to have lower parental self-efficacy for managing their child's weight-related health behaviours than parents of children with healthy body weights (Morawska & West, 2013; Rivera, Msc, Yap, Fracp, & Mager, 2014; West & Sanders, 2009). In

addition, qualitative studies exploring the perspectives of parents of children with overweight/obesity have also highlighted parents' lack of confidence in their ability to manage and support children's health behaviours (Brown, Dolisca, & Cheng, 2015; Styles, Meier, Sutherland, & Campbell, 2007).

Given the important role that parents play in family-based treatment programs, as well as the influence of parental self-efficacy on children's health behaviours, parental self-efficacy for modifying and supporting child health behaviours is an important consideration in paediatric obesity interventions (Arsenault et al., 2014; Berge & Everts, 2011; Golan & Weizman, 2001; Jago et al., 2015). Interestingly, parental self-efficacy is often not reported as a study outcome in traditional family-based or parent-only childhood obesity interventions (J. D. Anderson, Newby, Kehm, Barland, & Hearst, 2015; Ball et al., 2012; Boutelle et al., 2015; Foster et al., 2014; Golan & Crow, 2004; Golan et al., 2006; Golley, Magarey, Baur, Steinbeck, & Daniels, 2007; Kreier et al., 2013; Upton, Taylor, Erol, & Upton, 2014; Welsby et al., 2014). In fact, in a recent review of parent-only treatment interventions for childhood obesity ( $n = 20$  randomized controlled trials), Loveman et al. (2015) observed that only one study (West et al., 2010) reported on parental self-efficacy for child health behaviours. In their study, West and colleagues (2010) implemented a 12-week "Group Lifestyle Triple P", an adapted Triple P Program (i.e., Positive Parenting Program; Sanders, 2008) that emphasized nutrition, physical activity, and positive parenting with parents ( $n = 52$ ) of children with overweight/obesity, and compared it to a waitlist control group ( $n = 49$  parents). The Group Lifestyle Triple P intervention was associated with significant reductions in child BMI- $z$  and enhanced parental self-efficacy for managing weight-related 'problem' behaviours (e.g., eating unhealthy snacks, eating too quickly, playing too many video games; West et al., 2010). Another study that examined parental self-efficacy for changing

family health behaviours (but was not included in the Loveman et al. 2015 meta-analysis because it was *family-based* and not *parent-only*) was conducted by Gunnarsdottir and colleagues in 2011. Gunnarsdottir and colleagues delivered a family-based childhood obesity treatment to 84 parent-child dyads over 18 weeks and found that baseline parental self-efficacy for changing family health behaviours (i.e., their own and their children's) was a significant predictor of both treatment completion and child weight loss at the end of the intervention. Changes in parental self-efficacy were not reported and no associations between baseline self-efficacy and child weight outcomes were observed at the 1-year follow-up. However, given the influence of baseline parental self-efficacy on child post-intervention weight, the authors recommended that future interventions incorporate strategies to enhance parental self-efficacy for changing family health behaviours from the beginning of the treatment process (Gunnarsdottir, Njardvik, Olafsdottir, Craighead, & Bjarnason, 2011).

In short, parental self-efficacy may be a particularly salient factor within the context of parent-focused childhood obesity treatments, as children are not directly involved in such interventions and parents are targeted to play a primary role in supporting and promoting child health behaviour change. Given the success of previous parent-focused paediatric obesity interventions (Ewald et al., 2014; Jang et al., 2015; Loveman et al., 2015), as well as the influence of parental self-efficacy on children's health behaviours (Davies et al., 2014; Gholamalizadeh et al., 2014; Jago et al., 2015; Xu et al., 2015) and child BMI-z (Gunnarsdottir et al., 2011; Morawska & West, 2013), the purpose of the present study was to examine the impact of a community-based, parent-focused childhood obesity intervention on: (a) BMI-z scores in children (aged 6-14 years of age) with overweight or obesity; and (b) parental self-efficacy for promoting health behaviours in children.

## Method

### Intervention Context

The intervention was delivered in a large city in Ontario, Canada with a population of more than 383,000, approximately 9.2% of which are children between the ages of 5 and 14 years (Statistics Canada, 2019). Estimates of the local prevalence of child and youth overweight and obesity vary depending on the measures used (i.e., self-report vs. researcher-assessed), ranging from 19.3% (ages 12-17 years; Public Health Ontario, 2018) to 24.5% (ages 10-14 years; Gilliland et al., 2012), and up to 28.6% (ages 6-13 years; He & Beynon, 2006).

### Recruitment

Parents were recruited through multiple strategies including physician referrals, newspaper and radio advertisements, posters displayed in local businesses and community centres (Appendix F), and social media (i.e., Facebook and Twitter). Parents were eligible to participate in the study if: (a) they had a child ages 6-14 years with a BMI  $\geq$  85th percentile for age and sex (calculated during screening using parent reports and the Centers for Disease Control and Prevention [CDC] BMI Percentile Calculator for Child and Teens; CDC, 2018); (b) at least one parent or caregiver agreed to take part in the study; and (c) both the child and his/her parent(s) were able to speak, read, and understand English. Eleven participants met the eligibility criteria and consented to participate in the study. Of these eleven individuals, one participant dropped out of the study at the mid-intervention point and another did not complete a sufficient number of assessments to be included in the analyses. Thus, a total of nine participants and their children were included in the present study. All aspects of the intervention and present study

were approved by the University's Health Sciences Research Ethics Board (Project ID# 108826, Appendix E) registered retrospectively with ISRCTN (ID# 10752416).

### **Intervention Design and Procedure**

C.H.A.M.P. Families was a pilot intervention for the treatment of childhood overweight and obesity that targeted parents as the primary agent of change. The intervention was developed on the basis of Bandura's Social Cognitive Theory (SCT; Bandura, 1986, 2004) and included the use of several evidence-based strategies and techniques grounded in group dynamics (Carron & Spink, 1993; Forsyth, 2014; Martin et al., 2009) and motivational interviewing (Miller & Rollnick, 1991, 2013). Within SCT, self-efficacy has been identified as a focal determinant of behaviour change (Bandura, 1986, 1989, 2004); as such, the four sources of self-efficacy (i.e., mastery experiences, vicarious experience, verbal persuasion, and physical and emotional states; Bandura, 1977, 1997) were targeted explicitly throughout the current intervention. A full description of the C.H.A.M.P. Families intervention, including the theoretical foundation used and a detailed overview of the strategies applied to enhance parental self-efficacy, are presented in another manuscript (see Reilly et al., 2018).

C.H.A.M.P. Families was a 13-week intervention consisting of: (1) eight, 90-minute group-based education sessions attended by parents only (September-December 2017). Education sessions were delivered to parents at a local YMCA facility and covered a broad range of child and family health topics including: child growth and development; healthy eating and nutrition; physical activity; sleep and sedentary behaviours; mental health and wellbeing; parenting and family dynamics; policy issues; and community resources. Several health professionals (i.e., "experts") and members from community organizations were featured as



guest speakers during education sessions and delivered relevant content to parents. At the end of each session, parents were provided with evidence-based resources, and were assigned “homework” activities to encourage the application of class concepts in the home environment with children (Appendix J). A portion of the take-home activities were adapted, with permission, from materials used in an American obesity-prevention program for parents of children aged 2-5 years (i.e., “Homestyles”; Byrd-Bredbenner et al., 2017). Participation in C.H.A.M.P. Families was free and YMCA drop-in programming/child-minding was available for all children (including siblings) of parent participants. Following the 13-week formal intervention, two, 2-hour booster sessions were offered at 3- and 6-months post-intervention. These hands-on activity sessions were designed to include parents and children in a fun, family-oriented environment and focused on nutrition and physical activity, respectively.

### **Study Design**

This study utilized a quasi-experimental single-subject design (i.e., A-B design) with inter-subject replication, wherein a baseline measurement (i.e., baseline phase, “A”) was taken prior to the implementation of the treatment intervention and repeated measures were conducted during and after the intervention, at mid-intervention, post-intervention, and 6-month follow-up (i.e., treatment phase, “B”; Engel & Schutt, 2009).

### **Data Collection**

In an effort to enhance participants’ privacy and comfort, a researcher conducted four home visits with each family to collect data. Outcomes were assessed at baseline (i.e., Month 0,  $\leq 4$  weeks pre-intervention), mid-intervention (i.e., Month 2, Week 6), post-intervention (i.e., Month 4,  $\leq 2$  weeks post intervention), and at a 6-month follow-up time period (Month 10). Each

outcome related to the present study is described in detail below.

**Sociodemographic variables and participant characteristics.** The parent/caregiver who self-identified as the *primary parent* completed a demographic questionnaire during the first home visit (i.e., at baseline). The questionnaire items focused on parent's age, sex, ethnicity, marital status, educational attainment, household income, and relationship to child, as well as parent-reported age of the child, child gender, estimated age that weight became an issue for the child, and years child has been overweight. Sign-in sheets recorded parent attendance at each education session throughout the intervention ( $n = 8$ ) and at the additional booster sessions ( $n = 2$ ). In addition to the primary parent, other caregivers (i.e., parent and step-parent) were also invited to participate in the study. While data were collected only from the primary parent<sup>3</sup> for the purposes of this study, researchers recorded attendance for all family members, and invited them to join all education and booster sessions. The demographic information of each participant (i.e., the primary parent), session attendance, and a description of the child involved in the study is provided in Table 1.

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<sup>3</sup>Additional caregivers (i.e., parents and step-parents) who attended the educational sessions were also invited to participate in focus groups which were held at the conclusion of the formal intervention, and to provide informed consent if interested.

Table 1

*Demographic information of C.H.A.M.P. Families primary parents and their child*

ID	Age	Gender	Ethnicity	Marital Status	Educational Attainment	Employment Status	Household Income	Parent Sessions Attended <i>n</i> (%)	Booster Sessions Attended <i>n</i> (%)	Description of Child in Study at Baseline
1	52	Female	Caucasian	Separated	High school diploma	Full Time	\$50,000-\$59,999	5 (62.5)	1 (50)	Female, age 14 BMI = 35.1 Weight issue for ~5 yrs
2	41	Female	Caucasian	Married	University degree	Full Time	≥\$100,000	8 (100)	2 (100)	Female, age 10 BMI = 32.6 Weight issue for ~6 yrs
3	43	Male	Caucasian	Married	University degree	Full Time	≥\$100,000	8 (100)	2 (100)	Female, age 9 BMI = 22. Weight issue for ~1.5 yrs
4	40	Female	Caucasian	Married	College diploma	Part Time	\$60,000-\$69,999	8 (100)	1 (50)	Male, age 9 BMI = 29.0 Weight issue for ~5 yrs
5	45	Female	Caucasian	Single	Trades certificate	Full Time	\$30,000-\$39,999	8 (100)	2 (100)	Female, age 8 BMI = 26.6 Weight issue for ~5 yrs
6	45	Female	Caucasian	Common-Law	College diploma	Full Time	≥\$100,000	7 (87.5)	1 (50)	Male, age 9 BMI = 23.2 Weight issue for ~2 yrs
7	36	Female	Arab	Married	University degree	Part Time	\$60,000-\$69,999	6 (75)	2 (100)	Male, age 8 BMI = 28.2 Weight issue for ~7 yrs
8	30	Female	Arab	Married	University degree	Part Time	\$70,000-\$79,999	5 (62.5)	1 (50)	Female, age 10 BMI = 25.9 Weight issue for ~5 yrs
9	42	Female	Caucasian	Married	University degree	Unemployed	≥\$100,000	4 (50)	0 (0)	Female, age 10 BMI = 29.1 Weight issue for ~5 yrs

*Note.* Body mass index (BMI; kg/m<sup>2</sup>) scores presented are age- and sex-specific, years (yrs).

**Standardized body mass index (BMI-z).** Children's BMI-z was calculated using researcher assessed height and weight, parent-reported sex of the child, child's date of birth, and date of measurement. Height (nearest 0.1 cm) and weight (nearest 0.1 kg) were measured on a firm, flat surface using a Seca 214 portable stadiometer and digital glass bathroom scale. Participants were instructed to remove shoes and heavy clothing while measurements were conducted. Calculations were performed using the CDC Growth Charts in an online clinical tool (PediTools, 2018). Reductions of 0.25 in child BMI-z have been associated with improved cardio-metabolic risk factors in children (i.e., hypertension, hypertriglyceridemia, and low HDL-cholesterol), with reductions of 0.5 doubling these beneficial effects (Ford, Hunt, Cooper, & Shield, 2010; Reinehr et al., 2016). Therefore, a reduction of  $\geq 0.25$  in child BMI-z score was deemed to be clinically significant in the current study.

**Parental self-efficacy.** The Parental Self-Efficacy Questionnaire (Decker, 2012) is a 34-item instrument that is valid and reliable for parents of children aged 6-11 years old. The questionnaire was developed using the United States Department of Agriculture (USDA) Pyramid guidelines for healthy dietary and physical activity behaviours, and also includes items pertaining to outcome expectancies and environmental factors (United States Department of Agriculture, 2008). The root question in the instrument (i.e., *How confident are you that...*) asks respondents to rate their confidence from "not at all confident" (0) to "mostly or totally confident" (10), in accomplishing specific tasks related to their child's diet and physical activity (Decker, 2012). Example items include, "*How confident are you that your child chooses healthy foods at a fast-food restaurant?*" and "*How confident are you that your child is physically active, even if you have excessive demands at work?*". The questionnaire is divided into two separate subscales for dietary ( $n = 27$  items) and physical activity behaviours ( $n = 7$  items). In accordance

with scoring guidelines for this instrument (Decker, 2012), the questionnaire was scored and analyzed cumulatively to provide a total self-efficacy score for promoting health behaviours in children.

### **Data Analysis**

Single-subject data were examined via visual analysis of level and trend (Engel & Schutt, 2009; Horner et al., 2005). *Level* corresponds to magnitude of change of the variable (Engel & Schutt, 2009) and was measured via change scores for child BMI-z and total parental self-efficacy from: (1) baseline to post-intervention; and (2) post-intervention to 6-month follow-up. The amount of change for each individual was examined and compared across participants. *Trend* refers to the slope within a variable (Engel & Schutt, 2009; Horner et al., 2005) and was assessed for each participant using child BMI-z score and total parental self-efficacy score by calculating the linear trend line function in Microsoft Excel (version 15.21.1). With regard to trend, a positive outcome for child BMI-z would be a decreasing trend as it would denote a reduction in BMI-z score over the course of the study period (i.e., baseline [Month 0] to 6-month follow-up [Month 10]). In contrast, an increasing trend would reflect an increase in the child's BMI-z score within the timeframe of the study. In contrast, a positive outcome for parental self-efficacy would be an increasing trend as it represents greater self-efficacy upon completion of the study. Conversely, a decreasing trend would reflect a reduction in the parent's self-efficacy during the study time period.

## **Results**

### **Participants**

In total, nine families (4 dyads, 5 triads) participated in this study. Baseline age and BMI of the self-identified primary parents ( $n = 9$ ) ranged from 30 to 52 years ( $M_{Age} = 41.5$  years,  $SD = 6.1$ ) and  $25.2 \text{ kg/m}^2$  to  $64.4 \text{ kg/m}^2$  ( $M_{BMI} = 33.9 \text{ kg/m}^2$ ,  $SD = 12.3$ ), respectively, while children were between the ages of 8 and 14 years ( $M_{Age} = 9.7$  years,  $SD = 1.8$ ) with a BMI for age and sex at the 95<sup>th</sup> percentile or greater at baseline ( $M_{BMI-z} = 2.20$ ,  $SD = 4.1$ ). Parents were predominantly female ( $n = 8$ , 88.9%), Caucasian ( $n = 7$ , 77.8%), and married ( $n = 6$ , 66.7%). All but one parent had obtained some level of post-secondary education, including a trades certificate ( $n = 1$ , 11.1%), college diploma ( $n = 2$ , 22.2%), and university degree ( $n = 5$ , 55.5%), and had full time ( $n = 5$ , 55.5%) or part-time ( $n = 3$ , 33.3%) employment. Annual household income varied across participants from \$30,000-\$39,999 to \$100,000 or greater. Of the nine self-identified primary parents, five (55.6%) attended the intervention sessions with an additional caregiver (i.e., a parent or step-parent). It is worthwhile to note that program attendance was higher among participants who had a secondary caregiver attend the sessions with them ( $M_{Attendance} = 97.5\%$ , or 7.8/8 sessions) than for participants who did not have a secondary caregiver attend sessions ( $M_{Attendance} = 62.5\%$ , or 5/8 sessions).

### Visual analysis

**Child BMI-z.** The level of change in child BMI-z from baseline to post-intervention ranged from  $-0.22$  to  $+0.17$ . From baseline (i.e., Month 0) to post-intervention (i.e., Month 4), all but one child had a decreased BMI-z score (i.e., Participants 1-8). The level of change from post-intervention to 6-month follow-up ranged from  $-0.11$  to  $+0.16$ . Specifically, from post-intervention to the follow-up assessment (i.e., Month 10), five children had a reduced BMI-z score (i.e., Participants 1-4,7) and four children had an increased BMI-z score (i.e., Participants 5,6,8,9). Of the four children whose BMI-z increased during the post-intervention to follow-up

period, two children's (i.e., Participants 6,8) scores remained lower than the scores reported at baseline, whereas the other two children's (i.e., Participants 5,9) scores that were higher than those reported at baseline. No clinically significant reductions in BMI- $z$  (i.e.,  $\geq 0.25$ ) were observed from baseline to post-intervention, post-intervention to follow-up, or baseline to follow-up. Change scores from baseline to post-intervention and post-intervention to 6-month follow-up are displayed in Table 2.

Table 2

*Change scores from baseline to post-intervention and post-intervention to 6-month follow-up for standardized child body mass index (BMI-z) and total parental self-efficacy scores.*

Participant	Child BMI-z change scores		Total parental self-efficacy change scores	
	Baseline–Post-intervention (Months 0–4)	Post-intervention–Follow-up (Months 4–10)	Baseline–Post-intervention (Months 0–4)	Post-intervention–Follow-up (Months 4–10)
1	–0.09	–0.08	+1.72	–2.90
2	–0.05	–0.08	+0.65	+0.82
3	–0.10	–0.08	+1.92	–0.42
4	–0.08	–0.11	–0.50	+0.02
5	–0.09	+0.12	+0.18	–0.39
6	–0.22	+0.16	+1.20	+0.56
7	–0.05	–0.07	+1.28	–1.07
8	–0.12	+0.06	+1.25	+0.97
9	+0.17	+0.07	+1.76	–0.34



Trends in child BMI- $z$  scores ranged from  $-0.02$  to  $+0.02$  and are presented in Table 3. Decreasing trends of child BMI- $z$  scores across from baseline to 6-month follow-up were observed in six children (i.e., Participants 1–4,6,7), while increasing trends were calculated for two children (i.e., Participants 5,9). Graphical displays of the data and trends related to individual child BMI- $z$  scores are displayed in Figure 1.

Table 3

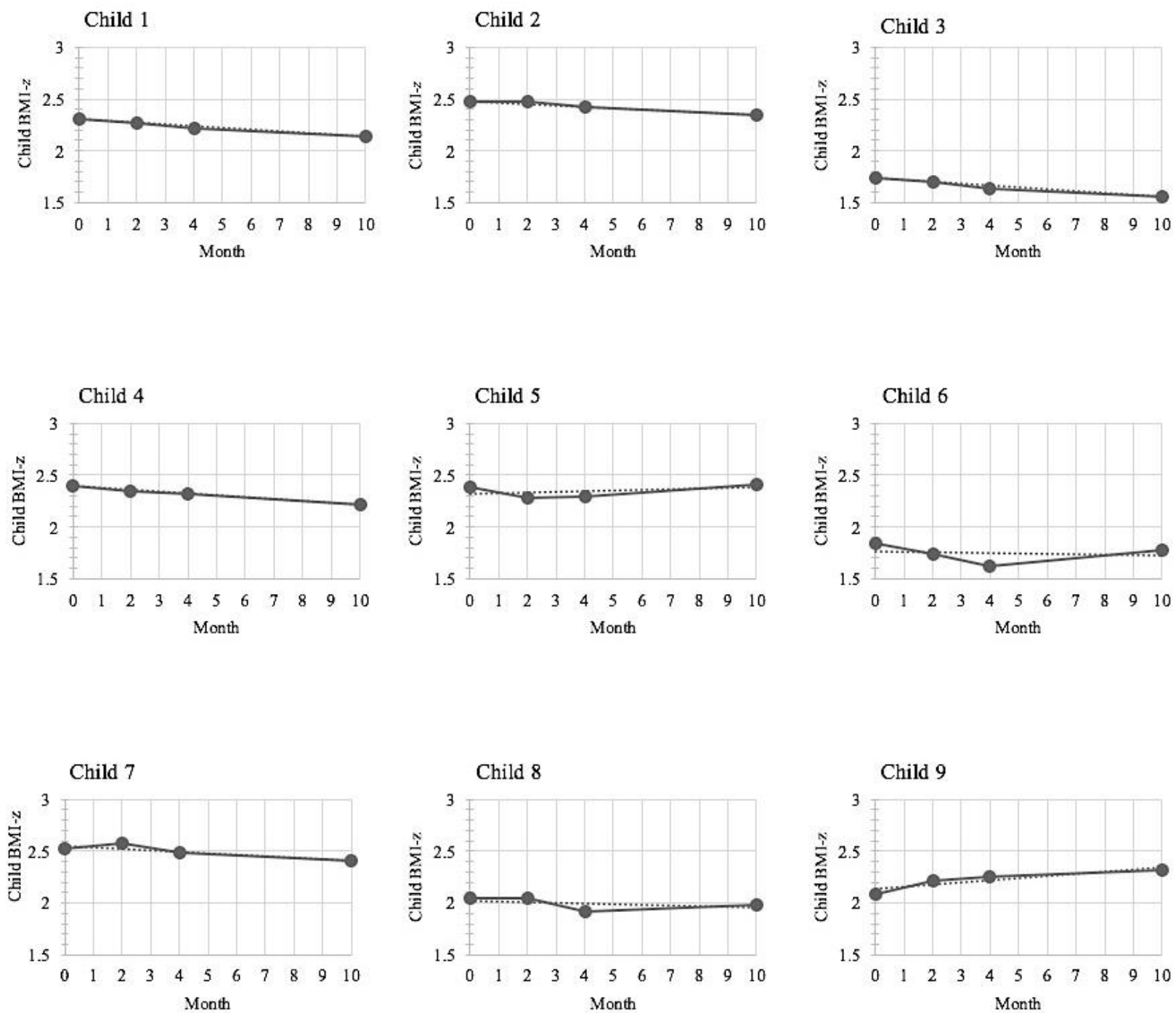
*Trends across study period (i.e., baseline [Month 0] to 6-month follow-up [Month 10]) for standardized child body mass index (BMI-z) and total parental self-efficacy*

Participant	Trends from Baseline to 6-Month Follow-up	
	Child BMI-z	Total Parental Self-Efficacy
1	-0.02	-0.14
2	-0.01	+0.12
3	-0.02	+0.12
4	-0.02	-0.01
5	+0.01	-0.06
6	0.00	+0.07
7	-0.01	+0.15
8	-0.01	+0.01
9	+0.02	+0.26

*Note.* Standardized body mass index (BMI-z)

Figure 1

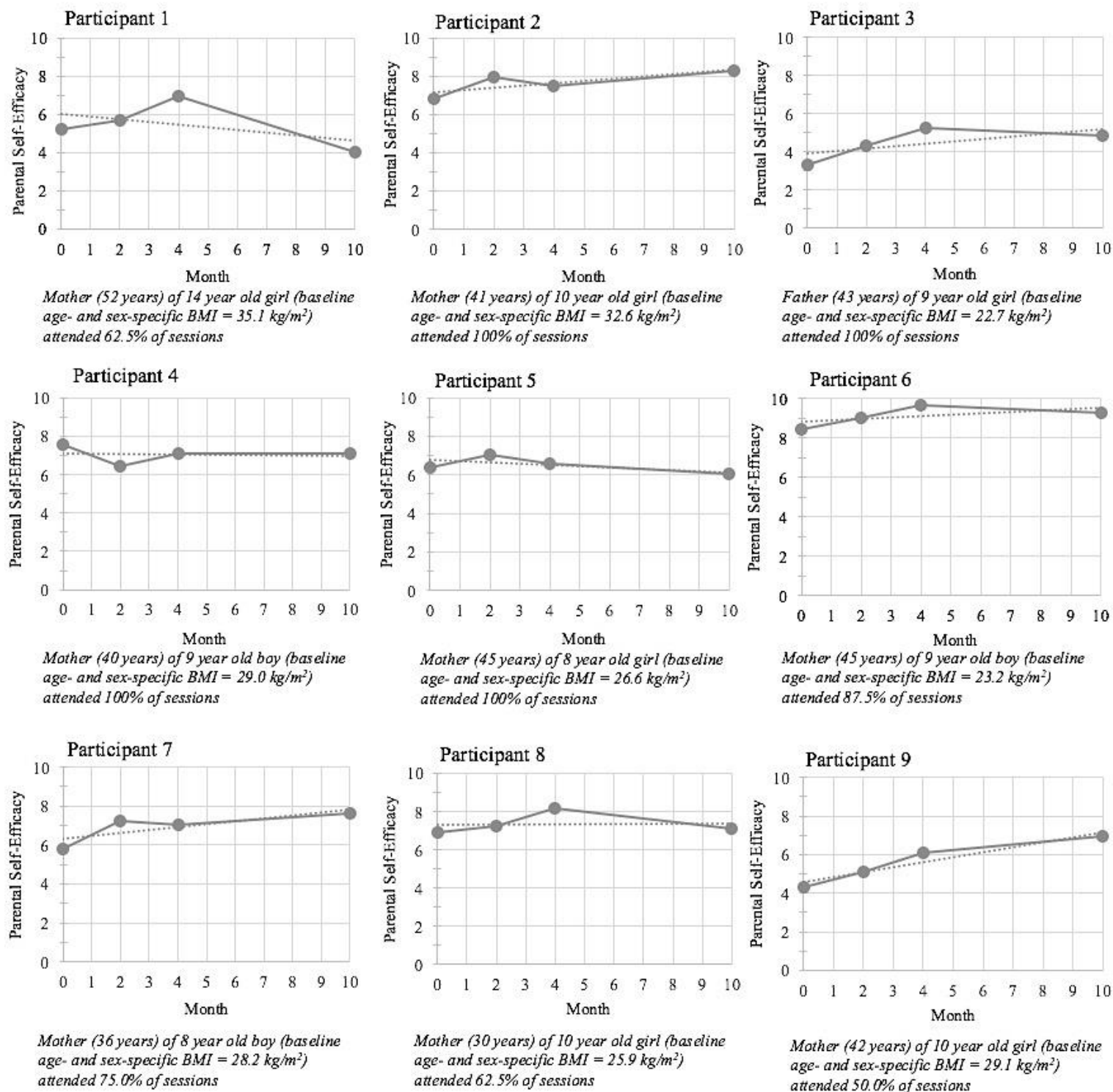
*Graphical display of data and trends for child standardized body mass index (BMI-z)*



**Parental Self-Efficacy for Promoting Health Behaviours in Children.** The level of change in total parental self-efficacy scores ranged from  $-0.50$  to  $+1.92$  from baseline to post-intervention (Table 2). Eight of nine parents (i.e., Participants 1-3, 5-9) had an increased total self-efficacy score from baseline (i.e., Month 0) to post-intervention (i.e., Month 4). From post-intervention to the 6-month follow-up assessment (i.e., Month 10), four participants had increased total self-efficacy scores (i.e., Participants 2,4,7,9) and five participants had decreased scores (i.e., Participants 1,3,5,6,8). Of the five participants whose self-efficacy scores decreased during the post-intervention to follow-up period, three parents' (i.e., Participants 3,6,8) scores remained higher than the scores reported at baseline, whereas the other two parents' (i.e., Participants 1,5) scores that were lower than those reported at baseline. The level of change from post-intervention to 6-month follow-up ranged from  $-2.90$  to  $+0.97$ . The trends ranged from  $-0.14$  to  $+0.26$  (Table 3). Increasing trends of parental self-efficacy scores across the total study period (i.e., from baseline to 6-month follow-up) were observed in six of the nine participants (i.e., Participants 2-3, 6-9) and a decreasing trend was identified for the remaining three participants (i.e., Participant 1,4,5). Graphical displays of the data and trends pertaining to parental self-efficacy for each participant are shown in Figure 2.

Figure 2

Graphical display of data and trends for parental self-efficacy for promoting child health behaviours



## Discussion

The purpose of this study was to assess the preliminary effects of a community-based, parent-only childhood overweight and obesity intervention on child BMI-*z* and parental self-efficacy for promoting health behaviours in children. From baseline to post-intervention (a span of 4 months), the majority of participants experienced positive effects on both researcher-assessed child BMI-*z* and self-reported parental self-efficacy scores ( $n = 8$  children and parents, respectively). Notably, the one participant whose child showed an increase in BMI-*z* at the post-intervention assessment (i.e., Participant 9) had the lowest overall attendance rate (i.e., attended only 50% of education sessions), and the one participant (i.e., Participant 4) who reported a decrease in total parental self-efficacy from baseline (i.e., 7.58) to post-intervention (i.e., 7.08) reported the second highest self-efficacy score at baseline.

At the 6-month follow-up assessment, there was considerably greater variability in BMI-*z* and self-efficacy outcomes across participants. With regard to child BMI-*z* scores, it was anticipated that some participants would experience a “rebound effect” (i.e., the inability to maintain behaviour changes independently after an intervention, causing participants to revert to baseline weight/BMI; Aguilar Cordero et al., 2015), as it is a common occurrence in the childhood overweight/obesity intervention literature (Aguilar Cordero et al., 2015). Despite some evidence indicating that parent-only interventions have had sustained positive effects at 1- (West et al., 2010) and 2-year (Magarey et al., 2011) follow-up assessment points, weight loss maintenance continues to be a major challenge in this area (Altman & Wilfley, 2015; Wilfley et al., 2007). In the present study, two children exceeded their baseline BMI-*z* at the 6-month follow-up. Interestingly, the two primary caregivers (i.e., Participants 5, 9) of these children reported anecdotally that they attributed the children’s weight gain to extenuating circumstances

rather than to the intervention itself, such as: parental health problems; family issues; and pubertal changes in the child (e.g., mood and hormonal fluctuations). Similar rebounds were observed for parental self-efficacy during the follow-up period; that is, five participants reported reductions in self-efficacy scores from post-intervention to 6-month follow-up. However, in three of these five cases, the scores remained higher than baseline values. One parent (i.e., Participant 1) reported a large decrease (-2.90) in parental self-efficacy during this time; a decrease more than two times greater than that observed for any other participant. This result could be attributable to the age of the parent's child (i.e., 14 years old) and the fact that the instrument used has not been validated for parents of children over the age of 11 years (Decker, 2011).

An examination of each participant's outcomes across the entire study period (i.e., from baseline to 6-month follow-up) via a visual analysis of trend highlighted that more than half of participants demonstrated improvements in BMI-*z* scores ( $n = 6$  children) and parental self-efficacy for promoting child health behaviours ( $n = 6$  parents). Researchers have noted that in the context of behavioural interventions for obesity, not all treatments are uniformly successful or unsuccessful (i.e., some participants improve, some worsen, and some experience no change), and that focusing on the average change of participants could result in outcomes cancelling each other out, giving the appearance that the treatment had no effect (J. E. Anderson & Gross, 1988; Wilson, 1978). Our findings, in general, are consistent with this notion. For example, if reported alone, the average child BMI-*z* change score for all children from post-intervention to 6-month follow-up ( $M_{\text{BMI-}z} = 0.00$ ,  $SD = 0.10$ ) would give the impression that there was no change during this time; however, when examined using single-subject design with inter-subject replication, it

is evident that 5 of the 9 participants experienced reductions in their BMI-z scores during this period.

The present study is not without its limitations. First, a minimum of three repeated baseline measures are generally recommended to establish a stable trend prior to implementing the intervention (Engel & Schutt, 2009; Horner et al., 2005); in doing so, the participant serves as his or her own control (i.e., *intra-subject replication*, Engel & Schutt, 2009; Horner et al., 2005). In some cases, however, when multiple baseline measures are not possible and/or feasible, fewer baseline data points are acceptable (Horner et al., 2005). Unfortunately, due to time and resource constraints, as well as the additional burden it would have placed on participants to schedule and undergo numerous assessments, multiple baseline assessments were not possible in the present study. Further, while we acknowledge that findings from single-subject studies are not typically generalizable (Akobeng, 2005; Spieth et al., 2016), this design enabled us to examine and describe trends and differences, and facilitated an examination of the treatment effect on individuals as well as the personal variables influencing treatment outcomes (J. E. Anderson & Gross, 1988; Wilson, 1978).

Second, given that this intervention was delivered in Canada, the use of an American tool to assess parental self-efficacy for promoting children's health behaviours (Decker, 2011) may not have been the most ideal method due to international differences in recommended food-related serving sizes and units of measurement (Health Canada, 2011; United States Department of Agriculture, 2008). However, to the authors' knowledge, there are no available validated and reliable instruments that assess parental self-efficacy for nutrition and health behaviours in a Canadian context. In addition, as stated previously, this survey was validated for parents of children between the ages of 6 and 11 (Decker, 2011), and therefore, may not have accurately



measured parental self-efficacy for the one participant whose child fell outside of this range.

Finally, the present study is also limited by the homogeneity of the sample. Firstly, fathers were underrepresented among parents who participated in C.H.A.M.P. Families; in all but one case, the primary parent participating in the study was female. The lack of fathers' representation in childhood overweight/obesity interventions has been well-documented (Davison et al., 2016; Morgan et al., 2017). In 2016, Davison and colleagues conducted a systematic review of observational studies ( $n = 667$ ) on parenting and childhood obesity and found that fathers comprised only 17% of parent participants. Subsequently, Morgan et al. (2017) found that in randomized controlled trials (RCTs) focused on obesity treatment and prevention, fathers represented only 6% of participants (Morgan et al., 2017). Interestingly, the lowest self-efficacy scores at baseline (i.e., 3.3), mid-intervention (i.e., 4.3), and post-intervention (i.e., 5.2) were reported by the only father in this study (i.e., Participant 3). This participant also reported the greatest increase in self-efficacy for promoting health behaviours in children (i.e., +1.92) from baseline to post-intervention. Additionally, individuals of diverse ethnicities and ethnic origins as well as individuals from lower socio-economic backgrounds were underrepresented in this study, both of which have been identified as limitations in a recent systematic review of parent-only childhood obesity interventions (Jang et al., 2015). This is noteworthy given that the prevalence of obesity is higher in children of an ethnic minority (Taveras, Gillman, Kleinman, Rich-Edwards, & Rifas-Shiman, 2013) and that these social determinants often intersect to increase health inequities (Caprio et al., 2008; Sharifi et al., 2016).

### **Conclusion**

The above findings provide preliminary evidence in support of the conclusion that C.H.A.M.P. Families, a unique parent-focused paediatric obesity intervention, may be associated

with modest improvements in both child BMI-z and parental self-efficacy for promoting health behaviours in children, with the greatest effects observed from pre- to post-intervention. Further research investigating strategies to engage fathers as well as culturally and economically diverse groups of parents in community-based paediatric obesity interventions is recommended. In addition to the routine assessment of and focus on children's body composition, future efforts to treat childhood obesity should target the application and development of strategies and interventions to improve parental self-efficacy for promoting child health behaviours.

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## **Chapter 5**

### **Study 4: Participants' perceptions of "C.H.A.M.P. Families": A parent-focused intervention targeting paediatric overweight and obesity**

#### **Introduction**

Obesity is widely recognized as one of the most significant health problems affecting children in the 21<sup>st</sup> century [1,2]. The prevalence of both overweight and obesity among children has increased dramatically over the last 30 years, with recent estimates showing that nearly 340 million children are affected worldwide [3]. The consequences of childhood overweight and obesity are severe and concerning. Children with obesity are at an increased risk of experiencing co-morbidities including type 2 diabetes [4], metabolic syndrome [5,6], high blood pressure [4,7,8], non-alcoholic fatty liver disease [9], and asthma [10]. Childhood obesity has also been associated with negative and serious psychosocial outcomes such as depression [11] and reduced quality of life [10,12]. Further, children with overweight and obesity tend to carry excess weight into later life [13], which can lead to the development of additional health consequences during adulthood, including stroke [14], osteoarthritis [15], and some cancers [15].

Consequently, there is an urgent need to design and implement effective and sustainable interventions that target the treatment of paediatric overweight and obesity [16]. One type of intervention, widely accepted and utilized in the treatment of childhood obesity, is the family-based approach [17–20]. Family-based paediatric obesity interventions acknowledge the family environment as a unit, as well as the significant influence of parents, both as gatekeepers and role models, on children's health-related choices and behaviours [17,21–25]. Thus, these treatments typically focus on improving

factors such as parental support, family dynamics, and aspects of the home environment to enhance health-related behaviours among children [17,19,20,25].

Central to the family-based approach, *parental involvement* has been identified as a key component of successful paediatric weight management interventions [18,26,27]. Kitzmann and colleagues (2010), for example, conducted a meta-analysis containing 125 experimental childhood overweight/obesity treatment studies to examine the effectiveness of interventions with high parental involvement (i.e., parents participated in all components of treatment) versus those with low parental involvement (i.e., only the child participated in the majority of the treatment components). The results showed that overall, childhood overweight/obesity treatment interventions consisting of high levels of parental involvement were significantly more effective with regard to improving child weight-related outcomes (i.e., weight, body mass index [BMI], standardized BMI [BMI-*z*], and percentage overweight) than were interventions with low levels of parental involvement [26].

Given the relative success of paediatric obesity treatment programs involving parents, researchers have also implemented and evaluated interventions that target parents as the *primary agents of change* [27–32]. Parent-focused interventions, also known as “parent agent-of-change” [30,31,33] or “parent-only” [28,34–37] interventions, are those that exclusively target parents in the treatment of childhood overweight/obesity [33,35]. While the primary outcomes generally remain child-focused, children are not directly involved in the intervention. Parent-only childhood obesity interventions have taken various forms based on focus (e.g., positive parenting skills [30,34]; health knowledge/education and behaviour change [38,39]; environmental modifications [40])

and setting (e.g., primary care [41,42]; out-patient [43–45]; university [39]; and community [46,47]).

Generally speaking, childhood obesity treatment studies in which parents have been identified and included as the primary agents of change have resulted in reductions in children's BMI-z [28,45,48] and BMI percentile [41,42]. In addition, the authors of various systematic reviews have found that parent-only interventions are either as effective as [35–37] or potentially more effective than [37] family-focused (i.e., parent- and child-focused) interventions in terms of reductions in children's BMI-z scores. Lastly, there is also evidence to suggest that parent-only childhood obesity interventions may be more cost-effective than traditional family-based interventions, as they are typically less expensive to implement and require fewer resources [37,49].

Approximately a decade ago, our research team developed and implemented a 4-week, family-based (i.e., parent-child) childhood obesity intervention, the *Children's Health and Activity Modification Program* (i.e., the original "C.H.A.M.P." program; [50]). This 4-week group-based pilot program was delivered to 40 families over two consecutive years in the form of a summer day-camp for children (Monday-Friday, 9am-4pm) plus weekend education/activity-based sessions for parents (Saturdays from 10am-2pm). Overall, qualitative data indicated that C.H.A.M.P. was received positively by both children [51] and parents [52]. The quantitative results were also promising; significant improvements were found for children's fat and muscle mass percentages from pre- to post-intervention, and significant reductions in BMI-z were sustained 6 months post-intervention [53]. Perhaps most noteworthy were the significant improvements in child- and parent-proxy reported quality of life, sustained up to 12-months post-intervention



[53], as well as improved physical activity self-efficacy from pre- to post-intervention [54].

Interestingly, the qualitative data gathered via focus groups conducted after the original C.H.A.M.P. program also revealed that parents and children expressed a desire for *greater* parental involvement [51,52]. For example, many children expressed that they required more support and participation from their parents in helping them to adopt and maintain healthy behaviour changes [51]. In addition, C.H.A.M.P. parents noted that they would have liked additional education and program engagement opportunities (e.g., professional consultation, take-home materials, hand-on learning activities) and that they wanted program staff to hold them more accountable for lifestyle changes and participation in the program [52]. However, despite expressing a need for more involvement in the program, parental adherence to the C.H.A.M.P. intervention was low in comparison to that of children (i.e., mean parental attendance rate was 69% vs. 91% for children over 4 weeks). Indeed, such findings are in line with the literature as participant adherence and attrition issues have been cited as important barriers to and limitations of other childhood obesity interventions, particularly those that target parents [35,37,55].

One strategy that has been found to be effective in enhancing recruitment and retention of both parents and children in childhood overweight/obesity interventions is engaging parents in both the design and implementation of such programs [56]. The results of the original C.H.A.M.P. program—including parents' perceptions of the program and recommendations for future interventions [52] were used to inform both the development and implementation of the subsequent C.H.A.M.P. Families intervention (discussed below). Further, gathering information about parents' perceptions of and

experiences in such programs is a critical component of assessing intervention acceptability and feasibility [57]. This was deemed to be important for the C.H.A.M.P. program [53] and also serves as a rationale for the present study.

As noted above, on the basis of evidence from the original C.H.A.M.P. program, as well as the growing literature and documented effectiveness of childhood obesity interventions targeting parents, our team developed and implemented a 13-week group-based intervention entitled “*C.H.A.M.P. Families*”. Whereas the original C.H.A.M.P. program was offered primarily to children (with a relatively small family-based/parental component), C.H.A.M.P. Families was offered to *parents* (with minimal direct child involvement) who had a child with overweight or obesity. The primary objective of this study was to explore the perspectives of parents who participated in the C.H.A.M.P. Families intervention with regard to their experience in the program, as well as the program’s influence on various aspects of child and parental wellbeing (i.e., health behaviours, parental confidence for supporting health behaviour change, and family communication). A secondary purpose was to explore parents’ perceptions of the program’s strengths and weaknesses, and to identify practical issues that could help inform the design of future childhood obesity treatment programs. While several previous studies have highlighted parents’ perspectives of their experiences related to primary care [58,59] and family-based childhood obesity interventions [60–62], to our knowledge, this is the first study to explore the perceptions of parents in the context of a community-based, parent-only lifestyle intervention targeting childhood obesity.

## **Method**

### **C.H.A.M.P. Families Intervention**

C.H.A.M.P. Families was designed as a single-centre, single group, non-randomized prospective study. Grounded in a theoretical model integrating Social Cognitive Theory [66,67], group dynamics [50, 68,69], and motivational interviewing techniques [70,71], C.H.A.M.P. Families was a 13-week intervention consisting of eight 90-minute education sessions delivered to parents/caregiver only (purposefully scheduled weekly and then bi-weekly to avoid an overreliance on the group [72,73]), as well as two post-program ‘booster sessions’ offered to parents/caregivers and children (see Reilly et al., 2018, for a detailed description of the study protocol and theoretical foundation [63]). All educational sessions were offered on Monday evenings at a local YMCA and covered a range of relevant child and family health topics including, but not limited to: child growth and development, nutrition, physical activity, sleep, sedentary behaviours, parenting and family dynamics, and mental health. Several experts (i.e., health professionals, researchers) and individuals from community organizations were invited to deliver intervention content to parents in interactive, group-based sessions. At the end of each session, parents received take-home materials, and were assigned “homework” activities to reinforce the concepts and to assist parents in implementing lifestyle modifications with children in the home environment (Appendix J). Participation in C.H.A.M.P. Families was free and YMCA drop-in programming/child-minding was also available for all children, free of charge, while parents attended the educational sessions. All components of the study were approved by the Host University’s Research Ethics Board (Project ID # 108826, Appendix E) and registered retrospectively with an International Standard Registered Clinical/Social Study Number (ISRCTN; ID # 10752416).

## **Participants**

Participants were recruited using a variety of strategies including newspaper and radio advertisements, social media, posters displayed in various community settings (e.g., libraries, local businesses, family health clinics; Appendix F), and study pamphlets and posters delivered to community paediatricians and family physicians. Parents/caregivers were eligible to participate if: (a) they had a child between the ages of 6 and 14 years with a BMI  $\geq$ 85th percentile for their age and sex [55]; and (b) both the parent and child were fluent in English. All parents and caregivers, including those living in separate homes, were invited to attend the program and participate in the study if interested and eligible. Participants were excluded from the study if: (a) the child was not between the ages of 6 and 14 and did not have a BMI  $\geq$  85th percentile for age and sex; (b) they did not provide written consent or assent; (c) they were unable to read, speak, or understand English; and/or (d) the child had a medical condition or used a medication that impacted physical activity levels and/or other study outcomes.

## **Focus Groups**

Three focus groups (two for parents/caregiver and one for children) were held concurrently during the last session of the formal intervention (i.e., in December 2017). Following a short end-of-program celebration during which the Program Coordinator (KR) and Principal Investigator (SB) presented families with participation certificates and awards, as well as a light dinner and refreshments, parents/caregiver were asked to relocate to one of two focus group rooms within the YMCA facility (children remained in the main program location for their focus group). Parents were assigned by the Project

Coordinator (KR) to one of two focus groups to ensure similar numbers in both groups.

All focus group participants provided consent to participate, and in cases where more than one parent and/or caregiver participated in the intervention, both were invited to participate in the same focus group to facilitate conversation and comfort.

Focus groups were approximately 75 minutes in duration, audio-recorded, and transcribed verbatim. The moderators (SB and DB) used a semi-structured interview guide to facilitate discussion. Once in their designated rooms, participants were reminded of the focus group's purpose and procedures, and that participation was voluntary. To reduce the potential for socially desirable responses, parents were also told that there were no correct or incorrect answers, that their honest views and experiences were being sought, and were asked to keep the discussion confidential [74]. To begin the discussion, participants were asked to comment on their overall experience in C.H.A.M.P. Families (e.g., *"How did you feel about C.H.A.M.P. Families and your family's participation in the program?"*). Next, participants were asked about their perceptions and the potential influence of C.H.A.M.P. Families with regard to: (a) child and parent physical activity and dietary behaviours (e.g., *What is different, if anything, for you about your own eating behaviours [or your thoughts about food and nutrition] since you started the C.H.A.M.P. Families program?"*); (b) parenting confidence (e.g., *"Do you find that you have higher levels of confidence in your ability to facilitate and support healthy choices in your family? If so, in what way(s)?"*); (c) family communication and cohesion (e.g., *In what ways, if any, has your family's communication changed since starting this program?"*); and (d) barriers and facilitators to health behaviour changes (e.g., *"Can you identify any barriers that might have impacted your child's physical activity levels throughout this*

*program?*”). Finally, participants were asked to identify logistical issues (e.g., “*How did you feel about the time commitment for this study?*”) as well as considerations and recommendations for future programming (e.g., “*How could the program be improved?*”).

### **Data Analysis**

Two researchers (KR and DB) analyzed the responses to each question in NVivo (Version 11.4, 2016) using inductive (i.e., “bottom-up”) methods [75,76]. The researchers conducted the six phases of thematic analysis described by Braun, Clarke, and Weate [75]: (a) *familiarising yourself with the data* (i.e., multiple readings of the transcripts, noting preliminary ideas); (b) *generating initial codes* (i.e., systematically aggregating the data set into codes); (c) *searching for themes* (i.e., grouping codes and all relevant data into potential themes); (d) *reviewing themes* (i.e., creating thematic maps and confirming that themes accurately represent codes and data); (e) *defining and naming themes* (i.e., creating and refining names and definitions of themes); and (f) *producing the report* (i.e., choosing illustrative excerpts to exemplify data and connect it to the analysis, research question, and literature). The researchers conducted their initial analyses independently, and met subsequently with a third investigator (SB) to discuss and corroborate their findings. When discrepancies arose, the researchers discussed their interpretations of the data until agreement was achieved. Once a final consensus was reached for each theme, the researchers worked collaboratively to select a number of illustrative quotes. Several measures proposed by Lincoln and Guba [78] and adapted by Irwin and colleagues [79], including member checking, summarizing, and peer debriefing, were taken to ensure

trustworthiness (i.e., credibility, dependability, confirmability, and transferability; [78,80]) of the data and analysis.

## **Results**

Twelve of the 16 parents (75%; 7 mothers, 5 fathers/step-fathers) who were enrolled in C.H.A.M.P. Families participated in one of the two focus groups ( $n = 6$  participants per group). Participants ( $n = 12$ ;  $M_{\text{age}} = 41.5$ ,  $SD = 5.2$ ) were parents/caregivers of 7 children ( $M_{\text{age}} = 9$ ,  $SD = 0.82$ ; 4 girls, 3 boys; average researcher-assessed BMI- $z$  at baseline = 2.20,  $SD = 0.28$ ). Parents who participated in a focus group attended an average of 85% of the educational sessions, a mean that was greater than that calculated for all parents in the program ( $n = 16$ ; 73%). Additional demographic information for parents/families who took part in the focus groups is presented in Table 1.

The qualitative analysis revealed a total of 14 overarching themes and 28 subthemes. The following five categories containing themes and/or subthemes are described in detail below: (a) Outcomes for children (3 themes); (b) Outcomes for parents and families (3 themes, 8 sub-themes); (c) Impactful components of C.H.A.M.P. Families (3 themes, 7 sub-themes); (d) Barriers to health behaviour change (3 themes, 8 sub-themes); and (e) Recommendations for future paediatric overweight/obesity interventions (2 themes, 5 sub-themes).

Table 1

*Demographic information for parents who participated in the C.H.A.M.P. Families focus groups (n = 12, unless indicated otherwise)<sup>1</sup>*

Demographic Variables	N (%)
<b>Gender</b>	
Female	7 (58.3)
Male	5 (41.7)
<b>Ethnicity</b>	
White/Caucasian	10 (83.3)
Arab	2 (16.7)
<b>Marital Status</b>	
Married	9 (75)
Common-law	2 (16.7)
Single, never married	1 (8.3)
<b>Level of Education (n =10)</b>	
University degree (or higher)	6 (60)
College diploma	3 (30)
Post-secondary qualification	1 (10)
<b>Annual Household Income (n =10)</b>	
\$100,000 or more	6 (60)
\$50,000-\$99,999	3 (30)
\$49,999 or less	1 (10)

<sup>1</sup>Participants (n = 2) did not complete the entire demographic questionnaire



## **Outcomes for Children**

Parents noted that they had observed several positive changes in their children since beginning C.H.A.M.P Families. These outcomes were grouped into three overarching themes: *improved dietary behaviours*; *increased physical activity*; and *enhanced empowerment and autonomy*. Quotations exemplifying these three themes are displayed in Table 2.

**Improved dietary behaviours.** Many parents expressed that their child(ren) displayed a greater awareness of their dietary behaviours and were making conscious efforts to choose healthier foods. Specifically, some parents described how their child(ren) showed more interest in the nutritional contents of foods and were increasingly involved in meal planning and preparation throughout the duration of the program.

**Increased physical activity.** Parents also noted that some children displayed greater motivation for and participation in various (and sometimes new) physical activities. Some parents mentioned that their child independently sought out opportunities to be active, and in some cases, attempted a new sport.

**Enhanced empowerment and autonomy.** A number of parents discussed that their child(ren) seemed to feel more empowered and demonstrated greater autonomy over their health behaviours since starting the program. Many detailed how children appeared to be exhibiting greater control over their diet by preparing and/or choosing their own meals, as well as independently selecting and engaging in new physical activities.

Table 2

*Selected quotes related to parents' perceptions of outcomes for children*

## Improved dietary behaviours

- “As opposed to [packaged food], now they’re [my children] going for like the banana or the orange, something more healthy when going for that quick snack. I think they’re more aware of the calories too now.” (Participant 6, male)
- “The program has ignited that [initiative] in him [my son]. At home he is reading labels right now...he is counting calories...he is just little bit more aware.... Since the program he wanted to start helping out and prepare meals.” (Participant 11, female)
- “Not that we were thinking a pop a night or anything, but I would say the sugary drink consumption has gone down significantly in the household.” (Participant 1, female)
- “He’ll [my son] always want to talk about portion sizes now and reading the [nutrition labels] on products.” (Participant 5, female)

## Increased physical activity

- “[My son] started hockey this year, but not just that, even at school before he was just hanging out with his buddy, but now he’s playing soccer.” (Participant 10, male)
- “[My son] came home and said he was on the volleyball team, and he’s not the child that would ever sign up for anything.” (Participant 9, female)
- “He [my son] will set a timer and say, ‘I need to go to the park for an hour on the bike.’... He’s wanting to participate in things, wanted to use the treadmill.” (Participant 11, female)

## Enhanced empowerment and autonomy

- “One thing she’s [my daughter] taken upon herself is to make her own eggs for breakfast. She’ll have eggs with cheese and a little piece of fruit and water. Not that she didn’t eat eggs before, but she made them herself now.” (Participant 1, female)
- “I let [my daughter] make dinner, and giving up the control and saying OK you can do that. I didn’t think she could be able to it, but...she gave me, you know, the idea that she really was old enough to help us do more in that way” (Participant 7, female)
- “Our daughter tried out for volleyball, which I’m not so sure if she would’ve done that before...she didn’t make the team but she was confident enough to go.... I think there is a healthier diet and she’s healthier and stronger so she’s willing to take on more and take those risks, and if you don’t make it, that’s OK.” (Participant 1, female)

## **Outcomes for Parents and Families**

Parents were also asked about any personal, parenting, and/or family-related changes experienced as a result of their participation in C.H.A.M.P. Families. Three overarching themes and eight subthemes emerged within this category, including: *healthy food choices for the family* (i.e., healthier food purchases and food preparation at home); *enhanced family dynamics* (i.e., greater confidence to have conversations with children about weight; increased family communication; and full family engagement in health behaviour changes); and *greater parental confidence to promote health behaviours in children* (i.e., confidence to serve as the primary “agent-of-change;” enhancing children’s responsibility for their health [“letting go”]; and perseverance towards change).

Illustrative quotes for these themes and subthemes are presented in Table 3.

**Healthy food choices for the family.** This theme captured improvements experienced by several parents with regard to food purchasing and food preparation behaviours. For example, many parents reported that they were selecting healthier options at the grocery store or avoiding packaged foods or treats while shopping. A number of parents also described how at-home food preparation had changed for them as a result of the program, with many opting to prepare meals from scratch and/or substituting more nutritious ingredients for the less healthy ingredients used previously.

**Enhanced family dynamics.** This theme focused on parents’ perceptions of increasingly positive interactions and activities occurring within the family since beginning C.H.A.M.P. Families. Several parents noted that family communication had improved. More specifically, many parents noted that that they felt more comfortable in

Table 3

*Selected quotes related to parents' perceptions of outcomes for parents and families*

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**Healthy food choices for the family****i. Healthier food purchases**

- “We go one night a week for our treat night, but before it was any day of the week.”
- “I would say the [biggest change is] packaged food. We’re not buying near as many chips anymore.” (Participant 5, female)
- “I’m particular about what I buy [the] kids.... I’m more aware of what I’m doing to give them a better chance of becoming healthy so, and staying healthy.” (Participant 9, female)
- “We still have some granola bars, but not nearly the amount of packaged cookies and things like that.” (Participant 1, female)

**ii. Preparing healthier meals at home**

- “Instead of just whipping up a batch of chocolate chip cookies, because the kids love chocolate chip cookies, I’m looking for healthier choices in a cookie that I can hide. Now I make a quinoa chocolate chip cookie that the kids think is just a regular chocolate chip cookie, but it’s fortified with a whole bunch of stuff that they can’t see.” (Participant 9, female)
- “Something we took away from this was preparing meals ahead of time, like the day before for the next day so it would be a healthy meal and not a rushed out of the box meal sort of thing.” (Participant 1, female)
- “I think it made me concentrate more on what I was putting in front of my kids as food like...even if it was something simple or maybe it wasn’t the best things they can be eating, how can I just make this a little more appealing, healthy... like instead of box of craft dinner like make homemade not as much, use skim milk, not as much cheese, just try and make it a little healthier... it just made me think more about what I was actually feeding my kids.” (Participant 8, male)

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**Enhanced family dynamics****i. Increased family communication**

- “... so as soon as supper’s ready...[everyone] participates in .... We talk amongst our supper table now and it’s much better” (Participant 5, female)
- “Every time we leave here [C.H.A.M.P. Families], almost the whole drive back home he’s [my son] talking ‘What’d you learn, Mom?’.” (Participant 5, female)
- “It’s an interesting conversation...unfolding every day at our dinner table. It’s fun to hear them [my children] ...we’re so busy, you don’t get those little bits of pieces ... you see all this coming out the dinner table, it’s a good thing.” (Participant 9, female)
- “It was a good opportunity for us to be more on the same page.... I think that’s a big impact to have both parents on board....and then be able to go back to the kids and say a five-minute synopsis of this is what I learned tonight.” (Participant 1, female)

**ii. Greater confidence to engage in health- and/or weight-related conversations with children**

- “I think for me it was not a license, but...it’s OK to talk to her [my daughter] about being overweight and about us as a family being overweight, and being healthier. It was almost like it made it feel like it was OK to have those conversations and feel more comfortable
-

with the conversation... it was an elephant in the room amongst the family that was just gone” (Participant 1, female)

- “... you always want to protect your children, so sometimes you might see an issue or see something but you don’t wanna address it because you’re afraid of their reaction. So you go along your merry way and if you keep doing the same thing nothing changes. So if you bring everything out in the open and start to talk, then once communication opens up you get a lot of feedback and you learn what motivates your children too.” (Participant 10, male)
- “I think too for us the kind of explains to [our son] that there’s different types of body types you might always be wider heavier because you’re just built like that as opposed to the sister who is a skinny little rail.” (Participant 6, male)

### iii. Full family engagement in health behaviour change

- “... the whole family’s doing it now, where before it was always let the kids go out and play.” (Participant 10, male)
- “As far as the whole family trying to participate in eating healthier and being more active, while trying to achieve the same goal and trying to help [my son] get where he wants to be and where we want him to be.... we are working together.” (Participant 6, male)
- “... you’re doing it as a whole family instead of an isolated individual.” (Participant 11, female)
- “Involving [our son], who is not overweight.... We said it was a family thing, whereas before it has always been [our daughter] do it and not [our son], right? So that’s a big thing the whole family was involved.” (Participant 1, female)
- “So we are always at the arena, all three of them [my children] play hockey. So if one of them is down there now all of us walk the walking track instead of sitting in the seats.” (Participant 5, female)

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## Greater parental confidence to promote health behaviours in children

### i. Confidence to serve as the primary “agent of change”

- “I do feel as though I’m more confident. I can tell her [my daughter] why we’re doing what we’re doing now. I have more knowledge, so I can pass that to her.” (Participant 8, male)
- “I am a lot less likely to make an excuse as to why I can’t go out with her [my daughter]. If she wants to do a dance party in the basement or if she wants to whatever. I have to be there. I have to at least make it possible for her to do it.” (Participant 3, male)
- “I have learned some things that have helped my daughter or given me the courage to do things a little differently.” (Participant 7, female)

### ii. Enhancing children’s responsibility for their health (“Letting go”)

- “I never realized how big of a deal that letting go is, that’s huge. I wouldn’t know that if they [guest speakers] didn’t say that. Let them [the children] do it, that’s big for them.” (Participant 3, male)
  - “I think I have learned some things that have helped my daughter, or given me the courage to do things a little differently, or let her try things like, let her cook one night and use the sharp knives that I wouldn’t have ever thought she was capable of doing. She is so much more capable than I ever gave her credit for.” (Participant 7, female)
  - “Our kids are doing stuff in the kitchen. Even though it ends up taking longer to make the meal, they’re involved and I’m also making sure to protect that time.” (Participant 3, male)
-

- “I am very particular...and I like things to be done a certain way, so knowing that it’s OK to let it go and let them be responsible, it’s a huge new thing for me.” (Participant 9, female)

iii. Perseverance towards change

- “You need to keep coming back, keep being reminded that in the end things could change if you try and keep trying.” (Participant 4, female)
  - “Just trying to open up and be more mindful ... I’m trying different things.” (Participant 1, female)
  - “I found setting goals hard because you’re trying to set the goals to correct the difficult situation ... but that is something that’s going to go forward and I’ll use the information we got to help with that.” (Participant 3, male)
  - “It takes time ... it’s hard for parents ... there is nothing wrong with your kid or the way we do it, it just takes time.” (Participant 11, female)
-

broaching the topic of weight with their children, and that these discussions had become easier to have as a family unit. Rather than focusing solely on the child, parents discussed the involvement of the entire family in working toward positive and sustained health behaviour changes.

### **Greater parental confidence to promote health behaviours in children.**

Several parents expressed that they had experienced an increased level of confidence in relation to their knowledge and role as the primary “agent of change” within the family unit and in the home environment. In addition to this enhanced confidence for supporting behaviour change, parents also reported that they were more confident in their ability to empower and provide their children with additional responsibility and control over their own health. Specifically, parents commented on the benefits of “letting go” from a health perspective; described by many as acknowledging children’s abilities and preferences by allowing them to choose their own foods and assist with meal preparation. Finally, parents voiced that despite the challenges and barriers experienced in promoting and changing health behaviours, they had the confidence to persist with the efforts required to achieve their family health goals.

### **Impactful Components of C.H.A.M.P. Families**

The following three themes and seven subthemes were identified on the basis of parents’ responses regarding their perceptions of the effective components of C.H.A.M.P. Families: *group environment* (i.e., sense of community/belonging and group interaction and support); *program content and materials* (i.e., inspiring and motivational expert speakers, relevant and applicable information and resources, reminders and

reinforcements); and *additional program benefits* (i.e., complimentary programming for children and at-home data collection visits, tools, and personnel). Quotes exemplifying these themes and subthemes are displayed in Table 4.



Table 4

*Selected quotes related to parents' perceptions of impactful components of the C.H.A.M.P. Families program*

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Group environment

i. Sense of community/belonging

- “It’s nice just meeting other families and knowing that we’re not the only family that’s having a child that is overweight.... Your circles of friends have children that maybe don’t have obesity or overweightness, and it’s hard to talk to them or you wouldn’t talk to them because you can’t relate. It’s nice to know that there are other people with the same kind of issues, that have struggles that are real like yours.” (Participant 1, female)
- “For me just listening to all the other parents and their struggles ... that we’re not the only ones, that’s what I think was important for me.” (Participant 6, male)
- “The strength of the program is the community feeling that you generate... There were a lot of emotions that parents had... and in there [C.H.A.M.P. Families] they are kinda laid out. I think that actually brings the group closer.” (Participant 3, male)
- “We are not alone. Sometimes in the thick of it you think my god I’m like the only parent who has this problem? What are we doing wrong and why? How come everyone else has it figured out and I can’t get this figured out?” (Participant 4, female)

ii. Group interaction and support

- “I love the fact that it’s a support program for the families. I work in healthcare and I haven’t seen a program like this ... It’s good to see that there is something going on that helps parents get together and learn from others ... like this is an idea I can implement, this is something that we can do, this is something that we are missing in the community.... so, it has been really rewarding.” (Participant 11, female)
- “I like the program because it was a very positive environment and it was nice to know other parents’ concerns and how they approach situations, or just to know there are common issues that I didn’t know how to solve.... just to share the feelings and what worked and what doesn’t.” (Participant 3, male)
- “Listening to other parents I was like, OK, I can take from that feedback and apply it to myself to change how I deliver my message tonight on how he [my son] needs to care for himself, maybe allow him to do that.” (Participant 9, female)

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Content and Materials

i. Inspiring and motivational expert speakers

- “I really enjoyed the mental health speaker ... I could relate better...with my kids, so I thought that was really useful.” (Participant 5, female)
  - “As the person who does the majority of the grocery shopping, I would say that the grocery tour too has a big tangible impact ... our dietitian that was with us was able to point out things ... it has just changed the way that I shop, which changes the way that you prepare food and you kinda stay away from certain things and it has [an] impact on a whole household.” (Participant 1, female)
  - “The biggest thing that I learned was when he [expert chef] said to have your children take control of the plate and their meal ... that never dawned on me before. Having them [my children] serve themselves and put whatever on their plate, and putting some
-

guidelines on there, but not saying you have to eat it all ... that was profound to me.”  
(Participant 1, female)

ii. Relevant and applicable information and resources

- “I’m gonna use that book [C.H.A.M.P. Families binder containing program resources and goal setting worksheets], keep referring to it. I’m going to fill in the parts that I didn’t do and use it as a guide. If I find something good, I’ll add to it. Gonna be kind of the reference.” (Participant 3, male)
- “We got a lot of good information as to how to go about doing it, I think the key is to apply it to your individual circumstances.” (Participant 3, male)
- “I would say the sugary drinks like, we had that little paper that we got that night on the fridge for a long time, and now we all know ... that was a big eye-opener.” (Participant 1, female)

iii. Reminders and reinforcements

- “There was a constant reminder. You want to slack off [then] you remember the program. You think back to it and say, ‘We are doing well, let’s get back to where we were.’ It was nice that it was a few times a month so even if you did forget, you could come in [on] the Monday, get the reminder again, go back home, refresh the information.” (Participant 12, female)
- “I think that [it] helped... because it takes so many tries. You need to keep coming back, keep being reminded that in the end things could change.” (Participant 4, female)
- “I think that for me coming here.... reinforced the fact that I am on the right track.” (Participant 9, female)

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Additional program benefits

i. Complimentary programming for children

- “My favourite part was [for] my daughter. She had a blast. She absolutely loved it. And five times in the last week, she said: ‘I wished this wasn’t the last week of the C.H.A.M.P. Families. I wished we could go back again.’ She’s enjoying it so much. She loves the kids and she’s just had new experiences that we haven’t had before.” (Participant 7, female)
- “We are members of the Y, but we never come and that’s the thing, this brought me back....I used to go up to the gym and my kids. I would drop them off Monday and Thursday...and they used to love it...but with life, you just stop, but with a program like this you feel like you have to come in, you’re obligated, you signed up, you come in and it’s the same set of kids.” (Participant 12, female)
- “That connection with the kids that are similar to him, that’s what he [my son] really liked about it.... He is able to physically relate to this boy, he made friends with him. He hated the weeks we had no class. When I picked him up, he was like, ‘Mom, I was so happy all day and so excited looking forward to the program tonight.’” (Participant 11, female)

ii. At-home data collection visits, tools, and personnel

- “The Actical thing [accelerometer] for [my son] was a very great competitive item. He knew that when he had it on he was focused and had to do whatever... and I know that it impacted the way that he looked at some of the things that he was doing on a regular basis.” (Participant 9, female)
  - “He [my son] liked the small chats with [the Project Coordinator].” (Participant 11, female)
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- “I found when [Project Coordinator] comes for the data collection, you don’t feel judged when you step yourself on the scale and your kids get on. There is no judgement and I think that is genuine.” (Participant 1, female)
  - “I will say she [Project Coordinator] is special.... she just has this great way about her and the data collection. I’m filling out the survey and I’m doing my own thing, she’s chatting with [my son], and then she’s asking me the questions and they are having a little chit chat.” (Participant 9, female)
-

**Group environment.** The positive aspects and significance of the group environment were emphasized often by parents, particularly in reference to the sense of community and belonging that were generated. Parents expressed the importance and benefits associated with feeling as though they were part of a group, and that they were not alone in their struggles to improve their child's health. Many parents also noted that the group-based focus of the program, as well as the social support provided by program personnel and other participants, were very impactful. Parents spoke pointedly to the power of hearing other families' experiences and struggles, and the significant impact of group problem solving.

**Program content and materials.** Many parents stated that the information delivered throughout the program was both relevant and applicable to their child and family, and they highlighted specific ways they were able to use the resources received (e.g., C.H.A.M.P. Families binder, children's kitchen utensils, posters and readings). In addition to the usefulness of program information and resources, parents noted that the intervention agents (i.e., the "experts") delivering the content were also highly impactful. Several participants noted that they found the guest speakers to be inspiring and motivational, highlighting the positive impact of the sessions delivered by the professional chef, the dietitian, and the public health nurse who specialized in mental health specifically. Finally, parents expressed that the program content and materials bolstered parents' existing knowledge about health and that the program itself served as a nudge or a reminder to prompt behaviour change.

**Additional program benefits.** Parents commented on a number of additional program components that were not part of the formal intervention delivered to parents

(i.e., components that took place outside of the group-based sessions). For example, several parents stated that the complimentary YMCA programming offered to children through the C.H.A.M.P. Families program was perceived very positively by both themselves and their children. Having a structured, easily accessible, and safe activity program available for children to engage in—with other children whose parents were enrolled in the program—was identified as being very important to and an unexpected benefit of the program for most parents. Further, parents commented positively on the research-related components of the program, namely the home data collection visits and the positive relationships developed with program personnel. Specifically, parents described how home visits with the Project Coordinator (KR) were important for establishing trust, ensuring comfort, and facilitating dialogue within the family unit and among parents, children, and C.H.A.M.P. staff. Parents also expressed that the research tools used and administered/distributed during home visits (i.e., questionnaires and accelerometers) were a source of motivation for children.

### **Barriers to Health Behaviour Change**

Insofar as barriers and challenges related to changing health behaviours are concerned, the following three overarching themes and eight subthemes were identified based on parents' responses: *Socioenvironmental issues* (i.e., school-related issues; stigma and bullying; social pressures and the food environment; lack of flexible and cost-effective programming for children; and geographic and seasonal issues), *time constraints*, and *parenting issues* (i.e., protecting children's feelings; setting appropriate boundaries; and difficulties associated with relaying program content to children).

Illustrative quotes for these themes and subthemes are found on Table 5.

Table 5

*Selected quotes related to parents' perceptions of barriers to health behaviour changes*

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**Socioenvironmental barriers**

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**i. School-related issues**

- “If you look at this group...and the overall challenge with children today, eating disorders and being overweight, there just seems to be a real lack of focus on it in the school system.” (Participant 10, male)
- “Sometimes they’ll come back [and] they haven’t touched their vegetables or anything in their lunch, and when we challenge them on it it’s like we didn’t have enough time.” (Participant 2, male)
- “I think they might have gym once or twice a week [at school], and with no actual focus on what to eat, how to eat.” (Participant 2, male)

**ii. Social pressures and the food environment**

- “You have to make the best decisions when you’re around the table and there’s a buffet, and Grandma made something, Great Aunt made something ... so have a typical strategy that works best for you, cause you don’t want to feel that now you have limited yourself or restricted yourself, and now that becomes another forbidden fruit for you and for the family, it’s hard.” (Participant 11, female)
- “With my kids, no sugary drinks. When they go to parties and everyone is having juice or pop it’s a, ‘Why can’t we have carbonated beverages, Mom?’, or like when the nephews and nieces come over and they have pop for breakfast.” (Participant 11, female)
- “We are really competing against food science and some of the brightest and best food scientists out there you know. It does not take fifteen times for a snack food to appeal to a kid. It is like an addictive drug, it really is ... how do you compete against that?” (Participant 3, male)

**iii. Lack of flexible and cost-effective programming for children**

- “... one of [the] things is cost for a lot of families. If you’ve already got your kids in a lot of activities and then your kids want to go out and do things. Everything costs money, right?” (Participant 9, female)
- “Everything is so structured and monetarized now too, it’s a struggle. People think they need to go to these places to go do physical activity. It is a mindset and it doesn’t have to be that way.” (Participant 10, male)
- “I wanted a program like a nice supportive activity where I could drop her off once a week... Where they do nice, structured, physical activities with a lot of other kids... Like a recreational but hard physical activity. Something that will make them sweat because I don’t want to put her into all the competitive stuff.” (Participant 12, female)

**iv. Stigma and bullying**

- “It was hard for him [my son] to understand why the kids at school called him fat...so it’s kind of trying to help explain that stuff to him.” (Participant 6, male)
  - “The problem that my son is facing is mental health.... He feels he is isolated because he is not able to relate to others and he has used the word “bullying” quite often.... He hasn’t missed school or pretended to be sick because he doesn’t want to go, his friends still play with him, but he does not feel like he belongs.” (Participant 11, female)
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- “There’s lot of blame and guilt that comes with your child who is overweight and you feel like everyone walking around and looks at you, [thinking] she’s not thin and no wonder her child’s not thin.” (Participant 1, female)

#### v. Geographical and seasonal issues

- “It’s tougher now too as we get into the winter.” (Participant 2, male)
  - “Especially now when it’s dark at five, like shower, bed time, let’s go.” (Participant 11, female)
  - “He’s had such a struggle always and we’ve been trying to reach out to get help, but it’s so hard. We live in a small community, about an hour away from here, but this was the closest that we could really get help.” (Participant 6, male)
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#### Time constraints

- “Barring going into a restaurant, to find a quick option when you are like off to a game or something like that, it is impossible” (Participant 10, male)
  - “I have been paying for the Y for six years ... I only do the summer camps, because I finish work by 5:30-6 o’clock and there is no way I can get anywhere.” (Participant 11, female)
  - “Getting your kids and family fed so you can get to the rest of the life.... You rush them through to get everything done, we are going back and forth from activity to home. You might have 10 or 15 minutes at home so you don’t have time to prep a great meal for your family.... Our lives are really busy; we’re gone every day of the week.” (Participant 9, female)
  - “Sometimes you know you shouldn’t be doing this, but you have 5 minutes or 10 minutes to get supper ready and get to whatever it is you have to do. I work sometimes 14-hour days.” (Participant 8, male)
  - “She [my daughter] could play in the park for 9 or 10 hours if you let her. It’s just, I’ve got her two days a week and if we go play at the park for 6-7 hours then I’m going to get absolutely nothing done. So as much as I would love to let her just go, there are other things I have to do.” (Participant 8, male)
  - “There’s so many things. Some days you get home from work and you had a plan, but there is no way, it’s just is not happening. For me it is all about dinners...I don’t meal prep, I don’t have time on weekends, I don’t do any of that so I get home and then I start making the dinners. Like [that’s] what really holds us back from doing anything.” (Participant 12, female)
  - “A barrier to nutrition is again, time management.” (Participant 3, male)
- 

#### Parenting issues

##### i. Protecting children’s feelings

- “She [my daughter] is a very confident girl, and she sees herself as very pretty and she’s very popular. She’s got tons of friends, but I think the moment those words come out of my mouth, that she thinks I look at her differently...I feel like it could shatter her.” (Participant 12, female)
- “We didn’t talk a lot about the program to my daughter and I have ... a bit of anxiety. I didn’t want to say why I sought it out. I didn’t want to say that... and whatever confidence they have, you don’t want to change that.” (Participant 4, female)
- “She has the most self-confidence...my biggest hope is that it stays.... She’s having fun and she’s enjoying it, and is keeping it positive. That is the part that I like, that I want to keep.” (Participant 7, female)

##### ii. Setting appropriate boundaries

- “It’s hard to say absolutely no screens ever, all day until Friday, until the weekend.” (Participant 5, female)
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- “You don’t want it to feel like, ‘No, you can’t have this. No you cannot have this.’ I did inquire to see what kind of information I can gather in that way that parents are not always coming down as the police officers in life.” (Participant 11, female)
- “It’s hard ‘cause you’re giving your kid withdrawals, like ‘No, you can’t do what everyone else is doing’” (Participant 3, male)

iii. Difficulties associated with relaying program content to children

- “I go home and she doesn’t listen to me. She would listen to someone else standing in front of the room talking to everyone. She would be more likely to get something out of that, than me retelling what we learned because I’m Mom and I don’t know that much.” (Participant 4, female)
  - “Parents don’t carry as much weight as the experts. Everything we took away from here was delivered by the parent. But if it’s not being delivered by Mom and Dad, it would be less [of a] chore.” (Participant 2, male)
-



**Socioenvironmental barriers.** Parents identified a broad range of socioenvironmental barriers that affect both themselves and their families. First, some parents reported that they experienced feelings of shame and perceived disapproval from others for having a child with overweight or obesity. Further, they spoke of the bullying and discrimination some of their children experienced as a result of their weight. Second, parents noted specific issues related to the school system, including children's perceptions that school lunch and snack breaks were too short. Many parents felt that the lack of time available for children to eat during school hours had a negative impact on their diet in that children would either have to rush to eat at an unhealthy pace or leave food uneaten. Parents also voiced concern about the perceived lack of health, nutrition, and physical activity-related education their children were receiving at school. The third subtheme, social pressures and the food environment, captured parents' perceptions of the social forces (i.e., family, peers, cultural and societal norms) as well as the physical presence of and proximity to food that promote the consumption of unhealthy foods. Several parents spoke about the challenges of maintaining a healthy diet during holidays, at family functions, and during parties when treats and other unhealthy foods are readily available. One parent spoke to the pervasiveness of food marketing and how it affects children's food preferences and attitudes. The fourth theme pertained to parental perceptions of the lack of flexible and cost-effective programs available for children in the community, referring most often to a lack of informal, inexpensive, physical activity programming for children. Many parents felt that current programs were overly structured and competition-focused which was discouraging for some children and required families to commit for several weeks/months (often without a trial period). The fifth and final subtheme, geographic and seasonal issues, referred specifically to the barriers to health behaviour

change that parents identified (e.g., cold winter months, living in a small community with few resources) in relation to weather and location.

**Time constraints.** The perceived lack of time, and/or inability to manage time effectively, to prepare healthy meals and engage in physical activity was identified by parents as a significant barrier to sustained health behaviour change. Many parents suggested that between work, school, and extra-curricular activities and responsibilities, it was challenging for both parents and children to schedule time for grocery shopping, meal preparation, and physical activity.

**Parenting issues.** The following three subthemes related broadly to parenting were identified as barriers to healthy behaviour change: protecting children's feelings, setting appropriate boundaries, and difficulties relaying program content to children. A number of parents voiced concerns about hurting their children's feelings, damaging their self-esteem, or unintentionally creating other issues by discussing weight- and health-related topics with them. Parents also expressed that they found setting appropriate limits related to food and screen time challenging, as many felt they were being overly withholding or restrictive to children. Finally, several participants noted that because their children did not view them as an "expert" or authority on health, parents' ability to relay and share the knowledge and information gained during the intervention with children at home was difficult and not always well-received. Some parents suggested that children would be more open to receiving this information, and therefore more likely to change their behaviours, if the intervention were delivered to the children themselves by experts.

## **Recommendations for Future Paediatric Overweight/Obesity Interventions**

Two overarching themes and five subthemes resulting from parents' recommendations for future interventions were generated, including: greater child involvement (i.e., increased accountability of children, hands-on activities for children, and peer supports and interactions among children) and practical information and strategies (i.e., missing the “how” to follow through on lessons learned and other topics of interest). Quotes reflecting the abovementioned themes and subthemes are presented in Table 6.

Table 6

*Selected quotes related to parents' recommendations for future paediatric  
overweight/obesity interventions*

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Greater child involvement

i. Increased accountability of children

- “Take it one step further... if the kids were a little more involved along the way... something child-focused, so they can feel even more proud of their accomplishments and share amongst their peers too.” (Participant 1, female)
- “I think it would have been even more powerful to have ... the child around the table with you to set those goals right because there’s a bit of a lack of commitment when they just don’t have that information coming right from the source.” (Participant 1, female)
- “I just think the kids were too excluded. Everything we took away from here was delivered by the parent... but if like the goal setting was done in a group environment.... I came up with the goals, we asked the kids, like what are some things we can do, but it’s just not the same right?” (Participant 2, male)

ii. Hands-on activities for children

- “There’s a lot of information sessions that were great for parents, but it would almost be great if you had one-week information session, the next week you did a little lab session with the kids. Presented the information in that way, so you did information and then the practical.” (Participant 2, male)
- “We put [our] kids in the cooking class at the [grocery store], maybe that could’ve been a finale where the children got to make something and be proud of that accomplishment using key ingredients.” (Participant 9, female)
- “He [my son] wants a recap to see what we talked about and of course I do like a small summary just so that he is aware of what we talked about, but we also talked about the day that we had the chef came in... and he thought it would be a cooking class to teach him how to cook. He wanted that involvement, he wanted that extra piece.... He wanted to be a little more involved in the program.” (Participant 11, female)

iii. Peer support and interactions among children

- “I like the idea of exchanging numbers, not just for the parents, but for the children, like you guys make friends within the program.” (Participant 3, male)
- “If a peer group similar to this could be made for kids. The parents can get together and find useful solutions, while the kids play and make friends. They’d probably all go to different schools, but they’d have the exact same issues and they won’t judge.” (Participant 12, female)
- “Bring them together. We’re doing our thing, but they’re doing something on a different level.... That brings the kids together at their own language and pace, and builds some friendships too.” (Participant 9, female)

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Practical information and strategies

i. Other topics of interest to parents

- “You could have a time management type of component too.” (Participant 8, male)
  - “Emotional intelligence so that we know what words to say.” (Participant 11, female)
-

- “Have a social worker come in and... connect with the schools and see what kind of support there is.” (Participant 11, female)

ii. Missing the “how”

- “I’ve learned something... everything was great but I just felt like how to implement it.” (Participant 12, female)
  - “We are more aware of what we need to do, but again because we are missing that ‘how’.” (Participant 11, female)
  - “I never got a clear idea as of how to talk to my kid and if there was somebody that came in that said, ‘When your kid reacts this way, you can say this, here’s a strategy to deal with certain answers.’ You know like salespeople they know, if you say, ‘Oh no, not right now’, then they have something ready.” (Participant 3, male)
-

**Greater child involvement.** Most parents voiced a preference for children to be more directly involved in the intervention. Specifically, parents expressed that by adding a structured, child-focused program component, children would be more empowered, as well as more conscientious of, committed to, and accountable for their health behaviours. Parents provided a number of suggestions for future programs, including the inclusion of opportunities for children to participate in practical learning (i.e., “hands-on”) learning experiences such as cooking classes. Parents also spoke to the importance of and benefits associated with fostering additional peer support and interactions among children. Many noted that engaging children in group activities would have helped to develop additional friendships and supportive relationships among children who experience the same issues and challenges. Parents felt that the group-based format had been a very impactful component of the program for themselves, and that creating a similar environment for children would have had a powerful and positive effect on their children as well.

**Practical information and strategies.** The final theme is divided into two subthemes that focus on information (i.e., other topics of interest) and strategies (i.e., how to implement the information learned during C.H.A.M.P. Families). Parents expressed an interest in different topics related broadly to child health such as weight-related communication and emotional intelligence. Parents also stated that time management strategies would have been helpful, as time constraints were identified as a hindrance<sup>3</sup> to healthy eating and physical activity in their family. Many parents voiced that while they had sufficient information on certain topics, they still felt they lacked concrete strategies pertaining to how to implement this knowledge with their children and families in the home environment.

## Discussion

The purpose of this study was to explore parents' perspectives related to their role(s) as the 'primary agent of change' in a parent-focused childhood overweight/obesity program, as well as the perceived impact of the program on child and parental health and wellbeing. Program strengths and weaknesses, as well as practical issues and recommendations that could contribute to the design of future family-based treatment programs for paediatric obesity were also elicited. Several studies have highlighted parents' perspectives of their experiences related to primary care [58,59] and family-based interventions [60–62], but to our knowledge, this is the first study to explore the perceptions of parents in the context of a community-based, parent-only lifestyle intervention targeting childhood obesity.

The parents who participated in focus groups described several perceived benefits for children (i.e., improved dietary behaviours, increased physical activity, and enhanced empowerment and autonomy), families (i.e., enhanced family dynamics and healthy food choices), and themselves (i.e., greater parental confidence to support and promote health behaviours in children), all of which were attributed to their involvement in the program. One additional and unanticipated benefit of the program that was highlighted by many parents related to the free, active programming that was offered to children at the YMCA during the parent-only sessions. Though this programming was not part of the formal intervention and was originally intended as a means to reduce barriers to participation, it was noted by participants to have very positive outcomes for both children and parents. Interestingly, while parents noted improvements in their confidence to serve as agents of change for their families and to have conversations with children about health- and

weight-related issues, they also emphasized that these areas could be addressed more explicitly in future paediatric obesity treatment programs. For example, several parents articulated challenges associated with relaying program content to children, suggesting that while they felt they had sufficient knowledge about the health topics discussed during the sessions, they lacked the necessary tools and strategies to effectively implement changes in the home environment. Some parents also noted that their children would likely be more receptive to the information if it came from an “expert” rather than from a parent or caregiver. With regard to communication, many parents expressed a desire to protect their children’s feelings and self-esteem, which they believed could be damaged if they did not broach certain health- and weight-related topics sensitively.

Indeed, poor family communication has been found to be associated with an increased risk of child overweight/obesity [81], and certain types of parent-child weight-related talk has also been identified as potentially detrimental to a child’s health and wellbeing [82]. For instance, in a 2016 meta-analysis consisting of 4 intervention studies and 38 associative (cross-sectional and prospective) studies, Gillison and colleagues found that communication consisting of weight criticism (i.e., teasing) and encouraging weight loss increases the likelihood of poor physical self-perceptions, dysfunctional eating, and dieting behaviours in children [82]. Conversely, Gillison et al. reported that encouraging healthy exercise and diet without discussing weight directly was associated with less unhealthy weight control and dieting behaviours among children [82]. Unfortunately, evidence-based resources and strategies to help parents navigate conversations with children about food and weight management are lacking in the literature [81,82]. Furthermore, it is important that as researchers, we acknowledge the



possibility that we may inadvertently draw parents', and subsequently children's, attention to weight given that weight-related measures such as BMI-z are often the primary outcome in childhood obesity studies [35]. Thus, shifting the focus towards healthy lifestyles and facilitating positive and supportive family communication are important considerations for future paediatric overweight/obesity interventions [82]. Additional barriers to health behaviour change identified by C.H.A.M.P. Families participants, including time constraints, parenting issues, and lack of social support, were consistent with those that have been previously cited by parents in the childhood obesity treatment literature [60–62].

As noted previously, C.H.A.M.P. Families was informed by feedback from parents who took part in the original C.H.A.M.P. program [50], many of whom advocated for greater parental involvement and accountability in future paediatric obesity interventions [52]. Despite evidence indicating that parent-only interventions for childhood overweight/obesity may be as effective, or even more effective, than parent-child interventions [37], many of the parents in the current study noted that their children would have benefited from increased participation in the program. Taken together, it is reasonable to suggest that parents seem to desire a childhood obesity treatment program that is relevant for, and balances the involvement and accountability of, both parents and children.

While nearly all of the feedback about C.H.A.M.P. Families was positive, one parent did note that the delivery of content provided by one of the invited guest speakers was not relatable or relevant to their family. Although this comment was not deemed to

be sufficient to warrant its own theme per se, such feedback will certainly be used by our team in the development of future programs.

One of the most impactful components of C.H.A.M.P. Families identified by participants was the sense of community and belonging that developed among the parents in the program. Connecting with other parents in a group-based setting was perceived by parents, especially those who had experienced stigma associated with having a child with overweight/obesity, as very powerful; many noted that they valued feeling as though they were “not alone”. This finding stresses the importance of cultivating a positive and inclusive group-based environment to support health behaviour change [83]. Groups can be powerful facilitators of change for and adherence to a variety of health behaviours [83–86], and in the context of childhood obesity, group-based programs have been shown to be more effective in reducing child BMI-z scores than treatments administered individually [87,88]. As stated previously, C.H.A.M.P. Families was intentionally designed using several evidence-based group dynamics strategies [63] that have been used successfully in previous family-based childhood obesity interventions [50] in an attempt to enhance adherence, group cohesion, and other health-related outcomes.

In addition to the importance of the group environment, participants emphasized that their experience in the program was enhanced by the rapport developed between themselves (including their children) and the Project Coordinator (KR) whom they described as likeable, engaging, and non-judgmental. Weight bias among primary care providers [89,90], as well as exercise and nutrition professionals [91], has been well-documented in the literature and has been shown to compromise patient outcomes and quality of care [92]. Furthermore, perceptions of judgment from health professionals can

have a negative effect on weight loss [93]. While this intervention was administered by researchers in a community setting, it remained important for program staff to foster supportive relationships with participants to ensure that they felt accepted and did not experience stigma or judgment.

In terms of limitations, while the feedback from parents was generally positive and despite the use of honesty demands [74], given that the focus groups were moderated by members of the research team it is possible that participants were influenced by social desirability [94]. Furthermore, there were four participants who did not participate in the focus groups (one who withdrew from study and three who had scheduling conflicts) and thus, whose perspectives and experiences were not captured. Finally, as a result of the limited sample size, it was difficult to determine if true data saturation was, in fact, reached.

### **Conclusions**

Given the current prevalence of childhood obesity, there is an urgent need for treatment programs that are feasible, effective, and accessible to parents and families [27]. Based on participants' perceptions, C.H.A.M.P. Families appears to have been well-received, and to have had an overall positive influence on the health and wellbeing of both parents and children [64,65]. Further research exploring the development and dissemination of effective communication strategies related to weight and other sensitive health-related topics for families is necessary. Lastly, group dynamics strategies should be used to enhance perceptions of belonging among families, and positive family communication should also be emphasized in future childhood overweight/obesity treatment interventions.

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## Chapter 6

### Summary, Implications, and Future Directions

The general purpose of this dissertation was to provide insight into and new knowledge about the role of parents as agents of change in the treatment of childhood obesity and the promotion of children's health behaviours. To achieve this objective, four studies were conducted. Study 1 (Reilly, Hasan, & Burke, 2018) explored parental perspectives regarding the meaning of nutritional literacy, as well as the needs identified by parents for nutritional literacy information, supports, and resources within their families and communities. Results demonstrated that parents perceived nutritional literacy as having an understanding of nutrition/healthy eating, as well as possessing the skills necessary to implement that knowledge into their daily lives. All participants agreed that nutritional literacy was important, and the majority believed that it could be improved within their families. Parents felt that nutritional literacy could be enhanced within their families if they had access to professional advice, practical skills, child-friendly recipes, and information on the food environment. In addition, parents identified food regulation, accessible community programming, and school-based policies and curricula as community-level needs.

Study 2 contained a detailed description of the components and theoretical model used in the development and implementation of a childhood overweight and obesity treatment intervention targeting parents of children (aged 6-14 years) with a body mass index (BMI) equal to or greater than the 85<sup>th</sup> percentile for age and sex (Reilly, Tucker, et al., 2018). The intervention, "C.H.A.M.P. Families", involved programming that focused

on parents as the primary agents of change for their families. The program included: (a) eight group-based (parent-only) education sessions; (b) eight home-based activities for parents to complete with their families; and (c) two group-based (family) follow-up support sessions. Each component of the intervention, as well as the related feasibility analyses, were explained in detail. Additionally, this study outlined the use of a unique theoretical framework that integrated evidence-based group dynamics principles and motivational interviewing techniques within the broader context of Social Cognitive Theory. Several practical examples of how theoretical constructs and evidence-based strategies can be applied within the design of parent-focused paediatric obesity interventions were presented.

The purpose of Study 3 (Reilly, Johnson, et al., 2018) was to investigate the impact of the abovementioned parent-only intervention for paediatric overweight and obesity (C.H.A.M.P. Families) on child standardized body mass index (BMI-z) and parental self-efficacy for promoting children's health behaviours. Results showed that the C.H.A.M.P. Families intervention had a small, positive effect on both parental self-efficacy for promoting child health behaviours and child BMI-z, from baseline to post-intervention. The results also indicated that while these improvements were not maintained at the 6-month follow-up, many of the values were still improved over baseline values.

Finally, the aim of Study 4 was to explore parents' perspectives of their experiences in and the influence of C.H.A.M.P. Families, as well as their recommendations related to future paediatric overweight and obesity treatment interventions (Reilly, Briatico, et al., 2018). Overall, C.H.A.M.P. Families was well-



received by parents, most of whom highlighted several positive outcomes for children, families, and parents. Parents underscored the importance of the group environment specifically, along with program content and materials, and additional intervention/program components that were viewed as beneficial. Many participants reported experiencing a number of socioenvironmental and personal barriers to health behaviour change, and recommended that future programs include greater child involvement and additional information and strategies for parents.

Notwithstanding the limitations noted for each study, when considered together, the findings of this body of work have yielded several important implications for future research. The first implication corresponds to the involvement in and accountability of both parents and children in terms of their participation in obesity treatment interventions and the associated behaviour changes. As noted throughout this dissertation, the design of C.H.A.M.P. Families (Reilly, Tucker, et al., 2018) was informed by empirical evidence showing that parent-only childhood obesity interventions are effective in improving child health outcomes (Ewald, Kirby, Rees, & Robertson, 2014; Faith et al., 2012; Golan, Kaufman, & Shahar, 2006; Jang, Chao Msn, & Whittemore, 2015), as well as feedback from parents and children advocating for greater parental involvement (Pearson, Irwin, & Burke, 2012; Pearson, Irwin, Burke, & Shapiro, 2012). While targeting parents as the primary agents of change in C.H.A.M.P. Families appeared to have a modest, positive effect on child BMI-z and parental self-efficacy for promoting child health behaviours (Reilly, Johnson, et al., 2018), parents also expressed they were not necessarily comfortable in assuming this role, and would have preferred that their children were more involved in the intervention (Reilly, Briatico, et al., 2018). Similar recommendations were

made by parents in Study 1 regarding the nutritional literacy resources identified as important for families (Reilly, Burke, & Hasan, 2018). Specifically, while the importance of parents teaching and role modelling healthy dietary behaviours was acknowledged, parents also emphasized the need for greater nutritional literacy resources and programming that involved the whole family. Further research investigating the optimal balance of involvement, accountability, and responsibility of both parents and children is necessary to enhance the development of future family-based resources and interventions focused on childhood overweight and obesity.

The second implication derived from this dissertation relates to the promotion of positive family communication surrounding children's health behaviours and weight concerns. Study 4 underscored the complicated experiences, feelings, and issues that parents of children with obesity navigated around discussions pertaining to children's health and body weight. For example, many parents noted feeling shame and experiencing stigma for having a child with overweight or obesity, and simultaneously, expressed a desire to protect their children from their own self-esteem and body image issues (Study 4; Reilly, Briatico, et al., 2018). Poor family communication and negative weight talk have been associated with adverse psychological and physical health outcomes in children (Gillison, Lorenc, Sleddens, Williams, & Atkinson, 2016; Halliday, Palma, Mellor, Green, & Renzaho, 2014). Interestingly, though the parents in C.H.A.M.P. Families noted improvements in their confidence to have conversations with children about health and weight, they also expressed that family communication should be emphasized in future childhood obesity treatment programs. Current recommendations for parents of children with overweight and obesity include fostering positive and

supportive dialogue that shifts focus from weight towards healthy lifestyles (Gillison et al., 2016; Halliday et al., 2014); however, as C.H.A.M.P. Families parents noted, clear and explicit communication strategies appear to be lacking. Family communication was assessed in C.H.A.M.P. Families and results will be presented in a future publication.

While those findings will surely provide important insights about the impact of a parent-focused paediatric obesity intervention on family communication and dynamics, additional research to guide parents through positive dialogues about health and weight with children is necessary.

The third implication drawn from this dissertation relates to the lack of representation of fathers in research pertaining to health behaviours and obesity in children. Parental involvement in childhood obesity treatment has a significant impact on child weight-related outcomes (Kitzmann et al., 2010). However, consistent with findings of previous systematic reviews (Davison et al., 2016, 2018; Morgan et al., 2017), the results of this dissertation support the general conclusion that fathers are not adequately recruited or engaged as participants in this area of research. This was exemplified in Study 1 given the lack of fathers (91.1% female) that completed the online survey about nutritional literacy (Reilly, Hasan, et al., 2018). A similar pattern emerged in Studies 2, 3, and 4 as newspaper and radio advertisements, physician referrals, and posters inviting parents to participate in a study regarding paediatric obesity did not sufficiently attract or engage fathers (Reilly, Briatico, et al., 2018; Reilly, Johnson, et al., 2018; Reilly, Tucker, et al., 2018). In some cases, once a mother signed up for the study, the father/step-father decided or was encouraged by their spouse/partner to join as well; however, in all cases but one, the self-identified ‘primary parent’ participating in the program was the mother.

These findings highlight the importance of investigating fathers' preferences for, and perspectives on, effective recruitment strategies as well as their involvement in paediatric obesity interventions.

A final implication emerging from this thesis related to the concept of 'food away from home' (FAFH), particularly within the school environment. In Studies 1 and 4, parents noted several examples related to how they carefully and purposefully promoted, modeled, or implemented changes to healthy dietary behaviours in the home environment (Reilly, Briatico, et al., 2018; Reilly, Hasan, et al., 2018). Unfortunately, many parents also expressed feeling undermined and frustrated by the unhealthy foods that were frequently provided to their children at school. Children spend a significant portion of their time at school (approximately 30 hours per week; Nettlefold et al., 2011), and during that time, are exposed to a broad range of unhealthy foods and beverages through vending machines and cafeterias (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Fox, Dodd, Wilson, & Gleason, 2009), school-related celebrations (e.g., birthday parties, pizza days, etc.; Reilly, Hasan, Burke, 2018), and the lunches brought to school by their peers (Reilly, Hasan, & Burke, 2018; Reilly et al., 2018). Parents in Study 1 advocated for the implementation and enforcement of school-based policies and guidelines to promote the consumption of healthy foods (e.g., fruits and vegetables) and limit the sale or provision of unhealthy foods and beverages (e.g., sugar-sweetened beverages, candy etc.) to support nutritional literacy and healthy eating. Indeed, previous studies have shown that policy changes to limit unhealthy foods and beverages in the school environment have improved the dietary behaviours of children in Canada (Godin, Hammond, Chaurasia, & Leatherdale, 2018; Watts, Mâsse, & Naylor, 2014) and the United States (Driessen,

Cameron, Thorton, Lai, & Barnett, 2014; Micha et al., 2018). In 2008, the Ontario Ministry of Education instituted a ‘School Food and Beverage Policy’ establishing mandatory nutrition standards for all food and beverages sold in school venues (e.g., vending machines, cafeterias, tuck shops), programs (e.g., catered lunch programs), and events (e.g., sporting events, and bake sales; Government of Ontario, 2010). Notably, the policy states that schools are exempt from these standards up to ten times per day (i.e., “special event days”), and specifies other scenarios in which these nutrition standards do not apply. For example, lunches or snacks brought from home are exempt, as are the foods and beverages provided to students for free at schools (Government of Ontario, 2010). Thus, despite the existence of such policies and assuming that schools are following the established guidelines, they are likely insufficient and parents may not be aware of them. Additional research in this area, and to the general concept of food away from home and its impact on children’s health, is also warranted.

As eluded to above, the results of the studies within this dissertation provide the foundation for a number of future research topics. First, there are a limited number of studies that evaluate the correlation between parental self-efficacy for promoting child health behaviours and child BMI-z. While Study 3 (Reilly, Johnson, et al., 2018) outlined the impact of a parent-focused paediatric intervention on parental self-efficacy as well as child BMI-z, given the limited sample size, it was not possible to assess the relationships between these and other variables. As such, further investigation is warranted. An additional and similar topic for future research is to quantitatively and qualitatively investigate the role of family communication in paediatric obesity interventions. Study 4 highlighted the perspectives of parents surrounding family dialogues about health and

weight; however, it would be interesting to explore children's perspectives related to family weight talk in an effort to gain an enhanced understanding of the family dynamics that influence these dialogues and to inform the development of family communication strategies (Reilly, Briatico, et al., 2018). It is also uncertain how family communication influences child weight-related outcomes in family-based obesity interventions.

A third recommendation for future research is to evaluate the implementation and adoption of current School Food and Beverage Policies and nutrition standards within school boards in the province. As highlighted above, although food and beverage policies have been enacted, there is uncertainty regarding the degree to which they are enforced by school boards and administrators. Further, while there have been studies examining food away from home and the school food environment (Briefel et al., 2009; Driessen et al., 2014; Mancino, Todd, Guthrie, & Lin, 2014), less is known about other environments or settings in which children spend their time outside of the home (e.g., sports teams, recreational clubs, birthday parties, with grandparents, etc.). Thus, as noted above, a fourth potential area of research would be to investigate food away from home in these contexts to strengthen the understanding of child dietary behaviours as well as parents' perceptions of and knowledge about such food provision to their children.

Fourth, with regard to the potential transferability and/or scalability of the C.H.A.M.P. Families program, it is important to acknowledge that the design and implementation of this program may not be readily transferable to other locations, namely rural and remote locations. Individuals living in rural and remote areas typically have less access to health-related services and professionals (Avis et al., 2014; Sibley & Weiner, 2011). As such, it would be challenging to deliver a community-based program that relies

heavily on the participation of numerous health professionals and community organizations. Additionally, the geographical distance between individuals living in rural and remote areas may make it difficult for parents to participate in a face-to-face, group-based intervention due to factors such as transportation time and the time/additional resources required to attend (Kilty, 2007; Ng, Wilkins, Pole, & Adam, 1997). Given that rates of overweight and obesity among children living in Ontario are higher in rural and remote areas (Public Health Ontario, 2018), a worthwhile area of future research would be the design and implementation of paediatric obesity interventions that would be feasible in these settings.

Finally, given the broader social and environmental conditions that influence parents' ability to promote children's health behaviours, another potential area of research is an exploration of the potential role of parents as advocates for children's health in the community. Paediatric obesity treatment programs such as C.H.A.M.P. Families focus primarily on providing parents with information and strategies to modify the home and family environments, with less attention paid to the broader socioenvironmental influences on health and obesity. The need for policy and environmental interventions are well documented in the literature (Eyler, Nguyen, Kong, Yan, MS, & Brownson, 2012; Institute of Medicine (US) Committee on an Evidence Framework for Obesity Prevention Decision Making, 2010). Currently, it is unknown whether parents are interested, or perhaps even aware of, health- and/or obesity-related policies that might impact their children and how they might become engaged in advocacy efforts. Opportunities to explore parents' interest and subsequently, develop resources that empower parents to

serve as agents of change for healthy policies in their communities may be worth investigating.

In conclusion, the results presented in this dissertation support a consensus in the literature that parents play a crucial role in the promotion of health behaviours in children, as well as in the treatment of childhood overweight and obesity. However, the findings of this body of work also highlight the fact that parents need additional support and resources, as well as greater involvement from their children, health professionals, and communities to enhance their capacity to make healthy changes in the home environment. It is important that researchers, health professionals, community stakeholders, and legislators work collaboratively to develop resources and interventions that empower families to adopt healthier lifestyles, and to create and enforce policies that foster health promoting environments for our children.



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Appendix A

Ethics Approval Notice for Study 1

**Western University Health Science Research Ethics Board  
HSREB Amendment Approval Notice**

**Principal Investigator:** Dr. Shauna Burke

**Department & Institution:** Health Sciences\Faculty of Health Sciences,Western University

**Review Type:** Full Board

**HSREB File Number:** 105845

**Study Title:** C.H.A.M.P. Families: A Needs Assessment for the Development of a Parent-Focused Advocacy Network

**Sponsor:** Heart and Stroke Foundation of Canada

**HSREB Amendment Approval Date:** June 20, 2016

**HSREB Expiry Date:** March 03, 2017

**Documents Approved and/or Received for Information:**

Document Name	Comments	Version Date
Revised Western University Protocol		2016/05/04
Instruments	CHAMP Families Online Survey for Parents	2016/05/04

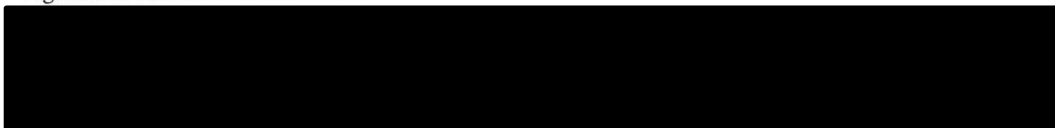
The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the amendment to the above named study, as of the HSREB Initial Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use Guideline for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.



Appendix B

Letter of Information and Consent Form for Study 1



*Children's Health and Activity Modification Program (C.H.A.M.P. Families): A Needs Assessment for the Development of a Parent-Focused Advocacy Network*

**C.H.A.M.P. Families Online Survey for Parents**

**Project Title:** C.H.A.M.P. Families – A needs assessment for the development of a parent-focused advocacy network.

**Investigators:** Shauna Burke, Ph.D., Associate Professor (July 1, 2016), Western University Canada; Kristen Reilly, MPH, Ph.D. Student, Western University Canada

**Background**

You are invited to participate in a survey about your perceptions, feelings, and attitudes about physical, nutritional, and civic literacy (“literacy” means knowledge, competence, and confidence in these areas). In this survey, you will also be asked to share ideas, strategies, and potential barriers that you think are important to consider for the creation of a new, parent-led health advocacy network in our community. Based on input from parents like you, our team at Western University will create a network to advocate for health and literacy among families in Ontario. This survey will help the research team understand more about the health-related topics that parents think are important for the creating a health advocacy network in our communities. Your thoughts and insights are greatly appreciated.

**Procedures**

Parents of children aged 16 or younger are invited to participate in a confidential online survey. The survey has 43 questions and will take about 25 minutes to complete.

**Voluntary Participation**

Participation in this study is voluntary. You may refuse to participate or withdraw from the study at any time with no penalty. You may also skip any question(s) that you do not wish to answer.

**Possible Benefits**

Participation in this study may make you more aware of physical, nutritional, and civic literacy and their potential impact on family health. It may also provoke thought about the development of and potential involvement in a parent-focused child health network. It is possible that you do not receive any benefits from participation in the study.

**Possible Risks and Harms**

There are no known or anticipated risks or emotional discomforts associated with participating in this study.

### **Confidentiality**

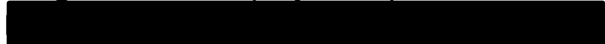

Electronic data from survey responses will be stored in an encrypted file on a password-protected computer, and inside a locked office. After a minimum of 5 years, all data will be destroyed. By participating in this research, you agree that your results may be used for scientific purposes, including publications in scientific journals. Upon completion of the study, this list will be destroyed. The results of the study will be reported without identifying you personally thus maintaining your confidentiality. Representatives of the Western University Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research. You do not waive any legal rights by signing the consent form.

### **Rights of Subjects**

If you have any questions about your rights as a research participant or the conduct of this study, you may contact: The Office of Research Ethics

Western University  


### **Contacts for Further Information**

If you require any further information regarding this research project or your participation in the study you may contact   
or 

### **Publication and Feedback from the Study**

If the results of the study are published, your name will not be used. You may request the general findings of this research after the study is complete.

**ELECTRONIC CONSENT:** Please select your choice below.

Clicking on the “agree” button below indicates that you have read the above information and that you voluntarily agree to participate.

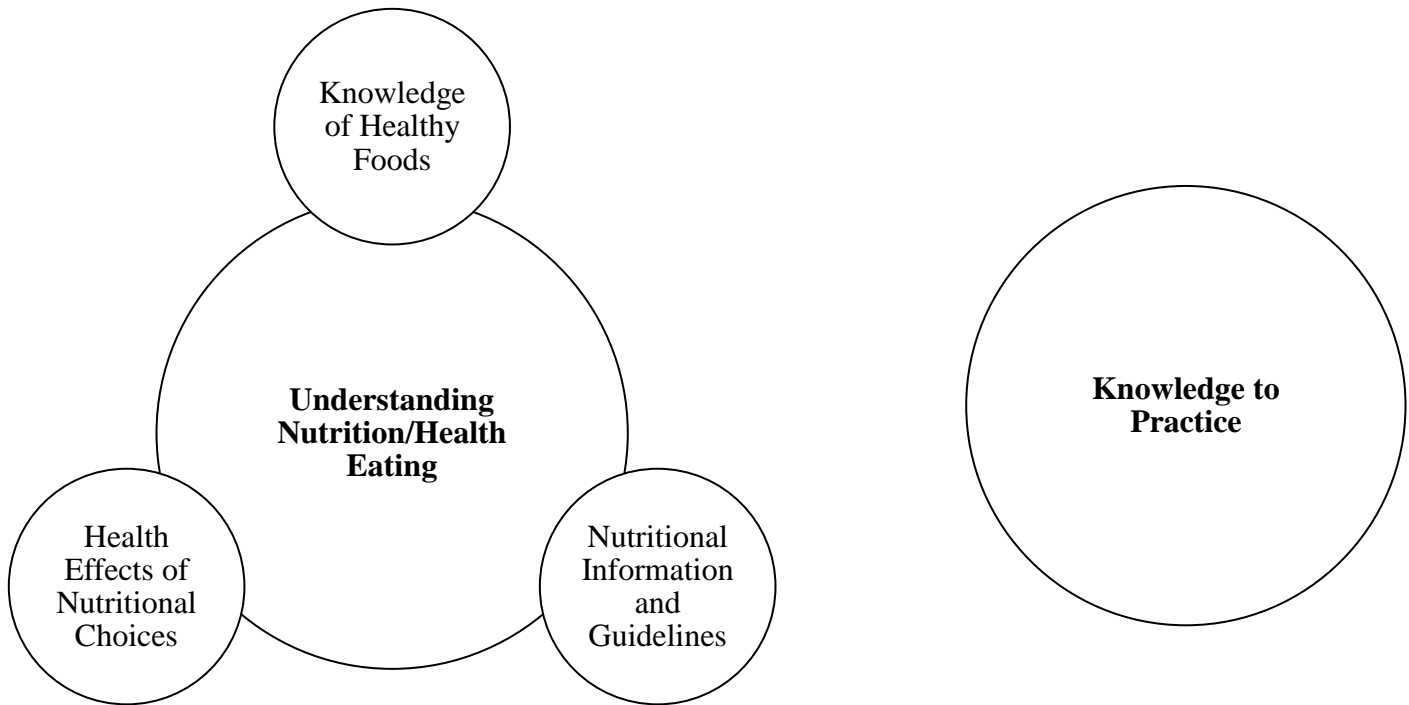
If you do not wish to participate in this research study, please decline participation by clicking the “disagree” button.

- Agree
- Disagree

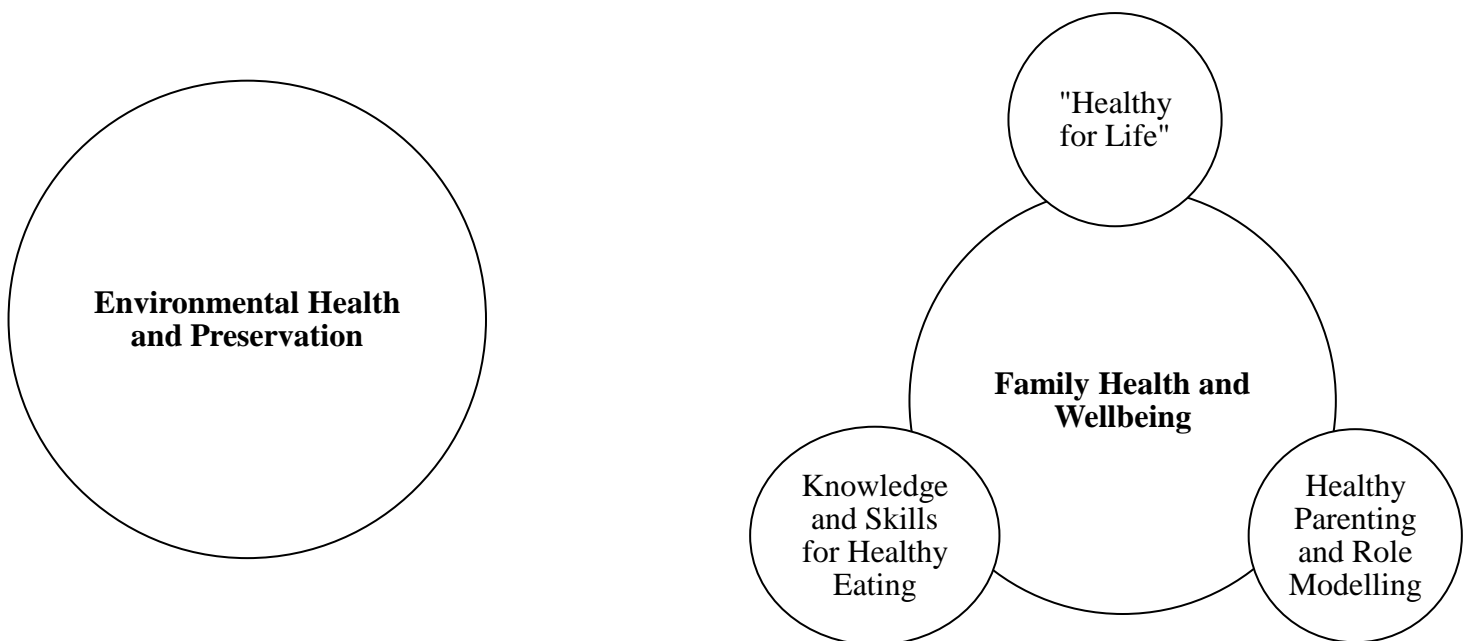
## Appendix C

### Final Thematic Maps from Qualitative Analysis in Study 1

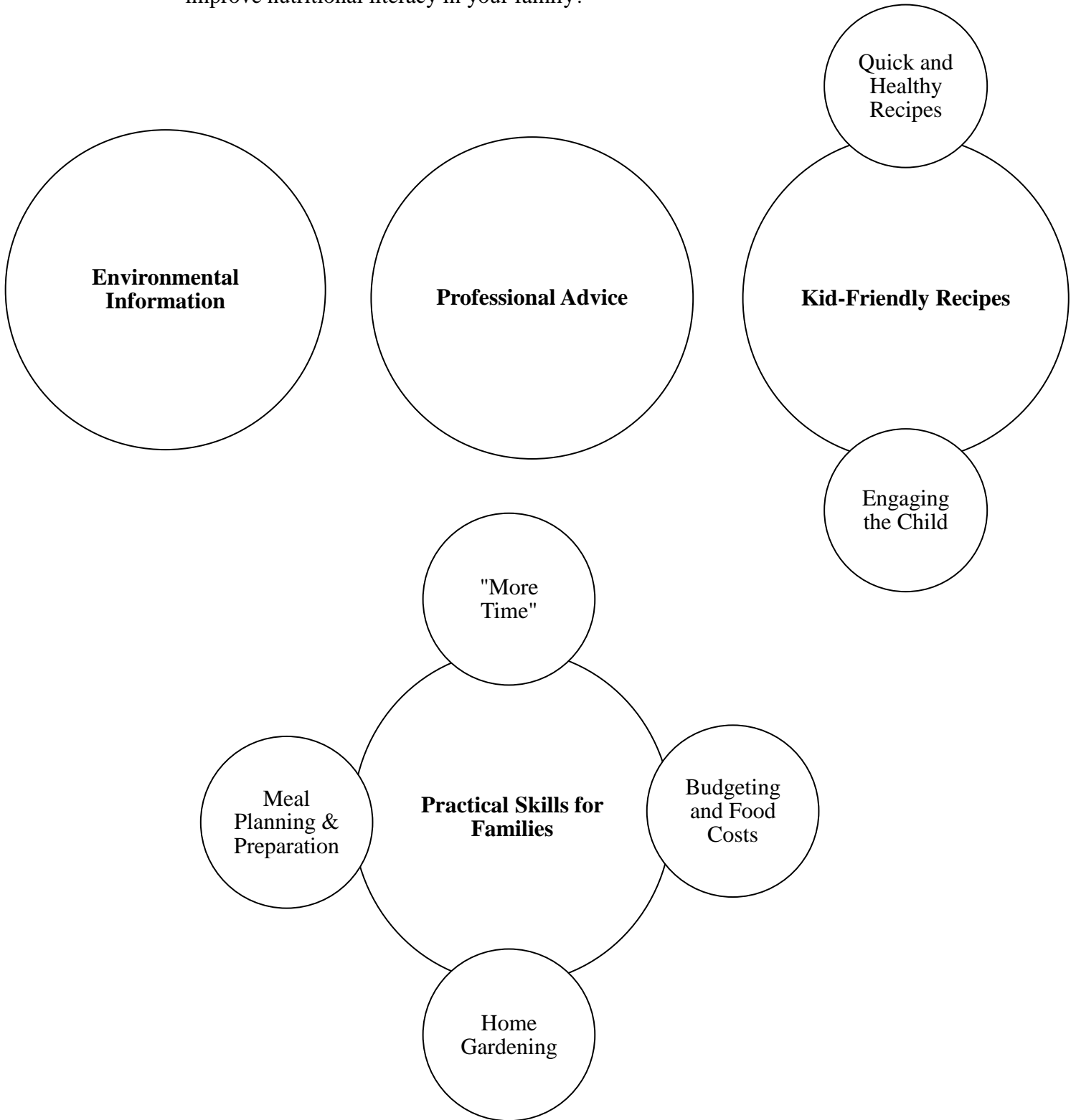
Question: What does nutritional literacy mean to you?



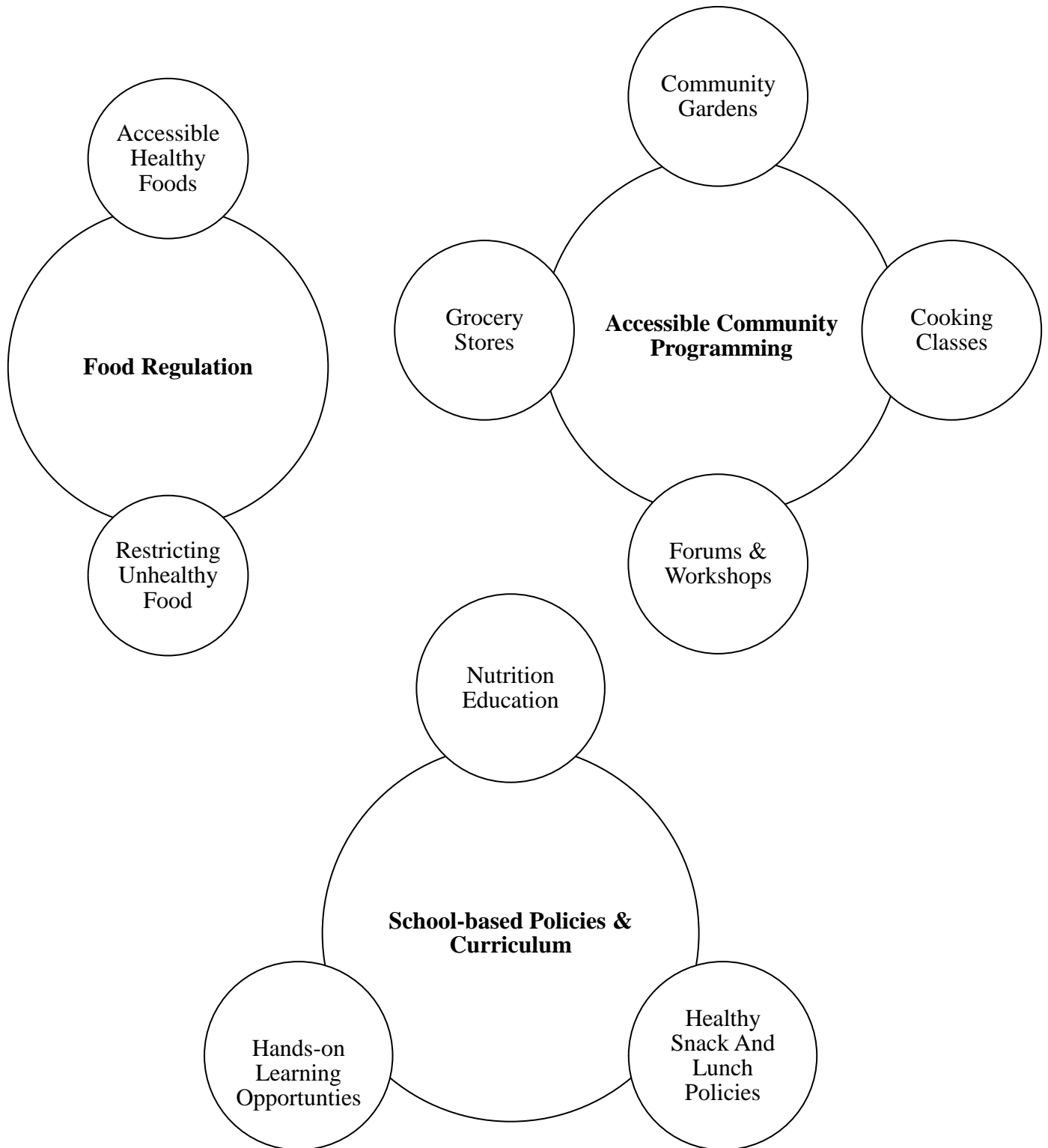
Question: Why is nutritional literacy important to you?



Question: What types of information, support, and/or resources would you need to improve nutritional literacy in your family?



Question: What types of information, support, and/or resources would you need to improve nutritional literacy in your community?



## Appendix D

The TIDieR (Template for Intervention Description and Replication) Checklist for  
Studies 2, 3, & 4

Item number	Item	Where located **
	<b>BRIEF NAME</b>	
1.	Provide the name or a phrase that describes the intervention.	1
	<b>WHY</b>	
2.	Describe any rationale, theory, or goal of the elements essential to the intervention.	1-4
	<b>WHAT</b>	
3.	Materials: Describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (e.g. online appendix, URL).	5-7
4.	Procedures: Describe each of the procedures, activities, and/or processes used in the intervention, including any enabling or support activities.	5-10
	<b>WHO PROVIDED</b>	
5.	For each category of intervention provider (e.g. psychologist, nursing assistant), describe their expertise, background and any specific training given.	8
	<b>HOW</b>	
6.	Describe the modes of delivery (e.g. face-to-face or by some other mechanism, such as internet or telephone) of the intervention and whether it was provided individually or in a group.	5-8
	<b>WHERE</b>	
7.	Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features.	5, 8-10
	<b>WHEN and HOW MUCH</b>	
8.	Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose.	5-8



**TAILORING**

9. If the intervention was planned to be personalised, titrated or adapted, then describe what, why, when, and how. 14-15

**MODIFICATIONS**

10. If the intervention was modified during the course of the study, describe the changes (what, why, when, and how). N/A

**HOW WELL**

11. Planned: If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them. 5-6, 8-10
- 12.† Actual: If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned. N/A
-

Appendix E

Ethics Approval Notice for Studies 2, 3, & 4



Research Ethics

**Western University Health Science Research Ethics Board  
HSREB Full Board Initial Approval Notice**

**Principal Investigator:** Dr. Shauna Burke  
**Department & Institution:** Health Sciences/Faculty of Health Sciences, Western University

**Review Type:** Full Board  
**HSREB File Number:** 108826  
**Study Title:** C.H.A.M.P. Families: A pilot randomized trial of a parent-focused intervention for childhood obesity

**HSREB Initial Approval Date:** March 15, 2017  
**HSREB Expiry Date:** March 15, 2018

**Documents Approved and/or Received for Information:**

Document Name	Comments	Version Date
Western University Protocol	108826(clean) 12Mar2017	2017/03/12
Data Collection Form/Case Report Form	L - Preference and Availability (clean copy)	2017/03/10
Data Collection Form/Case Report Form	J - Actical Wear-Time Log (clean copy)	2017/03/10
Instruments	Appendix R - Objectives and Guiding Questions	2017/02/13
Data Collection Form/Case Report Form	Appendix S - Sample Focus Group Questions	2017/02/16
Instruments	Appendix Q - FACES IV Sample Items	2017/02/16
Recruitment Items	Revised Appendix P - clean copy	2017/01/05
Data Collection Form/Case Report Form	Revised Appendix M - clean copy	2017/01/05
Letter of Information & Consent	C-Revised LOI - Children (clean copy)	2017/03/10
Assent	D-Revised Assent (clean copy)	2017/03/10
Letter of Information & Consent	B-Revised LOI - Parent (clean copy)	2017/03/10

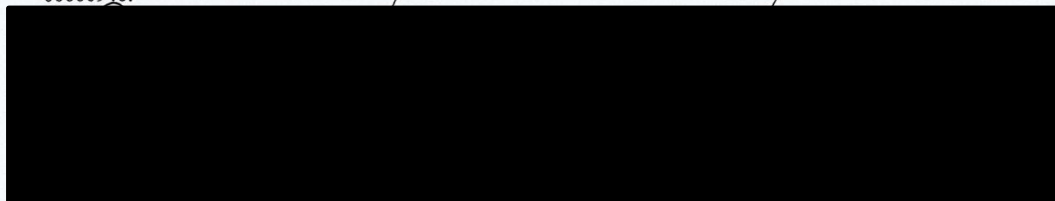
The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above named study, as of the HSREB Initial Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use Guideline for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.



Appendix F

Recruitment Poster for Studies 2, 3, & 4

**Do you have a child that struggles with his or her weight?**



Researchers at Western University are offering a program to help parents support the health of their children and families.



**Western**  
UNIVERSITY • CANADA

**C.H.A.M.P. Families** is a parent-focused program that provides parents like YOU with tools and information to promote the health of your family.

We will offer strategies to:

- ↑ physical activity
- ↑ healthy eating
- ↑ healthy sleep behaviours
- ↓ sedentary behaviours
- ↓ screen time

**YOU can make a difference in your family's health.**

**Join today and be a CHAMP for your family!**

For more information please contact:

**KRISTEN REILLY**  
Ph.D. Candidate

**DR. SHAUNA BURKE**  
Associate Professor



Children's Health and Activity Modification Program

Version #1: 06-12-2016

## Appendix G

Letter of Information and Consent Form for Parents in Studies 2, 3, and 4

**C.H.A.M.P. Families – LETTER OF INFORMATION AND CONSENT**  
(Parent/Guardian)

*Children's Health and Activity Modification Program (C.H.A.M.P.)*

**Names of Investigators**

**Primary Investigator: Dr. Shauna Burke**, Associate Professor, Western University

**Co-investigator: Kristen Reilly**, PhD Candidate, Western University

**Contact Information**

If you have any questions or concerns about the research described below, please feel free to contact [REDACTED]

**Introduction**

You and your child are invited to participate in a research-based healthy living program conducted by researchers at Western University. This project will provide health-based lifestyle information to parents of children who have a body mass index (BMI) greater than or equal to the 85<sup>th</sup> percentile for age and gender. BMI is a value calculated using an individual's body weight (kilograms) and height (metres). It is defined as weight divided by height squared (i.e., kg/m<sup>2</sup>). If you agree to participate, you will be randomly placed into one of two study conditions: (1) a group-based condition; OR (2) a home-based condition. Each group will receive bi-weekly information focusing on family health (e.g., physical activity, healthy eating, sedentary behavior, screen time, etc.) in either an individual- (i.e., home) or group-based setting.

**Purpose**

The primary purpose of the study is to evaluate the effectiveness of the health information delivered in these conditions in relation to several health outcomes pertaining to your child. Specific objectives include improving your child's health-related quality of life, physical activity levels, body composition (e.g., body mass index), and reducing his or her sedentary time.

**Procedures**

If you and your child agree to participate in this study, you will be randomly assigned to one of two conditions: (1) a **home-based condition**; or (2) a **group-based condition**. Sixty parent-child pairs are being recruited for this study (i.e., 30 pairs in each condition). All participants, regardless of assigned condition, will receive a home visit from a researcher and a research assistant at four time points: (1) one week before the start of the study; (2) half way through the study (2 months); (3) at the end of study (4 months); and (4) 6 months after the end of study. At each home visit, a researcher will measure your child's height and weight and ask him or her to complete a questionnaire (PedsQL 4.0 Child Report) regarding health-related quality of life. Completion of this questionnaire should take your child approximately 5-10 minutes. At this time, a researcher will also measure your height and weight and you will also be asked to complete a series of five short questionnaires: (1) PedsQL 4.0 Parent Report for Children (approximately 5 minutes to complete); (2) Child Health Questionnaire – Parent Form 50 (approximately 10-15 minutes to complete); (3) Family Adaptability and Cohesion Evaluation Scale; (4)

Parental Self-Efficacy Questionnaire (approximately 5 minutes to complete); and (5) Parental Self-Efficacy Questionnaire for Obesity Prevention Related Behaviors (approximately 5 minutes to complete). A member of the research team will be available at all times to answer any questions that you may have pertaining to the questionnaires. Some of these questionnaires indicate that you should answer all of the questions, however you may refuse to answer any of the questions at any time.

At each of the four study visits, your child will also be provided with an Actical<sup>®</sup> device, a small, lightweight accelerometer that has been shown to be a valid and reliable predictor of energy expenditure in children. Your child will be asked to wear the device during all waking hours for seven days in a row. They will also be asked to record on and off times using a log provided by the researchers. This process will take approximately 2 minutes to complete. At the end of the seven days, a researcher will contact you to arrange a time for the Actical<sup>®</sup> to be picked up from your home.

### **(1) Home-Based Condition**

If you agree to participate and are randomized into the home-based condition, you will receive an information packet every two weeks for 4 months (8 packets total) containing materials related to family and child health (e.g., healthy eating, physical activity, healthy sleep behaviours, sedentary behaviours, screen time, etc.). If randomized into this condition, you can choose to receive the materials electronically (via e-mail) or have hard copies sent to you by mail.

### **(2) Group-Based Condition**

If you agree to participate and are randomized into the group-based condition, you will be asked to attend **90-minute parent-only group sessions** held every two weeks (for a total of 8 sessions; dates and times to be determined based on participant schedules) in a community location. These sessions will cover a wide range of family health topics such as healthy eating, physical activity, screen time, sedentary behaviours, and healthy sleep behaviours. At the end of the 4-month program, you will also be invited to attend two C.H.A.M.P. Families “booster sessions”, which will be held 3 and 6 months following the program. These sessions will be led by researchers and health professionals, and will provide you with additional health-focused resources and information, social support, and group-based activities related to healthy lifestyles in the home environment. In order to reduce difficulties that may arise in terms of childcare, supervised childcare will be offered to children and siblings during all sessions.

During the last session, you and your child will be invited to participate in separate focus groups (i.e., one for children and one for parents) to discuss your experiences and the impact that the study had on your family. Each focus group will have 6- 10 participants and will be approximately 1-hour long.

Please note that six months after the study ends, all participants in the home-based condition will be offered the opportunity to participate in the group-based condition and all participants in the group-based condition will be offered the full information packets provided to participants in the home-based condition.

### **Voluntary Participation**



Participation in this study is voluntary. You and your family may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no penalty. If you decide to withdraw from the study, the information that was collected prior to your departure from the study will still be used in order to help answer the research question. No new information will be collected without your permission. You do not waive any legal rights by signing the consent form.

**Risks**

Speaking with other families and learning more about the risks associated with excess body weight may elicit feelings of distress or upset. If you feel that you would like to share your feelings with individuals outside of the program, there are resources available in London and area.

Canadian Mental Health Association – Middlesex Crisis Centre  
(648 Huron St., London ON, open 24 hours per/day, 7 days/week)  
<http://cmhamiddlesex.ca/crisis-services/>

Reach Out Crisis Line (1-866-933-2023) or Web Chat (<http://reachout247.ca/>)  
Connect with a mental health professional who can provide information, resources, and crisis support.

**Benefits**

You and your family members may experience a range of positive health outcomes including but not limited to improved healthy decision making, a broadened healthy living knowledge base, and increased family cohesion. It may also be possible that you do not receive any benefits from participation in the study.

**Confidentiality**

You and your family's participation in this study is completely confidential. The information obtained from the questionnaires and accelerometers will only be for the use of researchers. The completed questionnaires will be stored in a locked cabinet, inside a locked office. After a minimum of 5 years, all lab results and questionnaires will be shredded. By participating in this research, you agree that your results may be used for scientific purposes, including publication in scientific and exercise and health specific journals. A master list will be maintained linking your name as a participant to an identifying number. Upon completion of the study, this list will be destroyed. The results of the study will be reported without identifying you personally thus maintaining your confidentiality. Representatives of the University of Western Ontario Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

**Costs**

There is no cost to participate in this program. Participants will be reimbursed for transportation or parking costs that may result from attending group-based sessions.

**Compensation**

You will receive a grocery store gift card after each data collection point (i.e., at the start of the study, in the middle of the study, at the end of the study, and 6 months later). The amount of the gift card will increase by \$5.00 at every data collection point with all four gift cards totaling \$70.00. Gift cards will be delivered to your home by researchers at the time they arrange to collect the Actical<sup>®</sup> devices (i.e., one week after each home visit).

Please see payment amounts below:

- Baseline – \$10.00
- Mid-intervention (2 months) – \$15.00
- Post-intervention (4 months) – \$20.00
- 6-month follow-up – \$25.00

### **Rights as a Participant**

If you have any questions about the conduct of this study or your rights as a research participant, you may contact:

Office of Research Ethics  
The University of Western Ontario



### **Questions about the Study**

You may request the general findings of this research after the study is complete. If you have any concerns, please feel free to contact the researchers. You will receive a copy of this letter of information and the consent form.

**Thank you for considering participation in this study.  
This letter is for you to keep.**

**Informed Consent**

I, \_\_\_\_\_ have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Participant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Participant's Name (please print clearly):

\_\_\_\_\_

Would you like to receive a final report summarizing the results of this study?

YES \_\_\_\_\_ NO \_\_\_\_\_

.....

Name of Researcher/Individual Obtaining Consent:

Print: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Appendix H

Letter of Information and Consent Form for Children Ages 13-14 and Parents of All  
Child Participants for Studies 2 & 3

## C.H.A.M.P. Families – LETTER OF INFORMATION AND CONSENT

Children Ages 13-14 and Parents of All Child Participants (i.e., those ages 6-14)  
*Children's Health and Activity Modification Program (C.H.A.M.P.)*

Please note: The pronouns 'you' and 'your' should be read referring to your child rather than the parent/guardian who is signing the consent form for the participant.

### **Names of Investigators**

**Primary Investigator: Dr. Shauna Burke**, Associate Professor, Western University

**Co-investigator: Kristen Reilly**, PhD Candidate, Western University

### **Contact Information**

If you have any questions or concerns about the research, please feel free to contact



### **Introduction**

You and your parents are invited to participate in a research study about family health conducted by researchers from Western University. This project will provide health-based lifestyle information to parents of children who have a body mass index (BMI) greater than or equal to the 85<sup>th</sup> percentile for age and gender. BMI is a value calculated using an individual's body weight (kilograms) and height (meters). It is defined as weight divided by height squared (i.e., kg/m<sup>2</sup>). If you and your parents agree to participate, your parents will be randomly placed into one of two study conditions: (1) a group-based condition; OR (2) a home-based condition. Each group will receive bi-weekly information focusing on family health (e.g., physical activity, healthy eating, sedentary behavior, screen time, etc.) in either an individual- (i.e., home) or group-based setting.

### **Purpose**

The primary purpose of the study is to evaluate the effectiveness of the health information delivered in these conditions in relation to several outcomes pertaining to your health. Specific objectives include improving your health-related quality of life, physical activity levels, body composition (e.g., body mass index), and reducing your sedentary time.

### **Procedures**

If you and your parent agree to participate in this study, you will be randomly assigned to one of two conditions: (1) a **home-based condition**; or (2) a **group-based condition**. All participants, regardless of assigned condition, will receive a home visit from a researcher and a research assistant at four time points: (1) one week before the start of the study; (2) half way through the study (2 months); (3) at the end of study (4 months); and (4) 6 months after the end of study. At each home visit, a researcher will measure your height and weight and ask you to complete a questionnaire (PedsQL 4.0 Child Report) regarding health-related quality of life. If you are 12 or older, you will be asked to complete a second questionnaire called The Family Adaptability and Cohesion Evaluation Scale (FACES IV). This questionnaire will ask questions about cohesion, communication, and satisfaction in your family. Completion of these questionnaires should take you

approximately 15-20 minutes. At this time, a researcher will also measure your parent's height and weight and they will also be asked to complete a series of five questionnaires: (1) PedsQL 4.0 Parent Report for Children (approximately 5 minutes to complete); (2) Child Health Questionnaire – Parent Form 50 (approximately 10-15 minutes to complete); (3) Family Adaptability and Cohesion Evaluation Scale; (4) Parental Self-Efficacy Questionnaire (approximately 5 minutes to complete); and (5) Parental Self-Efficacy Questionnaire for Obesity Prevention Related Behaviors (approximately 5 minutes to complete) A member of the research team will be available at all times to answer any questions that you may have pertaining to the questionnaires. Some of these questionnaires indicate that you should answer all of the questions, however your parent may refuse to answer any of the questions at any time.

At each of the four study visits, you will also be provided with an Actical® device, a small, lightweight accelerometer that has been shown to be a valid and reliable predictor of energy expenditure in children. You will be asked to wear the device during all waking hours for seven days in a row. You will also be asked to record on and off times using a log provided by the researchers. This process will take approximately 2 minutes to complete. At the end of the seven days, a researcher will contact your parent to arrange a time for the Actical® to be picked up from your home.

### **(3) Home-Based Condition**

If you and your parent agree to participate and are randomized into the home-based condition, your parent will receive an information packet every two weeks for 4 months (8 packets total) containing materials related to family and child health (e.g., healthy eating, physical activity, healthy sleep behaviours, sedentary behaviours, screen time, etc.). If randomized into this condition, your parent can choose to receive the materials electronically (via e-mail) or have hard copies sent to your home by mail.

### **(4) Group-Based Condition**

If you and your parent agree to participate and are randomized into the group-based condition, your parent will be asked to attend **90-minute group sessions** held every two weeks (for a total of 8 sessions; dates and times to be determined based on participant schedules) in a community location. These sessions will cover a wide range of family health topics such as healthy eating, physical activity, screen time, sedentary behaviours, and healthy sleep behaviours. At the end of the 4-month program, your parents will be invited to attend two C.H.A.M.P. Families “booster sessions”, which will be held 3 and 6 months following the program. These sessions will be led by researchers and health professionals, and will provide your parents with additional health-focused resources and information, social support, and group-based activities related to healthy lifestyles in the home environment. In order to reduce difficulties that may arise in terms of childcare, supervised childcare will be offered to you (and your siblings) during these sessions.

During the last session, you and your parent will be invited to participate in separate focus groups (i.e., one for children and one for parents) to discuss your experiences and the impact that the study had on your family. Each focus group will have 6-10 participants and will be approximately 1-hour long.

Please note that six months after the study ends, all participants in the home-based condition will be offered the opportunity to participate in the group-based condition and all participants in the group-based condition will be offered the full information packets provided to participants in the home-based condition.

### **Voluntary Participation**

Participation in this study is voluntary. You and your family may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no penalty. If you decide to withdraw from the study, the information that was collected prior to your departure from the study will still be used in order to help answer the research question. No new information will be collected without your permission. You do not waive any legal rights by signing the consent form.

### **Risks**

Speaking with other children and families and learning more about the risks associated with excess body weight may elicit feelings of distress or upset. If you feel that you would like to share your feelings with individuals outside of the program, there are resources available in London and area.

Canadian Mental Health Association – Middlesex Crisis Centre  
(648 Huron St., London ON, open 24 hours per/day, 7 days/week)  
<http://cmhamiddlesex.ca/crisis-services/>

Reach Out Crisis Line (1-866-933-2023) or Web Chat (<http://reachout247.ca/>)  
Connect with a mental health professional who can provide information, resources, and crisis support.

### **Benefits**

You and your family members may experience a range of positive health outcomes including but not limited to improved healthy decision making, a broadened healthy living knowledge base, and increased family cohesion. It may also be possible that you do not receive any benefits from participation in the study.

### **Confidentiality**

You and your family's participation in this study is completely confidential. The information obtained from the questionnaires and accelerometers will only be for the use of researchers. The completed questionnaires will be stored in a locked cabinet, inside a locked office. After a minimum of 5 years, all lab results and questionnaires will be shredded. By participating in this research, you agree that your results may be used for scientific purposes, including publication in scientific and exercise and health specific journals. A master list will be maintained linking your name as a participant to an identifying number. Upon completion of the study, this list will be destroyed. The results of the study will be reported without identifying you personally thus maintaining your confidentiality.

Representatives of the University of Western Ontario Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

**Costs**

There is no cost to participate in this program. Participants will be reimbursed for transportation or parking costs that may result from attending group-based sessions.

**Compensation**

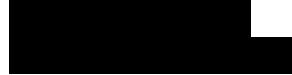
Your parents will receive a grocery store gift card after each data collection point (i.e., at the start of the study, in the middle of the study, at the end of the study, and 6 months later). The amount of the gift card will increase by \$5.00 at every data collection point with all 4 gift cards totaling to \$70.00. Gift cards will be delivered to your home by researchers at the time they arrange to collect the Actical<sup>®</sup> devices (i.e., one week after each home visit). Please see payment amounts below:

- Baseline – \$10.00
- Mid-intervention (2 months) – \$15.00
- Post-intervention (4 months) – \$20.00
- 6-month follow-up – \$25.00

**Rights as a Participant**

If you have any questions about the conduct of this study or your rights as a research participant, you may contact:

Office of Research Ethics  
The University of Western Ontario

**Questions about the Study**

You may request the general findings of this research after the study is complete. If you have any concerns, please feel free to contact the researchers. You will receive a copy of this letter of information and the consent form.

**Thank you for considering participation in this study.  
This letter is for you to keep.**



**Informed Consent** (Children ages 13-14)

I, \_\_\_\_\_ have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Participant's Name (please print clearly):

Participant's Age: \_\_\_\_\_

\_\_\_\_\_

Participant's Signature:

\_\_\_\_\_

Date: \_\_\_\_\_

.....

Name of Researcher/Individual Obtaining Consent:

Print: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**Informed Consent**  
Parents of Child Participants ages 6-14

I, \_\_\_\_\_ have read the Letter of Information, have had the nature of the study explained to me and I agree to allow my child \_\_\_\_\_ to participate. All questions have been answered to my satisfaction.

Parent or Legal Guardian Name (please print clearly):

\_\_\_\_\_

Parent or Legal Guardian Signature:

\_\_\_\_\_

Date: \_\_\_\_\_

.....  
Name of Researcher/Individual Obtaining Consent:

Print: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Appendix I

Letter of Information and Assent Form for Children Ages 7-12 Participating in Studies 2  
& 3

C.H.A.M.P. Families – Assent Form and Letter of Information for Children ages 7–12  
*Children’s Health and Activity Modification Program (C.H.A.M.P.)*

**Introduction**

You are invited to be in a research study about family health and wellness. This letter will explain what will happen in the study. After reading the letter, you can choose if you want to be in the study or not. If you have any questions or don’t understand something about the study, you can ask Kristen, Shauna, or your parents.

**Who is doing the study?**

Shauna Burke, Kristen Reilly, and other researchers from Western University.

**What is this study all about?**

The main point of C.H.A.M.P. Families is to provide your parents with information and tools that will help to support the health of you and your family.

**Who can be in this study?**

Boys and girls between the ages of 6 and 14 who have a body mass index (BMI) at or above the 85<sup>th</sup> percentile for age and gender can join the study. BMI is a math calculation that divides how much you weigh by how tall you are. BMI is a way to show how a kid is growing in comparison to other kids. A kid with a BMI at the 85<sup>th</sup> percentile means that 85% of the population has a lower BMI than he or she does.

**What will happen if I sign up for this study?**

Researchers from Western University will visit you and your family at your home 4 times to find out some information about you and your family’s health. The first visit will be at the start of the study, the second visit will be 2 months later (halfway through the study), the third visit will be 2 months after that at the end of the study, and the fourth and final visit will be 6 months later.

At each visit the researchers will measure how tall you are and how much you weigh. Then, they will ask you to complete a questionnaire. This questionnaire has 23 questions about your health, feelings, school, and your friends. If you are 12 or older, you will be asked to complete a second questionnaire about closeness, communication, and satisfaction in your family. It will take about 10-20 minutes to do the questionnaire(s). If There are no right or wrong answers and the researchers will be there to help you if you have any questions.

You will be asked to wear an Actical® which is a way for the researchers to see how much energy your body uses each day. The Actical® (which is small, light, and waterproof) is worn on your right hip from the time you wake to the time you go to sleep for 7 days straight, including weekends. The researchers would like you to write down the times you put on and take off the Actical® (your mom or dad can help you with this). You will be asked to wear the Actical 4 times, for one week each time: (1) 1

week at the start of the study; (2) 1 week half way through the study (2 months); (3) 1 week at the end of the study (4 months); and (4) 1 week 6 months later.

During the last session of the study, you and your parent will be invited to participate in separate focus groups (i.e., one for kids and one for parents) to talk to researchers and other kids about your experience in the study. Each focus group will have 6-10 kids and will be 1-hour long.

**Will C.H.A.M.P. Families hurt?**

No. The Actical® is small and light device that does not hurt to wear and will not get in the way of your daily activities.

**Will these activities be on my Report Card?**

No. None of the study activities are like the tests you do in school and they won't be marked on your report card.

**What if you have any questions?**

You can ask questions at any time, even when the study is over.

**Do you have to be in the study?**

No, you don't have to be in the study. No one will be mad at you if you don't want to do this. Even if you say yes, you can change your mind later. It's up to you.

**Rights of Subjects**

If you or your parents have any questions about your rights as a research participant or the conduct of this study, you may contact:

The Office of Research Ethics  
Western University



**Contact Information**

If you have any questions or want to talk about the study, you can contact one of the researchers below at any time by calling or e-mailing them.



**This letter is for you to keep.**

**Thank you!**

### Informed Consent

I, \_\_\_\_\_ want to participate in this study.  
(Please print your first and last name)

Signature of Child \_\_\_\_\_

Date \_\_\_\_\_

How old are you? \_\_\_\_\_

Researcher Name (please print): \_\_\_\_\_

Researcher Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Appendix J

Example of Home-Based Activity for Parents to Complete with Children in Studies 2, 3,  
& 4

# READY, SET, GO: FAMILY MEALS

**INSTRUCTIONS:** (1) Read through the following questions and write down your answers.  
 (2) As a family, set one or two goals to make family meals a routine in your home.

*Take a minute: Think about dinner time in your home...*

➤ What is important to you about eating dinner together as a family?

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➤ On a scale of 1 to 10, how important is it to you that your family eats dinner together as often as they can?

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➤ What does this number mean to you?

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➤ How many times per week does your family eat dinner together? \_\_\_\_\_

- How many times per week are these meals home-cooked? \_\_\_\_\_
- How many times per week are these meals at or from a restaurant (including take-out)? \_\_\_\_\_

➤ How many times per week would you like your family to eat a home-cooked dinner together? \_\_\_\_\_

Very  
Important

10
9
8
7
6
5
4
3
2
1

Not  
Important



- What challenges prevent you from eating home-cooked dinners together?

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- Think back to the last time your family ate a home-cooked meal together. What was good about it? What can be done to make home-cooked family meals happen more frequently?

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## Setting Family Goals to Make Family Meals a Routine

**Step 1: Write down your family's goal for regular, home-cooked dinners together.**

**Make it as Specific as possible, by including who, what, where, and when.**

Also note that you may need to revise this goal as you work through the steps below.

**GOAL**

**Step 2: How will your family reach this goal? List at least 3 action steps you'll take and record when (i.e., a specific date) these steps will be accomplished/completed:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Step 3: Make sure your goal is Measurable. How will you track your progress?**

\_\_\_\_\_

**Step 4: Make your goal Attainable. What additional resources do you need for success?**

Items we need to achieve this goal: \_\_\_\_\_

How we will find the time: \_\_\_\_\_

Things we need to learn more about: \_\_\_\_\_

People we can talk to for support: \_\_\_\_\_

**Step 5: Make your goal Relevant. Why is this goal important to your family?**

\_\_\_\_\_  
\_\_\_\_\_

**Step 6: Make your goal Time-focused. Put a deadline on your goal.**

We will reach our goal by: \_\_\_\_\_ (date)

Additional dates and milestones we will aim for:

\_\_\_\_\_

Appendix K

C.H.A.M.P. Families Philosophy for Study 2

## **C.H.A.M.P. Families Philosophy**

The Children's Health and Activity Modification Program for families (C.H.A.M.P. Families) is a parent-focused program designed to promote the overall health and well-being of children and their families both during and following parental or caregiver participation in a 12-week health-focused lifestyle program.

The overall purpose of C.H.A.M.P. Families is to improve family health behaviours and communication by enhancing the knowledge and confidence of parents in a group-based environment that is safe, supportive, inclusive, and positive. Rather than focusing on "weight loss" specifically, an important goal of the program is to support families in making lifelong healthy choices and behaviour changes that are sustainable and realistic.

C.H.A.M.P. Families is a unique and innovative research-based program developed by researchers at Western University. We, as a research team, are interested in conducting ethical health research from a variety of perspectives. What's more important, however, is that we are a group of individuals that has come together to work with parents, caregivers, children, and community partners to identify the best and most effective ways to promote health and wellness, and prevent illness, in our children.

In short, C.H.A.M.P. Families has been carefully developed by experts in the field of child health, to address child overweight and obesity in a manner that is respectful and supportive of families.

Every child deserves the opportunity to be a C.H.A.M.P.! We are thrilled that you have taken this positive step, as a parent, to be so actively involved in facilitating and supporting the health of your family. We look forward to the weeks ahead!

Sincerely,

The C.H.A.M.P. Families Research Team

## CURRICULUM VITAE

### SECTION 1 Personal Information

NAME: Kristen Claire Reilly

PLACE OF BIRTH: Scarborough, Ontario, Canada

### SECTION 2 Education

POST-SECONDARY  
EDUCATION AND  
DEGREES: Western University  
London, Ontario, Canada  
2014-2018 Ph.D.

The University of Guelph  
Guelph, Ontario, Canada  
2012-2013 MPH

The University of Ottawa  
Ottawa, Ontario, Canada  
2008-2012 Hons. B.HSc.

### HONOURS AND AWARDS:

CIHR Canada Graduate Scholarship  
Value: \$35,000 per annum  
2015-2018

Doctoral Excellence Research Award  
Value: \$10,000 per annum  
2016-2018

CIHR Dr. James Rossiter MPH Practicum Award  
Value: \$4,100  
2013

Dean's Honour List  
(University of Ottawa)  
Value: N/A

University of Ottawa Admission Scholarship  
Value: \$4,000  
2008

**SECTION 3**  
**Grants, Publications, Works in Progress, & Presentations**

REFEREED PUBLICATIONS:

**2018**

**Reilly, K.**, Tucker, P., Irwin, J., Johnson, A., Pearson, E., Bock, D., & Burke, S. (2018). “C.H.A.M.P. Families”: Description and Theoretical Foundations of a Paediatric Overweight and Obesity Intervention Targeting Parents—A Single-Centre Non-Randomised Feasibility Study. *International Journal of Environmental Research and Public Health*, 15(12), 2858. <http://doi.org/10.3390/ijerph15122858>

**Reilly, K.C.** (2018). Weighing the costs of obesity: A brief review of the health care, workplace, and personal costs associated with obesity. *Health Science Inquiry*, 2018(8). (*Peer-reviewed graduate student journal*)

**Reilly, K.C.** & Goren, K. (2018). Food and beverage marketing: Content not suitable for children. *Health Science Inquiry*, 2018(8). (*Peer-reviewed graduate student journal*)

**2016**

Hasan, D. & **Reilly, K.** (2016). A gut reaction: novel concerns and recommendations to address inappropriate antibiotic use. *University of Western Medical Journal*, 2016(1). (*Peer-reviewed medical student journal*)

**2015**

**Reilly, K.** & Slade, S. (2015). Home-based genetic testing: a risky business? *Health Science Inquiry*, 2015(6), 33-34. (*Peer-reviewed graduate student journal*)

Gavarkovs, A. G., Burke, S. M., **Reilly, K. C.**, & Petrella, R. J. (2015). Barriers to Recruiting Men Into Chronic Disease Prevention and Management Programs in Rural Areas: Perspectives of Program Delivery Staff. *American Journal of Men’s Health*, 1–3.

**2013**

Choi, E., **Reilly, K.**, Sargent, R., & Wells, V. (2013). Pedicure-associated infections. *Environmental Health Review*, 56(02), 39-48.

PUBLISHED ABSTRACTS

**Reilly, K. C.**, & Burke, S. M. (2017, March). What Does Physical Literacy Mean to You? An Exploration of Parents' Understanding and Perceptions of Physical Literacy. In *Annals of Behavioral Medicine* (Vol. 51, pp. S1018-S1019).

**Reilly, K.C.**, & Burke, S.M (2015). C.H.A.M.P. Families: A Needs Assessment for the Development of a Parent-Focused Advocacy Network [Abstract]. *Canadian Journal of Diabetes*, 39(2015), Supplement 1, S1-S74.

Proulx, I. & **Reilly, K.** (2013). Is race a prognostic factor for ovarian cancer survival? The answer is not just black and white: A systematic review [Abstract]. *Interdisciplinary Journal of Health Sciences*, 3(1), 57-59. (*Peer-reviewed student journal*)

#### “SUBMITTED” ARTICLES

##### 2018

**Reilly, K.**, Briatico, D., Irwin, J., Tucker, T., Pearson, E., & Burke, S. M. (submitted). Participants’ perceptions of “C.H.A.M.P. Families”: A parent-focused intervention targeting paediatric overweight and obesity. *PLOS One*.

#### RESEARCH GRANTS

Burke, S. M., & **Reilly, K. C.** (2014). *C.H.A.M.P. Families: A Needs Assessment for the Development of a Parent-Focused Advocacy Network*. Heart and Stroke Foundation of Ontario Advocacy Development Fund. (Value = \$5,000 CAD)

Sharma, A., Burke, S. M., Nagpal, T., & **Reilly, K. C.** (2018). *6<sup>th</sup> Canadian Obesity Student Meeting*. Canadian Institutes of Health Research for the Planning and Dissemination Grant – Institute Community Support Fund. (Value = \$20,000 CAD)

#### CONFERENCE PRESENTATIONS AND POSTERS

##### 2018

**Reilly, K. C.**, Burke, S. M., Pearson, E., Irwin, J., Tucker, T., Johnson, A., & Bock, D. (2018, June). *Evaluating the Impact of a Parent-Focused Pilot Intervention Targeting Childhood Obesity on Parental Self-Efficacy for Children’s Health Behaviours*. Oral presentation delivered at The 6<sup>th</sup> Canadian Obesity Student Meeting. London, Ontario.

**Reilly, K. C.**, & Burke, S. M. (2018, June). *Be The Change: A photovoice project to explore youth’s perceptions of community health issues*. Oral presentation delivered at the International Society of Behavioral Nutrition and Physical Activity 2018 Annual Meeting, Hong Kong, China.

**Reilly, K. C.**, Burke, S. M., & Hasan, D. (2018, June). *An exploration of parents’ perceptions of nutrition literacy and the resources required to enhance it in children*. Poster presented at the International Society of Behavioral Nutrition and Physical Activity 2018 Annual Meeting, Hong Kong, China.

- Briatico, D., Burke, S. M., **Reilly, K. C.**, Pearson, E., Irwin, J., Tucker, T., Johnson, A., & Bock, D. (2018, June). *The Impact of a Parent-Focused Pilot Intervention Targeting Childhood Overweight and Obesity on Parents' Perceptions of Family Cohesion, Communication, and Satisfaction*. Poster presented at The International Society of Behavioural Nutrition and Physical Activity 2018 Annual Meeting. Hong Kong, China.
- Burke, S. M., **Reilly, K. C.**, Pearson, E., Irwin, J., Tucker, T., Johnson, A., & Bock, D. (2018, June). *The Development and Implementation of a Parent-Focused Childhood Obesity Intervention Using a Combined Theoretical Framework*. Poster presented at The International Society of Behavioural Nutrition and Physical Activity 2018 Annual Meeting. Hong Kong, China.
- Reilly, K. C. & Burke, S. M. (2018, May) *Parent-focused and community-based (pilot) interventions for the treatment of childhood obesity*. Oral presentation delivered at The 31st Annual Paediatric Research Day, Children's Hospital London Health Sciences Centre, London, Ontario.
- Briatico, D., Burke, S. M., & **Reilly, K. C.** (2018, May). "C.H.A.M.P. Families": Exploring the Impact of a Childhood Obesity Intervention on Family Cohesion, Communication and Satisfaction. Poster presented at The Child Health Symposium, London, Ontario.
- Reilly, K. C.** & Burke, S. M. (2018, May). "Parent-focused and community-based (pilot) interventions for the treatment of childhood obesity". Oral presentation delivered at the 31<sup>st</sup> Annual Paediatric Research Day, Children's Hospital London Health Sciences Centre, London, Ontario.
- Reilly, K. C.**, Burke, S. M., Pearson, E., Irwin, J., Tucker, T., Johnson, A., & Bock, D. (2018, March). *The Use of a Combined Theoretical Model for the Development and Implementation of a Childhood Obesity Intervention Targeting Parents*. Oral presentation delivered at 2018 Eastern Canada Sport and Exercise Psychology Symposium. Montreal, Quebec.
- Briatico, D., Burke, S. M., **Reilly, K. C.**, Pearson, E., Irwin, J., Tucker, T., Johnson, A., & Bock, D. (2018, March). *Using the RE-AIM Framework to Evaluate the Feasibility of a Parent-Focused Intervention Targeting Childhood Overweight/Obesity*. Oral presentation delivered at 2018 Eastern Canada Sport and Exercise Psychology Symposium. Montreal, Quebec.
- Briatico, D., Burke, S. M., **Reilly, K. C.**, Pearson, E., Irwin, J., Tucker, T., Johnson, A., & Bock, D. (2018, February). *The Impact of a Parent-Focused Intervention Targeting Childhood Overweight and Obesity on Family Cohesion, Communication, and Satisfaction: A Proposed Study*. Oral presentation delivered at the Western University Health and Rehabilitation Sciences Graduate Research Symposium, London, Ontario.
- 2017**
- Reilly, K. C.**, Burke, S. M., & Hasan, D. (2017, May). Parents' Perceptions of Physical Literacy and the Resources Required to Enhance it in Children: An Exploratory Study. Poster



presented at the 4<sup>th</sup> Child Health Symposium, London, Ontario, Canada.

Burke, S. M. & **Reilly, K. C.** (2017, April). Parents Perceptions of the Family- and Community-Based Resources and Support Required to Enhance Physical Literacy in Children: an Exploratory Study. Lecture presented at the 5<sup>th</sup> Canadian Obesity Summit, Banff, Canada.

**Reilly, K. C.** & Burke, S. M. (2017, March). What does physical literacy mean to you? An exploration of parents' understanding and perceptions of physical literacy. Poster presented at the Society of Behavioral Medicine 38<sup>th</sup> Annual Meeting and Scientific Sessions.

## 2016

**Reilly, K. C.**, Burke, S. M., Tucker, T., and Donelle, L. (2016, June). Interventions promoting the development of adolescent health advocates: An integrative review. Poster presented at the International Society of Behavioral Nutrition and Physical Activity 2016 Annual Meeting, Cape Town, South Africa.

Hasan, D., **Reilly, K. C.**, and Burke, S. M. (2016, June). Empowering "C.H.A.M.P. (Children's Health and Activity Modification Program) Families" through the development of a comprehensive childhood obesity program. Canadian Public Health Association Conference. Poster presented at the Sheraton Centre in Toronto, Ontario

## 2015

**Reilly, K. C.**, Burke, S. M., Smith, J., Cramp, A., and Gavarkovs, A. (2015, June). Male partners' perceptions of breastfeeding-related roles, services, and supports. International Society of Behavioral Nutrition and Physical Activity 2015 Annual Meeting. Edinburgh, Scotland.

**Reilly, K. C.**, & Burke, S. M. (2015, May). Parents perceptions of the importance of nutritional and physical literacy in children. Lecture presented at the Child Health Symposium at Western University, London Ontario.

**Reilly, K. C.**, & Burke, S. M. (2015, May). C.H.A.M.P. Families: A Needs Assessment for the Development of a Parent-Focused Advocacy Network. Poster presented at the 4<sup>th</sup> Canadian Obesity Summit. Toronto, Ontario.

Gavarkovs, A., Burke, S. M., **Reilly, K. C.**, & Petrella, R. (March, 2015) Barriers to recruiting rural men into chronic disease prevention and management programs: Perspectives of program delivery staff. Lecture presented at the Western Undergraduate Research Conference, Western University, London, Ontario. \*WINNER OF BEST ORAL PRESENTATION

**Reilly, K. C.**, Burke, S. M., Smith, J., Cramp, A., and Gavarkovs, A. (2015, February). Male partners' perceptions of breastfeeding-related roles, services, and supports. Retiring With

Strong Minds. Lecture presented at the Windermere On the Mount Retirement Home, London, Ontario.

**Reilly, K. C.**, Burke, S. M., Smith, J., Cramp, A., and Gavarkovs, A. (2015, February). Male partners' perceptions of breastfeeding-related roles, services, and supports. Embark, Endure, Become – The Health and Rehabilitation Sciences Graduate Research Conference. Lecture presented at the Western University, London, Ontario.

## 2014

**Reilly, K.**, Chittavong, M., Drew, A., Kaensombath, L., Phommachanh, K., Donnelly, B., & Fèvre, S. (2014, May). Assessing the viability and impact of hybrid poultry on household livelihoods in central Lao PDR. Poster presented at the Global Development Symposium, University of Guelph, Guelph, Ontario.

## 2013

**Reilly, K.**, Chittavong, M., Drew, A., Kaensombath, L., Phommachanh, K., Donnelly, B., & Fèvre, S. (2013, November). Assessing the viability and impact of hybrid poultry on household livelihoods in central Lao PDR. Lecture presented at the Master of Public Health Forum Day, University of Guelph, Guelph, Ontario.

**Reilly, K.**, Chittavong, M., Drew, A., Kaensombath, L., Phommachanh, K., Donnelly, B., & Fèvre, S. (2013, November). Assessing the viability and impact of hybrid poultry on household livelihoods in central Lao PDR. Poster presented at the Graduate Student Research Symposium, University of Guelph, Guelph, Ontario.

## 2012

Proulx, I., & **Reilly, K.** (2012, May). Is race a prognostic factor for ovarian cancer survival? The answer is not just black and white: A systematic review. Poster presented at the Canadian Society of Epidemiology and Biostatistics National Student Conference, Saskatoon, Saskatchewan.

Proulx, I. & **Reilly, K.** (2012, March). Is race a prognostic factor for ovarian cancer survival? The answer is not just black and white: A systematic review. Poster presented at the Canadian Society of Epidemiology and Biostatistics (University of Ottawa Chapter) Student Conference, University of Ottawa, Ottawa, Ontario. \*WINNER OF STUDENT POSTER CONTEST, \$100

## INVITED LECTURES, KEYNOTES AND SYMPOSIA PRESENTATIONS

### SECTION IV Related Work Experience

#### ADDITIONAL RESEARCH EXPERIENCE

- September 2015 – June 2016      *Program evaluator*, 6<sup>th</sup> Annual Family Literacy Conference for Professionals, London Child and Youth Network
- September 2014 – December 2015      *Manuscript reviewer*, Western Undergraduate Research Journal: Health & Natural Sciences
- October, 2014      *Manuscript reviewer*, BMC Public Health (co-reviewed manuscript)

#### TEACHING EXPERIENCE

- Fall 2018      *Lecturer*: Faculty of Health Sciences, Western University  
Course: Health Promotion Seminar
- Fall 2014      *Graduate Teaching Assistant*: Faculty of Health, Western University  
Course: Health Sciences 1002 A, Social Determinants of Health
- Fall 2013      *Graduate Teaching Assistant*: Department of Population Health and Medicine, Western University  
Course: Population medicine 6510, Community Health Promotion

#### SECTION V SERVICES & SOCIETIES

##### SERVICES

- National Chapter Representatives, National Executive of Obesity Canada Students and New Professionals, 2018-present
- Co-chair, Obesity Canada Student and New Professionals (OC-SNP), Western University Chapter, 2016-2018
- Student Representative, Graduate Education Council, School of Graduate and Postdoctoral Studies, Western University, 2014-2016
- Councillor, Society of Graduate Students (SOGS), Western University, 2014-2016
- Community Outreach Coordinator, Obesity Canada Student and New Professionals (OC-SNP), Western University Chapter, 2014-2015
- Editorial Board Member, Western Undergraduate Research Journal: Health & Natural Sciences, Western University, 2014-2016
- President, Graduate Student Executive of Population Medicine, University of Guelph, 2012-2013

**MEMBERSHIP IN ACADEMIC OR PROFESSIONAL SOCIETIES**

International Society of Behavioural Nutrition and Physical Activity, 2018-present

Obesity Canada, 2014-present

Canadian College of Health Leaders, 2014-2015