REDUCE OBESOGENIC ENVIRONMENTS FOR CHILDREN: THE ROLE OF
NURSE PRACTITIONERS IN COMMUNITY-ORIENTED PRIMARY CARE

by

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Abstract

The purpose of this project is to conduct a critical examination and synthesis of knowledge in the subject area of obesogenic environments contributing to childhood obesity and how nurse practitioner (NP) practice can reduce these factors. The result is a literature review and position paper that concludes with evidence-informed recommendations on the use of the community-oriented primary care practice (COPC) model that are tailored for use by NPs. The critical examination and synthesis of knowledge is designed to address the following clinically significant question: What is the potential for NPs to foster environments that enable a reduction in childhood obesity for Canadian children under the age of 5, using COPC?

Approximately 26% of Canadian children ages 2-17 years old are currently overweight or obese and are likely to remain obese as adults. Childhood obesity is a concern for parents, teachers, health care professionals, and public health organizations because of the associated health problems that develop earlier in childhood and will persist into adulthood. In addition, the impact of adult and childhood obesity, and associated chronic diseases, adds a substantial cost to the Canadian health care system. These are incentives to consider the multiple factors contributing to the obesogenic environment and potential areas for intervention.

The COPC model is an excellent way to integrate primary care screening and health promotion with population-based health promotion to help reduce obesogenic environments for children. The model can first be applied during the first 5 years of life, as this is a time where primary care providers can take advantage of the periodic health examination to screen for childhood obesity and offer advise to families on diet,
exercise, and screen time. The community-based interventions that are part of the COPC model can be aimed at reducing obesogenic environments. Such interventions are within the scope of practice for primary care providers. This paper argues that NPs are well positioned to use the COPC model, a population-based approach, to change obesogenic environments and reduce childhood obesity.
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Glossary

Built Environment
Buildings, transportation infrastructure, elements of land use and community design, and recreational facilities, such as parks and trails, all affect citizens' physical activity (Sallis and Glanz, 2006). The nature of land development, whether it is transit- and pedestrian-friendly versus auto-oriented, determines the feasibility of transportation scenarios. In order for alternative transportation to be possible, it needs to be supported by both land use and transportation infrastructure decisions (Williams & Wright, 2007).

Collaboration
A recognized relationship among different sectors or groups, which is formed to take action on an issue in a way that is more effective or sustainable than might be achieved by acting alone (Public Health Agency of Canada [PHAC], 2012).

Community-based intervention
Health promotion interventions that target the individual, social, and environmental influences and determinants of health (Woodman et al., 2008).

Community-Oriented Primary Care
An approach to primary care that incorporates epidemiology, preventive medicine, and health promotion (Bonafede, Reed, & Pipas, 2009). The implementation of community-oriented primary care (COPC) requires an iterative process consisting of four main steps: (1) defining a community, (2) identifying a specific health issue or problem, (3) modifying care to address that problem, and (4) monitoring the effectiveness of that change (Bonafede, et al.). COPC is a strategy where elements of primary health care
and public health are systematically developed to address major health problems of a target population and brought together in coordinated practice.

**Environment**

Any aspect of the physical (natural) environment or the urban or constructed (built) environment that subconsciously or consciously relates to an individual and their physical activity behavior (National Institute for Health and Clinical Excellence [NICE], 2008).

**Family**

Two or more individuals who depend on one another for emotional, physical and/or economic support. The individual defines the members of the family (College of Registered Nurses of British Columbia [CRNBC], 2012).

**Family-Centered Care**

An approach to health care that shapes health care policies, programs, facility design, and day-to-day interactions among patients, families, physicians, and other health care professionals. Health care professionals who practice family-centered care recognize the vital role that families play in ensuring the health and well being of children and family members of all ages (American Academy of Pediatrics [AAP], 2003).

**Healthy Active Living**

Elements of healthy active living include regular physical activity, a healthy balanced diet, a limited amount of risk taking behavior (e.g. smoking, alcohol), a reduction in sedentary activities (e.g. computer and video games), and engagement in positive mental health activities (e.g. social interaction and safety issues) (Siemens & Issenman, 2004).
Health promotion is the process of assisting people to move toward a state of optimal health (Evans, 1999).

Nurse Practitioner (NPs)

NPs are health professionals who have achieved the advanced nursing practice competencies at the graduate level of nursing education that are required for registration as a NP with the CRNBC. NPs provide health care services from a holistic nursing perspective, integrated with the autonomous diagnosis and treatment of acute and chronic illnesses, including prescribing medications (Adapted from Canadian Nurses Association [CNA], 2010 in CRNBC, 2012).

Obesogenic environment

The environmental layers of world around us that interact with key elements of our biology resulting in an energy imbalance and the propensity towards becoming obese. Environments that foster overconsumption and increased sedentary behaviors converge to produce an imbalance of caloric intake compared with caloric output, resulting in obesity (Schwartz & Brownell, 2007).

Obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (World Health Organization [WHO], 2012). A child's weight status is determined using an age- and sex-specific percentile for body mass index (BMI) (Centers for Disease Control and Prevention [CDC], 2012). Obesity is defined as a BMI score at or above the 95th percentile for age and sex, and overweight status as a BMI between the 85th and 95th percentile for age and sex (CDC). These percentiles
correspond to adult BMI's of 25 and 30, the accepted definitions of adult overweight status and obesity respectively. Following are the growth chart percentiles and interpretation:

- < 5%ile Underweight
- 5-84%ile Healthy Weight
- 85-94%ile Overweight
- 95-98%ile Obesity

*Periodic Health Examination*

One or more visits with a health care provider to assess patients' overall health and risk factors for preventable disease, resulting in the delivery of clinical preventive services that are tailored to a patient's age, sex, and clinical risk factors and laboratory testing. They are designed to facilitate the early detection of health risks and emerging health problems (Cifuentes et al., 2005) and are offered up to 5 years of age in the following intervals: 1 week, 2 weeks, one month, 6 weeks, 4 months, 6 months, 9 months, 12 months, 18 months, 2-3 years and 4-5 years (Rourke, Leduc, & Rourke, 2011).

*Physical Activity*

Any bodily movement produced by skeletal muscles that requires energy expenditure. This includes any movement such as crawling, walking, running, or lifting that one engages in (Ministry of Health [MOH], 2012).

*Primary Care*

The first point of contact with a health care provider for diagnosis, treatment and follow-up for a specific health concern (CRNBC, 2010).
Primary Care Provider

Health professionals who take primary responsibility for an established group of patients for whom they provide longitudinal person-focused care; comprehensive care for most health needs; first contact assessment for new health care needs; and referral and coordination of care when it must be sought elsewhere. Care addresses a wide variety of health issues including health promotion, illness and injury prevention, and the diagnosis and treatment of illness and injury (CRNBC, 2010). NPs are one type of primary care provider, where others would include general practitioners.

Primary Health Care

Essential health care (promotive, preventive, curative, rehabilitative, and supportive) that focuses on preventing illness and promoting health with optimal individual and community involvement. It is both a philosophy and an approach that provides a framework for health care delivery systems. The five principles of primary health care are accessibility, public participation, health promotion, appropriate technology and intersectoral collaboration (WHO, 1978).

Public Health Care

Similar to primary care, public health can also be considered one of primary healthcare’s core services. It is a combination of sciences, skills, and values that function through collective societal activities and involves [health promotion and disease prevention] programs, services, and institutions aimed at protecting and improving the health of all people (Public Health Agency of Canada [PHAC], 2012).
Screen Time

Time spent watching television, playing video games, or engaging in noneducational computer activities (CDC, 2010).

Walkability

Defined as mixed land use, where stores, employment centers, government buildings, schools, and homes are within close proximity (Sallis & Glanz). Streets are laid out in a grid pattern that creates high levels of connectivity and offers several pedestrian routes. The World Health Organization (2007) defines walkability as "the degree to which a single route or a system of routes between points is relatively short, barrier-free, interesting, safe, well-lighted, comfortable and inviting to pedestrians" (p.4).
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Introduction

This paper is centered on an integrative review that will explore the opportunity for NPs to foster environments that enable a reduction in childhood obesity for Canadian children under the age of 5. This paper will explore the belief that, at its root, the health crisis that is childhood obesity is a problem of social norms and behavior that have led to the development of unhealthy nutritional and physical activity habits from the earliest years of life. The epidemiology, health concerns, risk factors, and family, school, and community environments as influences for childhood obesity will be presented. Health promotion efforts both in primary care and in the community, aimed at reducing childhood obesity, will be analyzed and discussed. Proposed interventions will explore what NPs can do to support families, and collaborate with other stakeholders, to positively support children's behaviors. Potential outcome measures that can evaluate COPC interventions will be explored and suggested. This paper will explore the opportunity for NPs to be leaders in the integration of public health and primary care efforts, using COPC, to foster environments that are less obesogenic.

The prevalence of childhood obesity and overweight has tripled in the past three decades (CDC, 2012), and it is strikingly more prevalent at an earlier age. The marked increase in the prevalence of childhood obesity over the past three decades has occurred in parallel with the changing social structure of our nation (McCarron et al., 2010). The obesogenic environment influencing these trends will be examined, including a number of factors. The increasing number of single-parent families and parents working outside the home; changes in dietary practices including what, when,
and where we eat; the electronic revolution that has lessened children's physical activities; the time and budget constraints on our teachers and schools; the wider marketing and availability of foods in general and those of low nutritional value in particular; and changes in our communities, transportation, and the built environment that limit outdoor and leisure-time pursuits have all contributed to the increase in childhood obesity (McCarron et al.). Factors contributing to the development of childhood obesity, such as parental influences, built environments, and societal factors, which are potential areas for intervention, will be explored.

This paper examines why current interventions aimed at reducing childhood obesity are important but not adequate. It examines alternative opportunities to intervene and prevent the development of obesity, taking into consideration broader influences and risk factors, including family and community environmental influences (Schwartz & Brownell, 2007) that contribute to the development of childhood obesity. The COPC is a model that will be explored as an approach to intervening through the integration of primary and community-based care. The reason this model is very appropriate for implementing population-based health promotion will be highlighted.

The evidence supporting family-centered care in conjunction with community-based health environmental changes will be reviewed. This paper will discuss potential opportunities for primary care providers in both the primary care setting and the community to foster less obesogenic environments. The role of NPs will be explored, not only in a context of a clinical encounter in primary care, but will also examine the possibilities for NPs to fully utilize their advanced nursing practice competencies
through both community-level work and through inter-sectoral collaboration (CRNBC, 2010).

This paper will analyze literature to address the question: Is it possible for NPs to foster environments that enable a reduction in childhood obesity for Canadian children under the age of 5, using COPC? Within the literature reviewed, findings, as they relate to the prevention of childhood obesity through COPC, will be explored. The argument, which recommends NPs as ideal primary care providers for reducing obesogenic environments through COPC, will be presented.
Section One: Background and Need

The following section will review the epidemiology of childhood obesity and explore the concept of obesogenic environments. Contributing factors for obesogenic environments, such as family and community environments will be examined, along with current and proposed interventions aimed at influencing these environments.

*The Epidemiology of obesity in Canadian preschool children*

Childhood obesity is a prevalent and complex health issue, necessitating multi-level intervention from governments, policy makers, health care providers, families, teachers and community planners to reduce its incidence (CDC, 2012; Katzmarzyk et al., 2007). In Canada, obesity was rarely observed among children and adolescents in the 1970's, but it is now evident among Canadian children of all ages (Twells & Newhook, 2011). Currently, in Canada, approximately one in three preschool children is obese, and over 26% of children and youth, or 1.6 million children, are considered obese (Twells & Newhook). Children and adolescents who are obese are likely to have increased risks of developing chronic health problems, which can have serious and lasting effects into adulthood (Twells & Newhook). The negative consequences of obesity and overweight occur at both the individual and population levels. Overweight and obesity pose a major risk for chronic diseases such as high blood pressure and high cholesterol, (which are risk factors for cardiovascular disease); increased risk of insulin resistance and type 2 diabetes; breathing problems, such as sleep apnea and asthma; joint problems and musculoskeletal discomfort; fatty liver disease, gallstones, gastro-esophageal reflux; and psychological problems including depression and poor
self esteem (CDC, 2012; Lee, 2007; US Preventive Services Taskforce [USPSTF], 2010, Decristofaro, & Elliott, 2010). The WHO estimates that, without action, there may be a one-third increase in the loss of healthy life internationally as a result of overweight and obesity in 2020 compared with 2000 (WHO, 2012). In addition to the associated chronic diseases of adult and childhood obesity, the burden of disease adds a substantial cost to the Canadian health care system, estimated at over $1.8 billion per year in 1997 (Raine & Wilson, 2007), with most recent estimates of physical inactivity costs at $5.3 billion (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2005) and $4.3 billion is attributed to obesity (CFLRI). These costs highlight the public health importance and emphasize the urgency to intervene.

He and Sutton (2004) observed the onset of becoming overweight by as early as two years of age, and found that approximately 30% of children aged three and above had risk factors for obesity. Quattrin et al. (2005) observed that children who become obese before the age of 5-6 years are likely to be obese later in childhood. Given that long-term weight loss is difficult to achieve once an individual becomes obese, (Katzmarzyk, 2007) the prevention of weight gain and obesity is an important public health priority, beginning in childhood (Katzmarzyk and Janssen, 2004). These findings highlight the importance of early screening with the goal to initiate intervention as early as possible.

In screening for obesity in children, rapid weight gain during the first 6 months of life that results in weight greater than the 95th percentile using the WHO growth charts appears to be a good predictor of overweight during childhood (Eid 1970; Dubois and Girard 2006; Ong et al., 2009; Stettler et al., 2002; Toschke et al., 2004; Chomtho et al.,
2008) and is as important as other obesity risk factors. As many children do not present with a specific complaint of obesity or rapid weight gain, screening at routine intervals beginning in infancy is an important element in primary care to reduce childhood obesity.

Given that behavioral and environmental factors are primarily responsible for the dramatic increase in obesity in the past two decades (Epstein et al., 1990; Sallis & Glanz, 2006), the need to assess for obesity risk factors such as lifestyle elements and environmental influences is an essential step in identifying opportunities to intervene. The following section will explore the concept of obesogenic environments, specifically in the family and community settings.

**Obesogenic Environments**

The term obesogenic environment refers to the layers of world surrounding us that interact with key elements of our biology. Woodman et al. (2008) organize factors that contribute to obesogenic environments into seven thematic clusters, based on the determinants of energy balance (consumption versus expenditure). These are grouped into: a) ‘social and environmental’ determinants of obesity and weight, which include: social psychology, food production, food consumption and physical activity environment and; b) ‘individual factors’, which include individual psychology, individual physical activity, and physiology.

What this means is that in essence our lifestyle habits are strongly influenced by our living environments which ultimately has an affect on our health. For example, convenience and a propensity to be sedentary has a strong influence on our behaviours. If we need to travel more than a short distance, we can get in a car; if we
are hungry, we can telephone or go to a nearby store to choose from a vast array of food. Convenience foods are often high in fat, sugar, and calories, low in nutrient value, and large in portion size. For many children, large amounts of time are spent in front of a screen, either the television or the computer, replacing, for some children at least, the opportunity for physical activity. It is this environment, referred to in this paper as "obesogenic", that predisposes genetically susceptible people to gain weight.

A rise in obesity has been linked in part to a lack of physical activity in sprawled communities where people drive rather than walk or bike (Williams & Wright, 2007). Over the past two decades, changes to communities' "built environment" have promoted sedentary lifestyles and less healthful diets (Sallis & Glanz, 2006). Links between built environment and children's physical activity have been identified, suggesting an association with childhood obesity (Sallis and Glanz).

Children are particularly vulnerable to their environment because they have less ability to shape it. They have little control over how they get around and what they are given to eat. In addition, children are strongly influenced by their immediate environments and role models (Epstein, 1990), including their family, community, and learning environments. Children tend to have similar eating habits and physical activity patterns as their parents, which is one environmental reason why obesity and obesity-related disorders often run in families (Saunders, 2011). This review will examine how family, school, and community environments can influence a child's eating and activity behaviors.
**Family Influences and parental obesity**

Generally, obesity aggregates in families, with risk factors including high birth weight, maternal diabetes and obesity in family members (Saunders, 2011). Obesity can be established through an interaction of more than 250 different genes, but the obese phenotype comes from gene-environment interactions (Snyder et al., 2003). Genetic factors are reported to account for roughly 25% of the variance in fat (Saunders), which is likely to account for some of the similarity in body composition between parent and child. However, genes are not the whole story: the significant change in obesity rates over the past 10 to 20 years speaks against genetic drift and in favor of strong environmental influences interacting with existing genes (Daneman, 2010).

Parental obesity has been shown to be a key risk factor because high parental BMI is one of the strongest predictors of childhood obesity (AAP, 2003; Goran, 2001), and children whose mothers are obese or children whose parents are both overweight are at greatest risk for developing obesity (AAP). Reilly and Armstrong (2005) found that children were 2.5 times more likely to be obese when they had an obese father, and 4.3 times more likely to be obese if they had an obese mother.

These findings indicate that although a genetic predisposition to obesity may exist, it is the interaction of genetic and environmental factors that fosters obesity (AAP; Maffeis, 2000) because children often follow examples set by their parents (Golan & Weizman, 2001; Larson, et al., 2005). Parents and family members are identified as major influences to children when it comes to diet and activity behaviors, within their immediate environments. Parents and caregivers can have a tremendous impact on
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preventing obesity and it is well established that the family environment is a key influence on children's healthy active living behaviors (Irwin et al., 2005; Weaver et al., 2008; Olstad & McCarger, 2008; Plourde, 2006; Epstein et al., 1990). Family behaviors have a long-term influence on health behaviors and health outcomes of the children (Epstein et al., 1990; Olstad & McCarger, 2008). Family involvement increases children's knowledge and positively improves attitudes toward healthy lifestyle behaviors (Tyler & Horner, 2008) and parents play an important role in shaping their children's routines involving nutritional intake and physical activity habits (Olstad & McCarger).

In addition to family environments, children's' school environments also contribute to their behaviors and habits. This is because each day, millions of children in Canada attend school and preschool, which comprises nearly half of their wakeful hours.

School Environments

Schools are unique in their environmental influences and intervention opportunities to promote healthy nutrition and physical activity. Environmental influences include: social (teacher/child interactions); curriculum (physical education classes, recess time, and free play); and built environment (access to safe play ground equipment, and safe, active transportation to school). The preschool where a child attends is significantly associated with the child's physical activity (Gubbels, Dremmers, & Kann, 2011).

The significance of social interactions has been revealed by Brown et al. (2009), who learned that children generally played with lower intensity when more peers were around (Brown et al.), and children are more active during child initiated activities compared with staff initiated activities. Short verbal messages promoting physical
activity from staff members generally increased activity intensity indoors and outside, although having more staff present generally decreased activity intensity indoors, but not outdoors (Brown et al.).

When examining school/preschool curriculum, although there is commitment to physical education, there are also significant pressures that view recess as a waste of time that would be better spent on academics (Ramstetter, Murray, & Garner, 2010). Time previously allocated to daily activity in school, such as physical education and recess, is being reallocated to make way for academic instruction (Ramstetter et al.). Ironically, minimizing or eliminating recess may be counterproductive to academic achievement, as recess can promote not only physical health, but also social, emotional and cognitive development (Ramstetter et al.). Opportunities for free play are positively associated with increased physical activity (Gubbels et al., 2011).

In addition to the curriculum pressures, physical environments play a large part in activity levels. Specific characteristics of the physical child-care environment linked to increased activity include the availability of play equipment and activity opportunities, a "natural" environment, shorter recess duration, smaller school size, and higher overall classroom quality (Gubbels et al., 2011). Children played with higher intensity when outside and when more activity opportunities were present (e.g., more space and equipment available) (Gubbels et al.). These study findings highlight the need to simultaneously consider how social, curriculum, and environmental factors influence physical activity levels in the school setting.
Physical Activity and Sedentary Trends

In its 2008 report card on physical activity for children and youth, Active Healthy Kids Canada gave Canada a grade of D, indicating that "insufficient appropriate physical activity opportunities and programs are available to the majority of Canadian children and youth" (Active Healthy Kids Canada 2008 in Olstad and McCarger, 2008). Overall levels of physical activity continue to be low or are even declining and activity promotion represents a public health priority (PHAC, 2012). While research on preschoolers' activity behaviors is minimal, we do know that two thirds of Canadian children aged 5-17 are not active enough to promote good health (Irwin et al., 2005).

The benefits of increased physical activity in preschool children has been studied by Klesges et al. (1995), who found evidence to suggest that lower activity levels, and decreases in activity levels over time, are associated with increases in BMI in children and, conversely, higher levels of physical activity were associated with lower BMI. Moore and colleagues (1995) found that preschool-aged children with low levels of physical activity gained substantially more subcutaneous fat than did more active children, and have suggested that early, regular physical activity provides protection against future weight gain (Moore et al.). In addition, exercise is important for children to help maintain appropriate metabolic rate, improve overall psychological outlook and aid in appetite control (Ben-Sefer, et al. 2009).

The issue of sedentary lifestyle due to increased use of computers, cell phones, video games and TVs constitutes an important environmental factor on children's physical activity levels (Ben-Sefer, et al.). Research by Epstein and colleagues (1990) examines whether obese children can benefit from a reduction in sedentary activities,
such as watching television and playing computer and video games. Their findings showed that a reduction in sedentary activities was more efficacious than an increase in physical activity in reducing obesity (Epstein et al.; Fox, 2004).

These findings highlight the direct association that sedentary time has on the incidence of childhood obesity. Interventions will be more efficacious if they aim to increase physical activity in children by reducing time spent being sedentary. Increasing levels of physical activity is a challenge, not just for those directly involved in public health but for professionals, groups and individuals in many sectors of society (NICE, 2008). This is because it is challenging to change behaviors when an individual’s immediate environment does not support such changes (NICE, 2008). Put simply, targeting a child’s living environment could be a more effective target for interventions aimed at enhancing physical activity in children rather than targeting the individual’s behavior. Therefore, while individual interventions to promote activity may be important, they are not the only, nor possibly the main, solution. By reviewing current guidelines and literature, those concepts most pertinent to primary care providers and NPs will be presented. Although this paper advocates for a broader, environmental focus for interventions aimed at reducing childhood obesity, this should not be at the expense of primary care interventions, as family-based primary care is at the center of COPC and health promotion efforts.

The next section will briefly review clinical guidelines and recommendations that pertain to obesity related health promotion for primary care providers.
Health Canada (2007), The Canadian Society for Exercise Physiology (CSEP) (2011), Lau et al. (2006), and the NICE (U.K.) (2006) have produced guidelines and recommendations relevant to the screening and health promotion of childhood obesity. For children over two years of age, Health Canada Eating Well with Canada's Food Guide (Health Canada, 2011) recommends eating a range in the number of servings based on age and energy needs. The CSEP (2011) offers physical activity guidelines, supported by the PHAC (2012), for toddlers and preschoolers. Toddlers (aged 1–2 years) and preschoolers (up to 5 years old) should accumulate at least 180 minutes of physical activity at any intensity spread throughout the day in a variety of environments that help develop movement and skills (CSEP). Activity should progress toward at least 60 minutes of energetic play by 5 years of age (CSEP).

The Canadian Obesity Screening and Management Guideline (Lau, 2006) is a comprehensive, Canadian, evidence-based guideline that incorporates family-centered care, primary care health promotion, and community/multidisciplinary approaches aimed at preventing adult and childhood obesity. For a full summary of the Canadian Obesity Screening and Management Guidelines, refer to www.cmaj.ca/content/176/8/S1.full. The following recommendations from these guidelines were selected because they emphasize primary care-based health promotion aimed at fostering less obesogenic family environments. Screening and calculating BMI is emphasized and widely accepted by many researchers (Lau et al., 2006; Canning et al., 2004; Dent et al., 2007; He & Sutton, 2004; Hopkins, 2010; Larsen et al., 2005) as a first step to identifying and treating childhood obesity. Lau et al. emphasize family-centered primary care, with
interventions aimed at fostering less obesogenic family, and school, environments through identification of risk factors and lifestyle modification to improve diet and increase physical activity.

- Measurement of BMI and waist circumference in order to make a weight diagnosis using BMI percentile (Lau et al., 2006). The rationale for this recommendation is that measuring BMI and waist circumference in all adults and in all children and adolescents (aged 2 years and older) is an essential first step to determine the level and distribution of adiposity, and assists in the surveillance of childhood obesity. Lau et al. recommend using the growth charts of the US Centers for Disease Control and Prevention for BMI to screen children and adolescents for overweight (≥ 85th to < 95th percentile) and obesity (≥ 95th percentile).

- The primary care provider will engage the patient's family so that they are made to feel part of the health care team (Lau et al.). Family-oriented behavior therapy is encouraged (Lau et al.).

- Limit screen time (i.e., watching television, playing video or computer games) to no more than two hours a day to encourage more activity and less food consumption, and to limit exposure to food advertising (Lau et al.).

- Activities prescribed for children should be fun and recreational, with lifestyle activities tailored to the relative strengths of the individual child and family. Health professionals are encouraged to emphasize the short-term benefits of physical activity rather than the long-term health benefits to children (Lau et al.).

- Obesity prevention should take a multisector approach, very much like that used for tobacco control in Canada. Prevention efforts should invest in and target all age
groups and span life from infancy to old age. Innovative ways to provide access and programs to less economically viable citizens should be developed (Lau et al.).

- The role of schools as pivotal settings for the promotion of healthy active living and school-based prevention programs to reduce the risk of childhood obesity is encouraged, as are interventions to increase daily physical activity through physical education class time and opportunities for active recreation (Lau et al.).

These guidelines are valuable for primary care clinicians in a primary care setting, incorporating individual and family-based screening, health promotion, and medical management of adult and childhood obesity. NPs who endeavor to use these guidelines will understand that screening and plotting BMI is a very important first step. Practitioners will also appreciate the value of family-centered care from these guidelines and may consider family appointments to discuss lifestyle habits and new strategies. The Lau et al. (2006) guidelines are strong in providing guidance for the primary care provider in a primary care setting, but are limited in their value outside the primary care setting. In other words, there is limited value for a primary care provider who is working in the community, such as with COPC. The risk of depending solely on these guidelines, as an NP using COPC to provide community-oriented health care, is that the population beyond the individual could become neglected. This means that population-based health care recommendations, such as obesogenic environmental changes, may not be implemented and the rich value of population-based health care would not be appreciated. The NICE guidelines (2006, 2008) provide a community complement for obesity-related health promotion.

The NICE published guidelines on how to create environments that encourage
physical activity, and active transport (NICE 2006, NICE 2008). These guidelines were included in this review because they highlight environmental interventions and contain specific recommendations for the public, local authorities, and partners in the community, which can be put into practice in early-years settings, schools, workplaces, self-help, commercial, and community programs (NICE). The recommendations on promoting and creating built or natural environments that encourage and support physical activity (2008) are directed at all “professionals who have a direct or indirect role in – and responsibility for – the built or natural environments” (p.3). This includes those working in local authorities and the education, community, voluntary and private sectors. It may also be of interest to members of the public (NICE, 2006a).

Presented here a highlights from the NICE (2006) and NICE (2008) guidelines that are relevant to this review:

- Assess the whole school environment and ensure that the ethos of all school policies helps children and young people to maintain a healthy weight, eat a healthy diet and be physically active, in line with existing standards and guidance. This includes policies relating to building layout and recreational spaces, catering (including vending machines) and the food and drink children bring into school, the taught curriculum (including physical education), school travel plans and provision for cycling, and policies relating to the National Healthy Schools Program and extended schools (NICE).

- Minimize sedentary activities during playtime and provide regular opportunities for enjoyable active play and structured physical activity sessions (NICE).

These guidelines offer the first national, evidence-based recommendations on how to improve the physical environment to encourage physical activity (NICE, 2008). They
demonstrate the importance of such improvements and the need to evaluate how they impact on the public's health. The evidence supporting these guidelines will be highlighted in this review.

Implementation of these relevant guidelines is the next step for primary care providers such as NPs. The following section will examine a model of care, COPC, which is ideal for the population-based health promotion that is necessary to prevent childhood obesity. COPC incorporates both family-based primary care and community-based, environmental interventions.

Community-Oriented Primary Care

The medical model frames childhood obesity as a disease that strikes individuals due to internal and external causes, while the environmental lens frames it as a disease that strikes a population as a consequence of individual vulnerability combined with exposure to environmental elements (Schwartz & Brownell, 2007). Viewing the issue of childhood obesity through an environmental lens helps to shift the focus from a medical to a public health lens, while also removing a sense of blame or failure. This is helpful because there is the risk of investing time, money, and effort into interventions based on the belief that obesity is a matter of personal responsibility, and missing the opportunity to make environmental changes that will have a greater impact (Schwartz & Brownell).

COPC is a model of care that incorporates health promotion on a broader scale, taking into account demographic, and environmental influences on the health of a population. COPC is a systematic approach to health care based on principles derived from epidemiology, primary care, preventive medicine and health promotion that has been shown to have positive benefits for communities in the United States and
worldwide (Dresang et al., 2005). COPC is a continuous process by which primary care is provided to a defined community on the basis of its assessed health needs through the planned integration of public health practice with the delivery of primary care services. This link with public health places health promotion and disease prevention at the forefront of the COPC concept. It involves engagement with public health and community contribution in the management decisions of the practice. The idea of community is the core element and the point of departure for the COPC process.

The COPC process includes the following steps: (1) defining and characterizing the community, (2) conducting a community diagnosis, (3) developing and implementing an intervention, and (4) monitoring the impact of intervention. An additional step added to this list includes (5) involving the community to carry out the preceding four steps (Connors, et al., 2003).

COPC was recognized as an important conceptual framework in American health care at a conference sponsored by the Institute of Medicine in 1982 (Mullan and Epstein, 2002). COPC is particularly well designed for “application to primary care and can bring increased levels of effectiveness and community participation to the health delivery enterprise” (Mullan & Epstein, p. 1753). While the identification of biological health risks is a staple of primary care, sociocultural ones are less often routinely identified. The role of COPC should also be to identify lower socioeconomic status as a health risk, identify the specific health hazards associated with it, and plan relevant interventions. This stands to be one of the most significant applications of COPC, with the potential to improve population health in both urban and rural settings in developed and developing countries alike. Because health issues are often more prevalent in
lower socioeconomic populations, COPC works well in publicly funded clinics that have the potential to provide health care to, or at least address health issues in underserved populations. Citizen participation is encouraged and the attention of the primary care practice is on the health-related issues that are identified as a result of social problems (Dresang et al., 2005). The multiple health effects of problems associated with social determinants of health, including poverty and education (CDC, 2010), are associated with obesity and can be addressed by community-oriented practices (Dresang et al.). COPC provides a model in which these health issues can be surfaced, quantified, and tackled.

The strength of the COPC idea over the years has been that it appeals to both practicality and principle. Practicality argues for coordination between public health strategies and primary care delivery, even though most health care systems around the world have developed without collaboration between these two vital and complementary forces (Martin-Mesiner, & Valaitis, 2009; Wong et al., 2009; Mullan & Epstein, 2002). COPC appeals on a principled level because it envisions community participation in health care decisions (Mullan & Epstein). Prevention, early intervention, and health promotion all require a functional overview of a practice’s population.

To be effective at providing COPC, identifying the health issue(s) is imperative. To do this, it is recommended that practitioners have an understanding of the community’s population health, such as health trends and demographic characteristics of the populations they serve (Mullen and Epstein, 2002). In addition to community demographics, sources of data can come from interviews with key informants, focus groups, community surveys, community meetings, and journal articles (Summers et al.,
REDUCE OBESOGENIC ENVIRONMENTS

2003). Data from the local community may be compared with previous years, and similar areas elsewhere to gain a sense of trends and norms (Summers et al.). With childhood obesity this means learning about the current chronic health issues (e.g. prevalence of obesity), socio-economic issues (availability of recreational options), and social determinants of health (e.g. poverty) in order to give direction to the health care that is required to reduce or address these issues. Each community may have different contributing factors, which will influence the direction of potential COPC interventions. Examples of obesogenic factors ripe for COPC interventions may include poor implementation of the “Guidelines for Food and Beverage Sales in BC Schools”, or a lack of sidewalks or pathways.

COPC in this review targets family, school, and community environments, with the rationale that a person’s immediate environment is the most influential element of a child’s diet and physical activity behaviors (Epstein et al., 1990; NICE, 2008; Raine & Wilson, 2007). COPC begins in the primary care setting, where providers see families and patients regularly for screening and management of health concerns. Knowing how strong a family’s influence is on their children’s’ behavior, the periodic health examination is an opportunity for primary care providers to positively influence family environments, encouraging less obesogenic factors.

Periodic health exam and health promotion

In practice, the primary care clinic is a good entry point for the health promotion that is integral to COPC, starting with screening and plotting BMI, and discussing healthy active living (diet, exercise, and screen time) with families (see Table 2). By virtue of their continuing contact with patients over time, primary care providers are in a
strong position to improve the odds for positive childhood development by taking advantage of periodic health exams (Mousmanis & Watson, 2008; Larson et al., 2005; Seal & Broome, 2011). Periodic health exams are offered up to 5 years of age in the following intervals: 1 week, 2 weeks, 1 month, 6 weeks, 4 months, 6 months, 9 months 12 months, 18 months, 2-3 years and 4-5 years (Rourke, Leduc, & Rourke, 2011). The periodic health exams are designed to facilitate the early detection of health risks and emerging health problems (Tyler and Horner, 2008). Knowing that childhood obesity is emerging earlier in life, between 2-17 years of age (Katzmarzyk et al., 2007) and that parents influence infant and child behaviors, these screening and health promotion opportunities should not be missed. By calculating and plotting the BMI for all children, and initiating obesity-prevention strategies in infancy, primary care providers can play a significant role in helping curb the rise in overweight and obesity among young children (Olstad and McCarger, 2008).

A focus on anticipatory guidance during the periodic health examinations includes screening for developmental milestones and discussing eating and activity patterns. These visits provide repeated opportunities for primary care providers to review guidelines and recommendations, and encourage healthy behaviors (Spivack, et al., 2010). Studies have shown that the simplest thing a primary care provider can do to help a person initiate lifestyle modifications is to recommend that the person do so (Dent, et al., 2007). Patients expect their health care providers to offer physical activity information, and providers generally accept and value their role in promoting physical activity (Seligman, et al., 2009).
This review highlights the value of family-centered care, finding that health promotion interventions in primary care are much more effective when they are family-focused compared with individual-based (Irwin et al., 2005; Weaver et al., 2008; Olstad & McCarger, 2008; Plourde, 2006; Epstein et al., 1990). Ensuring that the family is ready for change, involving all family members and caregivers, making changes gradually, and focusing on permanent changes rather than quick fixes are important for success (McKee, et al., 2010; Seligman, et al., 2009; Lipnowski & LeBlanc, 2012). Primary care providers need to be encouraging and not critical (Seligman, et al.), recognizing that behavioral changes are challenging and there exist multiple obesogenic barriers.

NPs, as primary care providers, can take advantage of periodic health examinations to screen for BMI in children, and support families to reduce their obesogenic lifestyles. The screening and health promotion aimed at preventing childhood obesity can be incorporated into COPC practice by NPs. NPs who want to more effectively target childhood obesity can broaden their practice to include community interventions aimed at reducing obesogenic environments at school and community levels.

**Nurse Practitioners**

NPs are well suited to use COPC because their role is derived from blending of “clinical, diagnostic and therapeutic knowledge, skills and abilities within a nursing framework that emphasizes holism, health promotion and partnership with individuals and families, as well as communities” (CNA, 2011). The NPs role in COPC involves screening for childhood obesity; encouraging healthy active family environments;
coordinating services between health care providers (public health nurses, physicians, dietician, social worker, etc.); and assessing, planning, and leading community-based health promotion, beginning with a school and a community "obesogenic" assessment. Examples of community interventions include: collaborating with schools to implement no junk food policies, mandatory recreation classes, extra-curricular activities, secure/covered bike rack; working with urban planners to encourage building pedestrian paths, traffic calmed areas, bike racks, bike lanes; and developing relationships with recreation centers to encourage subsidized rates for low-income families.

These environmental interventions entail working with stakeholders to gather and synthesize qualitative and quantitative information from a variety of sources about determinants of health. NPs can work with public health professionals to determine health trends and areas of concern. NPs can coordinate services provided by all health care providers such as public health nurses and physicians and integrate services offered in the first five years of age.

NPs have the opportunity to demonstrate leadership by encouraging and initiating health promotion efforts for individuals, families, groups, and communities. In addition, NPs can demonstrate leadership in collaborating with other health professionals, such as physicians and public health staff, which is an integral step to the success of COPC. Recent studies in British Columbia on NP role integration suggest that NPs are taking strong leadership roles in reaching out to public health and establishing collaborations (Wong et al., 2009). There is a clear overlap between the services provided by NPs and public health nurses. However, the focus for NPs tends to be more oriented toward the primary care, while the focus for public health nurses is toward the public health
elements at the health promotion and illness prevention (Wong et al.). Both groups of nurses have considerable potential for leading and facilitating collaboration between primary care and public health (Wong et al.). COPC is an excellent model for fostering this collaboration between public health and primary care services, in which NPs can take a leadership role in.

Question of Inquiry

Section two of this paper provides an overview of the literature search strategy. Then, literature reviewed explores the evidence behind family-centered health promotion in primary care, and the evidence behind community and school-based environmental changes.

This paper will review literature to address the question: Is it possible for NPs to foster environmental changes that will enable a reduction in obesity with Canadian children under the age of 5, using COPC?

Section Two: Review of the Literature

Literature Search Methodology

The literature search was conducted to find articles that include Canadian, preschool (0-5 year old) children and NP interventions aimed at reducing obesogenic environments. Interventions were sought that are family-focused in a primary care setting, as well as environmental and community-based (e.g. COPC). No studies encompassed all of these concepts concomitantly, therefore, the analysis synthesizes findings by concepts and themes to present practice implications and recommendations.
Inclusion Criteria

To help keep the search strategy focused on the purpose of the paper, the following inclusion criteria were used: Journal articles published between 1990 and 2012. The rationale for including articles greater than 10 years old was to include relevant research that examines environmental influences that have contributed to childhood obesity in the last two decades. Studies were included if they were conducted in Canada, the U.S., the U.K., Australia, or European countries; and if they addressed at least one of the following topics:

| Chronic disease prevention and family lifestyle | Obesity and physical activity clinical practice guidelines for Canada |
| Health promotion in primary care | Family centered care |
| Public health and primary care integration | Childhood obesity |
| Physical activity in children | Canadian primary care intervention |
| Nurse practitioners in primary care | Risk factors for obesity in Canadian children |
| Childhood obesity Canada Environment and physical activity | Community-oriented primary care |
| School and preschool environments and obesity | Built environment and physical activity |

Exclusion Criteria

Resources were excluded if they were published before 1990, not in English, or published as an editorial or commentary.

Search Strategy

I wanted to include databases that would include family-centered care, medical
practices, health promotion in primary care, NPs in and population-based health promotion, environmental influences on physical activity and obesity, the role of NPs in community-based health promotion, and collaboration between primary care and public health. The UNBC library, CRNBC library, PubMED, and Google Scholar were the four main search engines used to access journals, articles, clinical guidelines, and relevant data.

The following databases provide a comprehensive index (1,600 in CINAHL and 1370 in MEDLINE) of peer reviewed medical and nursing journals from most recent to 1965:

<table>
<thead>
<tr>
<th>MEDLINE with Full Text</th>
<th>CINAHL with Full Text</th>
<th>Alt HealthWatch</th>
<th>Health Source Consumer edition</th>
<th>Health Source Nursing/Academic edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women’s Studies International</td>
<td>EBSCOhost</td>
<td>Health Source: Nursing/Academic Edition</td>
<td>PsycARTICLES</td>
<td>PsycINFO</td>
</tr>
<tr>
<td>SociINDEX with Full Text</td>
<td>Applied Science &amp; Technology Index</td>
<td>Social Sciences Full Text</td>
<td>Humanities Full Text</td>
<td>Blackwell-Synergy</td>
</tr>
<tr>
<td>Cochrane Collaboration</td>
<td>Springer Link</td>
<td>PubMED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When searching within these databases, the following search terms were used:

<table>
<thead>
<tr>
<th>Childhood obesity in Canada</th>
<th>Primary care</th>
<th>Family health</th>
<th>Physical activity in Canadian children</th>
<th>Obesogenic environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration of public health and primary care</td>
<td>Primary health care</td>
<td>Community-based health promotion</td>
<td>Postpartum and health behaviors</td>
<td>Family-centered care and childhood obesity</td>
</tr>
<tr>
<td>Clinical practice guidelines</td>
<td>Healthy active living</td>
<td>Family lifestyle</td>
<td>Public health and primary care integration</td>
<td>Postpartum barriers to physical activity</td>
</tr>
<tr>
<td>Gaps in postpartum care</td>
<td>Role of primary care provider in postpartum health promotion</td>
<td>Nurse practitioner(s)</td>
<td>Advanced practice nurse</td>
<td>Family and chronic disease</td>
</tr>
<tr>
<td>Primary care provider</td>
<td>Health promotion</td>
<td>Childhood physical activity</td>
<td>Exercise</td>
<td>Primary care and health promotion</td>
</tr>
<tr>
<td>Chronic disease prevention</td>
<td>Community-oriented primary care (COPC)</td>
<td>Environmental influence and physical activity</td>
<td>School environments and childhood obesity</td>
<td>Canadian health care costs on physical inactivity</td>
</tr>
<tr>
<td>NPs and community-based health promotion</td>
<td>Urban design and obesity prevention</td>
<td>Barriers to health promotion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following grey literature was also valuable for information, guidelines, and recommendations relevant to this literature review: Canadian Pediatric Society (CPS), the AAP, PHAC, USPSTF, Canadian Academy of Sports Medicine, CFLRI, CSEP, U.S. Department of Health and Social Services, American Diabetics Association, Health Canada, US Department of Health Services, Childhood Obesity Foundation, NICE, and the Canadian Medical Association: Clinical Practice Guideline Database.

When articles were found that were particularly relevant, a manual search of their references was undertaken. Towards the end of the literature search, the review of references in relevant articles began to reveal similar authors and articles. It was felt
that saturation was reached when duplicates of articles were found in multiple
databases, and when reference lists were reviewed and some of the same articles were
found.

The literature reviewed included articles that fit the inclusion criteria along with the
search terms. Articles were excluded if they did not have any relevance to any of the
search terms, namely primary health care and obesogenic environments. The results of
the literature search are grouped together within the following themes, some articles
fitting into more than one theme:

<table>
<thead>
<tr>
<th>Themes</th>
<th>Number of articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Disease prevention and Healthy Active Families</td>
<td>39</td>
</tr>
<tr>
<td>Health Promotion in Primary Care</td>
<td>4</td>
</tr>
<tr>
<td>Family centered care</td>
<td>57</td>
</tr>
<tr>
<td>Public Health and Primary Care integration</td>
<td>8</td>
</tr>
<tr>
<td>Postpartum and Physical Activity</td>
<td>24</td>
</tr>
<tr>
<td>School and Community based interventions</td>
<td>16</td>
</tr>
<tr>
<td>Risk Factors for Obesity in Canadian Children</td>
<td>13</td>
</tr>
<tr>
<td>Obesity in Rural Canada</td>
<td>5</td>
</tr>
<tr>
<td>Community oriented primary care</td>
<td>7</td>
</tr>
<tr>
<td>Environment and physical activity</td>
<td>15</td>
</tr>
</tbody>
</table>

These results identify areas where there is a relatively large amount of research
(family-centered care) and where there is relatively little research (NPs in primary care,
COPC, and NP led environmental changes). In combination, there were no articles
including all search themes suggesting a paucity of research in the area of interest to
this paper.

In total, 135 articles were found that discussed at least one of the aforementioned
themes, discussing childhood obesity and population-based health promotion. These
relevant articles were referenced and reviewed for this project.

The next section will examine the research, literature reviews, and evidence to further the discussion on COPC and childhood obesity. Family centered care, and barriers to health promotion in primary care, will be explored to determine whether COPC fosters family-level changes that reduce obesogenic environments. The evidence on community and school-based environmental changes will be explored to discover specific interventions as well the potential value of these interventions for increasing physical activity in children and reducing obesogenic environments.

Family-Centered Primary Care

The AAP (2003) policy statement on prevention of pediatric overweight states: "Families should be educated and empowered through anticipatory guidance to recognize the impact they have on their child's development of lifelong habits of physical activity and nutritious eating" (p.427). Parents' activity patterns are closely associated with those of their offspring (Irwin et al., 2005). Consequently, parents' involvement in healthy bodyweight promotion in children is critical. Literature reviewed indicates that family-focused interventions starting at a young age have the best chances for successfully addressing overweight in childhood (McKee, et al., 2010).

Kilmer, Cook, and Munsell, (2010) provide a review of literature on family-centered care that supports their assertion that "caregivers and siblings in a child's family system are among the most powerful and significant proximal influences on that youngster's development and adjustment" (Kilmer et al., p.6). Kilmer notes that many researchers identified that "variables can cluster together to exert, in combination, positive or negative influences on children and families and their adjustment trajectories" (p.6).
Supportive interventions are aimed at the family, not just the child, in order to maximize the benefit for the identified children.

One of the most effective obesity prevention measures may be for parents, guardians, and other caregivers to adopt healthy lifestyles and avoid becoming obese themselves (Olstad and McCarger, 2008). In an obesity-prevention study among preschool-aged Native American children (Olstad & McCarger), obesity-prevention strategies plus parenting support group children showed a trend for decreased energy intake. This study highlights parental influence as being the most substantial during early childhood, and illustrates that parents play a significant role in promoting the development of practices that can support the maintenance of a healthy body weight, or conversely, that can contribute to overweight in their children (Olstad and McCarger).

The landmark study by Epstein, et al. (1990) with a 10-year follow-up demonstrated that interventions involving the parent and child were more effective in long-term weight loss compared with child-targeted interventions. Importantly, from the perspective of the family-based focus of this research, parent praise and amount of parent weight-loss were most strongly correlated with a child’s weight loss and success. (Epstein et al., 1990). The relationship between parent and child success suggests that changes are being made that influence multiple family members. A number of mechanisms are proposed as responsible for these results: Parents may serve as models for their children (Epstein 1990), or parents may modify aspects of the environment that influence weight loss efforts of parents and children separately. For example, if parents reduce the availability of high fat, high calorie foods in the house, then intake of children and parents can be independently influenced (Epstein et al.,
These studies reveal the importance and value of involving the family when it comes to reducing obesogenic environments to prevent childhood obesity. This is because parents and families create the most immediate and influential environment for children, especially under the age of 5 years. Based on these findings, this paper argues that interventions will be more effective if they aim to target family influences throughout a child's critical development period, namely prior to the age of 5. Primary care providers can educate parents and older siblings about how their behaviors and lifestyle choices strongly influence those of the younger children. NPs can highlight the opportunity to positively change the family environment to make it less obesogenic. Primary care providers, including NPs, must engage the whole family, at every opportunity, to discuss diet, physical activity, and screen time recommendations, and brainstorm with the family on how to achieve these recommendations.

**Barriers to Health Promotion in Primary Care**

Although family-centered health promotion in primary care is recognized as valuable in preventing obesity, actual practices in primary care reveal that providers stumble with implementation, mostly because of feelings of futility (Story et al., 2002; Boyle et al., 2009). It is difficult to change unhealthy behaviors (Story et al.), therefore health promotion efforts are often unsuccessful. Examining barriers to health promotion practices may help to guide direction for interventions, or redirect the focus of health promotion interventions towards an area that may be more efficacious and less futile.

Primary care providers do not lack an appreciation for the value of health promotion. They recognize the importance of childhood obesity, as noted by He, et al.
(2010) who identified the majority of practitioners in their study viewed childhood obesity as an 'important' or 'very important' issue. Screening practices reveal that primary care providers routinely measure height and weight, but fewer than 6% of primary care providers actually plot the BMI for children (Olstad & McCarger, 2008). As a consequence, primary care providers may fail to identify children with milder degrees of obesity and miss the opportunity to intervene early in the course of the disease. Even for children identified as obese, physician evaluation and treatment may not be consistent with current recommendations (Olstad & McCarger). Although dietary changes are recommended for many children (71%), increased physical activity (33%) and a reduction in TV viewing time (5%) are rarely advised (Olstad & McCarger). Children who are not identified as obese may receive little to no advice regarding diet, activity, and other obesity associated behaviors from their physicians (Olstad & McCarger).

When examining barriers to health promotion efforts, Story et al. (2002) found that most frequent barriers cited by practitioners overall were lack of parent involvement, lack of patient/family motivation, and lack of support services. Lack of reimbursement and lack of clinician time were also major barriers (Story et al.). Over half of the primary care providers identified treatment futility as a barrier either most of the time or often (Story et al.). Providers, including NPs, expressed frustration with the North American lifestyle and felt it was difficult for families to overcome the social norms of television, video games, soft drinks, and fast-food restaurants (Story et al., 2002). NPs also reported that parental attitudes were one of the biggest deterrents because parents were often described as poor examples for their children regarding physical activity and
nutrition habits and lacking knowledge about general nutrition balance. NPs reported that parents did not seem motivated to make appropriate family lifestyle changes.

Given the futility expressed by primary care providers, intervening at an environmental level, rather than a family level, could be a more effective and less frustrating approach. Health care providers studied by Boyle et al. (2009) perceived that changing the food and physical activity environments in neighborhoods and schools was likely to be the most effective way to support their clinical obesity prevention efforts.

Identification of barriers faced by primary care providers in the provision of health promotion aimed at reducing childhood obesity highlights the areas where intervention may be more effectively directed, namely fostering less obesogenic environments. It is apparent, in this literature reviewed so far, that integrating health promotion into primary care is an essential but challenging element of preventing childhood obesity. The literature identifies the futility experienced by individuals, families, and primary care clinicians in changing behaviors. This futility may be attributed, at least partly, to obesogenic influences beyond the family's control, such as community and societal environmental influences. A shift in intervention efforts to include environmental-based health promotion may be less frustrating for practitioners and families and, ultimately, more effective for long-term, population-based disease prevention. The community and school environments will be examined for opportunities for intervention through COPC.

Environmental changes and physical activity

Indirect evidence from countries where the use of active transportation is common, such as walking or biking to school and work, suggests that children in nations with a culture of physical activity are less likely to be obese (Fox, 2004). Research has
identified links between children’s physical activity, including active transportation, and their built environment (Sallis & Glanz, 2006). Examples of built environment that discourage walking and biking to school include lack of sidewalks, long distances to school, and busy streets (Sallis & Glanz). Built environment and urban design have been studied to determine their association with physical activity, termed by Sallis and Glanz (2006) as “walkability”. These communities are designed to support convenient pedestrian travel for common activities such as shopping and going to school (Sallis & Glanz). Recent studies have found that residents of high-walkable neighborhoods get one hour more physical activity each week and are 2.4 times more likely to meet physical activity recommendations than residents of low-walkable neighborhoods (Saelens et al., 2003). Over one year, this translates into energy expenditure of approximately 3,000 to 6,000 kcal or about 0.85 lb to 1.75 lb for a 150 lb person (Saelens, Sallis, & Frank, 2003). It turns out that even though 15-30 min of physical activity per week may seem small in the context of individual behavioral change, populations experience long term health benefits in communities where the environment favors active transportation (Saelens et al.).

In another study by Lumeng et al. (2006) neighborhood safety, or perceived safety, was associated with childhood obesity. The ability to be outdoors was the strongest correlate with physical activity in children (Ben-Sefer et al., 2009; Sallis & Glanz, 2006). Parents with safety concerns are attempting to protect their children from harm and decreasing the kind of physical activity that comes from playing outdoors in the neighborhood, but inadvertently increasing the likelihood of sedentary activity and snacking that comes from staying indoors (Lumeng et al.). Children have increasingly
been prevented from traveling and playing outdoors by parental fears for their safety (Ben-Sefer, et al., 2009). While parents must exercise a degree of caution for their children in navigating streets, the risk is that inactive children may become inactive adults (Whitzman 2006). This may lead to a vicious cycle of more children being driven, to more vehicles crowding the road and thereby, validating parental fears, and an increasing tendency for inactivity.

The NICE (2006) report "Physical Activity and the Environment" examines the evidence for the effectiveness of transport interventions involving built community and increasing physical activity through active transportation. The following bullets summarize the evidence revealed in twenty-six studies (NICE, 2006) involving six environmental interventions. This review highlights the evidence that reveals the strongest evidence for specific environmental changes, in order to prioritize and direct intervention planning. NPs working in a COPC model can take this evidence forward to city planners/counsel to support changes to the community's built environment in favor of less obesogenic environments. The specific environmental interventions which are summarized in the following bullets include: traffic calming, multi use trails, closing or restricting use of roads, road user charging, cycle infrastructure, and safe routes to schools:

- Nine studies suggested that traffic calming interventions may be useful in enabling children specifically to benefit from physical activity through play outdoors in the short and long term. Four studies suggested that traffic calming may enable children to benefit from physical activity through play outdoors in the short and long term (NICE).
• Five studies suggested that multi-use trails can lead to increases in levels of walking and cycling in both the short and long term. However, one US study found decreases in walking and cycling following this intervention. Trails located closer to population centers may be better used (NICE).

• Three studies suggested that closing or reducing the capacity of roads can lead to long term increased in levels of walking within the area of scheme. One study suggests that closing or reducing the capacity of roads can lead to increases in cycling. The evidence suggests that the setting of road closures through in city or town centers can lead to short term increases in cycling and long term increases in walking (NICE).

• Two studies suggested that introduction of road user charging schemes can lead to short term increases in levels of walking and long term increases in cycling within the area of the scheme. There was evidence of either no change or a decrease in road traffic casualties as a result of road user charging interventions (NICE).

• Seven studies suggested that the introduction of cycle infrastructure can lead to long-term increases in levels of cycling within the area of scheme. It appears that cycle infrastructure in both urban and rural areas can be effective in increasing cycling (NICE).

• Two studies suggested that the introduction of safe routes to schools can lead to short term increases in levels of walking and cycling within the area scheme (NICE).

It turns out that the strongest evidence is associated with traffic calming, the introduction of cycle infrastructure, and the development of multi-use trails. All the reviewed interventions involving built community revealed some degree of positive association with increasing walking or cycling. In total, there is enough evidence to
support a positive association between changes to the built environment and enhancement of physical activity (NICE, 2006).

Another study, with relevance to rural Canadian communities, surveyed small Canadian municipalities about barriers that exist in their communities, and what the most pressing infrastructure needs are to facilitate higher physical activity among their citizens (CFLRI, 2009). Frequently reported barriers included: sport and recreation facilities needing repair or maintenance, 68%; lack of funds to cover the costs of repair and maintenance of trails and parks, 64%; sidewalks and bike lanes needing of repair or maintenance, 30%; the amount of lighting discouraging people from walking or cycling at night, 19%; and the amount of crime on the streets discouraging people from walking or cycling, 5% (CFLRI).

Research that offers strong evidence for changes to the built environment in favor of active transportation as well as environmental barriers to physical activity gives NPs tools and direction for COPC. In light of these findings, NPs can focus their assessment and proposals on improving parks, lighting and safely, traffic calming, the introduction of cycle infrastructure, and the development of multi-use trails, based on the strength of these studies. NPs can share this evidence and guidance with stakeholders, such as urban planners and city counsels, when assessing and proposing environmental interventions.

Active transportation for families in the community extends to preschoolers and the school environment, where safe, active routes to and from school are also significant, among other environmental influences. The evidence around school environments and
Reduction of obesogenic environments will be examined, looking for ideas to guide potential interventions through COPC.

**School-based Environmental Changes**

The preschool/school environment, and structure of the school day are particularly important for environmental interventions (Fox, 2004). Intervention components identified by Woodman (2008) include changes to the physical environment, educational curricula, exercise and physical programs, staff development and training, changes to the structure of the school day, changes to the price and availability of food in school canteens, and in-school marketing. In addition to 'curricular' components, interventions may be 'noncurricular', such as active travel to school, physical activity in break times, and extracurricular activities after school or during the holidays (Woodman, 2008).

An example of a successful model is the Kids-Go for your life (K-GFYL) intervention (de Silva-Sanigorski et al., 2010). It is a school-based health promotion program being implemented across Victoria, Australia that aims to reduce the risk of childhood obesity by improving the socio-cultural, policy and physical environments in children's care and educational settings (de Silva-Sanigorski et al.). The intervention was designed within a Health Promoting Schools framework following discussions and workshops with multiple stakeholders. K-GFYL is being implemented in a range of children's settings, including primary (elementary) schools (children aged five to twelve years), preschool (also known as kindergarten; for children aged three to five years), and the early childhood services family day care (FDC, a home-based child care service for children from birth to twelve years) and long day care (LDC, centre-based care for children aged from birth to five years). The K-GFYL program includes support and
professional development for staff within those settings to make policy and practice changes that promote healthy eating and physical activity for children and their families. The key obesity-related behaviors targeted are: increasing fruit, vegetable and water consumption; reducing consumption of foods high in fat, salt and sugar and sweet drinks; increasing participation in physical activity; reducing sedentary behavior (such as screen time); and increasing active transport. Table 3 summarizes health promotion interventions in the school environment implemented with the K-GFYL program.

Examples of health promotion activities include:

- **Healthy Eating:** Children have access to water throughout the day; children are involved in activities to grow and cook food; special days to promote fruit and vegetables such as ‘Free Fruit Fridays’ and ‘Apple Slinky Days’; and the school policy/fundraising restricts unhealthy and promotes healthy foods and drinks.

- **Physical activity:** The establishment of partnerships with local physical activity organizations; safe biking or waking to school; available bike storage for children and staff; staff role model being physically active; planned 30 minutes of structured play and at least 60 minutes of free play activity daily; parents are given information/workshops about healthy eating, physical activity, and school policies.

The K-GFYL project is very promising and offers some excellent, practical examples aimed at increasing physical activity and healthy eating in the school environment.

The literature reviewed confirms the value of family-centered care, but illustrates the limitations of isolated primary care interventions. COPC incorporates community-based interventions to address population-based health issues. In this review, family,
school and community interventions aimed at reducing obesogenic environments have been examined. It turns out that physical activity and healthy eating patterns are influenced by our environment (Sallis & Glanz; Saelens, Sallis, & Frank, 2003; Fox, 2004) and primary care providers, including NPs, have the opportunity to influence them using COPC. Prior to implementation of COPC interventions, it is necessary to have an evaluation plan, which may be consistent with the school and community assessments. The next section will explore the evidence and resources related to evaluating COPC outcomes.

_Evaluation and Resources for COPC interventions_

Evaluation of COPC will depend on what interventions are being implemented. Outcomes being evaluated are directly, or indirectly, in line with the goals of the COPC interventions. Measurements and evaluation of program effectiveness could include: body composition (BMI), chronic disease indicators, physical fitness, nutrition, psychological outcomes, knowledge, physical activity, screen time, behavioral modification, family involvement, and behavioral changes.

Flynn et al. (2006) conducted a review of the literature examining the question; “Globally, what programs/models represent best practice in promoting healthy weights in children and youth for the prevention of chronic disease associated with obesity?”
Here are examples of interventions and the subsequent outcome categories (Flynn et al.), included in this review as possible indicators to be used for evaluation purposes:

**Intervention categories**

<table>
<thead>
<tr>
<th>Physical activity: Actual engagement in physical activities</th>
<th>Diet: Intervention focus on dietary intake</th>
<th>Psychosocial: Focus on self-esteem, body image, peer support and stress management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family: Involvement of family</td>
<td>Behavior modification: Motivational reinforcement</td>
<td>Education: Education on healthy eating, active living</td>
</tr>
<tr>
<td>Environment: Environmental modification within community, cafeteria menus</td>
<td>Incentives or rewards: Money, sports equipment, stickers</td>
<td></td>
</tr>
</tbody>
</table>

**Outcome categories**

<table>
<thead>
<tr>
<th>Body composition: BMI, fat distribution, prevalence of obesity/overweight, skin-fold thicknesses</th>
<th>Physical fitness: Fitness testing measures, heart rate, VO2 max</th>
<th>Chronic disease risk factors: Blood pressure, lipid levels, insulin levels, glucose levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition: Dietary habits, food choice, food consumption, energy intake and sources</td>
<td>Physical activity: Frequency, duration, intensity, sedentary behavior</td>
<td>Psychosocial factors: Self-esteem, body image, stress level, feelings of support</td>
</tr>
<tr>
<td>Knowledge: Knowledge of chronic disease risk factors, nutrition and physical activity requirements for optimal health</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Flynn et al., 2006).

In reviewing and analyzing 500 articles, Flynn et al. found that the majority of the interventions reviewed in the literature provided evidence of short-term improvement in indicators of chronic disease risk status. The evidence revealed by Flynn et al. strongly supports the recommendation for continued and expanded programming to address obesity in children. Key findings on outcome evaluation revealed that "body composition, chronic disease risk factors and fitness are directly measured and are
reliable indicators of program effectiveness and can be used for both clinic and population-based studies to determine changes in population indicators" (Flynn et al., p.54). Of significance, this review also found that few studies involved community and home environments, making it difficult to draw conclusions regarding interventions in these settings.

The CDC Healthy Communities Program (2010) provides a comprehensive action plan titled: The Community Health Assessment and Group Evaluation (CHANGE) Action Guide: Building a Foundation of Knowledge to Prioritize Community Health Needs. This action plan is designed to help communities promote health, prevent disease, and monitor interventions over time (CDC). It is an action plan for use by multiple stakeholders invested in making their communities healthy. The CHANGE action guide offers stepwise guidance on how to assess, implement, and evaluate community-based changes aimed at improving health. Evaluation tools measure indicators of individual health and healthy communities.

Additional resources and tools are linked in the CHANGE action guide (CDC, 2010). Examples of evaluation tools include: Healthy Community Checklist; Core Measures of Trail Use; Environmental Nutrition & Activity Community Tool; Community Food Security Assessment Toolkit; and Healthy People 2010 Toolkit, a Field Guide to Health Planning. A sample of questions to consider including in a COPC evaluation process is outlined in Table 4. Although these CDC resources are comprehensive and objective, but may have limitations because they are all U.S. based.

Canada does, however, have excellent resources for school-based health interventions through British Columbia Healthy Schools (Ministry of Education, 2012),
available at http://www.bced.gov.bc.ca/health/. The website provides guidance, tools, and policy updates on: Food and Beverage Sales in BC, School Fruit and Vegetable Nutritional program, tobacco-free schools, Daily Physical Activity, Health and Physical Activity Curriculum, and Action Schools BC (Ministry of Education).

These findings offer evidence and tools to help guide the evaluation process. Evaluation tools assess measurable outcomes and health indicators that are necessary in the evaluation of COPC interventions. Consistency of tool use and methods is recommended to ensure accurate long-term findings (CDC, 2010). In addition, involving multiple stakeholders in the needs assessment, implementation, and evaluation of COPC interventions is recommended (Flynn et al., 2006).

Section Three: Discussion

Summary of Findings

Findings from an extensive literature review were used to answer the project's question, and expand the discussion throughout the project to provide evidence-based recommendations for NP practice aimed at reducing obesogenic environments. Family-centered care is a mainstay of health promotion efforts (Epstein et al., 1990), but health care providers consistently express futility in changing behaviors in the primary care setting (Story et al., 2002). This futility to change behaviors stems from the significant influence that environment has on our behaviors (Daneman, 2010). These findings support the position of this paper to expand interventions beyond the primary care setting to include environmental initiatives in schools and in the community, targeting situations that have an influence on a child's behaviors.

A child's immediate environment has the most significant impact on behaviors and
propensity towards obesity, especially in the earliest years (Irwin et al., 2005; Weaver et al., 2008; Olstad & McCarger, 2008; Plourde, 2006; Epstein et al., 1990; Sallis & Glanz, 2006). Therefore, earlier intervention is encouraged because interventions are not usually successful once overweight and obesity have occurred (Canning, et al., 2004).

Family environments can be influenced through health promotion routinely offered at the periodic health examination. Not taking advantage of the periodic health exam appointments to provide health promotion is a missed opportunity. Primary care providers, including NPs, provide health advice and preventive health consultation to children and their parents during regularly scheduled physical examinations, required immunization visits, and illness care (Seal & Broome 2007). Routine screening is an essential first step to determine the level and distribution of adiposity, in order to make a weight diagnosis using BMI percentile (Lau et al., 2006). Irrespective of the weight diagnosis, the process of assessing BMI opens the door for primary prevention through health promotion around healthy active living and the prevention of obesity. Health promotion is most effective for preventing childhood obesity when targeting the whole family, primarily because the family environment has the strongest influence on a child’s behaviors (Epstein et al., 1990). Counseling messages include reducing sedentary behaviors (e.g. T.V. viewing and computer use), increasing physical activity, and promoting adequate daily intakes of vegetables, fruits and whole grains. Strategies listed in Table 2 (Lipnowski & LeBlanc; CPS, Healthy Active Living and Sports Medicine Committee, 2012) may be helpful for guiding patients and families toward healthy active living.

Beyond the primary care setting, COPC incorporates community-level intervention
that targets identified areas contributing to the population health issue (i.e. in this case, childhood obesity). In this review, in addition to the family environment, interventions in the school and the community environments have been identified as strong areas of influence for obesity related behaviors. Physical activity and environmental interventions analyzed by NICE (2006) reveal a positive association for enabling active transportation, with the strongest evidence associated with traffic calming, the introduction of cycle infrastructure, and the development of multi-use trails (NICE). Community interventions revealing the strongest evidence for behavioral changes include safe, accessible active transportation routes through town, and access to safe, outdoor play areas or recreational facilities/activities (Sallis & Glanz, 2006).

In the schools, reviewed literature provides ideas for interventions in the K-GFYL project (de Silva-Sanigorski et al., 2010), developed through community processes involving collaboration between multiple stakeholders. Interventions, summarized in Table 3, are aimed at ensuring the availability of healthy food choices (and eliminating opportunities for unhealthy food), and ensuring adequate play time through the preservation of recess time and safe, accessible, outdoor play areas/equipment (de Silva-Sanigorski et al.). Safe, active, transportation routes to school is also encouraged (de Silva-Sanigorski et al.).

Consistent evaluation of measurable outcomes, such as BMI, chronic disease indicators, screen time, frequency of active transportation, types of foods offered at school and minutes per day of physical activity at school will help to determine the effectiveness of interventions to substantiate these efforts. Interestingly, research and evidence to support the link between environmental interventions and a reduction of
childhood obesity is still in its infancy (Sallis & Glanz, 2006). However, it is well known that children who have access to safe places to be active, communities that are walkable, and schools that offer healthful foods are more likely to be more active and eat more healthful foods—behaviors that may help to avoid obesity (Sallis & Glanz).

COPC is an iterative process, starting with an assessment of population health and obesogenic factors; which directs the development and implementation of interventions involving a collaborative effort from public health, schools, city administration, and primary care providers; and leading to an evaluation of the effectiveness through the measurement of outcomes, thereby influencing intervention decisions. NPs have the opportunity and skills to be involved in this process.

**The Role of Primary Care Providers in COPC**

Primary care providers are the best-suited practitioners, assuming responsibility for all ages in the population and providing care to families and communities (Mullan & Epstein, 2002). Given the influence of population health, primary care providers need to look beyond the strict boundaries of medicine's traditional physician-patient dyad and assume a more comprehensive role as caregivers to families and communities, in order to achieve the true benefits of COPC (Mullen & Epstein). In practice, primary care providers have the opportunity to screen for obesity and offer health promotion advice to families in the clinic setting. In addition to health promotion in primary care clinics, providers can promote environmental changes, looking beyond the individual with obesity to other people at risk from the same health hazard. COPC uses this population perspective to systematically identify health problems in the community, modify practice procedures, add community interventions and monitor the impact of changes.
In the primary clinic setting, evaluation can include measurement of BMI routinely (e.g. at each periodic health exam and annually), measurement of chronic disease indicators (glucose tolerance/fasting blood glucose, dyslipidemia, blood pressure, and leptin levels). These chronic disease indicators tend to cluster in childhood and are strongly associated with obesity and its duration and have been identified in overweight children as young as 5 years of age (Flynn et al., 2006). In addition, screen time per day; physical activity minutes per day and nutritional habits can be assessed. Family, school and community based surveys can be circulated every 6 – 12 months to evaluate active transportation, physical activity, and nutritional choices. Conducting surveys will require the involvement of all stakeholders, including teachers, parents, city council, NPs, and other primary care providers.

The comprehensiveness of COPC model of care will require a new kind of hybrid practitioner with competencies in primary care, prevention, epidemiology, ethics and behavioral science (McWhinney, 1998). The principles of COPC can be applied through collaboration between all practices in a community, including public health and community partners (McWhinney). NICE (2012) suggests that collaboration between public health and other sectors show promise in creating supportive environments, as well as in enhancing access to services for marginalized populations. There is a need for more multi-level interventions that address structural determinants of health across the whole population. Hamilton and Bhatti (1996) illustrate these multiple levels of influence in their Population Health Promotion Model, which include individual, family, community, and society/sector. Each level will influence a child’s environment and can, therefore, be targets for intervention to reduce obesogenic environments.
As family medicine becomes more of a global force, the concepts of COPC should move with it. However, this will require that family medicine and its practitioners accept that their clinical responsibility goes beyond the individual and family to the broader community. Childhood obesity is not going to be prevented using isolated, primary care interventions, but will require efforts at multiple levels. For example, communities can build pathways and parks that foster physical activity; societies can eliminate advertisements about junk food or increase the cost of junk food and subsidize healthy food; and primary care providers can monitor and influence family behaviors and environmental interventions, being leaders in the evaluation of interventions.

*Nurse Practitioner Competencies Needed to Foster Environmental Changes in British Columbia*

Although COPC appears to be a good fit for preventing childhood obesity, the challenge will be the uptake and implementation of the COPC model of care, necessitating many of the NP competencies including: therapeutic management, health promotion, leadership, and collaboration. The competencies required of NPs fits with those skills needed for COPC.

According to the CRNBC (2011), NPs have the responsibility to demonstrate therapeutic management. The NP supports, educates, coaches and counsels clients regarding diagnoses, prognoses, and self-management including their personal responses to diseases, disorders, conditions, injuries, risk factors, lifestyle changes and therapeutic interventions (CRNBC). Family-centered care, screening for and counseling on lifestyle behaviors contributing to childhood obesity, are elements of NP practice supported by this review. In addition, evaluation of clinical indicators contributes to
evidence supporting or refuting interventions, tying in to research and evidence-based practice.

Health promotion is a key competency required in NP practice (CRNBC, 2011). The NP may lead or collaborate with other health-care team members, other sectors and/or the community by participating in initiatives that promote health and reduce the risk of complications, illness and injury for their individual clients, client groups and/or the population as a whole (CRNBC). NPs will use these competencies when designing and implementing COPC interventions aimed at environmental changes.

In the initial step of COPC, the NP assesses, identifies, and critically analyzes information from a variety of sources to determine client and/or population trends and patterns that have health implications (CRNBC). This involves a school-based and community-based obesogenic assessment. What factors are potentially contributing to obesogenic environments within these settings? Assessment criteria could neatly match outcome measures. In the schools this could include: minutes per day of physical activity, access to playground equipment or 'natural' environment, percentage of 'serve most' and 'serve least foods' and frequency children using active transportation. In the community the assessment, in collaboration with city planners, could include: areas of town without parks, poor lighting and safety, lack of traffic calming, lack of cycle infrastructure, and potential areas for multi-use trails. A survey of community members around use of active transportation and barriers could contribute to highlighting specific areas for intervention.

Collaboration is integral to the success of COPC and is one of the competencies for NP practice (CRNBC, 2011). Using COPC to design and implement environmental
changes, the NP collaborates with other health care providers and other sectors to use knowledge of determinants of health and principles of community development to help groups or entire communities obtain the services they need to meet their health goals (CRNBC, 2011). For example, NPs could collaborate with school staff, public health nurses, city counsel, and community programs to identify school and community-based needs (e.g. poor food choices at preschool, unsafe routes to school). NPs can work with public health professionals to identify specific statistics in order to target specific areas of concern. Public health professionals may have more influence on governmental policies and could take on more of the advocacy and policy development role (Interior Health Authority (IHA), 2012). Of relevance to NPs in British Columbia, the health care strategic priorities highlight an interest in COPC as identified in the public health strategic priorities (Wong et al., 2009). These strategic priorities include chronic disease/injury prevention and built environment, which includes: tobacco policy, healthy eating and physical activity stewardship, injury prevention strategies, safe and healthy built environment, and healthy schools, workplaces and communities (Wong et al.). In line with these priorities, the Healthy Communities Initiative (IHA 2012) addresses: physical activity, healthy eating, tobacco reduction, healthy environments and priority populations — “since there is strong evidence that actions in these areas can reduce the risk factors for chronic disease and obesity” (p.8). These health care strategies highlight the support that governmental and health care organizations are offering towards enabling positive environmental changes aimed at reducing associated chronic diseases. Childhood obesity prevention fits into these priorities. NPs have the opportunity to step up to an underserved and required area of health care, using COPC,
to make positive, population-based health improvements. This paper proposes that the "healthy communities" initiative is, essentially, about fostering less obesogenic environments in communities, schools, and families. Through collaboration between NPs and public health nurses, an alignment of strategies and approaches can more effectively achieve the goal to improve the health of communities. Through intersectoral committee work, NPs and public health professionals could inform each other to ensure that environmental interventions are aligned with the best available evidence and supported by provincial strategic plans.

Through this COPC process, the NP initiates or participates in the design of services/interventions for health promotion, health protection and the prevention of injury, illness, disease and complications (CRNBC). The NP participates in the implementation, monitoring and evaluation of health promotion and illness/injury prevention strategies in partnership with other health care providers, communities, social, and public, service sectors (CRNBC).

In evaluating outcomes of interventions, NPs demonstrate competencies in research. The NP identifies, collects data on, and evaluates the outcomes of, nurse practitioner practice for clients and the health-care system (CRNBC, 2011). NPs will engage in research needed to assess population health and conduct a community health needs assessment. As part of this process, NPs will be involved in evaluating outcomes to measure the effectiveness of interventions. Clinical indicators can be measured routinely by NPs during the periodic health exams, and then annually, or as determined by the involved stakeholders. Family, school, and community surveys can be conducted annually, prior to and following implementation of interventions. The NP
can coordinate the evaluation and analysis process, providing evidence-based recommendations to all stakeholders. Evaluation of COPC interventions is important for revealing the true value of interventions through a reduction in obesogenic related indicators (e.g. childhood obesity, chronic diseases, and behaviors).

NPs have the potential to be leaders in the organizations and communities where they work (CNA, 2008), including being leaders in initiating COPC to address childhood obesity. Through the implementation of COPC and supporting environmental changes, the NP provides leadership in the development and integration of the NP role within the health-care system (CRNBC, 2011).

**Considerations for Future Research**

Understanding that childhood obesity is a multi-factorial health issue, research can be directed at better understanding the impact of gender, biologic maturation, nutrition, physical activity levels, sociocultural milieu, built environments, ethnic background, biological factors, psychological factors and genetics on obesity and obesity-related health risk in the context of the Canadian population (Katzmarzyk, et al., 2007).

The evaluation of community-based environmental interventions is important for understanding the impact of these interventions. This includes the evaluation of eating and activity behaviors following community-based environmental changes in order to determine the effectiveness of these interventions. To date, relatively little evaluation evidence is available on the impact of social and environmental interventions for children and young people, particularly younger children under age 5. NPs can contribute to the dearth of evidence in this area through the evaluation of environmental interventions. Controlling for multiple variables could be a potential challenge in this
area of research.

Section Four: Recommendations for Practice

Recommendations for Nurse Practitioner Practice

In response to the research question, and upon reflection on the evidence presented in the reviewed literature, it is proposed that NPs can effectively foster less obesogenic environments, at a family and community level using COPC. This review offers several practice recommendations for NPs to use COPC to change obesogenic environments.

- NPs wanting to pursue the COPC model to foster less obesogenic environments could consider initiating a committee involving relevant stakeholder groups, such as public health, school administration, city administration, involved parents, and other primary care providers. A formal process could be established, consistent with the COPC model, starting with school and community assessments. Information and resources could be shared with other primary care providers on how to support families towards healthy active living (see Table 1 and Table 2). Evaluation tools and processes could be explored, such as tracking BMI measurements, and chronic disease indicators.

- It is recommended that NPs and primary care providers continue to screen for childhood obesity by plotting the child’s BMI at each periodic health exam starting from birth. Routine NP practice could incorporate asking about lifestyle choices, such as screen time, dietary choices as per the Canada Food Guide, and time spent being physically active/day (refer to Table 2). NPs can use this screening opportunity to offer health advice to families on healthy eating, physical activity, and sedentary behaviors.
• It is recommended that NPs collaborate and partner with other local health providers, such as physicians and public health nurses, offering resources and information, as needed, to screen for and work with families who are struggling with obesity. These resources include: The primary care pediatric tool kit by Hopkins et al. (2010) (Table 1); and Lipnowski and LeBlanc’s (2012) strategies to improve healthy active living (HAL) for children, adolescents and families (Table 2).

• It is recommended that NPs establish relationships with community partners and stakeholders responsible for school and community environments. This includes teachers, principals, school district administration, city counsel, city planners, and recreational facility administration. It is suggested that NPs ask to be invited onto school district meetings, social action planning city-planning meetings, and medical advisory meetings. NPs can use these opportunities to present the need for increased opportunities for physical activity and healthy diet options for children through their school and community environment.

• In collaboration with the school administration and public health nursing, NPs could consider developing and implementing a school wellness counsel, upon which an NP or public health nurse could have representation. It is recommended that NPs are aware of British Columbia Healthy Schools (Ministry of Education, 2012) and that NPs ensure that members of the school wellness counsel, the parent advisory counsel, and school staff are aware of recommendations and guidelines for British Columbia Healthy Schools, in order to take full advantage of intervention opportunities. Student representation is also encouraged on the school wellness counsel, to learn about student concerns and to develop grass-roots interventions that have the potential to
have better student 'buy-in'. This may have limitations at a preschool level, but involving the parent advisory counsel (PAC) is another alternative. An example of a possible intervention is to have the senior cooking class make breakfast for hungry students' twice/week.

- It is recommended that NPs initiate and coordinate a survey of the school and community to assess for obesogenic qualities and to understand community needs. This could mean: assessing school food and recreation options/policies; discussing neighborhood safety and crime rates with RCMP and parents; exploring recreational options and access (especially low-income families); assess pedestrian pathways and their safety; and explore possibilities for active transportation such as bike routes. Healthy eating opportunities should be explored also, which includes: assessing distances/access to grocery stores (especially for low-income families); quality and cost of healthy foods; and options for healthy foods (farmer’s markets, community gardens, food bank donations). Examples of other possible health promotion interventions are outlined in Table 3.

- NPs can be leaders in initiating environmental changes. a) NPs can lead agreements between local authorities and other partners to increase local physical activity levels. b) In schools, these strategies include establishing, and assisting to implement a ban on junk foods in schools and ensuring the preservation of recess and physical activity classes. NPs could explore opportunities to partner with local farmers and offer locally grown food in the cafeteria. Safe and active transportation to school/preschool, in addition to a minimum of 1.5 hours of schedule physical activity and free play during the day is encouraged. c) In the community, NPs can work with
urban planners to reduce environmental barriers to an active lifestyle through the construction of safe recreational facilities, parks, playgrounds, bicycle paths, sidewalks, and crosswalks. In the winter, this includes ensuring walkways are safe and accessible for pedestrians.

• NPs can encourage the reduction of barriers for low-income families to healthy eating and being active. Interventions include recommending the subsidization of passes to recreation facilities, recreational events, and encouraging healthy food donations to the food bank. NPs may consider exploring the opportunities for community gardens that are managed by volunteers and accessible to low-income families.

• NPs who want to initiate a COPC model of care in order to address the issue of obesogenic environments will need to consider logistics of time and cost. NPs will need to negotiate the structure of COPC with their employer, emphasizing the potential for long-term benefits appreciated through health promotion at a community level. The British Columbia government has revealed support for community health promotion, as seen in the IH strategic priorities (2012). NPs can speak to these priorities when negotiating with their employers for time allotment for community work. For example, NPs could negotiate for 70% primary care time and 30% community time, in order to use a COPC model effectively.

• Evaluation of these COPC interventions is essential because it substantiates COPC interventions, emphasizes program accountability, and reinforces continued fiscal support, ensuring the COPC programs are sustainable. Because of the long-term potential benefits of health promotion, in addition to the multiple contributing factors,
evaluation is often challenging. Outcomes will depend on what interventions have been implemented. For example, if there have been changes to the built environment such as more sidewalks, or safer bike routes through town, evaluation needs to measure uptake, like active transportation. Evaluation tools and resources are available through CDC’s Healthy Communities Program (2010). Measurable indicators reflecting a reduction in obesogenic environments could include: BMI of 5 year old children; measurement of chronic disease indicators (glucose tolerance/fasting blood glucose, dyslipidemia, blood pressure, and leptin levels); screen time in minutes/day; minutes/day spent being physically active (including preschool/preschool days), number of days/year using active transportation to get to school, or number of trips/year using active transportation (e.g. to school, activities, library, friend’s house, etc.); and percentage of “serve most” and “serve least” food choices available at school, as per the “Guidelines for Food and Beverage Sales in BC Schools” (Ministry of Education, 2010). Long-term evaluation could include the evaluation of trends in childhood obesity and associated chronic diseases in 5-year-old children. It should be noted that consistency in evaluation tools is important in order to glean accurate results (CDC, 2010). Long-term trends may be monitored in partnership between stakeholders including public health agencies, primary care providers, schools, city planners, and the Center for Disease Control.

Conclusion

Obesity remains a leading condition that is linked to morbidity and mortality worldwide (CDC, 2012) and it is, therefore, highly desirable to improve treatment and prevention of this condition. The impact of obesity points to the importance of
prevention through healthy behaviors, including increased physical activity and a healthy diet beginning early in life, ideally prior to the age of 4 (Klesges et al., 1995), and continuing through all stages of life (Klesges et al.). Both primary care providers and families meet health promotion efforts in primary care with feelings of futility (Story et al., 2002). This inability to affect major behavioral changes is due to the fact that childhood obesity is influenced by more than individual behavior, namely the negative influence of an obesogenic environment driven by the North American lifestyle. Therefore, interventions need to take on a broader approach, shifting blame away from individuals and encouraging responsibility and action through collaborative efforts of health care providers, school staff, community groups, city planners, and policy makers to reduce obesogenic environments.

COPC is an excellent model of intervention for reducing obesogenic environments at the family and community level. NPs can bridge the disintegration between health promotion efforts in primary care and public health, fostering and coordinating environmental changes. Working collaboratively, NPs complement rather than replace other health care providers (CNA, 2008), bridging the gap in primary and public health care services, and supporting the shift to wellness-based care. The uptake and implementation of COPC is a challenge that NPs can take a leadership role in. NPs who venture to implement COPC to reduce obesogenic environments must be passionate and patient in their leadership efforts to reduce childhood obesity.
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REDUCE OBESOGENIC ENVIRONMENTS


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Doi:10.1007/s11894-010-0116-1
REduce Obesogenic Environments


Table 1: Primary care provider tool kit for managing pediatric obesity

| 1. Screen for Childhood Obesity | 1. Calculate and plot BMI at every well child visit.  
2. Identify risk factors for obesity:  
a. Diet: Assess if breakfast is consumed daily, if meals are eaten primarily at home and with family, components of total dietary intake (snacks and meals). Use dietary recall or food diary.  
b. Exercise: Assess exercise routines including outside play, or organized sports/organizations, family involvement in activities, amount of activity completed at school.  
c. Sedentary Activity: Assess hours of screen time per day, including TV, computer, and games.  

| 2. Educate for Prevention | 1. Educate regarding complications of childhood obesity: include pathophysiological and psychosocial co-morbidities, adult sequelae, and mortality implications.  
2. Give recommendations:  
a. Dietary:  
   • Eat breakfast daily.  
   • Limit sugar sweetened beverages and fruit juices.  
   • Drink water and fat free milk.  
   • Eat a high fiber diet.  
   • Encourage family togetherness at meals.  
   • Involve child in preparation of meals.  
   • Limit fast foods and junk foods.  
   • Adhere to appropriate serving sizes.  
   • Follow U.S. Dept. of Agriculture recommendations.  
   • Encourage use of [www.mypynmid.gov](http://www.mypynmid.gov)  
b. Exercise:  
   • Participate in 60 minutes of physical activity.  
   • Activity may be divided up throughout the day.  
   • Incorporate enjoyable activity for compliance.  
   • Encourage family involvement in activities.  
c. Sedentary Behavior: Limit screen time to 2 hours or less each day.  

| 3. Goals | 1. For overweight children (BMI 85<sup>th</sup>–95<sup>th</sup> percentile) with no co-morbidities: goal is to stabilize current weight (prevent BMI increase).  
2. For overweight children with co-morbidities as well as obese children (BMI ≥ 95<sup>th</sup> percentile): goal is to begin weight reduction of 0.45 kg per month (if serious complications are present more aggressive weight loss may be attempted).  

| 4. Monitor and treat for co-morbidities | 1. If overweight without co-morbidities:  
Order fasting lipid levels.  
2. If overweight with co-morbidities or obese:  
Order fasting lipid, glucose, AST, ALT levels.  
3. Further investigation: Based on risk factors and physical exam findings.  

| 5. Initial Lifestyle Intervention | 1. Data acquisition (flow sheet):  
   • Diet/nutrition guidance/adherence  
   • Activity/exercise guidance/adherence  
   • Serial measurements of weight and BMI.  

2. Multidisciplinary support:  
   • Consult or refer to specialty clinics to provide the best treatment options for children with obesity.  
   • Consult or refer to specialists for support managing syndromes (e.g., Prader-Willi, T2DM, dyslipidemia).  

|
3. **Behavior Modification:**

   a. **Monitoring:**
      - Monitor with periodic evaluation at least every 3 months.
      - If managed solely by primary care, consider increasing monitoring frequency to monthly.
      - If weight loss, maintenance of target BMI, and improvement in comorbidities is successful, continue with current management and continued monitoring every 3 to 6 months.

   b. **Nutrition/Diet:**
      - Gradual decrease in caloric intake by decreasing saturated fats (30% of calories from fat; 50% from carbohydrates; 20% from protein).
      - Help identify triggers for overeating.
      - Use the Traffic-light Diet or My Pyramid.
      - Consult/refer with dietitian/nutritionist if available

   c. **Activity/Exercise:**
      - Implement a gradual increase in physical activity to create a negative energy balance.
      - Ensure 60 minutes of moderate to high intensity activity per day.
      - Restrict screen time to 2 hours or less per day.
      - Consult or refer with community exercise programs and resources (YMCA/YWCA, hospital, city/county recreation departments).

   d. **Psychosocial:**
      - Encourage social activities to promote success.
      - Reinforce importance of family involvement.
      - Consult or refer to mental health specialists as indicated
      - Offer encouragement and support
      - Incorporate positive reinforcement strategies
      - Adapt lifestyle modifications based on patient and family preferences and ability.

6. **Failed lifestyle intervention – pharmacologic therapy**

   **Pharmacologic Treatment:** Consider for obese children with comorbidities or those who have not responded to lifestyle modification after 6 months or more.
   - **Continue intense behavioral modifications during pharmacologic treatment.**
   - **Begin medication considering patient’s age and co-morbidities.**
     - **For those 12 years of age and older:**
       - Begin Orlistat 120 mg TID with intake of fat containing meals.
       - Instruct to take multivitamin with vitamins A, D, E, K, and beta carotene at least 2 hours before or after medication.
       - Warn regarding gastrointestinal symptoms.
       - Continue to monitor at periodic intervals of at least every 3 months.
       - Continue medication for up to 1 year if weight loss is occurring until adequate loss is achieved.
       - Watch for rebound effect when/if medication discontinued.

(Hopkins et al., 2010).
Table 2: Strategies to improve healthy active living (HAL) for children, adolescents and families

<table>
<thead>
<tr>
<th>Reducing sedentary activities</th>
<th>Increasing physical activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counsel families to remove television sets and computers from bedrooms</td>
<td>Create individual PA prescriptions:</td>
</tr>
<tr>
<td></td>
<td>• CPS Prescription for Healthy Active Kids</td>
</tr>
<tr>
<td></td>
<td>• CPS Healthy Active Living: Quick Reference Sheet</td>
</tr>
<tr>
<td>Counsel families to avoid eating in front of the TV</td>
<td>Post photos or posters demonstrating:</td>
</tr>
<tr>
<td></td>
<td>• families eating together without TV</td>
</tr>
<tr>
<td></td>
<td>• children involved in active play/dancing during TV shows</td>
</tr>
<tr>
<td>Encourage families to replace screen time (TV, computer games, interactive cell phones, internet browsing, chat lines and related social media) with PA</td>
<td>Determine child/adolescent access to free play, sports, and high quality school PE. Provide current information about local activities for families, community events, or recreational programs</td>
</tr>
<tr>
<td>Counsel families to avoid sitting for prolonged periods of time and to increase active transportation</td>
<td>Increase incidental movement:</td>
</tr>
<tr>
<td></td>
<td>• Take breaks from sedentary activities</td>
</tr>
<tr>
<td></td>
<td>• Avoid sitting for prolonged periods</td>
</tr>
<tr>
<td></td>
<td>• Walk throughout the day</td>
</tr>
<tr>
<td></td>
<td>• Take the stairs</td>
</tr>
<tr>
<td>Suggest families engage in games promoting PA rather than computer games</td>
<td>Provide educational information in waiting rooms:</td>
</tr>
<tr>
<td></td>
<td>• CPS HAL pamphlets</td>
</tr>
<tr>
<td></td>
<td>• Canada's PA Guidelines</td>
</tr>
<tr>
<td></td>
<td>• Active Healthy Kids Canada</td>
</tr>
<tr>
<td></td>
<td>• ParticipACTION</td>
</tr>
<tr>
<td></td>
<td>• Pedometers and exergaming</td>
</tr>
<tr>
<td>Engage families to mentor young children so they can develop suitable PA skills</td>
<td>Encourage inviting an older child to motivate a younger one to adopt recreational PA or sport</td>
</tr>
<tr>
<td>Empower overweight child/adolescent to replace sedentary time with PA</td>
<td>Offer physically inactive or overweight child/adolescent activities which they may prefer:</td>
</tr>
<tr>
<td></td>
<td>• Water-based sports</td>
</tr>
<tr>
<td></td>
<td>• Strength training</td>
</tr>
<tr>
<td></td>
<td>• Less focus on competition</td>
</tr>
</tbody>
</table>

PA physical activity; CPS Canadian Paediatric Society; HAL Healthy active living (Lipnowski & LeBlanc; CPS, 2012).
Table 3: K-GFYL health promotion activities implemented in settings K-GFYL

<table>
<thead>
<tr>
<th>Water and sweet drinks</th>
<th>Children have access to water throughout the day (water bottles, jugs and fountains)</th>
<th>Sweet drinks are restricted or not allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having access to drinking water is reflected in school/service policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defined periods of time when students/children are encouraged to eat fruit and vegetables only (e.g. Fruit &amp; Veg play lunch, fruit break)</td>
<td>School/service policy that includes a fruit break</td>
<td>Information is provided to parents about healthy lunches and snacks</td>
</tr>
<tr>
<td>Special days to promote fruit and vegetables such as: Free Fruit Fridays, nude food days (e.g. no packaged snacks), apple slinky days</td>
<td>Students/children are involved in activities to grow and cook food</td>
<td>Staff role modeling healthy eating and drinking practices</td>
</tr>
<tr>
<td>Establishing links with local fruit and vegetable retailers</td>
<td>Food is not used as a reward, incentive or for comfort</td>
<td></td>
</tr>
<tr>
<td>Fruit and Vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unhealthy food and drinks</td>
<td>The school/service policy restricts unhealthy and promotes healthy foods and drinks</td>
<td>The food service provides foods consistent with healthy eating guidelines and government policy</td>
</tr>
<tr>
<td>Fundraising is consistent with healthy eating guidelines and policies</td>
<td>Established partnerships with local community and physical activity organizations</td>
<td>Structured and free active play sessions are planned on a daily basis</td>
</tr>
<tr>
<td>Professional development opportunities for staff</td>
<td>Structural equipment (e.g. sandpit, fixed play equipment) is available for all students</td>
<td>Classroom programs encourage physical activity during break time for all students</td>
</tr>
<tr>
<td>Children have at least 30 minutes of structured active play and at least 60 minutes (and up to several hours) of unstructured play during their care session</td>
<td>Physical activity/active play policies are implemented</td>
<td>Restrictions on screen-based activities (e.g. TV, DVDs, computers)Parents are provided with information about screen time recommendations for children and children's physical activity</td>
</tr>
<tr>
<td>Staff role model being physically active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safe and Active</td>
<td>Promotion of walking/riding to school or other places zone/term</td>
<td></td>
</tr>
<tr>
<td>Transport Available bike storage for student and staff</td>
<td>Child cyclist and pedestrian safety program</td>
<td>Traffic calming measures outside the school/service</td>
</tr>
<tr>
<td>Curriculum and Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole school/service approach to healthy eating and physical activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parents/carers are provided with information about the healthy eating and physical activity policy requirements and/or copies of the policies</td>
<td>Information sessions/workshops for parents on healthy eating and physical activity</td>
<td></td>
</tr>
</tbody>
</table>

de Silva-Sanigorski et al. (2010).
**Table 4: Community Health Assessment and Group Evaluation (CHANGE) List of Questions**

### Demographic

1. Number of staff: fewer than 20, 20 – 99, 100 – 249, 250 – 499, 500 – 999, 1,000 – 1,499, 1,500+
2. Type of health care organization: medical/physician office, clinic, hospital, ambulatory care, home health agency, Health Maintenance Organization (HMO), local health department, Federally Qualified Health Center (FQHC), other
3. Number of patients: average number of patients on monthly basis
4. Sector type: private, public
5. Profit type: for-profit, not-for-profit

### Physical Activity

To what extent does the health care facility:

1. Promote stairwell use (e.g., make stairs appealing, post motivational signs near stairs to encourage physical activity) to patients, visitors, and staff?
2. Assess patients’ physical activity as part of a written checklist or screening used in all routine office visits?
3. Provide regular counseling about the health value of physical activity during all routine office visits?
4. Implement a referral system to help patients’ access community-based resources or services for physical activity?

### Nutrition

To what extent does the health care facility:

1. Implement breastfeeding initiative for future or current moms?
2. Assess patients’ nutrition as part of a written checklist or screening used in all routine office visits?
3. Provide regular counseling about the health value of good nutrition during all routine office visits?
4. Provide free or low cost weight management or nutrition programs?
5. Implement a referral system to help patients to access community-based resources or services for nutrition?
6. Institute healthy food and beverage options in vending machines?
7. Institute healthy food and beverage options served to their patients?
8. Institute healthy food and beverage options in the onsite cafeteria and food venues?
9. Institute pricing strategies that encourage the purchase of healthy food and beverage options?
10. Institute healthy food purchasing (e.g., to reduce the caloric, sodium, and fat content of foods offered) for cafeteria and onsite food venues?
11. Institute healthy food preparation practices (e.g., steaming, low fat, low salt, limiting frying) in onsite cafeteria and food venues?
12. Institute nutritional labeling (e.g., ‘low fat,’ ‘light,’ ‘heart healthy,’ ‘no trans fat’) at the onsite cafeteria and food venues?
13. Ban marketing (e.g., counter advertisements, posters, other print materials) of less than healthy foods and beverages onsite?
14. Provide smaller portion sizes in onsite cafeteria and food venues?

### Tobacco

To what extent does the health care facility:

1. Institute a smoke-free policy 24/7 for indoor public places?
2. Institute a tobacco-free policy 24/7 for indoor public places?
3. Institute a smoke-free policy 24/7 for outdoor public places?
4. Institute a tobacco-free policy 24/7 for outdoor public places?
5. Assess patients’ tobacco use as part of written checklist or screening used in all routine office visits?
6. Assess patients’ exposure to tobacco smoke as part of written checklist or screening used in all routine office visits?
7. Provide advice and counseling about the harm of tobacco use and exposure during all office visits?
8. Implement a referral system to help patients to access tobacco cessation resources and services, such as a quitline (e.g., 1-800-QUIT-NOW)?
9. Provide access to free or low cost pharmacological quitting aids for their patients?
10. Implement a provider-reminder system to assess, advise, track, and monitor tobacco use?

### Chronic Disease Management
To what extent does the health care facility:

1. Implement a referral system to help patients to access community-based resources or services for chronic disease management?
2. Provide routine follow-up counseling and education to patients to help address chronic diseases and related risk factors (e.g., poor nutrition, physical inactivity, hypertension, high cholesterol, elevated blood sugar levels, tobacco use and exposure)?
3. Provide screening for chronic diseases in adults with risk factors (e.g., poor nutrition, physical inactivity, hypertension, high cholesterol, elevated blood sugar levels, tobacco use and exposure)?
4. Measure weight and height, and calculate appropriate body mass index (BMI) for every patient at each visit?
5. Adopt a plan or process to increase patient adherence to chronic disease (e.g., cardiovascular disease, diabetes) treatment?
6. Institute a systematic approach to the processes of diabetes care?
7. Institute the latest emergency heart disease and stroke treatment guidelines (e.g., Joint National Committee 7, American Heart Association)?
8. Provide access to resources and training for using a stroke rating scale?
9. Provide specialized stroke care units?
10. Provide specialized heart disease units?

Leadership

To what extent does the health care facility:

1. Participate in community coalitions and partnerships (e.g., food policy council, tobacco-free partnership, neighborhood safety coalition) to address chronic diseases and related risk factors (e.g., poor nutrition, physical inactivity, tobacco use and exposure)?
2. Participate in the public policy process to highlight the need for community changes to address chronic diseases and related risk factors (e.g., poor nutrition, physical inactivity, tobacco use and exposure)?
3. Enhance access to childhood overweight prevention and treatment services to reduce health disparities?
4. Promote high standards of modifiable risk factor (e.g., poor nutrition, physical inactivity, tobacco use and exposure) practice to healthcare and provider associations?
5. Institute standardized treatment and prevention protocols that are consistent with national evidence-based guidelines to prevent heart disease, stroke, and related risk factors?

74 75 Institute an electronic medical records system and patient data registries to provide immediate feedback on a patient's condition and compliance with the treatment regimen?

1. Institute an electronic medical records system and patient data registries to provide immediate feedback on a patient's condition and compliance with the treatment regimen?
2. Adopt the Chronic Care Model in hospitals?
3. Provide patient services using provider care teams that cross specialties (e.g., physician/ pharmacist teams)?
4. Provide access to medical services outside of regular working hours (e.g., late evenings, weekends)?
5. Promote collaboration between health care professionals (e.g., physicians and specialists) for managing chronic diseases (e.g., cardiovascular disease, diabetes)?
6. Partner with community agencies to provide free or low cost chronic disease health screenings, follow-up counseling, and education for those at risk?
7. Institute annual cultural competence training for all health workers for optimal care of all patients (regardless of their race/ethnicity, culture, or background)?

CDC Healthy Communities Program (2010).